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AGENDA

ROCKWALL CITY COUNCIL REGULAR MEETING

Monday, October 21, 2019 - 5:00 PM

City Hall Council Chambers - 385 S. Goliad St., Rockwall, TX 75087

I. CALL PUBLIC MEETING TO ORDER

II. EXECUTIVE SESSION.

THE CITY OF ROCKWALL CITY COUNCIL WILL RECESS INTO EXECUTIVE SESSION TO DISCUSS THE FOLLOWING MATTERS AS AUTHORIZED BY CHAPTER 551 OF THE TEXAS GOVERNMENT CODE:

1. Discuss the Texas State Soil and Water Conservation Board Dam Improvement Program. Section 551.071 (Consultation with Attorney).
2. Discuss contract negotiations with wholesale utility customers pursuant to Section 551.071 (Consultation with Attorney).
3. Discussion regarding TXDOT program for exchange of right-of-way pursuant to Section §551.072 (Real Property) and Section §551.071 (Consultation with Attorney).
4. Discussion regarding legal issues pertaining to potential annexation/development in the Extraterritorial Jurisdiction (ETJ) pursuant to Section §551.071 (Attorney/Client Consultation).
5. Discussion regarding possible sale/purchase/lease of real property in the vicinity of downtown, pursuant to Section §551.072 (Real Property) and Section §551.071 (Consultation with Attorney).
6. Discussion regarding sale/exchange of real property in the vicinity of John King Boulevard pursuant to Section §551.072 (Real Property) and Section §551.071 (Consultation with Attorney).
7. Discussion regarding appointments to city regulatory boards, commissions, and committees - specifically the Board of Adjustments - pursuant to Section 551.074 (Personnel Matters)
8. Discussion regarding the appeal to the Public Utility Commission filed by the cities of Garland, Mesquite, Plano and Richardson against the North Texas Municipal Water District (NTMWD) regarding water rates pursuant to Section §551.071 (Consultation with Attorney)

III. ADJOURN EXECUTIVE SESSION

IV. RECONVENE PUBLIC MEETING (6:00 P.M.)

V. INVOCATION AND PLEDGE OF ALLEGIANCE – COUNCILMEMBER JOHANNSEN

VI. PROCLAMATIONS

pg.8 **1.** Domestic Violence Awareness Month

pg.10 **2.** First Presbyterian Church of Rockwall Day

pg.12 **3.** National Community Planning Month

pg.14 **4.** Texas Chamber of Commerce Week

VII. OPEN FORUM

VIII. TAKE ANY ACTION AS A RESULT OF EXECUTIVE SESSION

IX. CONSENT AGENDA

pg.16 **1.** Consider approval of the minutes from the October 7, 2019 regular city council meeting, and take any action necessary.

pg.26 **2.** Consider approving cooperative purchasing agreement with the City of Cleburne and authorizing the City Manager to execute the Interlocal Cooperative Agreement, and take any action necessary.

pg.31 **3.** Consider approving cooperative purchasing agreement with the City of Royse City and authorizing the City Manager to execute the Interlocal Cooperative Agreement, and take any action necessary.

pg.36 **4.** Consider awarding a bid to Musco Sports Lighting and authorizing the City Manager to execute a Purchase Order for adding lights at the Myers Park Pickle Ball Court in the amount of $42,612 to be funded out of General Fund Reserves, and take any action necessary.

pg.38 **5.** Consider awarding a bid to Caldwell Country Chevrolet and Rockdale Country Ford and authorizing the City Manager to execute Purchase Orders for new 2020 model vehicles in the amount of $301,502 to be funded out of General Fund Reserves and Water Sewer Fund, and take any action necessary.

pg.40 **6.** Consider authorizing the City Manager to execute a maintenance and services agreement with RLC Controls, Inc. for the 2020 fiscal year to provide maintenance and service for Supervisory Control and Data Acquisition computer systems (SCADA) for the Water, Wastewater, and Street Divisions of Public Works, to be funded by the 2019-2020 budget, and take any action necessary.

X. APPOINTMENT ITEMS

1. Appointment with the Planning and Zoning Chairman to discuss and answer any questions regarding cases on the agenda and related issues and take any action necessary.

XI. PUBLIC HEARING ITEMS

pg.46 **1.** **MIS2019-001** - Hold a public hearing to discuss and consider approval of an **ordinance** adopting updated impact fees for water, wastewater, and roadway facilities by updating the land use assumptions and capital improvement plans for such facilities, establishing updated service areas for such facilities, providing definitions, providing for collection and assessment, and take any action necessary. **(1st Reading)**

pg.302 **2.** **Z2019-021** - Hold a public hearing to discuss and consider a request by Pat Atkins of KPA Consulting, Inc. on behalf of the owners Gwen Reed, Saddle Star South Holdings, LLC, and CDT Rockwall/2017, LLC for the approval of an **ordinance** for a zoning amendment to Planned Development District 79 (PD-79) [Ordinance No. 16-39] for the purpose of amending the development standards and concept plan on a 70.408-acre tract of land identified as Tracts

1, 1-03, 1-5 & 2-03 of the P. B. Harrison Survey, Abstract No. 97, City of Rockwall, Rockwall County, Texas, zoned Planned Development District 79 (PD-79) for Single-Family 8.4 (SF-8.4) District land uses, situated within the SH-205 By-Pass Overlay (SH-205 BY-OV) District, located on the north side of John King Boulevard south of Featherstone Drive, and take any action necessary **(1st Reading).**

pg.335 **3.** **Z2019-022** - Hold a public hearing to discuss and consider a request by Marty Wright for the approval of an **ordinance** for a Specific Use Permit (SUP) allowing an accessory building on a one (1) acre tract of land identified as Lot 10, Block B, Saddlebrook Estates #2 Addition, City of Rockwall, Rockwall County, Texas, zoned Single-Family 16 (SF-16) District, addressed as 2340 Saddlebrook Lane, and take any action necessary **(1st Reading).**

pg.375 **4.** **Z2019-024** - Hold a public hearing to discuss and consider a request by Adam Buczek of Stone Creek Balance, LTD for the approval of an **ordinance** for a zoning amendment to Planned Development District 70 (PD-70) for the purpose of changing the number of hard-edged retention ponds required for the residential subdivision being a ~336.00-acre tract of land identified as the Stone Creek Subdivision and being situated within the W. T. Deweese Survey, Abstract No. 71 and the S. King Survey, Abstract No 131, City of Rockwall, Rockwall County, Texas, zoned Planned Development District 70 (PD-70) for Single-Family 10 (SF-10) District land uses, situated within the North SH-205 Overlay (N. SH-205 OV) and SH-205 By-Pass Overlay (SH-205 BY-OV) Districts, generally located at the southeast corner of the intersection of FM-552 and SH-205 [N. Goliad Street], and take any action necessary **(1st Reading).**

XII. ACTION ITEMS

pg.499 **1.** Discuss and consider a request for a variance from the sign separation requirement for a new monument sign to be located at 1306 Summer Lee Drive, and take any action necessary.

pg.507 **2.** Discuss and consider (re)appointments to the city's Airport Advisory Board, Historic Preservation Advisory Board, and Park Board, and take any action necessary.

pg.509 **3.** Discuss and consider trends in water consumption, and take any action necessary.

pg.511 **4.** Discuss and consider appointing a Comprehensive Plan Advisory Committee (CPAC) to assist staff in the annual update to the Comprehensive Plan, and take any action necessary.

pg.521 **5.** Discuss and consider approval of an **ordinance** amending the Rockwall Code of Ordinances in Chapter 38. Subdivisions; Article I. In General; Sec. 38-23 Standards for Design of Developments within Subdivisions Adopted to reflect the 2016 update to these standards, and take any action necessary. **[1st reading]**

XIII. EXECUTIVE SESSION

THE CITY OF ROCKWALL CITY COUNCIL WILL RECESS INTO EXECUTIVE SESSION TO DISCUSS THE FOLLOWING MATTERS AS AUTHORIZED BY CHAPTER 551 OF THE TEXAS GOVERNMENT CODE:

1. Discuss the Texas State Soil and Water Conservation Board Dam Improvement Program. Section 551.071 (Consultation with Attorney).
2. Discuss contract negotiations with wholesale utility customers pursuant to Section 551.071 (Consultation with Attorney).
3. Discussion regarding TXDOT program for exchange of right-of-way pursuant to Section §551.072 (Real Property) and Section §551.071 (Consultation with Attorney).
4. Discussion regarding legal issues pertaining to potential annexation/development in the Extraterritorial Jurisdiction (ETJ) pursuant to Section §551.071 (Attorney/Client Consultation).
5. Discussion regarding possible sale/purchase/lease of real property in the vicinity of downtown, pursuant to Section §551.072 (Real Property) and Section §551.071 (Consultation with Attorney).
6. Discussion regarding sale/exchange of real property in the vicinity of John King Boulevard pursuant to Section §551.072 (Real Property) and Section §551.071 (Consultation with Attorney).
7. Discussion regarding appointments to city regulatory boards, commissions, and committees - specifically the Board of Adjustments - pursuant to Section 551.074 (Personnel Matters)
8. Discussion regarding the appeal to the Public Utility Commission filed by the cities of Garland, Mesquite, Plano and Richardson against the North Texas Municipal Water District (NTMWD) regarding water rates pursuant to Section §551.071 (Consultation with Attorney)

XIV. RECONVENE PUBLIC MEETING & TAKE ANY ACTION AS RESULT OF EXECUTIVE SESSION

XV. ADJOURNMENT

This facility is wheelchair accessible and accessible parking spaces are available. Request for accommodations or interpretive services must be made 48 hours prior to this meeting. Please contact the City Secretary's Office at (972) 771-7700 or FAX (972) 771-7727 for further information.

The City of Rockwall City Council reserves the right to adjourn into executive session at any time to discuss any of the matters listed on the agenda above, as authorized by Texas Government Code § 551.071 (Consultation with Attorney) § 551.072 (Deliberations about Real Property) § 551.074 (Personnel Matters) and § 551.087 (Economic Development)

I, Kristy Cole, City Secretary for the City of Rockwall, Texas, do hereby certify that this Agenda was posted at City Hall, in a place readily accessible to the general public at all times, on the **18th** day of **October,** 2019 at 4:00 p.m. and remained so posted for at least 72 continuous hours preceding the scheduled time of said meeting.

_____ _____

Kristy Cole, City Secretary
or Margaret Delaney, Asst. to the City Sect.

Date Removed

Rockwall, Texas

Proclamation

Whereas, according to the National Coalition Against Domestic Violence:

- A woman is assaulted or beaten every 9 seconds in the U.S., an average of 20 people are physically abused by intimate partners every minute, and there are more than 10 million abuse victims annually;
- One in 3 women and 1 in 4 men has been physically abused by an intimate partner, with 1 in 5 women and 1 in 7 men having been severely physically abused;
- On a typical day, domestic violence hotlines, nationwide, receive about 20,000 calls;
- Twenty-one to 60% of victims lose their job due to reasons stemming from abuse; and

Whereas, domestic violence is prevalent in every community, affecting people regardless of age, socioeconomic status, sexual orientation, gender, race or nationality; and

Whereas, those who are abused often do not leave the abusive relationship for many reasons, such as fear that the abuser's violent behavior will escalate if he or she tries to leave; the belief or hope that the abuser may change; the victim is financially dependent on the abuser; or religious or cultural beliefs prevent the person from leaving; and

Whereas, domestic violence can result in physical injury, mental trauma, and even death, with children often becoming victimized as well.

Now, Therefore, I, Jim Pruitt, Mayor of the City of Rockwall, Texas, do hereby proclaim the month of **October** as **Domestic Violence Awareness Month** in the City of Rockwall encouraging all citizens to help raise awareness about domestic violence in our community and support organizations that aim to eradicate this crime and assist those who are affected.

In Witness Whereof, I hereunto set my hand and official seal this 21st day of October, 2019.

Jim Pruitt, Mayor

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Rockwall, Texas

Proclamation

Whereas, First Presbyterian Church of Rockwall has been a vital part of Rockwall since both the community and the church were founded 165 years ago in 1854; and

Whereas, First Presbyterian Church of Rockwall has been actively serving God by serving our neighbors in the County since November 7 of that year; and

Whereas, for 165 years, First Presbyterian Church of Rockwall has consistently contributed to the spiritual growth and physical and emotional well-being of the greater community by supporting numerous organizations within Rockwall and beyond; and

Whereas, First Presbyterian Church of Rockwall was instrumental in the founding of and ongoing support of Rockwall County Helping Hands; and

Whereas, First Presbyterian Church of Rockwall embraces as its call to help people "*Feel* the Love. *Be* the Love," and its members continue to reach out to the community so that all may feel the love of God in Christ and have the opportunity to be God's love for others.

Now, Therefor, I, Jim Pruitt, Mayor of the City of Rockwall, Texas, do hereby proclaim November 7, 2019 as:

FIRST PRESBYTERIAN CHURCH OF ROCKWALL DAY

in the City of Rockwall, and express our most sincere appreciation for the valuable contributions of First Presbyterian Church of Rockwall to our community and encourage others to "*Feel* the love. *Be* the love." on this day and every day.

In Witness Whereof, I hereunto affix my hand and official seal this 21st day of October, 2019.

Jim Pruitt, Mayor

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Rockwall, Texas

Proclamation

Whereas, change is constant and affects all cities, towns, suburbs, counties, boroughs, townships, rural areas, and other places; and

Whereas, community planning and planners can help manage this change in a way that provides better choices for how people work, live, and play; and

Whereas, community planning provides an opportunity for all residents to be equally involved in making choices that determine the shared-vision of their neighborhoods; and

Whereas, the full benefits of planning requires public officials and citizens who understand, support, and demand excellence in planning and plan implementation; and

Whereas, the month of October is designated as National Community Planning Month throughout the United States of America and its territories; and

Whereas, the American Planning Association and its professional institute, the American Institute of Certified Planners, annually endorse National Community Planning Month as an opportunity to highlight the contributions sound planning and plan implementation make to the quality of our neighborhoods and environment; and

Whereas, this month, we would like to publicly recognize the participation and dedication of the members of our planning-related commissions and other citizen planners who contribute their time and expertise to the improvement of the City of Rockwall.

Now, Therefore, I, Jim Pruitt, Mayor of the City of Rockwall, Texas, do hereby proclaim **October 2019** as:

APA National Community Planning Month

In the City of Rockwall and urge all citizens to join me in recognizing the many valuable contributions made by both the professional planners of the City and by our many volunteers and extend our heartfelt thanks for the continued commitment to public service by these individuals.

In Witness Whereof, I hereby affix my official hand and seal this 21st day of October, 2019.

Jim Pruitt, Mayor

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Rockwall, Texas

Proclamation

Whereas, Chambers of Commerce work with area industry, businesses, and merchants to advance the civic, economic, industrial, professional, and cultural life of cities; and

Whereas, Chambers of Commerce were first chartered by the Republic of Texas in 1840 and have contributed to the civic and economic life of Texas for 179 years; and

Whereas, this year marks the 90th anniversary of the Rockwall Area Chamber of Commerce and the 113th Anniversary of the Texas Association of Chamber of Commerce Executives, the state's longest standing association of Chamber professionals in the nation; and

Whereas, the Rockwall Area Chamber of Commerce, founded in 1929, is the leading broad-based business organization that serves as a unified voice for area business; and

Whereas, Chambers of Commerce encourage the growth of existing industries, services, and commercial firms and encourage new businesses and individuals to locate in Rockwall, acting as a liaison with the State of Texas, City and County of Rockwall, schools and business community; and

Whereas, Chambers of Commerce remain strong, viable organizations of professionals throughout the nation; and

Whereas, Chambers of Commerce provide guidance and leadership to communities across the state and serve as a career development organization for chamber of commerce professionals.

Now, Therefore, I, Jim Pruitt, Mayor of the City of Rockwall, Texas, do hereby proclaim October 14 - 18 as

Chamber of Commerce Week

in the City of Rockwall and encourage all citizens to recognize and applaud this organization for its many professional endeavors which benefit our city and beyond.

In Witness Whereof, I hereunto set my hand and official seal this 14th day of Oct., 2019.

Jim Pruitt, Mayor

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MINUTES

ROCKWALL CITY COUNCIL REGULAR MEETING
Monday, October 07, 2019 - 4:00 PM
City Hall Council Chambers - 385 S. Goliad St., Rockwall, TX 75087

I. CALL PUBLIC MEETING TO ORDER

Mayor Pruitt called the public meeting to order at 4:00 p.m. Present were Mayor Jim Pruitt, Mayor Pro Tem Dana Macalik, and Councilmembers Patrick Trowbridge, John Hohenshelt, Kevin Fowler, Bennie Daniels, and Trace Johannesen. Also present were City Manager Rick Crowley, Assistant City Managers Mary Smith and Joey Boyd and City Attorney Frank Garza.

II. WORK SESSION

1. Hold work session with city attorney to hear briefing regarding recently passed state legislation impacting cities.

City Attorney Frank Garza briefed the Council on various pieces of recently passed legislation that impact cities.

2. Hold Work Session to discuss flag pole entry feature on IH-30

City Councilman Bennie Daniels came forth and provided background information pertaining to this agenda item. He explained that this idea was birthed as a result of a discussion he had over two years ago with a local veteran, former FBI agent and resident, David Cutcomb. In late 2018, Councilmember Johannesen and John Adams, both of whom are members of the local American Legion Auxiliary, were asked to join the efforts. Councilman Daniels further explained that the purpose of this flag being placed in a prominent location is to send the message that the City of Rockwall is proud of the United States of America. Assistant City Manager Joey Boyd then came forth and shared with the Council three, separate possible locations for placement of a 200' flagpole that will display the American flag. Indication was given that the initial project would consist of the flagpole, flag and lighting but not landscaping. The funding would come out of General Fund Reserves. The options considered by the group included the following (along with associated budget estimates):

150' Flagpole with installation: $57,750
170' Flagpole with installation: $76,114
180' Flagpole with installation: $98,340
195/200' Flagpole with installation: $113,340

Mr. Boyd explained that the planning committee is seeking direction as to if the City Council approves of the concept of the entry feature, a confirmation of the 3rd site being the preferred site, and authorization to further study the site by performing a geotechnical study to get a soil report for base design. Based on the geotechnical report, a structural engineering firm will perform foundation design

and provide a rendering to submit to TXDOT for approval. The design will be performed and stamped by a structural engineer. The cost for the geotechnical study and report is $3,500 and base design is $1,200. In addition, an FAA Study will be required due to the location of the site being within 7 nautical miles of an airport. The study is free but can take up to 12 weeks to complete. This can be written authorization from the State and while geotechnical and flagpole base design is being performed for the site.

Mr. Boyd also shared that the ongoing costs is estimated at $3000 - $6000 annually for flags and a replacement flag. Council generally gave indication that they desire for Councilman Daniels and staff to go ahead and move forward with the next steps of the project, which is expected to cost no more than $8,000.

3. Hold work session to hear updates to the Engineering Department's "Standards of Design and Construction" and receive City Council input prior to adoption.

City Engineer Amy Williams briefed the Council on the updated design standards, which are quite lengthy and were included in council members' informational meeting packet. Following brief comments, Council generally gave its blessing for staff to move forward by bringing the proposed standards back to Council at a future meeting for formal action.

Mayor Pruitt then read the below listed discussion items into the public record before recessing the meeting to go into Executive Session at 4:52 p.m.

III. EXECUTIVE SESSION.

THE CITY OF ROCKWALL CITY COUNCIL WILL RECESS INTO EXECUTIVE SESSION TO DISCUSS THE FOLLOWING MATTERS AS AUTHORIZED BY CHAPTER 551 OF THE TEXAS GOVERNMENT CODE:

1. Discussion regarding legal issues pertaining to potential annexation pursuant to Section §551.071 (Attorney/Client Consultation).
2. Discussion regarding legal matters pertaining to Breezy Hill pavilion pursuant to Section 551.071 (Consultation with Attorney).
3. Discussion regarding City Manager employee evaluation, pursuant to Section 551.074 (Personnel Matters)
4. Discussion regarding sale of real property in the vicinity of IH-30 pursuant to Section §551.072 (Real Property) and Section §551.071 (Consultation with Attorney).
5. Discussion regarding sale of real property in the vicinity of John King Boulevard pursuant to Section §551.072 (Real Property) and Section §551.071 (Consultation with Attorney).
6. Discussion regarding legal issues pertaining to a Facilities Agreement pursuant to Section §551.071 (Attorney/Client Consultation).
7. Discussion regarding ballot nominations associated with elections to the Rockwall Central Appraisal District Board pursuant to Section 551.074 (personnel matters)
8. Discussion regarding appointments to city regulatory boards, commissions, and committees - specifically the Board of Adjustments - pursuant to Section 551.074 (Personnel Matters)
9. Discussion regarding the appeal to the Public Utility Commission filed by the cities of Garland, Mesquite, Plano and Richardson against the North Texas Municipal Water District (NTMWD) regarding water rates pursuant to Section §551.071 (Consultation with Attorney)

IV. Adjourn Executive Session

Council adjourned from Executive Session at 5:56 p.m.

V. Reconvene Public Meeting (6:00 p.m.)

Mayor Pruitt reconvened the public meeting at 6:00 p.m. with all seven council members present.

VI. Take Any Action as a Result of Executive Session

Council took no action as a result of Executive Session.

VII. Invocation and Pledge of Allegiance – Councilmember Fowler

Councilmember Fowler delivered the invocation and led the Pledge of Allegiance.

VIII. Proclamations

1. Fire Prevention Month

Mayor Pruitt read the proclamation for Fire Prevention Month. Fire Chief, Kenneth Cullins indicated that the Fire Department will host its annual Open House this Saturday at Fire Station #2 behind the Kroger on the South side of the city. He shared that there will be bounce houses, food and fun, and he invited and encouraged everyone to attend.

2. Rockwall Fire Dept. Presentation of Life Saving Award to Tyra Winters

Mayor Pruitt, Fire Chief Cullins and Assistant Fire Chief, Brett Merritt presented Tyra with a Life Saving Award, recognizing her heroic efforts related to recently dislodging a piece of candy from the throat of a small child who was choking during the RHS homecoming parade. Tyra introduced her family, sharing that she learned this lifesaving technique after a classmate was choking on a granola bar in 8th grade, and she – at the time – did not know what to do to help. Thereafter, her mother got her trained in CPR and the Heimlich maneuver. She thanked her family for its support.

IX. Open Forum

Mayor Pruitt explained how Open Forum is conducted and asked if anyone would like to come forth and speak at this time.

Dennis Denney
162 Meadowlark Circle
Rockwall, TX 75087

Mr. Denney came forth to speak about the planned RV park on Cornelious Road (located outside the city limits, in the county). He expressed various concerns associated with this proposed development, including environmental concerns such as water run off and the development being solely on septic.

There being no one else wishing to come forth and speak, Mayor Pruitt then closed Open Forum.

X. CONSENT AGENDA

1. Consider approval of the minutes from the September 16, 2019 regular city council meeting, and take any action necessary.
2. **Z2019-018** - Consider a request by Rob Whittle for the approval of an **ordinance** amending Planned Development District 5 (PD-5) to change the garage setback requirements for an 11.003-acre tract of land identified as Lots 1-40, Block A, the Highlands Addition, City of Rockwall, Rockwall County, Texas, zoned Planned Development District 5 (PD-5) for Zero Lot Line (ZL-5) District land uses, situated within the SH-205 By-Pass Overlay (SH-205 BY OV) District, located at the northwest corner of the intersection of SH-66 and FM-1141, and take any action necessary **(2nd Reading).**
3. **Z2019-020** - Consider a request by Todd Panzner for the approval of an **ordinance** for a zoning change from an Agricultural (AG) District to a Commercial (C) District for a 11.85-acre tract of land identified as Tract 1-1 of the J. H. Bailey Survey, Abstract No. 22, City of Rockwall, Rockwall County, Texas, zoned Agricultural (AG) District, situated within the SH-276 Overlay (SH-276 OV) District, generally located south of the intersection of Green Circle and SH-276, and take any action necessary **(2nd Reading).**
4. Consider awarding a bid to All Seasons Foam Coatings and authorizing the City Manager to execute a Contract for a new Liner for the Harbor Fountain in the amount of $142,500 to be funded out of General Fund Reserves, and take any action necessary.
5. Consider awarding a bid to B&B Concrete and authorizing the City Manager to execute a Contract for the removal and replacement of 4,200 sf of concrete trail at Myers Park in the amount of $59,600 to be funded out of the Recreation Development Fund, and take any action necessary.
6. **P2019-037** - Consider a request by Dub Douphrate of Douphrate & Associates, Inc. on behalf of Carla Rankin Real Estate Holding for the approval of a final plat for Lot 1, Block A, Rankin Addition being a 0.29-acre tract of land identified as Tract 22 of the J. Strickland Survey, Abstract No. 187, City of Rockwall, Rockwall County, Texas, zoned Residential Office (RO) District, situated within the North SH-205 Overlay (N. SH-205 OV) District, addressed as 4035 N. Goliad Street [SH-205], and take any action necessary.
7. **P2019-038** - Consider a request by Bryon Connally of CBG Surveying Texas, LLC on behalf of Shannon McCord Riddell for the approval of a replat for Lot 1, Block A, Goliad-Riddle Addition being a 0.4079-acre tract of land identified as Lot C, Block 117, B. F. Boydston Addition, City of Rockwall, Rockwall County, Texas, zoned General Retail (GR) District, addressed as 501 S. Goliad Street, and take any action necessary.
8. Consider awarding a bid to Play Works - Playwell Group and authorizing the City Manager to execute a Purchase Order for new shade canopy at Tuttle Sports Complex Playground in the amount of $38,853 to be funded out of the Recreation Development Fund, and take any action necessary.
9. Consider awarding a bid to MHC Kenworth and authorizing the City Manager to execute a Purchase Order for a new Brush Truck in the amount of $190,462.32 for Streets and Drainage Operations to be funded out of General Fund Reserves, and take any action necessary.

10. Consider authorizing the City Manager to execute a contract with the Texas Department of Transportation, Aviation Division for participation in the Routine Airport Maintenance Program (RAMP) at the Ralph M. Hall / Rockwall Municipal Airport, with matching funds for the grant to be provided by the Airport Operating Budget, and take any action necessary.

11. Consider authorizing the City Manager to execute a contract between the City of Rockwall and STAR Transit for transportation services for fiscal year 2020 in the amount of $109,884 to be funded by the Administration Department Operating Budget, and take any action necessary.

12. Consider authorizing the City Manager to execute a contract with Meals on Wheels Senior Services for certain nutritional and senior service programs for fiscal year 2020 in the amount of $40,000 to be funded from the Administration Department Operating Budget, and take any action necessary.

13. Consider awarding a bid to Freightliner/CLS Equipment Co. and authorizing the City Manager to execute a Purchase Order for a new Vac Truck in the amount of $389,415.25 to be funded out of the Water and Sewer Fund, Wastewater Operations budget, and take any action necessary.

14. Consider authorizing the City Manager to execute an Engineering Services Agreement with Binkley & Barfield, Inc. for the 2020 fiscal year to provide general engineering services for the preparation and review of all TIAs ("traffic impact analysis") submitted to the City of Rockwall, to be funded by the 2019-2020 Engineering Consulting Budget with developer reimbursement, and take any action necessary.

15. Consider authorizing the City Manager to execute an interlocal agreement between the city and Rockwall County regarding fire protection services, and take any action necessary.

Councilman Johannesen moved to approve the entire Consent Agenda (#s 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15). Councilmember Trowbridge seconded the motion. The ordinance captions were read as follows:

CITY OF ROCKWALL
ORDINANCE NO. 19-38

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS AMENDING PLANNED DEVELOPMENT DISTRICT 5 (PD-5) [*ORDINANCE NO.'S 73-31, 87-23, 88-11, 96-25 & 00-28*] AND THE UNIFIED DEVELOPMENT CODE [*ORDINANCE NO. 04-38*] OF THE CITY OF ROCKWALL, AS HERETOFORE AMENDED, FOR THE PURPOSE OF AMENDING PLANNED DEVELOPMENT DISTRICT 5 (PD-5), BEING A ~547.68-ACRE TRACT OF LAND SITUATED WITHIN THE S. S. McCURRY SURVEY, ABSTRACT NO. 146, CITY OF ROCKWALL, ROCKWALL COUNTY, TEXAS AND MORE FULLY DESCRIBED HEREIN BY *EXHIBIT 'A'* AND DEPICTED IN *EXHIBIT 'B'* OF THIS ORDINANCE; PROVIDING FOR SPECIAL CONDITIONS; PROVIDING FOR A PENALTY OF A FINE NOT TO EXCEED THE SUM OF TWO THOUSAND DOLLARS (*$2,000.00*) FOR EACH OFFENSE; PROVIDING FOR A SEVERABILITY CLAUSE; PROVIDING FOR A REPEALER CLAUSE; PROVIDING FOR AN EFFECTIVE DATE.

CITY OF ROCKWALL

ORDINANCE NO. 19-39

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS, AMENDING THE UNIFIED DEVELOPMENT CODE [*ORDINANCE NO. 04-38*] OF THE CITY OF ROCKWALL, AS HERETOFORE AMENDED SO AS TO FURTHER AMEND THE ZONING MAP TO ADOPT A CHANGE IN ZONING FROM AN AGRICULTURAL (AG) DISTRICT TO A COMMERCIAL (C) DISTRICT FOR AN 11.85-ACRE TRACT OF LAND IDENTIFIED AS TRACT 1-1 OF THE J. H. BAILEY SURVEY, ABSTRACT NO. 22, CITY OF ROCKWALL, ROCKWALL COUNTY, TEXAS AND MORE SPECIFICALLY DESCRIBED IN EXHIBIT 'A' OF THIS ORDINANCE; PROVIDING FOR SPECIAL CONDITIONS; PROVIDING FOR A PENALTY OF FINE NOT TO EXCEED THE SUM OF TWO THOUSAND DOLLARS ($2,000.00) FOR EACH OFFENSE; PROVIDING FOR A SEVERABILITY CLAUSE; PROVIDING FOR A REPEALER CLAUSE; PROVIDING FOR AN EFFECTIVE DATE.

The motion passed by a vote of 7 ayes to 0 nays.

XI. APPOINTMENT ITEMS

1. Appointment with representative(s) of The Downtown Rockwall Association to consider a request to utilize a portion of parking on N. San Jacinto for a valet parking stand (including loading / unloading) for the "Shop Small Saturday" event on November 30, and take any action necessary.

Tammy Sharp
108 Teakwood Drive
Rockwall, TX

Mrs. Sharp came forth and briefed the Council on this proposal. Councilmember Macalik thanked Tammy, her husband and everyone for their efforts this past Saturday at the Rib Rub Run & Roll. Councilman Fowler moved to approve this request, as presented. Councilman Trowbridge seconded the motion, which passed by a vote of 7 ayes to 0 nays.

2. Appointment with Josh Deaton of Sideways BBQ to request permission to sell alcoholic beverages at The Harbor public event venue as part of a Veteran's Day event on November 9, 2019, and take any action necessary.

Josh Deaton
5446 Ranger Drive
Rockwall, TX 75032

Mr. Deaton came forth and briefed the Council on the nature of his request, generally explaining that he is seeking permission to sell alcoholic beverages at The Harbor as part of a Veterans' Day event on Nov. 9. He shared that he was in the Marine Corps., and his son is in the Marines as well. So, he is very passionate about putting on this Veteran's Day event. He's received a lot of support from the community, businesses and the city. Mike Thorton, a Medal of Honor recipient, is scheduled to speak at 1:00 p.m., and two bands are scheduled, so far. Two high dollar smokers have been donated for the cause, and Wood Creek is willing to donate their beer. Also, five veteran-related charities have been identified, and 100% of the proceeds raised during the event will be donated to these charities. He went on to explain

the plan for selling tickets for the beer, and he shared that a person will be 'cut off' and unable to purchase any more beer after they've been served four beers and received four stamps on their hand.

Mayor Pruitt shared that he has looked into the city's ordinances and policies concerning the sale of beer (specifically downtown, at The Center, and at The Harbor). He went on to explain that, as long as Mr. Deaton's plans comply with the existing, city policies, then his event may be handled administratively by staff, and the Council will not need to vote on this matter.

Councilmember Johannesen asked if Mr. Deaton is working with TABC on this matter. Mr. Deaton explained that, yes, he is working closely with TABC, and he is purchasing related insurance for the event as well.

XII. ACTION ITEMS

1. Discuss and consider approval of the Hotel Occupancy Subcommittee's recommendation for funding of the "Salute to Veterans" event, and take any action necessary.

Mr. Deaton shared further details pertaining to his vision for this Salute to Veterans event, which he plans to hold at The Harbor on Nov. 9. Following discussion concerning the requirements associated with spending 'hotel occupancy tax ("HOT") funds,' Mayor Pruitt moved to approve the subcommittee's recommendation of $7,500 in funding and the waiver of Harbor rental related fees. Councilman Trowbridge seconded the motion, which passed by a vote of 6 ayes with 1 abstention (Johannesen).

2. Discuss and consider approval of a resolution providing for the submission of names to the Rockwall Central Appraisal District (CAD) for nominations to the Board of Directors, and take any action necessary.

Mayor Pruitt moved to put forth John Hohenshelt and Patrick Trowbridge as the nominees for City of Rockwall for the CAD Board of Directors. Councilmember Fowler seconded the motion, which passed by a vote of 7 ayes to 0 nays.

3. **SP2019-031** - Discuss and consider an appeal by Ryan Moorman of R. D. Moorman, Inc. concerning a variance request denied by the Planning and Zoning Commission in conjunction with an approved site plan for an office building on a 1.244-acre parcel of land identified as Lot 22, Rainbow Acres Addition, City or Rockwall, Rockwall County, Texas, zoned Commercial (C) District, addressed as 259 Ranch Trail, and take any action necessary.

Planning Director Ryan Miller provided background information pertaining to this agenda item. Mayor Pruitt made a motion deny the requested exception to the standards pertaining to vertical articulation. Councilman Daniels seconded the motion, which passed by a vote of 7 ayes to 0 nays.

4. Discuss and consider appointing a Comprehensive Plan Advisory Committee (CPAC) to assist staff in the annual update to the Comprehensive Plan, and take any action necessary.

Mayor Pruitt suggested to Mr. Miller that he get with the previous CPAC committee members and see if they would like to serve again.

5. Discuss and consider (re)appointments to the city's Airport Advisory Board, Historic Preservation Advisory Board, Main Street Advisory Board, and Park Board and take any action necessary.

Councilmember Johannesen moved to appoint Jason Alvarado on the city's Park Board. Councilman Hohenshelt seconded the motion, which passed by a vote of 7 ayes to 0 nays.

Councilmember Trowbridge moved to appoint Stuart Smith to the Main Street Advisory Board (to replace Terry Gregory, who resigned, with a partial term expiring in Jan. 2020). Councilmember Hohenshelt seconded the motion, which passed unanimously (7 ayes to 0 nays).

Councilmember Fowler moved to reappoint Mr. Potter, Mr. Wolf, and Mr. Woodruff to the Airport Advisory Board (thru August 2021). Councilmember Macalik seconded the motion, which passed by a vote of 7 ayes to 0 nays.

6. Discuss and consider approval of a resolution establishing a "Complete Count Committee" for the U.S. 2020 Census, and take any action necessary.

Mayor Pruitt moved to approve the resolution, including appointing Councilman Bennie Daniels to head up the effort. Councilman Trowbridge seconded the motion, which passed by a vote of 7 ayes to 0 nays.

XIII. CITY MANAGER'S REPORT, DEPARTMENTAL REPORTS AND RELATED DISCUSSIONS PERTAINING TO CURRENT CITY ACTIVITIES, UPCOMING MEETINGS, FUTURE LEGISLATIVE ACTIVITIES, AND OTHER RELATED MATTERS.

1. Departmental Reports

Building Inspections Monthly Report - August 2019
GIS Division Monthly Report - August 2019
Harbor PD Monthly Report - August 2019
Internal Operations Department Monthly Report - August 2019
Recreation Monthly Report - August 2019
Rockwall Animal Adoption Center Monthly Report - August 2019
Rockwall Fire Dept. Monthly Report - August 2019
Rockwall Meals on Wheels Senior Services 4th Quarter Report
Rockwall Police Department Monthly Report - August 2019
STAR Transit Monthly Report - August 2019

2. City Manager's Report

No discussion, questions, or action took place pertaining to departmental or city manager's reports.

XIV. EXECUTIVE SESSION

THE CITY OF ROCKWALL CITY COUNCIL WILL RECESS INTO EXECUTIVE SESSION TO DISCUSS THE FOLLOWING MATTERS AS AUTHORIZED BY CHAPTER 551 OF THE TEXAS GOVERNMENT CODE:

1. Discussion regarding legal issues pertaining to potential annexation pursuant to Section §551.071 (Attorney/Client Consultation).

2. Discussion regarding legal matters pertaining to Breezy Hill pavilion pursuant to Section 551.071 (Consultation with Attorney).
3. Discussion regarding City Manager employee evaluation, pursuant to Section 551.074 (Personnel Matters)
4. Discussion regarding sale of real property in the vicinity of Mims Rd. and IH-30 pursuant to Section §551.072 (Real Property) and Section §551.071 (Consultation with Attorney).
5. Discussion regarding sale of real property in the vicinity of John King Boulevard pursuant to Section §551.072 (Real Property) and Section §551.071 (Consultation with Attorney).
6. Discussion regarding legal issues pertaining to a Facilities Agreement pursuant to Section §551.071 (Attorney/Client Consultation).
7. Discussion regarding ballot nominations associated with elections to the Rockwall Central Appraisal District Board pursuant to Section 551.074 (personnel matters)
8. Discussion regarding appointments to city regulatory boards, commissions, and committees - specifically the Board of Adjustments - pursuant to Section 551.074 (Personnel Matters)
9. Discussion regarding the appeal to the Public Utility Commission filed by the cities of Garland, Mesquite, Plano and Richardson against the North Texas Municipal Water District (NTMWD) regarding water rates pursuant to Section §551.071 (Consultation with Attorney)

XV. Reconvene Public Meeting & Take Any Action as Result of Executive Session

Council did not reconvene in Executive Session following the close of the public meeting agenda.

XVI. Adjournment

Mayor Pruitt adjourned the meeting at 6:51 p.m.

PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS, THIS 21st DAY OF OCTOBER, 2019.

ATTEST: _____
JIM PRUITT, MAYOR

_____
KRISTY COLE, CITY SECRETARY

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CITY OF ROCKWALL, TEXAS
MEMORANDUM

TO: **Richard Crowley, City Manager**

FROM: **Lea Ann Ewing, Purchasing Agent**

DATE: **October 14, 2019**

SUBJECT: **Cooperative Purchasing Agreement with the City of Cleburne**

An Interlocal Purchasing Agreement for participation in a cooperative purchasing program with the City of Cleburne is attached for City Council consideration.

The interlocal agreement provides for cooperative purchasing between the Cities of Rockwall and Cleburne for goods, materials and services. By participating in this cooperative program, cities realize additional savings through economies of scale when utilizing the coop contracts. Another benefit is by piggybacking other cities' contracts we would meet all the formal bidding requirements pertaining to contract purchases and eliminate the cost of the competitive bidding process for the contracted materials and services. The interlocal agreement would remain in effect until terminated by either the City of Rockwall or Cleburne.

City of Cleburne contacted me about the opportunity to coop so that they may use our contract with New Edge Services LLC for CityWorks software purchase.

Staff asks City Council to consider joining this purchasing cooperative by authorizing the City Manager to execute the cooperative agreement.

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STATE OF TEXAS §
§
COUNTY OF ROCKWALL §

INTERLOCAL COOPERATION AGREEMENT

This Interlocal Cooperation Agreement ("Agreement") is by and between the City of Rockwall, Texas ("Rockwall"), and the City of Cleburne, Texas ("Cleburne"), acting by and through their authorized officers.

RECITALS:

WHEREAS, this Agreement is authorized by Chapter 791 of the Texas Government Code and Subchapter F, Chapter 271, Texas Local Government Code; and

WHEREAS, Section 271.102 of the TEX. LOC. GOV'T CODE authorizes a local government to participate in a Cooperative Purchasing Program with another local government or a local cooperative organization; and

WHEREAS, a local government that purchases goods and services pursuant to a Cooperative Purchasing Program with another local government satisfies the requirement of the local government to seek competitive bids for the purchase of the goods and materials; and

WHEREAS, each party has and will on an annual basis obtain competitive bids for the purchase of goods and services; and

WHEREAS, the parties desire to enter into a cooperative purchasing program, which will allow each party to purchase goods and services under each other's competitively bid contracts pursuant to Subchapter F, Chapter 271 of the TEX. LOC. GOV'T CODE;

NOW THEREFORE, in consideration of the mutual covenants and promises contained herein, the parties agree as follows:

ARTICLE I
PURPOSE

The purpose of this Agreement is to establish a cooperative purchasing program between the parties, which will allow each party to purchase goods and services under each other's competitively bid contracts pursuant to Subchapter F, Chapter 271 of the TEX. LOC. GOV'T CODE.

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ARTICLE II
TERM

The term of this Agreement shall be for a period of one (1) year commencing on the last date of execution hereof ("Effective Date"). Thereafter this Agreement shall automatically renew for successive periods of one (1) year each under the terms and conditions stated herein, unless sooner terminated as provided herein.

ARTICLE III
TERMINATION

Either party may terminate this Agreement by providing thirty (30) days prior written notice to the other party.

ARTICLE IV
PURCHASING

The City Manager or designee for each of party is authorized to act on behalf of the respective party in all matters relating to this cooperative purchasing program. Each party shall make payments to the other party or directly to the vendor under the contract made pursuant to Subchapter F, Chapter 271 of the TEX. LOC. GOV'T CODE. Each party shall be responsible for the respective vendor's compliance with provisions relating to the quality of items and terms of delivery.

ARTICLE V
MISCELLANEOUS

5.1 **Relationship of Parties**: This Agreement is not intended to create, nor should it be construed as creating, a partnership, association, joint venture or trust.

5.2 **Notice**: Any notice required or permitted to be delivered hereunder shall be deemed received when sent in the United States Mail, Postage Prepaid, Certified Mail, Return Receipt Requested, or by hand-delivery or facsimile transmission addressed to the respective party at the address set forth below the signature of the party.

5.3 **Amendment**: This Agreement may be amended by the mutual written agreement of both parties hereto.

5.4 **Severability**: In the event any one or more of the provisions contained in this Agreement shall for any reason be held to be invalid, illegal, or unenforceable in any respect, such invalidity, illegality, or unenforceability shall not affect the other provisions, and the Agreement shall be construed as if such invalid, illegal, or unenforceable provision had never been contained in this Agreement.

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5.5 **Governing Law**: The validity of this Agreement and any of its terms and provisions as well as the rights and duties of the parties shall be governed by the laws of the State of Texas; and venue for any action concerning this Agreement shall be in the State District Court of Rockwall County, Texas.

5.6 **Entire Agreement**: This Agreement represents the entire agreement among the parties with respect to the subject matter covered by this Agreement. There is no other collateral, oral or written agreement between the parties that in any manner relates to the subject matter of this Agreement.

5.7 **Recitals**: The recitals to this Agreement are incorporated herein.

5.8 **Counterparts**: This Agreement may be executed in any number of counterparts, each of whom shall be deemed an original and constitute one and the same instrument.

EXECUTED this _____ day of _____, 2019.

CITY OF ROCKWALL, TEXAS

By: _____
RICHARD CROWLEY, CITY MANAGER

385 S. Goliad, St.
Rockwall, TX 75087

ATTEST:

By: _____
KRISTY COLE, CITY SECRETARY

EXECUTED this _____ day of _____, 2019.

CITY OF CLEBURNE, TEXAS

By: _____

_____

ATTEST:

By: _____

_____

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CITY OF ROCKWALL, TEXAS
MEMORANDUM

TO: **Richard Crowley, City Manager**

FROM: **Lea Ann Ewing, Purchasing Agent**

DATE: **October 14, 2019**

SUBJECT: **Cooperative Purchasing Agreement with the City of Royse City**

An Interlocal Purchasing Agreement for participation in a cooperative purchasing program with the City of Royse City is attached for City Council consideration.

The interlocal agreement provides for cooperative purchasing between the Cities of Rockwall and Royse City for goods, materials and services. By participating in this cooperative program, cities realize additional savings through economies of scale when utilizing the coop contracts. Another benefit is by piggybacking other cities' contracts we would meet all the formal bidding requirements pertaining to contract purchases and eliminate the cost of the competitive bidding process for the contracted materials and services. The interlocal agreement would remain in effect until terminated by either the City of Rockwall or Royse City.

Royse City has competitively bid and awarded a contract for mowing to Chief Landscape. We would like to piggyback this contract for the mowing and trimming at the water yards and lift stations. This service is funded in the Water and Sewer Fund, Water and Wastewater operations budgets. Estimated annual mowing cost with Chief Landscape is $57,000.

Staff asks City Council to consider (1) joining this purchasing cooperative by authorizing the City Manager to execute the cooperative agreement, (2) award a bid to Chief Landscaping for water yards and lift station mowing services for $57,000 and authorize the City Manager to execute a contract for this service.

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STATE OF TEXAS §
§
COUNTY OF ROCKWALL §

INTERLOCAL COOPERATION AGREEMENT

This Interlocal Cooperation Agreement ("Agreement") is by and between the City of Rockwall, Texas ("Rockwall"), and the City of Royse City, Texas ("Royse City"), acting by and through their authorized officers.

RECITALS:

WHEREAS, this Agreement is authorized by Chapter 791 of the Texas Government Code and Subchapter F, Chapter 271, Texas Local Government Code; and

WHEREAS, Section 271.102 of the TEX. LOC. GOV'T CODE authorizes a local government to participate in a Cooperative Purchasing Program with another local government or a local cooperative organization; and

WHEREAS, a local government that purchases goods and services pursuant to a Cooperative Purchasing Program with another local government satisfies the requirement of the local government to seek competitive bids for the purchase of the goods and materials; and

WHEREAS, each party has and will on an annual basis obtain competitive bids for the purchase of goods and services; and

WHEREAS, the parties desire to enter into a cooperative purchasing program, which will allow each party to purchase goods and services under each other's competitively bid contracts pursuant to Subchapter F, Chapter 271 of the TEX. LOC. GOV'T CODE;

NOW THEREFORE, in consideration of the mutual covenants and promises contained herein, the parties agree as follows:

ARTICLE I
PURPOSE

The purpose of this Agreement is to establish a cooperative purchasing program between the parties, which will allow each party to purchase goods and services under each other's competitively bid contracts pursuant to Subchapter F, Chapter 271 of the TEX. LOC. GOV'T CODE.

ARTICLE II
TERM

The term of this Agreement shall be for a period of one (1) year commencing on the last date of execution hereof ("Effective Date"). Thereafter this Agreement shall automatically renew for successive periods of one (1) year each under the terms and conditions stated herein, unless sooner terminated as provided herein.

ARTICLE III
TERMINATION

Either party may terminate this Agreement by providing thirty (30) days prior written notice to the other party.

ARTICLE IV
PURCHASING

The City Manager or designee for each of party is authorized to act on behalf of the respective party in all matters relating to this cooperative purchasing program. Each party shall make payments to the other party or directly to the vendor under the contract made pursuant to Subchapter F, Chapter 271 of the TEX. LOC. GOV'T CODE. Each party shall be responsible for the respective vendor's compliance with provisions relating to the quality of items and terms of delivery.

ARTICLE V
MISCELLANEOUS

5.1 **Relationship of Parties**: This Agreement is not intended to create, nor should it be construed as creating, a partnership, association, joint venture or trust.

5.2 **Notice**: Any notice required or permitted to be delivered hereunder shall be deemed received when sent in the United States Mail, Postage Prepaid, Certified Mail, Return Receipt Requested, or by hand-delivery or facsimile transmission addressed to the respective party at the address set forth below the signature of the party.

5.3 **Amendment**: This Agreement may be amended by the mutual written agreement of both parties hereto.

5.4 **Severability**: In the event any one or more of the provisions contained in this Agreement shall for any reason be held to be invalid, illegal, or unenforceable in any respect, such invalidity, illegality, or unenforceability shall not affect the other provisions, and the Agreement shall be construed as if such invalid, illegal, or unenforceable provision had never been contained in this Agreement.

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5.5 **Governing Law**: The validity of this Agreement and any of its terms and provisions as well as the rights and duties of the parties shall be governed by the laws of the State of Texas; and venue for any action concerning this Agreement shall be in the State District Court of Rockwall County, Texas.

5.6 **Entire Agreement**: This Agreement represents the entire agreement among the parties with respect to the subject matter covered by this Agreement. There is no other collateral, oral or written agreement between the parties that in any manner relates to the subject matter of this Agreement.

5.7 **Recitals**: The recitals to this Agreement are incorporated herein.

5.8 **Counterparts**: This Agreement may be executed in any number of counterparts, each of whom shall be deemed an original and constitute one and the same instrument.

EXECUTED this _____ day of _____, 2019.

CITY OF ROCKWALL, TEXAS

By: _____
RICHARD CROWLEY, CITY MANAGER

385 S. Goliad, St.
Rockwall, TX 75087

ATTEST:

By: _____
KRISTY COLE, CITY SECRETARY

EXECUTED this _____ day of _____, 2019.

CITY OF ROYSE CITY, TEXAS

By: _____

_____

ATTEST:

By: _____

_____

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CITY OF ROCKWALL, TEXAS
MEMORANDUM

TO: **Richard Crowley, City Manager**

FROM: **Lea Ann Ewing, Purchasing Agent**

DATE: **Oct. 11, 2019**

SUBJECT: **Bid Award for Pickle Ball Court Lighting**

Approved in the General Fund, Parks Operations budget is $50,000 for adding lights to the pickle ball court at Myers Park. The total cost of this project is $42,612 using the Texas Association of School Boards Buy Board Purchasing coop contract vendor Musco Sports Lighting. As a member and participant in this cooperative, the City has met all formal bidding requirements pertaining to the purchase and install of the new lights.

For Council consideration is the bid award to Musco for $42,612 and authorize the City Manager to execute a purchase order for this project.

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CITY OF ROCKWALL, TEXAS
MEMORANDUM

TO: **Richard Crowley, City Manager**

FROM: **Lea Ann Ewing, Purchasing Agent**

DATE: **October 16, 2019**

SUBJECT: **Purchase of 2020 Model Vehicles**

Approved in the current budget are eight (8) new work trucks and one (1) Police Pursuit SUV.

Dept	Item	Budget	Cost	Funding
Inter Operations	2 trucks	$91,000	$82,260	Gen Fund Res
Parks	2 trucks	$84,000	$75,495	Gen Fund Res
Bldg Inspection	1 truck	$28,200	$22,886	Gen Fund Res
Engineering	2 trucks	$57,000	$45,772	Gen Fund Res
Police Patrol	SUV	$51,700	$36,900	Gen Fund Res
Water	1 truck	$46,000	$38,189	Water Sewer Fund

These vehicles are available for purchase from Caldwell Country Chevrolet and Rockdale Country Ford through the Texas Association of School Board (Buy Board) and the State of Texas Smart Buy cooperative purchasing programs. As a member and participant in these cooperative programs, the City has met all formal bidding requirements pertaining to the purchase of the new vehicles. The remaining budget dollars will be used to purchase safety equipment, emergency lights, decals, install of radios and computer equipment once these vehicles are received by the City.

For Council consideration are the bid award to Caldwell Country Chevrolet $226,413 and Rockdale Country Ford $75,089 and authorize the City Manager to execute purchase orders.

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City of Rockwall
The New Horizon

MEMORANDUM

TO: **Rick Crowley, City Manager**

FROM: **Amy Williams, P.E., Director of Public Works/City Engineer**

DATE: **October 16, 2019**

SUBJECT: **General Service Agreement for Supervisory Control and Data Acquisition**

Supervisory Control and Data Acquisition (SCADA) computer systems gather and analyzing real-time data. Examples of the numerous functions the City's SCADA systems provide are monitor and control school zone lights, water levels in City water storage systems, and usage, monitoring the multiple lift stations throughout the City. SCADA allows employees to control operations from a computer and notifies employees of issues 24/7 through cell phones.

The contract with RLC Controls, Inc. will ensure the SCADA system is updated annually with the latest technology and replace or repair any components associated with the systems. Staff requests the City Council consider approval of the attached general services contract for the 2020 fiscal year. This agreement will be funded by the 2019-2020 Water, Wastewater, and Street Department budget.

RLC Controls, Inc.

Maintenance and Service Agreement

RLC Controls agrees to provide and the "CUSTOMER" agrees to accept, under the terms and conditions of this agreement, technical services on a "Time and Material" basis as defined hereafter.

This agreement is effective for the period of one (1) year from _____. This agreement may be canceled by either party within thirty (30) days written notice to the other party. The agreement shall be renewed automatically unless either party wishes to terminate\renegotiate by mutual consent one (1) month in advance of expiration of said agreement.

1) Service Categories

a. Scheduled Service:

Schedule Service is defined as non-critical services scheduled with one (1) week of notice.
A minimum of two (2) hours will be charged for Scheduled or Non-Critical Services.
Material, special tools and job site facilities requested to be furnished by RLC Controls shall be invoiced for at actual documented costs plus 15% markup. Mileage rate shall be billed at $0.75 per mile

Scheduled Annual System Calibration will consist of a complete system checkout and completing miscellaneous request by the "CUSTOMER". All integral parts of the system including Computers, Software, and RTUs will be tested and exercised during this week. A report will be generated documenting any problems found and resolved during this procedure.

Scheduled monthly services will consist of completing and checking any miscellaneous problems or request the "CUSTOMER" may have. We ask that "CUSTOMER" keep a log of issues and/or items to be addressed during this visit.

b. Emergency Service:

Emergency Services is defined as technical assistance being on-site within twenty four (24) hours of call. Emergency service requests will be returned by telephone within one (1) hour of contact from the customer. RLC Controls shall make every effort to provide requested services in a timely manner. On-Site response to requests for emergency services shall be expected within 4-6 hours. Communication between the technician and customer will remain open during this time period.

Upon an emergency service call, a minimum of four (4) hours will be charged.
Material, special tools, and job site facilities requested to be furnished by RLC Controls shall be invoiced for at actual documented costs plus 25% markup. Mileage rate shall be billed at $0.75 per mile.

c. Time and Material Projects (Not to Exceed Quotes)

For "Special Projects" that are non-emergency related, a meeting between RLC and "CUSTOMER" will be conducted to determine project scope, project schedule and budget\GMP pricing. "CUSTOMER" staff is responsible for ensuring compliance with District Purchasing Policy.

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2) **Service Rates:**

	Scheduled Service / Project Rate	Emergency Service Rate
Engineering		
Senior Project Engineer	$ 135.00	$ 156.00
Project Engineer	$ 110.00	$ 127.00
Field Engineer	$ 100.00	$ 115.00
I&C Technician	$ 75.00	$ 87.00
Fiber Technician	$ 75.00	$ 87.00
Security Specialist	$ 75.00	$ 87.00
Convergence Engineer	$ 137.00	$ 158.00
Construction		
Superintendent	$ 100.00	$ 115.00
Electrician	$ 75.00	$ 87.00
Installer /Elec Helper	$ 60.00	$ 69.00
Project Support		
Project Manager	$ 105.00	$ 121.00
Construction Manager	$ 85.00	$ 98.00
Panel Shop Manager	$ 60.00	$ 69.00
Assistant Mgr	$ 75.00	$ 87.00
Office / Admin	$ 47.00	$ 55.00
Designer / CAD	$ 90.00	$ 104.00
Panel Shop Technician	$ 50.00	$ 58.00

Labor rates include all payroll taxes, benefits, hand tools, overhead and profit. Straight time rates apply for all hours worked during the normal eight (8) hour day, Monday through Friday. Overtime will be billed at "Time and a Half" (standard rate X 1.5) and shall apply for all hours worked in excess of the normal eight (8) hour day and all day Saturday and Sunday.

Double time rates shall apply for all hours worked during following Holidays:

a. New Year's Day
b. Easter Sunday
c. Memorial Day
d. July 4th
e. Labor Day
f. Thanksgiving Day and the Friday following
g. Christmas Day

Travel time shall be charged at the applicable rate.

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3) Invoicing

a. Change of Rate

All rates and charges specified are those currently in effect and will not change for the period of this agreement. RLC Controls reserves the right to review and modify any change of rate at the renewal of this agreement.

b. Invoicing

Invoicing shall be monthly and include a recap of all services provided and related supporting documentation. Invoicing will be job/ project specific and will denote the physical location that the work was completed at.

c. Taxes

Invoices shall include applicable sales tax as a separate line item. Taxes shall be charged on material and labor except that work for which the customer provides an executed tax exemption certificate to RLC Controls.

4. Insurance and Liability

a. Insurance

RLC Controls agrees to obtain and maintain insurance with the following minimum coverages:

General Liability:	$1,000,000/$2,000,000
Umbrella Liability	$10,000,000
Automobile Liability:	$1,000,000
Workers Compensation:	$500,000

A certificate of insurance shall be provided upon request.

b. Conduct and Performance

RLC Controls shall assume full responsibility for the conduct and performance of our employees and/or subcontractors.

c. Disclaimer and Limitation of Liability

RLC Controls shall not be responsible for consequential or special damages resulting from any work, or lack thereof, carried out on the equipment covered by this agreement, except that damage which is determined to be caused directly by negligence on the part of RLC Controls employees or agents thereof. In any event, liability shall be limited to repair or replacement of damaged equipment.

RLC Controls, Inc.

Date: 10/16/19

"CUSTOMER"

Date: _____

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CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 10/16/2019

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Keystone Southwest Insurance Agency P O Box 1747 Rockwall TX 75087	CONTACT NAME: Jennifer Rodriguez PHONE (A/C, No, Ext): (972) 771-3861 FAX (A/C, No): (972) 772-1021 E-MAIL ADDRESS: jrodriguez@kswins.com
INSURED RLC Controls, Inc. 8115 Hicks Hollow McKinney TX 75071	INSURER(S) AFFORDING COVERAGE — NAIC # INSURER A : Great Northern Insurance Co — 20303 INSURER B : Federal Insurance Company — 20281 INSURER C : INSURER D : INSURER E : INSURER F :

COVERAGES **CERTIFICATE NUMBER:** 19/20 Master **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	[X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS-MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: [ ] POLICY [X] PRO-JECT [ ] LOC OTHER:			3604-55-01	01/07/2019	01/07/2020	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG Employee Benefits	$ 1,000,000 $ 1,000,000 $ 10,000 $ 1,000,000 $ 2,000,000 $ 2,000,000 $ 1,000,000
	AUTOMOBILE LIABILITY [ ] ANY AUTO [ ] OWNED AUTOS ONLY [ ] SCHEDULED AUTOS [ ] HIRED AUTOS ONLY [ ] NON-OWNED AUTOS ONLY						COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ $ $ $
B	[ ] UMBRELLA LIAB [ ] OCCUR [X] EXCESS LIAB [ ] CLAIMS-MADE [ ] DED [ ] RETENTION $			7818-69-12	01/07/2019	01/07/2020	EACH OCCURRENCE AGGREGATE	$ 3,000,000 $ 3,000,000
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y / N [ ] If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		7177-07-67	01/07/2019	01/07/2020	[X] PER STATUTE [ ] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 1,000,000 $ 1,000,000 $ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

General Liability policy includes Blanket Waiver of Subrogation, Blanket Additional Insured that is primary and non-contributory, when required by written contract.
Workers compensation policy includes Blanket Waiver of Subrogation coverage when required by written contract.

CERTIFICATE HOLDER

City of Rockwall
385 S Goliad Street
Rockwall TX 75087

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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CITY OF ROCKWALL

CITY COUNCIL MEMORANDUM

PLANNING AND ZONING DEPARTMENT
385 S. GOLIAD STREET • ROCKWALL, TX 75087
PHONE: (972) 771-7745 • EMAIL: PLANNING@ROCKWALL.COM

TO:	Mayor and City Council
CC:	Rick Crowley, *City Manager* Mary Smith, *Assistant City Manager* Joey Boyd, *Assistant City Manager*
FROM:	Ryan Miller, *Director of Planning and Zoning*
DATE:	October 21, 2019
SUBJECT:	Water, Wastewater, and Roadway Impact Fee Study

In accordance with Chapter 395 of the Texas Local Government Code, the City Council is scheduled to hold a public hearing at the October 21, 2019 City Council meeting to consider the approval of updated Land Use Assumptions and a Capital Improvements Plan for water, wastewater, and roadway impact fees. The Capital Improvements Advisory Committee (CIAC) [*i.e. the Planning and Zoning Commission*] reviewed the Land Use Assumptions, Capital Improvements Plan, and impact fees on September 10, 2019 and provided the City Council with a written recommendation. This recommendation is provided as an attachment to this memorandum and was provided to the City Council on September 25, 2019 in accordance with the requirements of the Texas Local Government Code.

The CIAC's recommendations on roadway impact fees included: [*1*] expanding the program to include additional projects, and [*2*] increasing the roadway impact fees by 25% of the previous collection rate or from $256.00 to $320.00 for all service areas. With regard to water and wastewater impact fees, the CIAC's recommendation is that both impact fees be increased to 50% of the maximum fee calculated. The CIAC made these recommendations after a finding that the updated impact fees would continue to keep Rockwall competitive with its comparable cities while reducing the tax-payers burden as much as possible. It is also not anticipated that the updated impact fees will have a negative impact on development in the City.

The City's consultants (*Eddie Haas with Freese and Nichols, Inc and Matt Hickey, PE and Derek Chaney, PE with Brikoff, Hendricks & Carter, LLP*) will be making presentations concerning their findings prior to the public hearing. Staff will also be available to answer any questions concerning the Land Use Assumptions report, which was prepared by staff at the beginning of the update process.

August 24, 2019

TO: Mayor and City Council

CC: Rick Crowley, *City Manager*
Mary Smith, *Assistant City Manager and Director of Finance*
Joey Boyd, *Assistant City Manager and Director of Internal Operations*

FROM: Eric Chodun, *Capital Improvement Advisory Committee Chairman*

SUBJECT: Recommendation from the CIAC Concerning the 2019 Water, Wastewater and Roadway Impact Fee Update

In accordance with Section 395.058 of the Texas Local Government Code, the Capital Improvement Advisory Committee (CIAC) has been conducting meetings with City staff and the City's consultants -- *Edmund Haas, AICP of Freese and Nichols, Inc. and Matt Hickey, PE and Derek Chaney, PE of Birkoff, Hendrix & Carter, LLP* -- for the purpose of commenting on technical data relative to the update of the Water, Wastewater, and Roadway Impact Fee program. This section of the Texas Local Government Code requires that the program be reviewed periodically with a review happening at least every five (5) years. Technical elements reviewed included Land Use Assumptions (2019-2029), respective Capital Improvement Plans and the resultant cost per service unit calculations for determining impact fees.

After consideration and deliberation of the information, the CIAC recommends the following:

(1) Concurrence with the information presented in the Land Use Assumptions for Impact Fees, the Impact Fee Capital Improvement Plans, resultant cost per service unit calculations, and Final Impact Fee Reports;

(2) *Collection Rates*:

(a) For roads, an increase from the previous collection rate of $256.00 by 25%, to a new collection rate of $320.00 per service unit for all service areas (*i.e. Services Areas 1-4*) within the program. A review of benchmarking data presented found Rockwall to remain competitive, given the proposed increase, with other similar communities with impact fee programs.

(b) For water and wastewater, fee collections should be increased to 50% of the calculated maximum fee. This recommendation was driven primarily by the incorporation of projects passed through to the city as part of the North Texas Municipal Water District (NTMWD) Regional Systems. Based on benchmark data, increasing collections for water to the 50% level would have nominal impacts to fees on a standard single-family home (*i.e. an increase of $13.99*). A review of benchmarking data presented found Rockwall to remain competitive, given the proposed increase, with other similar communities with impact fee programs.

The Committee came to these conclusions after reviewing comparable cities' impact fees to ensure that Rockwall would remain competitive if the rates were raised. The consensus of the Committee was a desire to reduce the tax-payers burden as much as possible while maintaining reasonable rates that would not negatively impact development. The updated rates should not affect growth in the City of Rockwall over the next five (5) years.

The CIAC would recommend that the City Council approve the updated Land Use Assumptions Report, Capital Improvements Plan, and the water, wastewater, and roadway impact fees as presented.

Sincerely,

Eric Chodun
Capital Improvement Advisory Committee Chairman

CITY OF ROCKWALL

RESOLUTION NO. 19-20

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS, ESTABLISHING A PUBLIC HEARING DATE TO CONSIDER THE APPROVAL OF UPDATED LAND USE ASSUMPTIONS, CAPITAL IMPROVEMENT PLAN, AND IMPACT FEES FOR THE 2019 IMPACT FEE UPDATE.

WHEREAS, the City Council of the City of Rockwall has authorized an impact fee study to determine whether to adopt updated Land Use Assumptions (LUA), Capital Improvement Plan, and Impact Fees for roadway, water, wastewater facilities in accordance with Chapter 395, *Financing Capital Improvements Required by New Development in Municipalities, Counties, and Certain Other Local Governments*, of the Texas Local Government Code (*"Ch, 395 of the TLGC"*) and Article III, *Impact Fee Regulations*, of Chapter 38, *Subdivisions*, of the City of Rockwall Municipal Code of Ordinances; and

WHEREAS, *Ch. 395 of the TLGC* requires the City Council of the City of Rockwall to hold a public hearing to consider whether to update the Land Use Assumptions, Capital Improvement Plan, and Impact Fees for roadway, water, and wastewater facilities;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS:

SECTION 1. RECITALS. The above recitals are found to be true and correct and they are incorporated as findings of the City Council for all purposes.

SECTION 2. PUBLIC HEARING. A public hearing of the City Council shall be held on *October 21, 2019* at 6:00 PM at City Hall, 385 S. Goliad Street, Rockwall, Texas, for the purpose of considering amendments to the Land Use Assumptions, Capital Improvement Plan, and Impact Fees for roadway, water, wastewater facilities.

SECTION 3. PUBLIC NOTICE. Notice of the public hearing shall be published in a newspaper of general circulation in Rockwall County at least 30-days prior to the public hearing date.

SECTION 4. EFFECTIVE DATE. This *Resolution* shall be effective immediately following its passage and approval by the City Council.

PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS, ON THIS THE 3RD DAY OF SEPTEMBER, 2019.

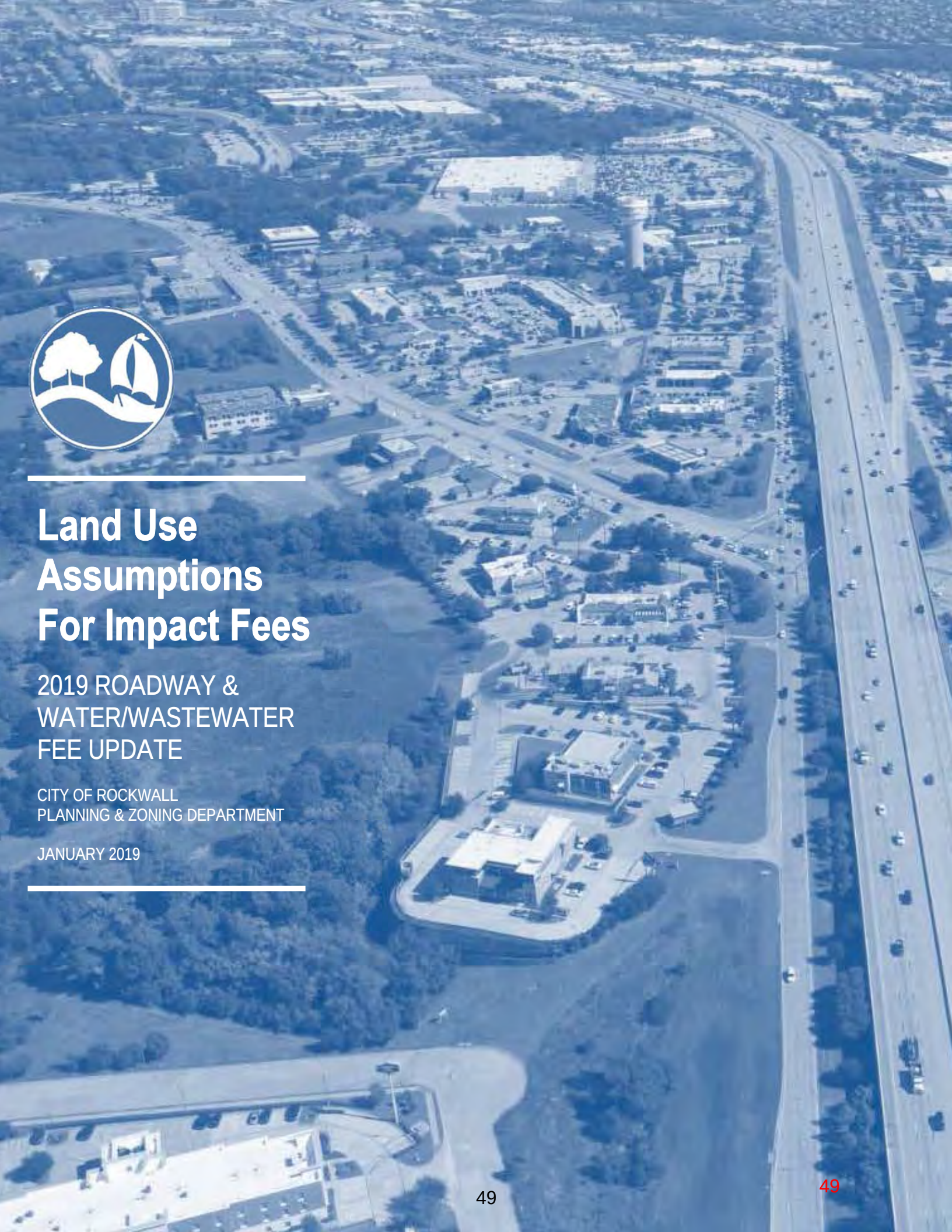
APPROVED:

Jim Pruitt, *Mayor*

ATTEST:

Kristy Cole, *City Secretary*

CITY OF ROCKWALL TEXAS SEAL



Land Use Assumptions For Impact Fees

2019 ROADWAY & WATER/WASTEWATER FEE UPDATE

CITY OF ROCKWALL
PLANNING & ZONING DEPARTMENT

JANUARY 2019

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ACKNOWLEDGEMENTS

CITY COUNCIL

- JIM PRUITT, *MAYOR*
- KEVIN FOWLER, *MAYOR PRO-TEM*
- JOHN HOHENSHELT
- BENNIE DANIELS
- DANA MACALIK
- TRACE JOHANNESEN
- PATRICK TROWBRIDGE

CAPITAL IMPROVEMENT ADVISORY COMMITTEE

[*PLANNING AND ZONING COMMISSION*]

- JOHNNY LYONS, *CHAIRMAN*
- ERIC CHODUN, *VICE-CHAIRMAN*
- ANNIE FISHMAN
- MARK MOELLER
- JERRY WELCH
- TRACEY LOGAN
- JOHN WOMBLE

STAFF MEMBERS BY DEPARTMENT/DIVISION

PLANNING AND ZONING DIVISION

- RYAN MILLER, AICP, *DIRECTOR OF PLANNING AND ZONING*
- DAVID GONZALES, AICP, *PLANNING MANAGER*
- KOREY BROOKS, AICP, *SENIOR PLANNER*

GIS DIVISION

- LANCE SINGLETON, *GIS SUPERVISOR*
- LINDSAY HICKS, *GIS ANALYST*
- JORGE RUIZ, *GIS TECHNICIAN*

ENGINEERING DEPARTMENT

- AMY WILLIAMS, PE, *CITY ENGINEER/DIRECTOR OF PUBLIC WORKS*
- JEREMY WHITE, PE, *ENGINEER*
- SARAH HAGER, *EIT*

BUILDING INSPECTIONS DEPARTMENT

- JEFFERY WIDMER, *CHIEF BUILDING OFFICIAL*

ADDITIONAL ACKNOWLEDGEMENTS

- BIRKHOFF, HENDRICKS & CARTER, LLP
- FREESE & NICHOLS, INC.

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FORWARD

What are *Impact Fees? Impact Fees* are charges that are imposed by local governments against new development for the purpose of generating revenue for or to recoup the cost of capital facilities (*i.e. infrastructure*) that are necessitated by and attributable to new development. These fees are generally implemented to reduce the economic burden of a municipality and its taxpayers when addressing the need for adequate capital improvements to accommodate growth. Impact fees are typically paid to a municipality in advance of the completion of a particular development project, and are based on a defined methodology and calculation that is derived from the cost of the facility and the scope/impact of the development.

PURPOSE

Chapter 395, *Financing Capital Improvements Required by New Development in Municipalities, Counties, and Certain Other Local Governments*, of the Texas Local Government Code outlines the process for adopting and updating impact fees for political subdivisions. On October 20, 2014, the City of Rockwall adopted roadway and water/wastewater impact fees through *Ordinance No. 14-47*. According to the statutory requirements stipulated by the Texas Local Government Code impact fees are required to be updated at a minimum of every five (5) years [*§395.052*].

In approaching an update to existing impact fees it is important for a city to assess its growth and employment potential, and establish land use assumptions that will guide development for a ten (10) year planning period (*i.e. 2019-2029*) [*§395.001(5)*]. These land use assumptions form the basis for the preparation of the *Impact Fee Capital Improvement Plan* for water, wastewater, and roadway facilities.

In order to determine the need and timing of capital improvements to serve future development, a rational estimate of the future growth of the City is required. The purpose of this report is to formulate growth and employment projections based upon assumptions pertaining to the type, location, quantity and timing of future development within the City, and to establish and document the methodology used for preparing these land use assumptions.

ELEMENTS OF THE LAND USE ASSUMPTIONS REPORT

This report contains the following components:

- *Methodology*: This component of the report contains the systematic and theoretical analysis of the methods and principals used to prepare the projections and land use assumptions contain within this report.
- *Data Collection Zones and Service Areas*: This component provides an explanation of the data collection zones (*i.e. Land Use Districts established in the OURHometown 2040 Comprehensive Plan*) and the Roadway, Water and Wastewater Impact Fee Service Areas for capital facilities.
- *Base Year Data*: This component provides information on population, housing and employment in the City of Rockwall as of January 1, 2019 for each capital facility service area.
- *Ten-Year Growth Projections*: This component provides assumptions with respect to the population, housing and employment data for the City of Rockwall in ten (10) years (*i.e. 2029*). This information is broken out by the capital facility service area.
- *Build Out Analysis:* This component provides projections for population, housing and employment under the assumption that the City and its Extraterritorial Jurisdiction (ETJ) are developed to their carrying capacity, or their *Built Out*.
- *Summary*: This component provides a synopsis of the land use assumptions contained within this report.
- *Appendices:* This component contains information that was important in deriving the population, housing and employment projections for 2019-2029.

METHODOLOGY

Building off the base year and build out projections contained in the OURHometown Vision 2040 Comprehensive Plan, and the growth assumptions and capital improvement needs estimated to support future growth, it is possible to develop an impact fee structure that fairly allocates improvement cost to growing areas of the City with relation to the growths' potential impact on the entire infrastructure system. The data contained in this report has been formulated using reasonable and generally accepted planning principles.

These land use assumptions and future growth projections take into consideration several factors influencing development patterns, including:

- The character, type, density and quantity of existing development.
- The current zoning patterns as documented on the City's zoning map and the anticipated future land uses as established in the OURHometown Vision 2040 Comprehensive Plan, which contains the City's Future Land Use Plan.
- The availability of land and infrastructure to support future expansion of development.
- The current and historical growth trends of both population and employment within the City.
- The location and configuration of vacant parcels of land and their ability to support development.
- The growth of employment utilizing previously established and generally accepted data from ESRI's ArcGIS *Business Analyst*.
- Local knowledge concerning future development projects or anticipated development within the city.

LAND USE ASSUMPTIONS REPORT METHODOLOGY

The following is the general methodology that was used for the preparation of this report:

(1) Population, housing and employment data was collected from the United States Census Bureau, North Central Texas Council of Governments (*NCTCOG*), the City of Rockwall's Geographic Information Systems (GIS) Division, the City of Rockwall's Building Inspection Department and other acceptable sources. This information was then analyzed and used to provide base information for all service areas from which projections could be extrapolated [see *Service Areas and Data Collection Zones*].

(2) The base year (*i.e. January 1, 2019*) estimates for housing, population and employment were calculated based on the information collected [see *Base Year Data*].

(3) From the base year and the information gathered from various sources a growth rate was established by examining recent growth trends experienced by the City over the last ten (10) years. This growth rate was then applied to each of the impact fee service areas to project the base year data over the ten (10) year planning period (*i.e. 2019-2029*) [see *Ten Year Growth Assumptions*].

(4) After the projections for housing, population and employment were prepared for the ten (10) year planning period, city staff made adjustments to account for known or anticipated development activity within the planning periods. In making these adjustments city staff took into consideration the recommendations made within the newly adopted OURHometown Vision 2040 Comprehensive Plan, existing public works data, and demographic information provided by the GIS Division and the Building Inspections Department.

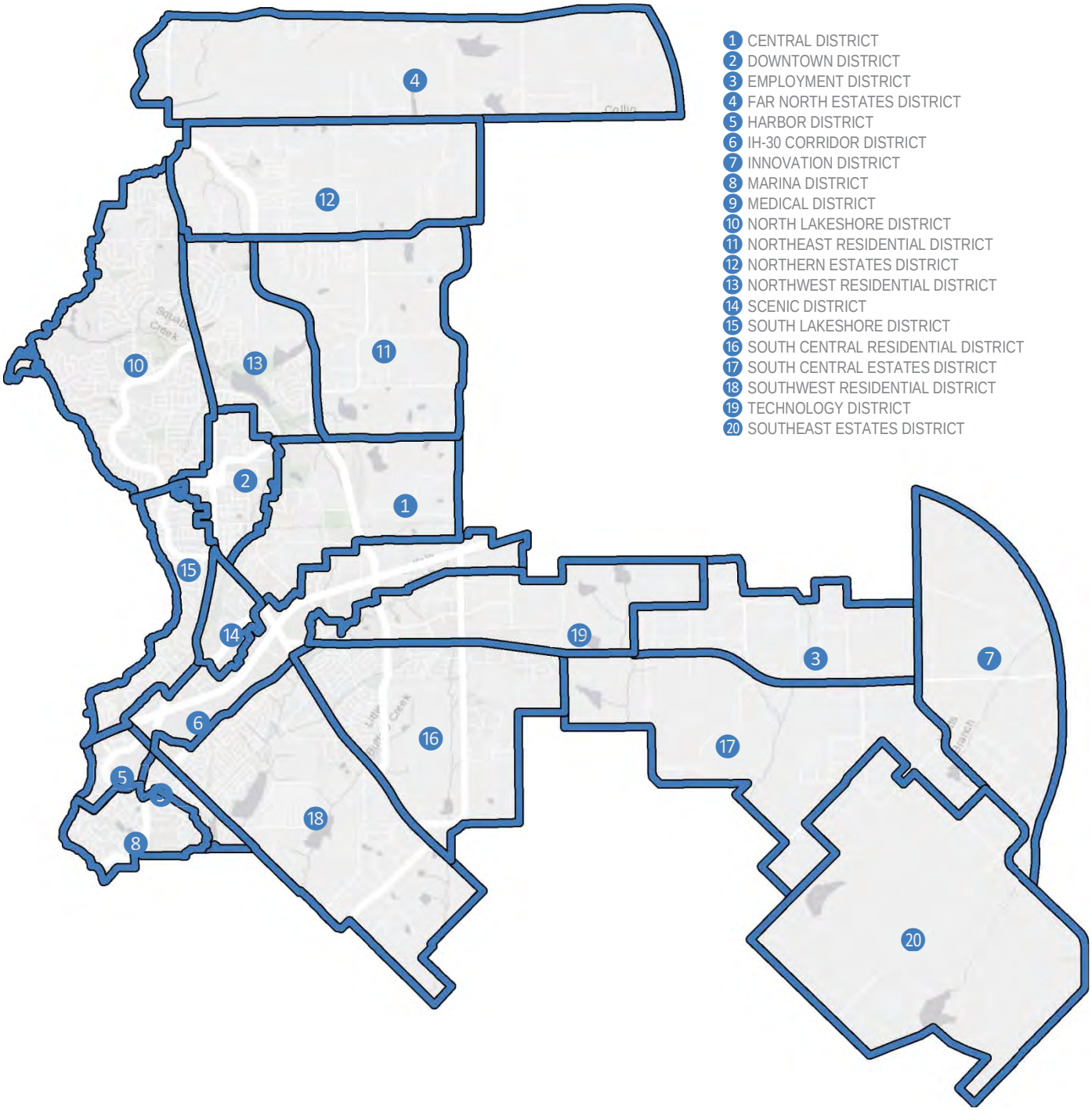
(5) Finally, the City's *Build Out* projections for housing, population and employment were calculated by establishing the City's carrying capacity in terms of developable acres and projecting population forward using the previously established Compound Annual Growth Rate (CAGR) to establish a *Build Out Year*. The housing and employment information were then projected to the *Build Out Year* [see *Build Out Projections*].

DATA COLLECTION ZONES AND SERVICE AREAS

DATA COLLECTION ZONES

The *Data Collection Zones* used for this study were taken from the OURHometown Vision 2040 Comprehensive Plan, which breaks the City down into 20 *Land Use Districts* (*see Figure 1*). These districts were created as a way of breaking down the overall *Future Land Use Plan* to create strategies to help manage growth and land uses in the future. They were also intended to be used as a tool by the City's various boards, commissions and the City Council when contemplating policy changes that could affect certain areas of the City.

FIGURE 1: DATA COLLECTION ZONES
NOTE: The Data Collection Zones are the Land Use Districts contained in the OURHometown Vision 2040 Comprehensive Plan.



SERVICE AREAS

The Texas Local Government Code (TLGC) requires that service areas be established within the corporate boundaries of a political subdivision for the purpose of ensuring that capital improvements service the areas generating need. The boundaries for impact fees are defined as follows:

- *Roadway Impact Fees* refers to a service area that is limited to the corporate boundaries of a political subdivision or city, and cannot extend into the Extraterritorial Jurisdiction (ETJ) or for a distance exceeding more than six (6) miles. The City of Rockwall is divided into four (4) service areas that are depicted in *Figure 3*.

- *Water and Wastewater Impact Fees* refers to a service area that includes a city's corporate boundaries and Extraterritorial Jurisdiction (ETJ), which is depicted in *Figure 2*. This service area is depicted in *Figure 4*.

SUMMARY OF DATA

As opposed to the databases calculated in 2007 and 2013 -- *which utilized Traffic Survey Zones (TSZ) as the data collection zones* -- the current database utilizes the following geographic areas:

- *Land Use Districts from the OURHometown Vision 2040 Comprehensive Plan.* These geographic areas better conformed to the City's corporate boundaries, and were drafted with the OURHometown Vision 2040 Comprehensive Plan as the geographic regions intended to be used for all future long-range planning/data collection exercises.

- *Service Areas.* The Service Areas correlate to the Water, Wastewater and Roadway Service Areas identified in *Figures 3 & 4*. As previously stated, the corporate boundaries of the City of Rockwall serve as the limits for the Roadway Service Areas and the Water and Waste Water Service Areas include the corporate boundaries and the Extraterritorial Jurisdiction (ETJ) of the City.

Additionally, all databases and projections utilized the following variables:

- *Households (2019).* The *Residential Address Point* feature class in the City's Geographic Information Systems (GIS) software includes all residential addresses (i.e. *single-family, duplex, multi-family, group home/quarters, etc.*) existing as of January 1, 2019. The total number of residential address points (*i.e. households*) was queried from this layer to establish the base years' numbers.

FIGURE 2: CITY OF ROCKWALL CITY LIMITS AND EXTRATERRITORIAL JURISDICTION (ETJ)

NOTE: The City Limits of Rockwall are depicted in RED. The Extraterritorial Jurisdiction (ETJ) is depicted in BLUE.

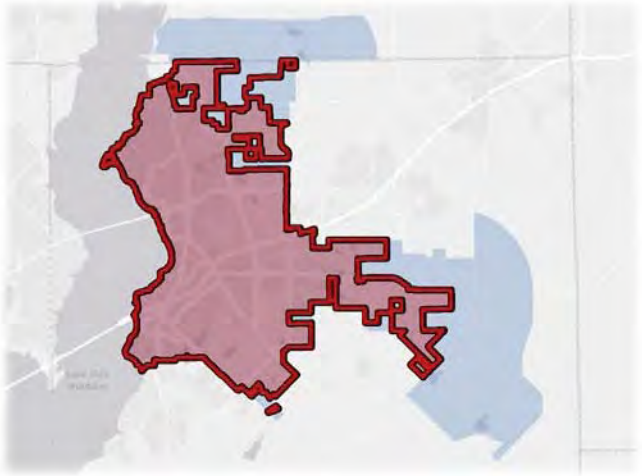


FIGURE 3: ROADWAY SERVICE AREAS

This is the derived service area structure for roadway facilities. These service areas conform to the current city limits of the City of Rockwall and are divided by John King Boulevard and Interstate Highway 30.

NOTE: RED: Service Area 1; BLUE: Service Area 2; GREEN: Service Area 3; YELLOW: Service Area 4

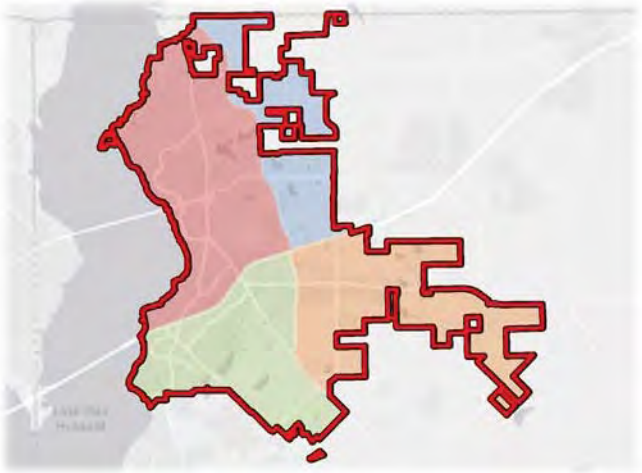
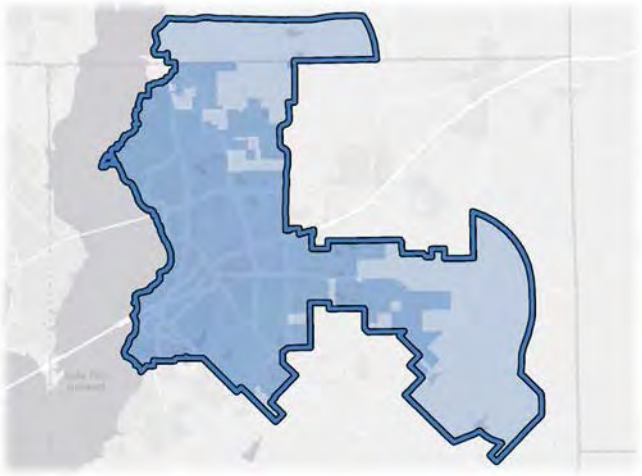


FIGURE 4: WATER/WASTE WATER SERVICE AREAS

This is the derived service area structure for water/wastewater facilities. These service areas conform to the current city limits and Extraterritorial Jurisdiction (ETJ).

NOTE: BLUE: Service Area



- *Households (2029).* This is the projected household data by service area for the year 2029, which represents a ten (10) year growth projection. This information was derived by staff using the stated databases and proper projection techniques.
- *Population (2019)*. This is the existing population for the base year (i.e. *2019*). This information was calculated utilizing the number of households existing as of January 1, 2019, the occupancy, rate and the average household size as established by the United States Census Bureau for each Census Block.
- *Population (2029)*. This is the projected population by service area for the year 2029, which represents a ten (10) year growth projection. This information was derived by staff using the stated databases and proper projection techniques.
- *Employment (2019).* Employment data was aggregated to three (3) employment sectors, which include *Basic*, *Retail* and *Service* as provided by the Business Analyst tool available from ESRI (*the City's provider for its geospatial database software*). These service sectors serve as the basis for non-residential trip generation. The following is a summary of these employment sectors followed by corresponding North American Industry Classification System (NAICS) code:

    - *Basic.* Land use activities that produce goods and services such as those that are exported outside the local economy. These include manufacturing, construction, transportation, wholesale trade, warehousing and other industrial uses (NAICS Code: *#210000 - #422999*).
    - *Retail.* Land use activities that provide for the retail sale of goods that primarily serve households and whose location choice is oriented toward the residential sector. These include uses such as grocery stores, restaurants, etc. (NAICS Code: *#440000 - #454390*).
    - *Service.* Land use activities that provide personal and professional services. These include such uses as financial, insurance, government, and other professional and administrative offices (NAICS Code *#520000 - #928199*).

- *Employment (2029).* The projected employment data was aggregated to three (3) employment sectors, which include *Basic*, *Retail* and *Service* as provided by the Business Analyst tool available from ESRI. These service sectors were then projected by service area to the year 2029, which represents a ten (10) year growth projection. This information was derived by staff using the stated databases and proper projection techniques.

BASE YEAR DATA

This section documents the methods used to derive the base year data for the City of Rockwall as of January 1, 2019. This *benchmark* information provides data for the corporate limits and Extraterritorial Jurisdiction (ETJ) of the City, and creates a starting point in which to extrapolate the ten (10) year growth projections that are depicted in the following section (*see Ten-Year Growth Projections*). This information was initially developed with the OURHometown Vision 2040 Comprehensive Plan, but has been updated to include the additional growth that has taken place since the original numbers were derived and the numbers for January 1, 2019.

HOUSEHOLDS

Utilizing the City's Geographic Information System (GIS) software, the residential addresses for each data collection zone (*i.e. Land Use Districts*) were queried. This provided the raw housing data that was then reviewed to remove any vacant lots or anomalies in the data set. Based on this process, the City of Rockwall was shown to have 16,690 households inside the City's corporate limits and 1,700 households in the City's Extraterritorial Jurisdiction (ETJ) as of January 1, 2019. The total number of households is 18,390. Staff should note that this query included all residential housing types (*i.e. multi-family, single-family, and group homes*) from the data sets.

POPULATION

The City of Rockwall generally uses the North Central Texas Council of Government's (NCTCOG) population estimates as the City's official population; however, for the purposes of this planning study it was necessary to calculate a baseline population that was specific to January 1, 2019. This was also necessary in order to estimate the population of the City's Extraterritorial Jurisdiction (ETJ).

To calculate the population as of January 1, 2019, the City's Geographic Information Systems (GIS) Division utilized the following formula to derive the population estimate for each of the data collection zones:

$$\sum_{d=1}^{20} POP = ((a * o) * f)$$

Where:

POP = Population as of January 1, 2019
d = Land Use District
a = Number of Residential Address Points in Each District
o = Occupancy Rate [per U.S. Census Bureau]
f = Density Factor per Census Block [U.S. Census Bureau]

Using this methodology the base year population as of January 1, 2019 was established to be 44,575 residents inside the corporate limits and 5,041 people residing in the Extraterritorial Jurisdiction (ETJ).

EMPLOYMENT

The base employment data was calculated using ArcGIS *Business Analyst*, which is software that provides location-based market information. Utilizing this tool, the City's Geographic Information Systems (GIS) Division was able to query employment and business information relating to each data collection zone (*i.e. Land Use District*). This information was then broken down into one (1) of the three (3) employment categories (*i.e. Basic, Service, or Retail*). Based on the analysis, the City's corporate limits were shown to have a total employment of 24,083 jobs on January 1, 2019. Of the total employment 2,505 jobs were classified as *Basic*, 12,403 jobs were classified as *Service*, and 9,175 jobs were classified as *Retail*. The Extraterritorial Jurisdiction (ETJ) was shown to have an additional 643 jobs, with 535 jobs being classified as *Service* and 108 jobs being classified as *Retail*. In addition, the GIS Division calculated the total non-residential building square footages (*i.e. improvements*) relating to all of these employment types at ~14,444,596 SF inside the City's corporate boundaries and Extraterritorial Jurisdiction (ETJ), with ~3,209,401 SF being classified as *Basic*, ~5,374,068 SF being classified as *Service*, and ~5,861,127 SF being classified as *Retail*. The total non-residential square footage of land area 139,424,433.67 (or 3,200.74-acres), with 11,967,581.81 SF being classified as *Basic*, 58,451,896.18 SF being classified as *Service*, and 69,004,955.68 SF being classified as *Retail*.

TEN-YEAR GROWTH PROJECTIONS

GROWTH ASSUMPTIONS

In this planning study, growth is characterized in two (2) forms: 1) Population (*i.e. residential land use*), and 2) Employment (*i.e. non-residential land use*). To calculate a reasonable growth rate for population and employment it was necessary for staff to make a series of assumptions on which to base the ten (10) year growth projections. These assumptions are summarized as follows:

- Future growth identified within this study will conform to the *Future Land Use Plan* depicted in the OURHometown Vision 2040 Comprehensive Plan.
- Infrastructure will continue to be development driven, and the City will continue to be able to finance any other necessary improvements needed to accommodate future growth.
- School facilities will continue to be sufficient to accommodate any increases in population.
- Densities will generally conform to the land classifications and *District Strategies* identified within the OURHometown Vision 2040 Comprehensive Plan, and as depicted on the Future Land Use Map.
- The residential and non-residential carrying capacity for the City or its *build out* will occur simultaneously.

The ten (10) year projections for population are based on the growth rate, which was previously discussed and staff's consideration of past development trends. The ten (10) year projections for employment are based on the overall carrying capacity for non-residential development compared to the current non-residential development in the City. *Tables 1 & 2* detail the ten (10) year projections for households, population and employment for the service areas associated with roadway and water/wastewater impact fees.

POPULATION GROWTH RATE ANALYSIS

The City of Rockwall has experienced steady residential population growth (*see Figure 5*) over the last 18-years and -- *with the City being ~48.29% vacant and taking into account the City's current availability of water and wastewater infrastructure* -- staff anticipates that the population growth will continue to be fairly steady. It should be noted, however, that the City has seen a slight decline in the population growth percentage over the last five (5) years. From 2000 to 2018, the population growth percentage was 5.08%, but when looking at the last five (5) years this number drops to 1.79% (*see Table 3*).

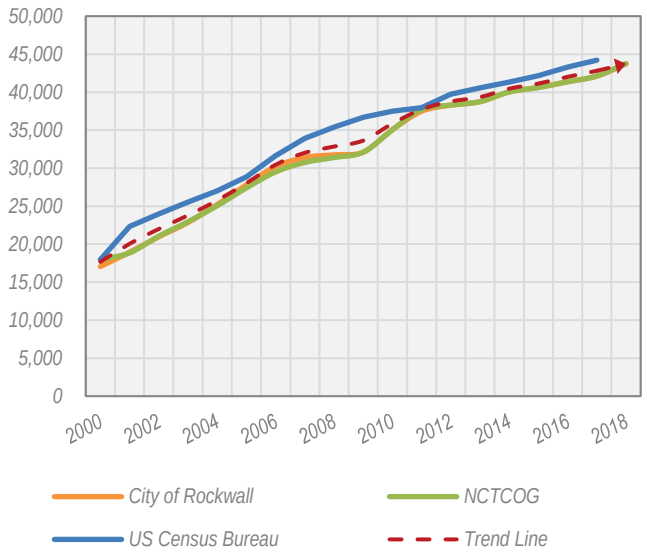
TABLE 1: SUMMARY OF TEN-YEAR GROWTH (ALL ROADWAY SERVICE AREAS)

	2019	2029	Increase
Households	16,690	22,135	24.60%
Population	44,575	59,898	25.58%
Total Employment	24,083	32,366	25.59%
Basic	2,505	3,367	25.60%
Service	12,403	16,669	25.59%
Retail	9,175	12,330	25.59%

TABLE 2: SUMMARY OF TEN-YEAR GROWTH (WATER/WASTE WATER SERVICE AREA)

	2019	2029	Increase
Households	18,390	26,609	30.89%
Population	49,616	73,228	32.24%
Total Employment	25,369	34,065	25.53%
Basic	2,505	3,367	25.60%
Service	13,473	18,082	25.49%
Retail	9,391	12,616	25.56%

FIGURE 5: POPULATION BY AGENCY, 2000-2018



To calculate the ten (10) year population projections, City staff utilized the *Compound Annual Growth Rate (CAGR)* method. CAGR allows for a general assessment of growth when considering periodic increases and decreases in residential

population growths that coincide with changing economic conditions. The formula for CAGR is as follows:

$$CAGR = \left(\frac{x}{y}\right)^{\left(\frac{1}{n}\right)} - 1$$

Where:
CAGR = Compound Annual Growth Rate
x = End Value
y = Beginning Value
n = Number of Years

In 2007, a CAGR of four (4) percent was used to calculate the ten (10) year population projections; however, based on the five (5) year annual growth rate and the number depicted in *Table 3*, staff utilized a more conservative three (3) percent annual growth rate. In assessing the past growth rates, staff used several sources including the North Central Texas Council of Governments (NCTCOG), the U.S. Census Bureau, and the City of Rockwall. Based on a three (3) percent CAGR, the following chart shows the anticipated population growth over the next ten (10) years:

TABLE 4: TEN (10) YEAR POPULATION GROWTH
This table shows the projected ten (10) year population growth at a three (3) percent Compound Annual Growth Rate (CAGR).

Year	Population
2019	44,575
2020	45,907
2021	47,284
2022	48,703
2023	50,164
2024	51,669
2025	53,219
2026	54,815
2027	56,460
2028	58,154
2029	59,898

TABLE 3: CITY OF ROCKWALL GROWTH RATES

Data Source	Growth Rate
2014 – 2017 US Census	*1.70%*
2010 – 2017 US Census	*2.08%*
2000 – 2017 US Census	*5.13%*
2014 – 2018 Single Family Permits	*1.82%*
2010 – 2018 Single Family Permits	*4.80%*
2000 – 2018 Single Family Permits	*-2.93%*
Future Growth Projection	*3.0%*

PROJECTED POPULATION FOR 2029

Utilizing the three (3) percent Compound Annual Growth Rate (CAGR) established in the previous section, staff projects that the population for the City will be 59,898 in 2029 (*see Table 4 and Figure 6*). This estimate does appear to be consistent with trends that have been observed at the county and regional level (*see Figure 7 for a comparison of the City's population growth versus the County's population growth*). Although, the growth rate has slowed over the last five (5) years this is seen as a temporary trend and not a sign indicative of the City's future growth trend.

In determining this population projection, staff observed how this projection would relate to the City's projected building permits, and the additional population added to the City on an annual basis (*see Table 5*). Taking this into consideration, the estimated average annual building permits anticipated over this time period is approximately 522. This represents a decrease of approximately 121 permits annually from the estimates completed in 2014. This estimate -- *while still likely high in some years due to shifts in market demand* -- is a more conservative estimate than what was used in 2014. It should be noted that this estimate takes into consideration the type of development likely to occur in a given area (*i.e. single-family or multi-family*).

FIGURE 6: TEN (10) YEAR POPULATION GROWTH
This chart shows the projected ten (10) year population growth at a three (3) percent Compound Annual Growth Rate (CAGR).

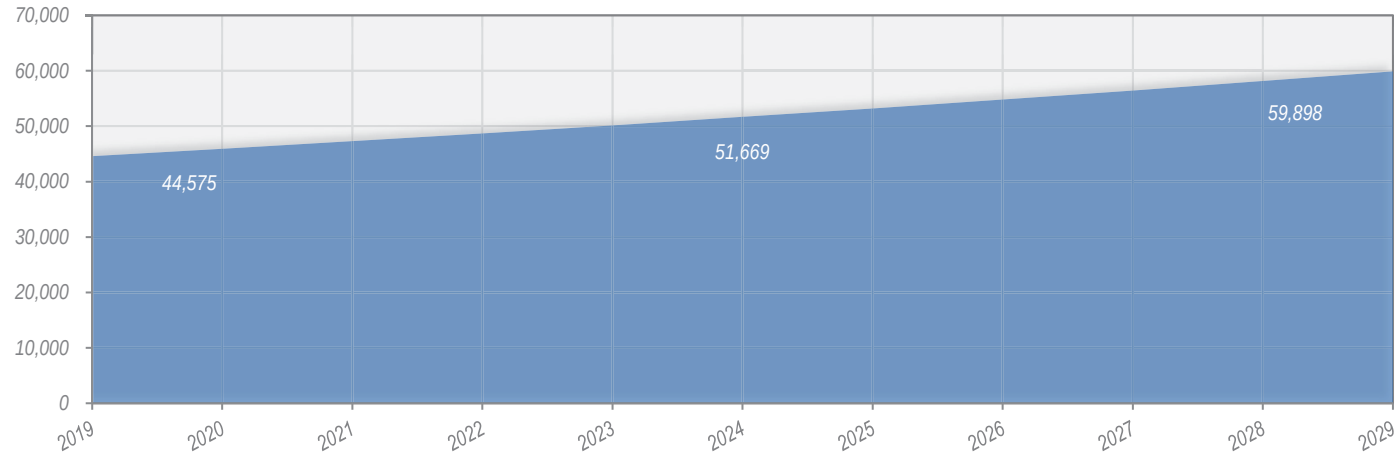
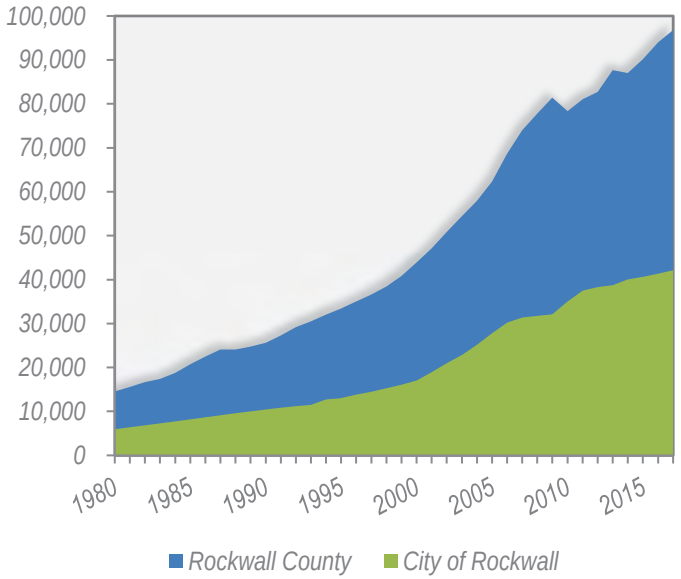


TABLE 5: PROJECTED BUILDING PERMITS

Year	Population	New Residents	New Building Permits
2019	44,575	825	294
2020	45,907	1,332	474
2021	47,284	1,377	490
2022	48,703	1,419	505
2023	50,164	1,461	520
2024	51,669	1,505	536
2025	53,219	1,550	552
2026	54,815	1,597	568
2027	56,460	1,644	585
2028	58,154	1,694	603
2029	59,898	1,745	621
Average Number of Annual Permits:			522

FIGURE 7: CITY POPULATION VS COUNTY POPULATION, 1980-2017



PROJECTED EMPLOYMENT FOR 2029

Employment data for the year 2029 was calculated by taking the information established in the base year analysis -- *which was obtained through the ArcGIS Business Analyst tool* -- and the corresponding ratio of employment to population, and extrapolating this information out to January 1, 2029. These estimates are summarized in Appendix C, *Employment Breakdown by Roadway Service Area*, and Appendix D, *Employment Breakdown by Water/Wastewater Service Area*.

BUILD OUT ANALYSIS

A *Build Out Projection* for a city (also referred to as the city's *Carrying Capacity*) is an estimate of the location and density of all potential development, employment and population that a city can support within its future corporate boundaries.

ESTABLISHING HOUSEHOLDS AND POPULATION AT THE CITY'S BUILD OUT

As part of the newly adopted OURHometown Vision 2040 Comprehensive Plan, City staff calculated the number of households and residents at *Build Out*. In establishing the City's households and population at *Build Out* staff made the following assumptions:

- All vacant or undeveloped land within the City's corporate boundaries will develop with the maximum density permitted for the current zoning per the Unified Development Code (UDC).
- All Agricultural (AG) District property is assumed to be vacant or undeveloped and will develop at the maximum density permitted in accordance to the property's' designation on the Future Land Use Map contained in the OURHometown Vision 2040 Comprehensive Plan.
- All property within the Extraterritorial Jurisdiction (ETJ) is assumed to be vacant and will be developed in conformance with the Future Land Use Map at the maximum density permitted by the OURHometown Vision 2040 Comprehensive Plan.
- The City's ETJ is fixed and will not increase in the future.

Taking these assumptions into consideration, staff utilized Geographical Information Systems (GIS) software to calculate all the undeveloped land within the city's corporate boundaries, including the ETJ. Once calculated the acreages were broken down by land use and multiplied by the maximum density permitted for each of the land uses as established within the Unified Development Code (UDC) and the Comprehensive Plan. These totals were then multiplied by the average people per household [*i.e. 2.81 per the US Census Bureau*] to establish the unadjusted population at *Build Out*. Staff then reviewed the projected densities coupled with current land use patterns, and adjusted the numbers to account for known or anticipated development activity. Based on the final *Build Out* population (*i.e. 149,525*), staff projected the population forward using the previously established three (3) percent Compound Annual Growth Rate (CAGR) [*see the Ten-Year Growth Assumptions section*] until the build out population was reached (*see Table 6*). This established a build out year of 2060. The following formula lays out the methodology used to calculate these numbers:

TABLE 6: PROJECTED POPULATION @ 3% COMPOUND ANNUAL GROWTH (CAGR)

Year	Population	New Residents
2018	43,750	1,630
2019	44,570	820
2020	45,907	1,337
2021	47,284	1,377
2022	48,703	1,419
2023	50,164	1,461
2024	51,669	1,505
2025	53,219	1,550
2026	54,815	1,597
2027	56,460	1,644
2028	58,154	1,694
2029	59,898	1,745
2030	61,695	1,797
2031	63,546	1,851
2032	65,453	1,906
2033	67,416	1,964
2034	69,439	2,022
2035	71,522	2,083
2036	73,667	2,146
2037	75,877	2,210
2038	78,154	2,276
2039	80,498	2,345
2040	82,913	2,415
2041	85,401	2,487
2042	87,963	2,562
2043	90,602	2,639
2044	93,320	2,718
2045	96,119	2,800
2046	99,003	2,884
2047	101,973	2,970
2048	105,032	3,059
2049	108,183	3,151
2050	111,429	3,245
2051	114,771	3,343
2052	118,215	3,443
2053	121,761	3,546
2054	125,414	3,653
2055	129,176	3,762
2056	133,052	3,875
2057	137,043	3,992
2058	141,154	4,111
2059	145,389	4,235
2060	149,751	*BO:* 149,525

$$BO = P + CP + EP$$

$$CP = (\sum[(LU_1 xD_1) \dots (LU_x\, xD_x)]\,) x\ AHS$$

$$EP = (LDR\ x\ 2.5) + (MDR\ x\ 3.5) + (HDR\ x\ 5)$$

Where:

BO = Build Out Population
P = Population as of January 1, 2019
CP = Population of Vacant or Undeveloped Land in the City Limits
EP = Population of Vacant or Undeveloped Land in the ETJ
LU = Vacant Available Land Inside the City Limits for a Land Use
D = Maximum Density Permitted for a Land Use per UDC
AHS = Average Household Size [2.81185 per US Census Bureau]
LDR = Low Density Residential Acreage Available in ETJ
MDR = Medium Density Residential Acreage Available in ETJ
HDR = High Density Residential Acreage Available in ETJ

ESTABLISHING EMPLOYMENT AT THE CITY'S BUILD OUT

To calculate employment at *Build Out*, staff utilized the employment numbers calculated with the base year analysis, and -- *based on the estimated current year population* -- calculated ratios between employment and population for the City and its Extraterritorial Jurisdiction (ETJ). These ratios were then used to extrapolate the number of employees for basic, service and retail sectors for the ten (10) year and build out projections.

SUMMARY

The following is a summary of staff's findings when preparing the *Land Use Assumption Report* in preparation for the update of the Roadway, Water and Wastewater Impact Fees for 2019:

- The average annual growth rate as calculated by staff is three (3) percent. This growth rate was established based on data from the US Census, North Texas Council of Governments (NCTCOG), the City and County of Rockwall. Using this growth rate staff projected the following population numbers:
  - The population of the City of Rockwall as of January 1, 2019 was 44,691. This is expected to increase by 25.39% in the next ten (10) years to an estimated 59,898 by January 1, 2029.
  - The population for the City of Rockwall and its Extraterritorial Jurisdiction (ETJ) as of January 1, 2019 was 49,743. This is expected to increase by 32.07% in the next ten (10) years to an estimated 73,228 by January 1, 2029.
- The estimated employment for the City of Rockwall as of January 1, 2019 was 24,083 jobs, with another 1,286 jobs existing within its Extraterritorial Jurisdiction (ETJ). Staff estimates this number to climb to 32,366 jobs within the current city limits, and another 1,699 jobs within the current Extraterritorial Jurisdiction (ETJ) by January 1, 2029.
- Staff has established that there are currently 8,204.17 undeveloped acres of land within the city limits. This represents ~48.29% of the current land in the City. Additionally, the City of Rockwall has access to another 14,083.24-acres of land within its current Extraterritorial Jurisdiction (ETJ). Approximately 75.11% (10,577.67-acres) of the land within this area is vacant.
- According to staff's estimate, the City of Rockwall is expected to be built out in the year 2060, with a total population of 149,525.

APPENDIX A: SUMMARY OF ROADWAY SERVICE AREAS

SERVICE AREA 1

	ESTIMATES (JANUARY 1, 2019)			PROJECTIONS (JANUARY 1, 2029)			BUILD OUT PROJECTIONS (2060)		
DISTRICTS	HU	POP	EMP	HU	POP	EMP	HU	POP	EMP
Central District	216	455	2,332	427	899	3,134	816	1,714	4,331
Downtown District	971	2,332	3,105	1,056	2,519	4,173	1,060	2,531	5,767
IH-30 Corridor District	-	-	2,825	-	-	3,797	-	-	5,247
North Lakeshore District	3,884	11,081	944	4,318	12,324	1,269	4,326	12,350	1,753
Northern Estates District	3	9	4	12	34	5	184	513	7
Northwest Residential District	1,422	3,974	667	2,291	6,401	896	2,324	6,493	1,239
Scenic District	1,084	2,280	1,161	1,217	2,559	1,560	1,248	2,624	2,156
South Lakeshore District	1,578	3,317	968	1,578	3,317	1,301	1,595	3,352	1,798
	9,158	23,448	12,006	10,898	28,053	16,135	11,553	29,577	22,298

SERVICE AREA 2

	ESTIMATES (JANUARY 1, 2019)			PROJECTIONS (JANUARY 1, 2029)			BUILD OUT PROJECTIONS (2060)		
DISTRICTS	HU	POP	EMP	HU	POP	EMP	HU	POP	EMP
IH-30 Corridor District	1	3	205	-	-	276	-	-	381
South Central Estates District	37	112	122	148	448	164	2,504	7,611	227
South Central Residential District	795	2,417	-	1,487	4,522	-	2,399	7,293	-
Technology District	47	100	824	162	367	1,107	1,748	4,760	1,530
	880	2,632	1,151	1,797	5,336	1,547	6,651	19,664	2,138

SERVICE AREA 3

	ESTIMATES (JANUARY 1, 2019)			PROJECTIONS (JANUARY 1, 2029)			BUILD OUT PROJECTIONS (2060)		
DISTRICTS	HU	POP	EMP	HU	POP	EMP	HU	POP	EMP
Harbor District	552	1,255	2,766	1,040	2,364	3,717	1,713	3,893	5,137
IH-30 Corridor District	-	-	2,613	-	-	3,512	-	-	4,853
Marina District	1,423	3,441	630	1,525	3,702	847	1,537	3,734	1,170
Medical District	-	-	1,897	-	-	2,549	-	-	3,523
South Central Residential District	1,089	3,310	371	1,089	3,310	499	1,089	3,310	689
Southwest Residential District	2,257	7,260	1,900	3,695	11,847	2,553	3,943	12,509	3,529
Technology District	615	1,292	63	618	1,298	85	658	1,383	117
	5,936	16,558	10,240	7,966	22,520	13,762	8,940	24,829	19,018

SERVICE AREA 4

	ESTIMATES (JANUARY 1, 2019)			PROJECTIONS (JANUARY 1, 2029)			BUILD OUT PROJECTIONS (2060)		
DISTRICTS	HU	POP	EMP	HU	POP	EMP	HU	POP	EMP
Central District	92	193	167	182	382	224	349	735	310
IH-30 Corridor District	-	-	71	-	-	95	-	-	132
Northeast Residential	361	1,009	438	762	2,129	589	1,786	4,988	813
Northern Estates District	263	735	10	529	1,478	13	1,066	2,984	19
	716	1,937	686	1,473	3,990	922	3,201	8,707	1,274

GRAND TOTAL	16,690	44,575	24,083	22,135	59,898	32,366	30,345	82,777	44,728

APPENDIX B: SUMMARY OF WATER/WASTEWATER SERVICE AREA

	ESTIMATES (JANUARY 1, 2019)			PROJECTIONS (JANUARY 1, 2029)			BUILD OUT PROJECTIONS (2060)		
DISTRICTS	HU	POP	EMP	HU	POP	EMP	HU	POP	EMP
Central District	308	648	2,499	609	1,281	3,358	1,165	2,449	4,641
Downtown District	971	2,332	3,105	1,056	2,519	4,173	1,060	2,531	5,767
Employment District	314	971	880	532	1,645	1,162	630	1,952	5,538
Far North Estates District	230	674	96	676	1,980	127	4,426	12,950	-
Harbor District	552	1,255	2,766	1,040	2,364	3,717	1,713	3,893	5,741
IH-30 Corridor District	1	3	5,714	-	-	7,679	-	-	10,612
Innovation District	268	822	66	794	2,438	87	5,323	16,407	415
Marina District	1,423	3,441	630	1,525	3,701	847	1,537	3,734	1,170
Medical District	-	-	1,897	-	-	2,549	-	-	3,523
North Lakeshore District	3,884	11,081	944	4,317	12,324	1,269	4,326	12,350	1,753
Northeast Residential District	629	1,758	438	1,244	3,476	589	2,384	6,658	813
Northern Estates District	512	1,439	14	1,090	3,065	19	2,626	7,390	26
Northwest Residential District	1,422	3,974	667	2,291	6,401	896	2,324	6,493	1,239
Scenic District	1,084	2,280	1,161	1,217	2,558	1,560	1,248	2,624	2,156
South Lakeshore District	1,578	3,317	968	1,578	3,317	1,301	1,595	3,352	1,798
South Central Residential District	1,970	5,987	371	3,265	9,923	499	3,618	10,998	689
South Central Estates District	315	956	366	824	2,502	486	3,760	11,428	1,762
Southwest Residential District	2,267	7,286	1,900	3,772	12,068	2,553	4,229	13,344	3,529
Technology District	662	1,392	887	780	1,665	1,192	2,406	6,143	1,647
Southeast Estates District	-	-	-	-	-	-	8,168	24,829	441
	18,390	49,616	25,369	26,609	73,228	34,064	52,538	149,525	53,262

APPENDIX C: EMPLOYMENT BREAKDOWN BY ROADWAY SERVICE AREAS

SERVICE AREA 1

DISTRICTS	ESTIMATES (JANUARY 1, 2019) BASIC	SERVICE	RETAIL	PROJECTIONS (JANUARY 1, 2029) BASIC	SERVICE	RETAIL	BUILD OUT PROJECTIONS (2060) BASIC	SERVICE	RETAIL
Central District	973	633	726	1,308	851	976	1,807	1,176	1,348
Downtown District	608	1,104	1,393	817	1,484	1,872	1,129	2,050	2,587
IH-30 Corridor District	599	916	1,310	805	1,231	1,761	1,112	1,701	2,433
North Lakeshore District	-	608	336	-	817	452	-	1,129	624
Northern Estates District	-	4	-	-	5	-	-	7	-
Northwest Residential District	-	531	136	-	714	183	-	986	253
Scenic District	-	650	511	-	874	687	-	1,207	949
South Lakeshore District	-	572	396	-	769	532	-	1,062	735
	2,180	5,018	4,808	2,930	6,744	6,462	4,049	9,320	8,930

SERVICE AREA 2

DISTRICTS	ESTIMATES (JANUARY 1, 2019) BASIC	SERVICE	RETAIL	PROJECTIONS (JANUARY 1, 2029) BASIC	SERVICE	RETAIL	BUILD OUT PROJECTIONS (2060) BASIC	SERVICE	RETAIL
IH-30 Corridor District	-	-	205	-	-	276	-	-	381
South Central Estates District	-	94	28	-	126	38	-	175	52
South Central Residential District	-	-	-	-	-	-	-	-	-
Technology District	298	283	243	400	380	327	553	526	451
	298	377	476	400	507	640	553	700	884

SERVICE AREA 3

DISTRICTS	ESTIMATES (JANUARY 1, 2019) BASIC	SERVICE	RETAIL	PROJECTIONS (JANUARY 1, 2029) BASIC	SERVICE	RETAIL	BUILD OUT PROJECTIONS (2060) BASIC	SERVICE	RETAIL
Harbor District	27	2,456	283	36	3,301	380	50	4,561	526
IH-30 Corridor District	-	845	1,768	-	1,136	2,376	-	1,569	3,284
Marina District	-	267	363	-	359	488	-	496	674
Medical District	-	1,651	246	-	2,219	331	-	3,066	457
South Central Residential District	-	331	40	-	445	54	-	615	74
Southwest Residential District	-	924	976	-	1,242	1,312	-	1,716	1,813
Technology District	-	44	19	-	59	26	-	82	35
	27	6,518	3,695	36	8,760	4,966	50	12,105	6,862

SERVICE AREA 4

DISTRICTS	ESTIMATES (JANUARY 1, 2019) BASIC	SERVICE	RETAIL	PROJECTIONS (JANUARY 1, 2029) BASIC	SERVICE	RETAIL	BUILD OUT PROJECTIONS (2060) BASIC	SERVICE	RETAIL
Central District	-	167	-	-	224	-	-	310	-
IH-30 Corridor District	-	-	71	-	-	95	-	-	132
Northeast Residential	-	313	125	-	421	168	-	581	232
Northern Estates District	-	10	-	-	13	-	-	19	-
	-	490	196	-	659	263	-	910	364

GRAND TOTAL	2,505	12,403	9,175	3,367	16,669	12,330	4,652	23,035	17,040

APPENDIX D: EMPLOYMENT BREAKDOWN BY WATER/WASTEWATER SERVICE AREA

	ESTIMATES (JANUARY 1, 2019)			ESTIMATES (JANUARY 1, 2029)			BUILD OUT (2060)		
DISTRICTS	BASIC	SERVICE	RETAIL	BASIC	SERVICE	RETAIL	BASIC	SERVICE	RETAIL
Central District	973	800	726	1,308	1,075	976	1,807	1,486	1,348
Downtown District	608	1,104	1,393	817	1,484	1,872	1,129	2,050	2,587
Employment District	-	742	138	-	980	182	-	4,670	869
Far North Estates District	-	86	10	-	114	13	-	-	-
Harbor District	27	2,456	283	36	3,301	380	50	5,103	589
IH-30 Corridor District	599	1,761	3,354	805	2,367	4,507	1,112	3,271	6,229
Innovation District	-	54	12	-	71	16	-	340	76
Marina District	-	267	363	-	359	488	-	496	674
Medical District	-	1,651	246	-	2,219	331	-	3,066	457
North Lakeshore District	-	608	336	-	817	452	-	1,129	624
Northeast Residential District	-	313	125	-	421	168	-	581	232
Northern Estates District	-	14	-	-	19	-	-	26	-
Northwest Residential District	-	531	136	-	714	183	-	986	253
Scenic District	-	650	511	-	874	687	-	1,207	949
South Lakeshore District	-	572	396	-	769	532	-	1,062	735
South Central Residential District	-	331	40	-	445	54	-	615	74
South Central Estates District	-	282	84	-	375	112	-	1,358	404
Southwest Residential District	-	924	976	-	1,242	1,312	-	1,716	1,813
Technology District	298	327	262	400	439	352	553	607	487
Southeast Estates District	-	-	-	-	-	-	-	189	252
	2,505	13,473	9,391	3,367	18,082	12,616	4,652	29,958	18,651

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City of Rockwall

2019 Update of Roadway Impact Fees

Final Report

Submitted By:

FREESE AND NICHOLS

September 16, 2019

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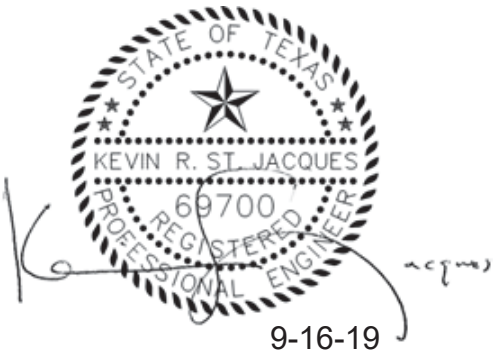
City of Rockwall

2019 Update of Roadway Impact Fees

Final Report



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ENGINEERING FIRM
F-2144

Submitted By:

FREESE AND NICHOLS

September 16, 2019

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Chapter 1: Introduction

Shrinking funds available for transportation improvements on city thoroughfares limit many cities from upgrading infrastructure to meet increasing travel demands. To meet the needs of new growth, many cities collect "impact fees" from new development to help fund transportation improvements necessitated by such development. What is unique about impact fees is that they often finance roadway improvements that are considered “offsite” to new development. However, when considering the traffic implications created by new development on the roadway system, impact fees provide a means by which infrastructure may keep pace with new development.

Texas initially authorized the use of impact fees with the 1987 legislature. Now codified in Chapter 395 of the Texas Local Government Codes, the legislation authorizes cities to collect fees from new developments to finance new construction or expansion of capital improvements such as water treatment and distribution facilities, storm and wastewater facilities, and transportation facilities. The law stipulates that all fees collected from new development must not exceed the maximum amount calculated by the methodology described therein.

The law also mandates that impact fee systems be updated periodically to ensure that an appropriate cost per service unit is calculated commensurate with an impact fee capital improvements program. The law also mandates that as new transportation improvements are completed, actual costs are inserted into the cost per service unit calculation to reflect a more accurate reading of service area costs as opposed to estimated costs that were established at the onset of the impact fee system. Finally, new capital improvement projects may be added to the program, subject to meeting eligibility requirements.

In September 2001, Chapter 395 was amended which revised called for several technical and administrative changes of impact fee systems including:

- Expansion of the permissible service area structure for roadway facilities from three to six miles;
- A credit for the portion of ad valorem tax revenues generated by improvements over the program period, or the credit equal to 50% of the total projected cost of implementing the capital improvements plan;
- A city's share of costs on the federal or Texas highway system, including matching funds and costs related to utility line relocation, the establishment of curbs and gutters, sidewalks, drainage appurtenances, and rights-of-way;
- Increase in the time period of update of impact fee land use assumptions and capital improvements plan from a three to five-year period;
- Changes in compliance requirements as they relate to annual reporting; and
- Consolidation of the land use assumptions and capital improvements plan hearings.

The implementation and administration of roadway impact fee systems offers several advantages to both a city and new development among which include: 1) a systematic, structured approach to assessment of fees, 2) a clear, equitable distribution of costs associated with the impact of new development, 3) the ability to pool funds for project initiation within a service area, 4) assurance that fees collected will be spent in the area where new development is occurring, 5) up-front knowledge of fees to be imposed, 6)

credits for developer participation, and 7) ability for developers to demonstrate that, pursuant to city guidelines, specific unit equivalencies (service unit generation) may be different from those presented in the land use equivalency table.

Recognizing the need to provide adequate facilities and desiring to have equitable funding of transportation improvements, the City of Rockwall embarked in the development of a roadway impact fee system in January 2008 and is updating the program to comply with legislative requirements identified in Chapter 395. The program was updated in 2013. This update amends the roadway capital improvements program based on updated land use assumptions as well as, input by the designated impact fee Capital Improvements Advisory Committee. To assist with this study, the City of Rockwall retained Freese and Nichols, Inc. to update the roadway impact fee system.

Study Methodology

To update the roadway impact fee for the City of Rockwall, a series of work tasks were undertaken and are described below:

1. Meetings were held with the City of Rockwall Staff and the Capital Improvement Advisory Committee to discuss the approach and roadway methodology to be used in the study update.

2. Impact fee service areas were reviewed and amended for any city annexations. Roadway service areas are contained to the current city limits.

3. The vehicle-mile of travel (VMT) during the PM peak hour was retained as the unit of measure for the roadway impact fee system.

4. A roadway conditions inventory was conducted on Rockwall thoroughfares for lane geometries, roadway classifications and segment lengths. New arterial and/or collector streets not previously assessed were added to the program database.

5. The existing roadway network was evaluated based on traffic volume count data collected May 2019, to determine roadway capacity, current utilization, and if any capacity deficiencies exist within each impact fee service area.

6. Projected 10-year growth, in terms of vehicle-miles of demand, was calculated for the service areas based on updated land use assumptions (projections of population and employment growth) prepared by Rockwall City Staff in June 2019 and supplemented with the updated land use equivalency table. The Land Use Assumptions for Impact Fees report was reviewed and approved by the Capital Improvements Advisory Committee (CIAC) prior to development of VMT growth projections and capital improvements plan (CIP) update.

7. The existing impact fee CIP was evaluated with updated traffic count data to ensure that excess capacity remained within each impact fee project for retention in the system. The analysis of the existing impact fee CIP revealed excess capacity and therefore could remain in the impact fee program.

8. A roadway impact fee CIP was reviewed and amended relative to projected growth from the updated land use assumptions, analysis of existing system deficiencies, likelihood of project initiation over the short-term, the Rockwall Comprehensive Plan, and input by the CIAC and City Staff. The CIP was amended for John King Boulevard to include portions of the roadway that were previously out of the city and the addition of several new projects to the program.

9. Roadway costs associated with construction, engineering, right-of-way, and project financing for recoupment projects were provided by the City. Cost estimates for new projects were prepared by Freese and Nichols. Costs for study updates are eligible for recovery and were included in the total project cost. Roadway cost data was compiled and distributed by service area.

10. The cost of capacity supplied, cost attributable to new development and the maximum cost per service unit was calculated for each service area. A credit of 50% was applied to the overall cost of the capital improvements program for use in the calculation of the cost per service unit.

11. This report was prepared to document the procedures, findings, and conclusions of the study.

Organization of Report

This report describes the background information, analysis, and findings of the study in six parts, with a chapter devoted to each:

- Roadway Impact Fee Service Areas (Chapter 2)
- Roadway Impact Fee Service Units (Chapter 3)
- Existing Conditions Analysis (Chapter 4)
- Projected Conditions Analysis (Chapter 5)
- Calculation of Impact Fees (Chapter 6)
- Conclusion (Chapter 7)

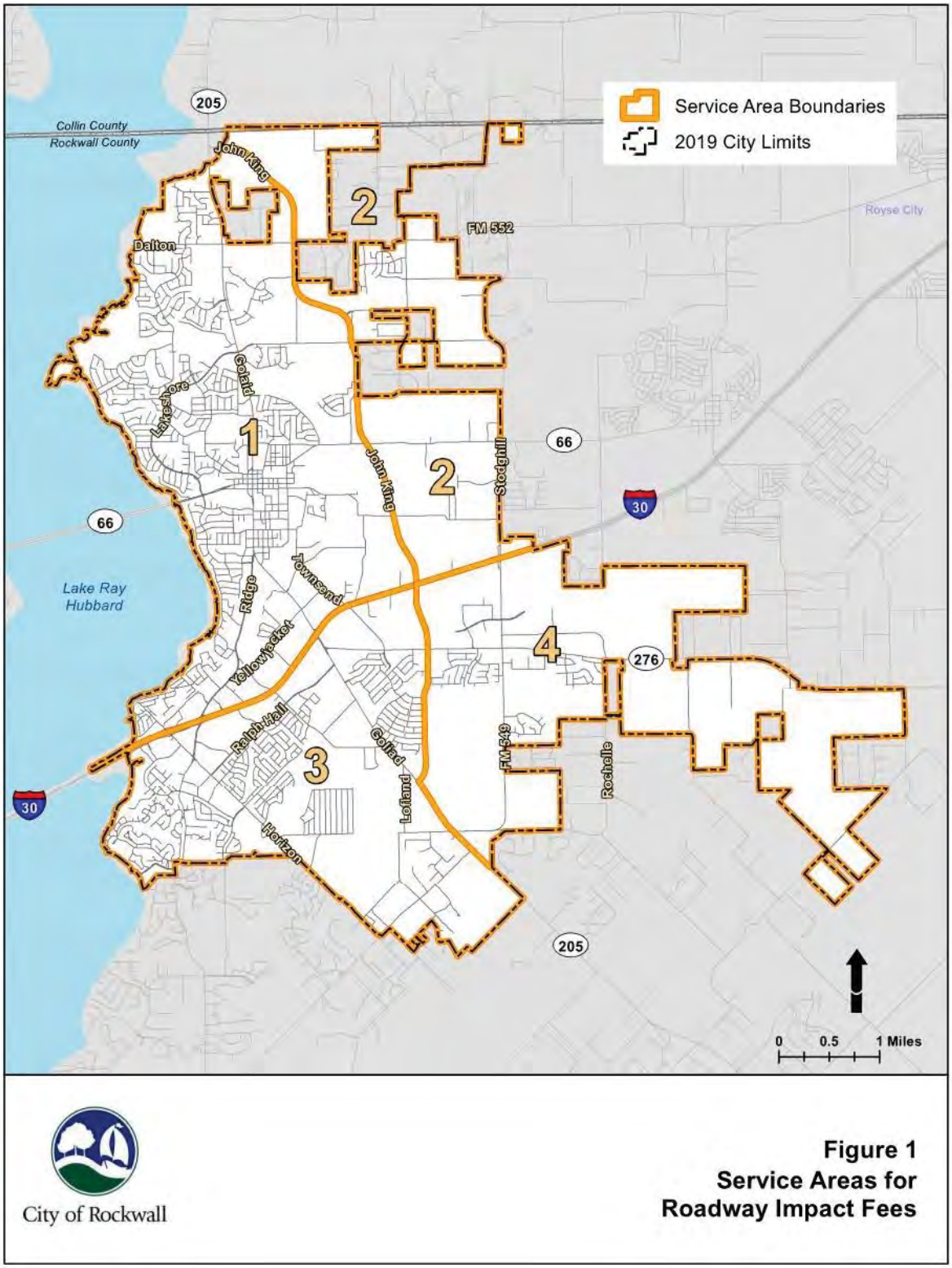
Chapter 2: Roadway Impact Fee Service Areas

Chapter 395 requires that service areas be defined for impact fees to ensure that facility improvements are in proximity to the area that is generating the need. Legislation mandates that roadway service areas be limited to a six-mile maximum and must be located within the current city limits. Roadway service areas are different from other impact fee service areas, which can include the city limits and Extra-Territorial Jurisdiction (ETJ). This is primarily because roadway systems are "open" to both local and regional use as opposed to a defined limit of service that is provided with water and wastewater systems. The result is that new development can only be assessed an impact fee based on the cost of necessary capital improvements within that service area.

The service area structure was developed using the criteria defined in Chapter 395 as it relates to conformance with city limits and the six-mile boundary limits. Other considerations included use of physical or natural features, potential roadway projects and their relation to undeveloped areas of the community, and the planning areas used in long-range plan efforts (for consideration of service area expansion due to possible annexation).

Four service areas were initially developed for the program in 2007 and have been retained in each of the program updates and are generally delineated by John King Boulevard and IH-30. Changes to the service area structure include city annexations on the northern and southern sector of the city. The service area structure for Rockwall is illustrated in **Figure 1**.

Figure 1: Service Areas for Roadway Impact Fees



Chapter 3: Roadway Impact Fee Service Units

An important aspect of the impact fee system is the determination of the proper service unit to be used to calculate and assess impact fees for new developments. As defined in Chapter 395, "Service unit means a standardized measure of consumption, use, generation, or discharge attributable to an individual unit of development in accordance with generally accepted engineering or planning standards for a particular category of capital improvements or facility expansions."

To determine the roadway impact fee for a development, the service unit must accurately identify the impact that the development will have on the transportation system serving the development. This impact is a combination of the number of new trips generated by the development, the peaking characteristics of the land-use(s) within the development, and the length of each new trip on the transportation system.

The correct service unit must also reflect the supply, which is provided by the roadway system, and the demand placed on the system during the time in which peak, or design, conditions are present on the system. Transportation facilities are designed and constructed to accommodate volumes expected to occur during the peak hours (design hours). These volumes typically occur during the morning (AM) and evening (PM) rush hours as motorists travel to and from work.

The vehicle-mile was retained as the service unit for calculating and assessing transportation impact fees in Rockwall. The vehicle-mile as a service unit establishes a way to relate the intensity of land development to the demand on the system with published trip generation data. It also recognizes state legislation requirements with regards to trip length.

The PM peak hour was retained as the time period for assessing impacts because the greatest demand for roadway capacity occurs during this hour. Roadways are sized to meet this demand, and roadway capacity can more easily be defined on an hourly basis. Traffic volume data collected in May 2019 was used as the basis for the system update.

Service Units

Service units create a link between supply (roadway projects) and demand (development). Both can be expressed as a combination of the number of vehicles traveling during the peak hour and the distance traveled by these vehicles in miles.

Service Unit Supply

For roadway capital projects improvement, the number of service units provided during the peak hour is simply the product of the capacity of the roadway in one hour and the length of the project. For example:

> Given a four-lane divided roadway project with a 600 vehicle per hour per lane capacity and a length of two miles, the number of service units provided is:
>
> *600 vehicles per hour per lane x 4 lanes x 2 miles = 4,800 vehicle-miles*

Service Unit Demand

The demand placed on the system can be expressed in a similar manner. For example, a development generating 100 vehicle trips in the PM peak hour with an average trip length of two miles would generate:

100 vehicle-trips x 2 miles/trip = 200 vehicle-miles

Likewise, the existing demand placed on the roadway network is calculated in the same manner with a known traffic volume (peak hour roadway tube counts) on a street and a given segment length.

Service Units for New Development

An important objective in the development of the impact fee system is the development of a specific service unit equivalency for individual developments. The vehicle-miles generated by a new development are a function of the trip generation and average trip length characteristics of that development. The following describes the process used to develop the vehicle-equivalency table, which relates land use types and sizes to the resulting vehicle-miles of demand created by that development.

Travel characteristics were reviewed and deemed to be similar in nature to the previous system update, and therefore no changes were made to the resultant land use equivalency table.

Trip Generation

Trip generation information for the PM peak hour was based on data published in the Tenth Edition of *Trip Generation* by the Institute of Transportation Engineers (ITE). *Trip Generation* is a reference publication that contains travel characteristics of over 160 land uses across the nation and is based on empirical data gathered from over 4,600 studies that were reported to the Institute by public agencies, developers and consulting firms. Data contained in this publication is generally accepted for use in studies by transportation engineers throughout the nation. Data not available was drawn from other published information. Rates were established for specific land use types within the broader categories of residential, office, commercial, industrial and institutional land uses. Within each of the land use categories, a rate was also established for any land uses not specifically identified.

Adjustments

The actual "traffic impact" of a specific site for impact fee purposes is based on the amount of traffic added to the street system as a result of new development. To accurately estimate new trips generated, adjustments must be made to trip generation rates and equations to account for pass-by and diverted trips. The added traffic is adjusted so that each development is assigned only for a portion of trips associated with a specific development and thus reducing the possibility of over-counting by counting only primary trips generated. Trip generation rates were reduced by percentages presented in **Table 1** to isolate the primary trip purpose.

Pass-by trips are those trips that are already on a route for a different purpose and simply stop at a development on that route. For example, a stop at a convenience store on the way home from the office is a pass-by trip for the convenience store. A pass-by trip does not create an additional burden on the street system and therefore should not be counted in the assessment of impact fees of a convenience store.

A diverted trip is a similar situation, except that a diversion is made from the regular route to make an interim stop. For example, a trip from work to home using Ridge Road (from IH-30) would be a diverted trip if the travel path were changed Yellow Jacket and Goliad for the purpose of stopping at a retail site. On a system-wide basis, this trip places a slightly additional burden on the street system but in many cases, this burden is minimal.

Table 1 contains the documented estimates of trip rate adjustments used in determining the appropriate rate to use in the impact fee calculation process. Adjustments were based on studies documented in the ITE trip generation manual.

The resulting recommended trip rates are illustrated as part of Table 3 Land Use/Vehicle Mile Equivalency Table illustrated later in this chapter. Rates were developed in lieu of equations to simplify the assessment of impact fees by the City and likewise, the estimation of impact fees by persons who may be required to pay an impact fee in conjunction with a development project.

A local study may also be conducted to confirm rates in *Trip Generation* or change rates to reflect local conditions. In such cases, a minimum of three sites should be counted. Selected sites should be isolated in nature with driveways that specifically serve the development and not other land uses. The results should be plotted on the scatter diagram of the selected land use contained in *Trip Generation* for comparison purposes. It is recommended that no change be approved unless the results show a variation of at least fifteen percent across the range of sample sizes surveyed. *Trip Generation* was used as the primary source of information for this study.

Trip Length

Trip lengths (in miles) are used in conjunction with site trip generation to estimate vehicle-miles of travel. Trip length data was based on information generated in the 1995 North Central Texas Council of Governments (NCTCOG) Workplace Survey and the National Workplace Survey. These travel characteristics were applied to Rockwall to determine average trips lengths for common land use types.

Table 2 summarizes the derived average trip lengths for major land use categories. These trip lengths represent the average distance that a vehicle will travel between an origin and destination of which either the origin or destination contains the land-use category identified below. Data compiled by the Workplace Survey represents the best available information on trip lengths for this area.

Table 1: Trip Reduction Estimates (PM Peak Hour) *

ITE Code	Land Use Category	Pass-by Trips	Diverted Trips
110	General Light Industrial	0	0
130	Industrial Park	0	0
150	Manufacturing	0	0
151	Mini-Warehousing	0	0
210	Single-Family Detached Housing	0	0
220	Apartment	0	0
250	Retirement Community	0	0
540	Junior/Community College	0	0
560	Church/Place of Worship	0	0
565	Day Care Center	0	0
610	Hospital	0	0
710	General Office Building	0	0
750	Office Park	0	0
760	Research Center	0	0
815	Discount Store	17%	35%
820	Shopping Center	34%	26%
831	Quality Restaurant	44	27
832	High-Turnover Restaurant (Sit-down)	43	26
834	Fast Food Restaurant w/Drive-thru	50	23
843	Auto Parts Sales	41	13
848	Tire Store	36	38
851	Convenience Market	66	22
862	Convenience Market w/Gas Pumps	63	26
862	Home Improvement Store	48	24
863	Electronics Superstore	40	33
880	Pharmacy with Drive-thru	49	13
881	Pharmacy without Drive-thru	49	13
912	Bank with Drive-thru	47	26

DU = Dwelling Unit, GFA = Gross Floor Area; (*) Expressed as percent of total PM peak hour trips generated.
Source: Trip Generation, ITE 10th Edition, 2018

Table 2: Average Trip Lengths

Land Use Category	Average Trip Length (miles)	Localized Trip Length (miles)	Adjusted Trip Length (miles)
General Office	12.06	6.81	3.41
General Retail/Shopping Center	4.12	2.33	1.16
Industrial	9.95	5.62	2.81
Residential	11.16	6.31	3.15
Warehousing	8.84	4.99	2.50
Drive-In Bank	2.62	1.48	0.74
Specialty Retail	2.86	1.62	0.81
Hospital	5.18	2.93	1.46
Medical Office/Clinic	9.63	5.44	2.72
School	4.12	2.33	1.16
Hotel	4.15	2.34	1.17
Restaurant	3.74	2.11	1.06
Fast-Food Restaurant	3.53	1.99	1.00
Day Care Center	1.64	0.93	0.46
Supermarket	1.84	1.04	0.52
Pharmacy without Drive-thru	1.93	1.09	0.55

Source: US Census Bureau, NCTCOG, and Freese and Nichols.

Adjustments

The assessment of an individual development's impact fee is based on the premise that each vehicle-trip has an origin and a destination and that the development end should pay for one-half of the cost necessary to complete each trip. Thus, the development is charged only for a portion of the vehicle-trip associated with that development.

To prevent double charging, and to fairly attribute the demand placed on the system to each trip end location, the trip length was adjusted to remove travel on the federal roadway system and then divided by two to reflect half of the vehicle trip to and from the development. Data from the NCTCOG travel forecast model was used to compare vehicle-miles of travel (VMT) by roadway functional class. Data revealed 43% of travel to use the federal system and thus the average trip length was reduced by this percentage to reflect localized travel on city streets (reflected in column 2). The average trip length, localized trip length, and adjustment for one-half trip length are illustrated in column 3 of Table 2. Where specific land uses were considered to exhibit different trip length characteristics than those identified in Table 3, engineering judgment was used to estimate the average trip length. Finally, as the service area structure was based on a six-mile boundary, those land uses that exhibited trip lengths greater than six miles were limited to this threshold.

Service Unit Equivalency Table

The result of combining the trip generation and trip length information is an equivalency table which establishes the service unit rate for various land uses. These service unit rates are based on an appropriate development unit for each land use. For example, a dwelling unit is the basis for residential uses, while 1,000 gross square feet of floor area is the basis for office, commercial, and retail uses. Other less common land uses are based on appropriate independent variables.

Separate rates have been established for specific land uses within the broader categories of residential, commercial, industrial and institutional to reflect the differences between land uses within the categories. However, even with these specific land use types, information is not available for every conceivable land use, so limitations do exist.

The updated equivalency table is illustrated in **Table 3**. Table 3 is reflective of adjusted trip rates (detailed in Table 1) and trip lengths (Table 2).

Table 3: Land-Use Vehicle-Mile Equivalency Table

CATEGORY	LAND USE	DEVELOPMENT UNITS (X)	TRIP RATE	LOCAL TRIP LENGTH (mi.)	TOTAL SERVICE UNITS (VEH-MI / DEV UNIT)
RESIDENTIAL					
	SINGLE-FAMILY DETACHED	D.U.	0.99	3.15	3.12
	APARTMENT/TOWNHOUSE	D.U.	0.56	3.15	1.77
	RETIREMENT COMMUNITY	D.U.	0.16	2.27	0.36
	INDEPENDENT SR. LIVING FACILITY	D.U.	0.30	2.27	0.68
OFFICE					
	GENERAL OFFICE BLDG	1000 GFA	1.15	3.41	3.92
	CORPORATE HEADQUARTERS BLDG	1000 GFA	0.60	3.41	2.05
	MEDICAL-DENTAL OFFICE BLDG	1000 GFA	3.46	2.72	9.42
	U.S. POST OFFICE	1000 GFA	3.36	2.26	7.60
	BUSINESS PARK	1000 GFA	0.42	3.41	1.43
	RESEARCH AND DEVELOPMENT CENTER	1000 GFA	0.49	3.41	1.67
COMMERCIAL					
	RETAIL/SHOPPING CENTER	1000 GLA	1.52	1.16	1.77
	QUALITY RESTAURANT	1000 GFA	3.75	1.06	3.97
	FAST FOOD RESTAURANT WITH DRIVE-THROUGH	1000 GFA	8.82	1.00	8.79
	HIGH TURNOVER RESTAURANT	1000 GFA	3.03	1.10	3.33
	GAS STATION w/CONVENIENCE MARKET	1000 GFA	2.40	0.50	1.20
	CONVENIENCE MARKET WITH GASOLINE PUMPS	1000 GFA	5.42	0.50	2.71
	GROCERY/SUPERMARKET	1000 GFA	2.40	0.52	1.25
	DISCOUNT CLUB	1000 GFA	2.93	1.12	3.29
	AUTO SALES	1000 GFA	2.43	1.26	3.07
	BANK	1000 GFA	7.73	0.74	5.74
	PHARMACY/DRUGSTORE WITH DRIVE-THROUGH	1000 GFA	3.91	0.55	2.13
	APPAREL STORE	1000 GFA	2.88	0.96	2.76
	MOVIE THEATER	SCREENS	14.60	0.93	13.61
	FURNITURE STORE	1000 GFA	0.08	1.32	0.11
	HOME IMPROVEMENT SUPERSTORE	1000 GFA	0.65	1.16	0.76
	HARDWARE/PAINT STORE	1000 GFA	1.23	0.45	0.56
	BUILDING MATERIALS/LUMBER STORE	1000 GFA	1.55	0.45	0.70
	NURSERY (GARDEN CENTER)	1000 GFA	5.21	0.74	3.87
	NURSERY (WHOLESALE)	1000 GFA	3.89	0.74	2.89
	HOTEL	ROOMS	0.38	1.17	0.45
	MOTEL	ROOMS	0.38	1.17	0.45
	ALL SUITES HOTEL	ROOMS	0.36	1.17	0.42
	AUTO CARE CENTER	1000 GFA	3.75	0.81	3.03
	QUICK LUBE SHOP	1000 GFA	2.43	0.81	1.96
	AUTO PARTS SALES	1000 GFA	0.77	0.81	0.62
	TIRE STORE	1000 GFA	3.98	1.16	4.63
	MINI-WAREHOUSE/SELF STORAGE	1000 GFA	0.17	1.79	0.30
INDUSTRIAL					
	GENERAL LIGHT INDUSTRIAL	1000 GFA	0.63	2.81	1.77
	MANUFACTURING	1000 GFA	0.67	2.90	1.95
	INDUSTRIAL PARK	1000 GFA	0.40	2.82	1.13
	WAREHOUSING	1000 GFA	0.19	2.50	0.47
INSTITUTIONAL					
	PRIVATE SCHOOL (K-12)	STUDENTS	0.17	1.16	0.20
	JUNIOR/COMMUNITY COLLEGE	STUDENTS	0.11	1.19	0.13
	UNIVERSITY/COLLEGE	STUDENTS	0.15	1.41	0.21
	DAY CARE CENTER	STUDENTS	0.20	0.46	0.09
	HOSPITAL	BEDS	0.97	1.46	1.42
	NURSING HOME	BEDS	0.59	1.46	0.86
	ASSISTED LIVING CENTER	BEDS	0.26	1.46	0.38
	PLACE OF WORSHIP	1000 GFA	0.49	0.70	0.34

* THIS REPRESENTS TOTAL SERVICE UNIT EQUIVALENCY FOR LAND USES NOT SPECIFIED IN THIS CATEGORY. ACTUAL EQUIVALENCY MAY VARY AND MAY BE DEMONSTRATED BY PROPERTY OWNER TO BE DIFFERENT.

DU = Dwelling Unit
GFA = Gross Floor Area
GLA = Gross Leasable Area

Chapter 4: Existing Conditions Analysis

Chapter 395 identifies specific requirements necessary in the capital improvements plan for impact fees. The existing conditions, including defining the existing roadway system, and analysis of the total capacity, the level of current usage, and commitments for usage of the existing roadway, are required as part of the capital improvements plan. This chapter discusses the existing conditions.

Existing Conditions

An inventory of the collector and arterial roadway facilities within the city limits was conducted to determine existing conditions throughout Rockwall. This analysis determines the capacity provided by the existing roadway system, the demand currently placed on the system, and the potential existence of deficiencies on the system. Updated data for the inventory was obtained from traffic volume counts conducted by the City and field reconnaissance of current roadway sections.

The roadways were divided into segments based on volume changes, major intersections, service area boundaries, and capacity changes. For each roadway segment, the length, number of lanes, cross-section, and PM peak hour volume data were obtained. Lane capacities were assigned to each segment based on functional street classification, associated roadway lane capacities and the present number of lanes. Lane capacities used in the analysis are shown in **Table 4.**

Table 4: Roadway Facility Vehicle-Mile Lane Capacities

Roadway Facility	Designation	Hourly Vehicle-Mile Capacity per Lane Mile of Roadway Facility
Divided Arterial	DA	600
Divided Collector	DC	500
Undivided Arterial	UA	575
Undivided Collector	UC	475
Special Arterial (with two-way left turn lane)	SA	450

Roadway hourly volume capacities are based on information reflecting Level-of-Service “C” operation, as identified in the transportation element of the Rockwall Comprehensive Plan.

Existing Volumes

Existing directional PM peak hour volumes were obtained from automated traffic counts conducted in May 2019 by the City. Automated traffic counts at 25 separate locations were collected on major roadways (as identified in the Thoroughfare Plan as arterial or collector status) throughout Rockwall. To minimize the total number of counts, data was collected at locations where traffic volumes would typify link volumes on the major segments within the immediate area. For segments not counted, existing volumes were used, or estimates were developed based on data from adjoining roadway counts.

Data was compiled for roadway segments throughout the city and entered into the database for use in calculations. A summary of volumes by roadway segment is included in **Appendix D** as part of the existing capital improvements database.

Vehicle-Miles of Existing Capacity Supply

An analysis of the total capacity for each service area was performed. For each roadway segment, the existing vehicle-miles of capacity supplied were calculated using the following equation:

Vehicle-Miles of Capacity = Link capacity per peak hour per lane x Number of lanes x Length of segment (miles)

A summary of the current capacity available on the roadway system is shown in **Table 5**. It is important to note that the roadway capacity depicted in Table 5 is system-wide for most major roadways and not restricted to those roadways proposed in the impact fee capital improvements plan. Directional calculations of capacity were performed separately. For a detailed listing of vehicle-miles of capacity by roadway segment, refer to Appendix D.

Vehicle-Miles of Existing Demand

The level of current usage in terms of vehicle-miles was calculated for each roadway segment. The vehicle-miles of existing demand were calculated by the following equation:

Vehicle-Miles of Demand = PM peak hour volume x Length of segment (miles)

Table 5 also lists total vehicle-miles of demand. Appendix D includes a detailed listing of vehicle-miles of demand by directional roadway segment.

Vehicle-Miles of Existing Excess Capacity and Deficiencies

For each roadway segment, the existing vehicle-miles of excess capacity and/or deficiencies were calculated. Each direction was evaluated to determine if vehicle demands exceeded the available capacity. If demand exceeded capacity in one or both directions, the deficiency is deducted from the supply associated with the impact fee capital improvement plan. A summary of peak hour excess capacity and deficiencies are shown in **Table 6**. A detailed listing of the existing excess capacity and deficiencies by roadway segment is also located in Appendix D.

Table 5: Peak Hour Vehicle-Miles of Existing Capacity and Demand

Service Area	Capacity (Veh-Mile)	Demand (Veh-Mile)
1	32,508	18,560
2	10,799	4,944
3	21,972	16,417
4	9,674	6,816
Total	74,952	46,738

Table 6: Peak Hour Vehicle-Miles of Excess Capacity and Deficiencies

Service Area	Excess Capacity (Veh-Mile)	Deficiencies (Veh-Mile)
1	15,085	1,137
2	5,854	0
3	6,480	925
4	3,666	808
Total	31,085	2,871

Chapter 5: Projected Conditions Analysis

Chapter 395 requires a description of all capital improvements or facility expansions and their costs necessitated by and attributable to new development within the service area. This chapter describes the projected growth, vehicle-miles of new demand, capital improvements program, vehicle-miles of new capacity supplied, and costs of the roadway improvements.

Projected Growth

The projected growth for each transportation service area is represented by the increase in the number of new vehicle-miles generated over the 10-year planning period. The basis for the calculation of new demand is the population and employment projections that were prepared as part of a technical report entitled Land Use Assumptions for Roadway Impact Fees by the Rockwall Planning Department in June 2019. Estimates of population and employment were prepared for the years 2019 and 2029.

Population data was provided in terms of the number of dwelling units, households and persons. Employment data is aggregated into three sectors of employees: basic, service and retail. These employment sectors serve as the typical components used in the traffic forecast modeling process. The employment grouping also correlate with the North American Industrial Classification (NAIC) system and include: basic employment (NAIC 210000-422999) generally encompasses the industrial and manufacturing uses; service employment (NAIC 520000-928199) encompasses government, office and professional uses; and retail employment (NAIC 440000-454390) generally includes commercial and retail use.

Projected Vehicle-Miles of New Demand

Projected vehicle-miles of demand were calculated based on the growth expected to occur during the 10-year planning period and the service unit generation for each of the population and employment data components (basic, service and retail). Separate calculations were performed for each data component and were then aggregated for the service area. Vehicle-miles of demand for population growth were based on dwelling units, and vehicle-miles of demand for employment were based on the number of employees and estimates of square footage per employee.

Land Use Equivalency for 10-Year Demand Estimate

Information extracted from the NCTCOG regional travel demand model, used for development of the Mobility 2040, provides information on average trip lengths for the residential and the three types of land uses. These are : 3.12 vehicle-miles per dwelling unit for residential, 1.77 vehicle-miles per thousand square feet for Basic and Retail employment, and 3.92 vehicle-miles per thousand square feet for Service employment.

Table 7 lists the projected vehicle-miles of demand over the 10-year planning period for Rockwall. **Appendix C** contains the projected demand calculation worksheet.

Table 7: Vehicle-Miles of New Demand

Service Area	Projected 10-Year Growth (Vehicle-Miles)
1	13,731
2	3,676
3	13,001
4	2,814
Total	33,222

Capital Improvements Program

Evaluation of Current Impact Fee CIP

At the outset of the update process, capacity of the CIP was evaluated to ensure that excess capacity remained in previously approved impact fee projects. Chapter 395 mandates that only CIP projects with excess capacity are eligible for consideration. The initial impact fee program contained only one project, John King Boulevard, which extended from the northern city limit to Goliad Street (SH205) just north of FM549. Traffic volume count data collected at several locations within this corridor was used to determine if excess capacity remains on this project. The analysis revealed all segments of John King Boulevard to contain excess capacity and therefore can be retained in the program.

New Impact Fee CIP – Recoupment & Future Projects

Recoupment Projects:

John King Boulevard was the lone project identified for the initial impact fee program in 2008 and 2013 update. At the time the impact fee system was initiated, not all portions of this roadway in the north were within the city limits. The segment between FM552 and SH205 was within the county and not eligible for impact fee consideration. With annexations in 2013, additional portions of the facility were included in the program.

Three of the added projects were recently implemented and are considered recoupment. Traffic counts were also conducted on these three to assess whether excess capacity remains in these projects.

Future Projects:

Two new CIP projects are future projects planned for implementation within the next 10 years. Costs estimates for new project segments were prepared by Freese and Nichols.

Actual costs for project recoupment were provided by City Staff. **Figure 2** illustrates the location of this capital improvement in relation to the city and associated service areas. Project costs were broken into general categories of construction, engineering, right-of-way and finance (debt service). The breakout of costs among the various service areas are listed in **Table 8**. The cost of the impact fee program is $145.9 million. When considering the state mandated credit (50%), the cost eligible for impact fee consideration totals $72.9 million. The impact fee CIP also includes the cost of two five-year updates estimated at $40,000 each.

Figure 2: Roadway Impact Fee Capital Improvement Plan

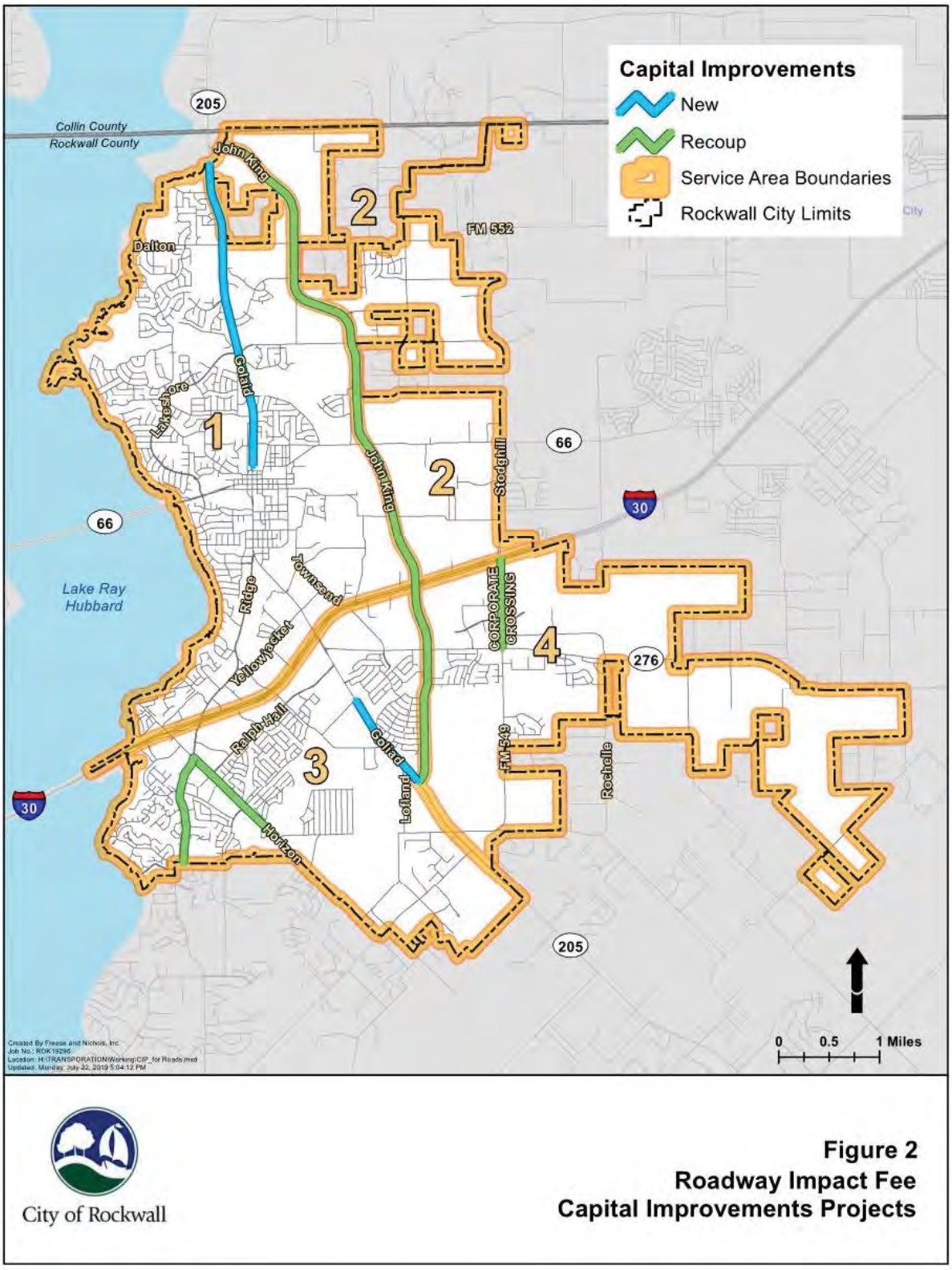


Table 8: Roadway Impact Fee Capital Improvements Plan

2019 Rockwall Roadway Impact Fee Study Update

Serv Area Number	CIP Year	Roadway	From	To	Length (mi)	No. of Lanes	Rdwy. Type	Pct. in Serv. Area	Project Status	Roadway Costs *Engineering*	Roadway Costs *ROW*	Roadway Costs *Construction**	Roadway Costs *Finance*	Project Cost
1/2	2007	John King	City Limit (near G	FM552	1.28	4	DA	50%	R	$363,513	$893,017	$3,000,276	$3,716,172	$7,972,977
1/2	2007	John King	FM 552	Quail Run	1.29	4	DA	50%	R	$366,353	$899,994	$3,023,715	$3,745,205	$8,035,266
1/2	2007	John King	Quail Run	SH 66	1.04	4	DA	50%	R	$295,354	$725,576	$2,437,724	$3,019,390	$6,478,044
1/2	2007	John King	SH 66	IH 30 WB FR	1.47	4	DA	50%	R	$417,472	$1,025,574	$3,445,629	$4,267,792	$9,156,466
1	2019	SH 205 (Goliad St)	Olive	Live Oak	0.33	4	SA	100%	N	$236,600	$17,300	$3,380,500	$0	$3,634,400
1	2019	SH 205 (Goliad St)	Olive	N. City Limit	2.98	4	DA	100%	N	$2,481,248	$314,700	$35,446,400	$0	$38,242,348
Sub-total SA 1					**8.39**					**$4,160,539**	**$3,876,160**	**$50,734,244**	**$14,748,559**	**$73,519,502**
2/1	2007	John King	City Limit (near G	FM552	1.28	4	DA	50%	R	$363,513	$893,017	$3,000,276	$3,716,172	$7,972,977
2/1	2007	John King	FM 552	Quail Run	1.29	4	DA	50%	R	$366,353	$899,994	$3,023,715	$3,745,205	$8,035,266
2/1	2007	John King	Quail Run	SH 66	1.04	4	DA	50%	R	$295,354	$725,576	$2,437,724	$3,019,390	$6,478,044
2/1	2007	John King	SH 66	IH 30 WB FR	1.47	4	DA	50%	R	$417,472	$1,025,574	$3,445,629	$4,267,792	$9,156,466
Sub-total SA 2					**5.08**					**$1,442,691**	**$3,544,160**	**$11,907,344**	**$14,748,559**	**$31,642,754**
3/4	2007	John King Blvd	IH 30 EB FR	SH 276	0.89	4	DA	50%	R	$107,472	$231,933	$1,098,543	$2,455,941	$3,893,889
3/4	2007	John King Blvd	SH 276	Goliad	1.34	4	DA	50%	R	$162,580	$350,860	$1,661,837	$3,715,260	$5,890,537
3	2019	SH 205 (Goliad St)	Sids	John King Blvd	0.96	6	DA	100%	N	$974,148	$101,900	$13,916,400	$0	$14,992,448
3	2019	FM3097/Horizon	Ridge Road	County Line Rd	1.13	4	DA	100%	R	$0	$0	$900,000	$0	$900,000
3	2019	FM740/Ridge Rd	Horizon	S. City Limit	1.10	4	DA	100%	R	$0	$0	$472,902	$0	$472,902
Sub-total SA 3					**5.42**					**$1,244,200**	**$684,694**	**$18,049,682**	**$6,171,201**	**$26,149,776**
4/3	2007	John King Blvd	IH 30 EB FR	SH 276	0.89	4	DA	50%	R	$107,472	$231,933	$1,098,543	$2,455,941	$3,893,889
4/3	2007	John King Blvd	SH 276	Goliad	1.34	4	DA	50%	R	$162,580	$350,860	$1,661,837	$3,715,260	$5,890,537
4	2019	FM 549 (Corp Crossing)	IH30	SH276	0.87	4	DA	100%	R	$0	$0	$4,724,665	$0	$4,724,665
Sub-total SA 4					**3.09**					**$270,052**	**$582,794**	**$7,485,045**	**$6,171,201**	**$14,509,091**
Totals:					**13.80**					**$7,117,483**	**$8,687,808**	**$88,176,313**	**$41,839,518**	**$145,821,123**

	City portion of construction of John King Blvd. (formerly 205 By-Pass):*	***100%***

Totals:

Engineering Cost	$7,117,483
Right-of-Way Cost	$8,687,808
Construction Cost	$88,176,313
Finance Cost	$41,839,518
TOTAL NET COST	$145,821,123
Future Impact Fee Update C	$80,000
TOTAL IMPLEMENTATION	$145,901,123

Notes: * City's portion of costs incurred. (No particiaption by other agencies.)
Cost figures provided by the City.

Notes:

DA- Divided Arterial

N- New Impact Fee Project

R- Impact Fee Recoupment Project

Projected Vehicle-Miles Capacity Available for New Growth

The vehicle-miles of new capacity supply were calculated similar to the vehicle-miles of existing capacity supplied. The equation used was:

Vehicle-Miles of New Capacity Supplied = Link capacity per peak hour per lane
x Num. of lanes within Service Area
x Length of segment (miles)

Vehicle-miles of new supply provided by the CIP are listed in **Table 9**. While the project has not been built, there are system deficiencies (by service area) that have been removed from the total supply to properly account for new "net" availability. Table 9 depicts net availability of supply by the CIP. **Appendix E** details capacity calculations provided by the CIP program.

Table 9: Vehicle-Miles of New Capacity Supplied

Service Area	Vehicle-Miles of New Capacity Supplied	Vehicle-Miles of Net New Capacity Supplied
1	13,836	5,869
2	6,096	3,114
3	11,489	4,476
4	4,751	2,405
Total	36,172	15,864

Cost of Roadway Improvements

The total and net cost to implement the roadway improvements plan projects by service area is shown in **Table 10**. If traffic exists on proposed CIP project roadways or there are any deficiencies present in each respective service area, the total system cost is adjusted to reflect the net capacity being made available by the impact fee program. In other words, only the unused portion of the CIP and its associated costs are considered eligible. A detailed listing by project segment in each service area can be found in **Appendix F**. **Appendix G** details system costs by service area.

Table 10: Summary of Roadway Improvements Plan Cost Analysis

Service Area	Actual Cost of Proposed Impact Fee Program	Adjusted Cost (50% Credit) of Proposed Impact Fee Program
1	$73,550,103	$36,775,052
2	$31,656,236	$15,828,118
3	$26,175,186	$13,087,593
4	$14,519,597	$7,259,799
Total	$145,901,123	$72,950,562

State law is specific in identifying that only the portion of the CIP necessitated and attributable to new development is eligible for cost recovery. For example, if only 60% of the net service units supplied by the CIP are needed in the next 10 years, only 60% of the cost (credited at 50% per legislative requirements) may be considered in the calculation of fees. All the capacity provided by the impact fee CIP will be necessitated to address future growth over the 10-year planning period. The cost attributable to new

growth is $31.9 million and represents the citywide cost to implement projects on the impact fee program. **Table 11** depicts CIP costs attributable to new growth by service area.

Table 11: Capital Improvements Plan Costs Attributable to New Development

Service Area	Adjusted Cost (50% Credit) of Net New Capacity	Adjusted Cost (50% Credit) Attributable to New Growth
1	$15,598,596	$15,598,596
2	$8,084,777	$8,084,777
3	$5,098,520	$5,098,520
4	$3,675,714	$3,675,714
Total	$31,993,304	$31,993,304

Chapter 6: Calculation of Impact Fees

This chapter discusses the calculation of the cost per service unit and the calculation of roadway impact fees. The transportation impact fee will vary by the land use, service area, and size of the development. Examples are included to better illustrate the method by which the transportation impact fees are calculated.

Cost Per Service Unit

The cost per service unit is calculated by dividing the cost of the CIP necessitated and attributable to new demand (net cost) by the projected service units of growth over the 10-year planning period.

Generally, the cost per service unit varies by service area because of variations in cost of CIP, projected growth and the number of service units necessitated by new growth between zones. Where net capacity supplied is greater than demand, the cost per service unit is simply the cost of the net capacity divided by the number of service units provided. In this case, only the portion of the CIP necessitated by new development is used in the calculation. If the net capacity supplied is *less* than projected new demand, then the cost per service unit is calculated by dividing the total cost of net supply by the portion of new demand attributable and necessary by development. The result is generally a decrease in the cost per service unit, because such cost is spread over the larger number of service units of growth.

Table 12 lists the results of the cost per service unit calculation by service area. The actual cost per service unit reflects the true burden to the City for the implementation of the roadway capital improvements program. As per state law, a credit for the portion of ad-valorem tax revenues generated by improvements over the program period, or a credit equal to 50% of the total projected cost of implementing the capital improvements plan must be given. Based on this analysis, the maximum collection rate reflects the maximum amount per service unit that can be charged to follow the state statute. **Appendix G** details the maximum fee per service unit calculation for each service area.

Table 12: Cost Per Service Unit Summary

Service Area	Actual Cost Per Service Unit	Maximum Fee per Service Unit (50% Credit)
1	$2,272.00	$1,136.00
2	$4,398.00	$2,199.00
3	$784.00	$392.00
4	$2,612.00	$1,306.00
Total	$1,926.00	$963.00

Calculation of Roadway Impact Fees

The calculation of roadway impact fees for new development involves a two-step process. Step one is the calculation of the total number of service units that will be generated by the development. Step two is the calculation of the impact fee due by the new development.

Step 1: Determine number of service units (vehicle-miles) generated by the development using the equivalency table.

No. of Development Units	x	Vehicle-miles per development unit	=	Development's Vehicle-miles

Step 2: Calculate the impact fee based on the fee per service unit for the service area where the development is located.

Development's Vehicle-miles	x	Fee per vehicle-mile	=	Impact Fee due from Development

Examples: The following fees would be assessed to new developments in Service Area 3 if the cost per service unit were retained at the current collection rate $256.00 (adopted in 2008, retained in 2013).

Single-Family Dwelling

1 dwelling unit x 3.12 vehicle-miles/dwelling unit = 3.12 vehicle-miles
3.12 vehicle-miles x $256.00 /vehicle-mile = $798.72

20,000 square foot (s.f.) Office Building

20 (1,000 s.f. units) x 3.92 vehicle-miles/1,000 s.f. units = 78.40 vehicle-miles
78.40 vehicle-miles x $256.00 /vehicle-mile = $20,070.40

100,000 s.f. Retail Center

100 (1,000 s.f. units) x 1.77 vehicle-miles/1,000 s.f. units = 177.00 vehicle-miles
177.00 vehicle-miles x $256.00 /vehicle-mile = 45,312.00

200,000 s.f. Industrial Development

200 (1,000 s.f. units) x 1.77 vehicle-miles/1,000 s.f. units = 354.00 vehicle-miles
354.00 vehicle-miles x $256.00 /vehicle-mile = $90,624.00.

Chapter 7: Conclusions

Chapter 395 authorizes the assessment and collection of impact fees in Texas for transportation related capital improvements that must be met in order to assess and collect impact fees. This study was conducted to fulfill the requirements of Chapter 395 in developing a transportation-related impact fee for the City of Rockwall.

Three service areas were created for Rockwall. This service area structure was configured so that no point is greater than the six-mile maximum set forth by law. The six-mile limit ensures that roadway improvements are near the development paying the fees that it serves.

Vehicle-miles of travel in the PM peak hour are used as the service unit for calculating and assessing impact fees. Vehicle-miles establish a relationship between the intensity of land development and the demand on the roadway system using published trip generation data and average trip length. The PM peak hour is used as the time period for assessment because typically the greatest demand for roadway capacity occurs during this hour. Additionally, roadways are sized to meet this demand and roadway capacity can more accurately be defined on an hourly basis.

The service units (vehicle-miles) for new development are a function of trip generation and the average trip length for specific land uses. Trip generation information was based on data published by the Institute of Transportation Engineers as reported in the initial study. Where appropriate, trip generation rates were adjusted to reflect the primary trip purpose. This ensures that new development is assigned for the portion of trips associated with that specific development. Average trip length data was based on information compiled by NCTCOG and based on data from a NCTCOG Workplace Survey, statistics from the US Census Bureau National Workplace Survey and tailored to Rockwall.

The result of combining trip generation and trip length information is an equivalency table that establishes a service unit rate for various land uses. Separate rates were established for specific land uses within the broader categories of residential, community, industrial and institutional uses.

An analysis of existing conditions revealed that the current roadway system provides over 74,952 vehicle-miles of capacity. The existing demand placed on the system was determined to be 46,738 vehicle-miles. Evaluation of the existing roadway system found 2,871 vehicle-miles of deficiencies on the existing roadway network.

Projected growth, in terms of vehicle-miles over the 10-year planning period, was based on population and employment data that was prepared in the Land Use Assumptions for Roadway Impact Fees dated August 2019 by the City Planning Department. Based on this growth, the projected vehicle-miles of demand calculated to be 33,222.

Rockwall City Staff identified the roadway impact fee capital improvements program for the 10-year planning period. Projects eligible for this CIP include arterial and collector streets that have been designated on the officially adopted Thoroughfare Plan of the City. Developer funded roadways are not eligible for inclusion in calculating impact fees. Projects totaling $145.9 million, was identified for impact fee consideration based on need, projected growth, project affordability and achievability, financial

considerations, jurisdictional issues, the Thoroughfare Plan, and staff recommendation. The credited (50%) cost attributable to new growth is $72.94 million and represents 100% of the net capacity made available for development by impact fee roadway projects. The recommended CIP program will provide 15,864 vehicle-miles of new net capacity.

The *actual* cost per service unit was calculated to be between $784.00 and $4,398.00 and was based on the total cost of net capacity supplied by the CIP and the demand attributable to new development over the 10-year planning period. State legislation requires that a credit for the portion of ad-valorem tax revenues generated by improvements over the program period, or a credit equal to 50% of the total projected cost of implementing a roadway impact fee capital improvements program be given. Based on a 50% credit, the cost per service unit ranges between $392.00 and $2,199.00.

The determination of fees due from new development is based upon the size of development, its associated service unit generation (equivalency table) and the cost per service unit derived or adopted for each service area.

APPENDICES

A. Roadway Impact Fee Definitions

ROADWAY IMPACT FEE DEFINITIONS

Average Trip Length - the average actual travel distance between two points. The average trip length by specific land use varies.

Diverted Trip - similar to pass-by trip, but a diversion is made from the regular route to make an interim stop.

Impact Fee - a charge or assessment imposed by a city against new development to generate revenue for funding or recouping roadway improvements necessitated and attributable to new development.

Land Use Equivalency – correlation of a land use to the rate of vehicle miles CIP of network capacity it would consume

Maximum Fee Per Service Unit - the highest impact fee that may be collected by the City per vehicle-mile of supply. Calculated by dividing the costs of the capital improvements by the total number of vehicle-miles of demand expected in the 10-year planning period.

Pass-by Trip - a trip made as an intermediate stop on the way from an origin to a primary trip destination. For example, a stop at a convenience store on the way to office from home.

PM Peak Hour - the hour when the highest volume of traffic typically occurs. Data collection (May 2019) revealed the peak hour of travel between 5:00 and 6:00 pm for Rockwall.

PM Peak Hour Traffic Counts - the number of vehicles passing a certain point during the peak hours of travel. Traffic counts are conducted during the PM peak hour because the greatest demand for roadway capacity occurs during this hour.

Primary Trip - a trip made for the specific purpose of visiting a destination; for example, from home to office.

Roadway Demand - the demand placed on the roadway network as a result of development. Determined by multiplying the trip generation of a specific land use by the average trip length.

Roadway Supply (or Capacity) - the number of service units provided by a segment of roadway over a period of time. Determined by multiplying the lane capacity by the roadway length.

Service Area - the area within the city boundaries to be served by capital improvements. Criteria for developing the service area structure include; 1) restricted to six-mile limit by legislation (to ensure proximity of roadway improvements to development), 2) conforms to census or forecast model boundaries, 3) projects on CIP as boundaries, 4) effort to match roadway supply with projected demand, or 5) city limit boundaries.

Service Unit - a measure of use or generation attributable to new development for roadway improvements. Also used to measure supply provided by existing and proposed roadway improvements.

Trip - a single, one-direction vehicle movement from an origin to a destination.

Trip Generation - the total trip ends for a land use over a given period or the total of all trips entering and exiting a site during that designated time. Used in the development of the land use equivalency table for Rockwall. Based primarily on data prepared by the Institute of Transportation Engineers (ITE).

Vehicle - for impact fee purposes, any motorized appurtenance that carries passengers and/or goods on the roadway system during peak periods of travel.

Vehicle-mile - a unit used to express both supply and demand provided by, and placed on, the roadway system. A combination of a number of vehicles traveling during a given time period and the distance in which these vehicles travel in miles.

B. Land Use Definitions

LAND USE DEFINITIONS

Residential

Single-Family Detached - Any single-family detached home on an individual lot is included in this category. A typical example of this land use is a home in a suburban subdivision. Also included are duplex residential units and manufactured homes and other residential land uses not specified above.

Multi-Family - This land use includes both low-rise ("walk-up" dwellings) and high-rise multi-family apartments. An apartment is defined as a dwelling unit that is located within the same building with three or more dwelling units. Also included in this land use are residential condominiums, townhomes, triplex and quadplex units. Residential condominiums and townhomes are defined as single-family units that have at least one other single-family unit within the same building structure.

Independent Senior Living Facility - Retirement communities - restricted to adults or senior citizens - contain residential units like apartments or condominiums and are usually self-contained villages. They may also contain special services such as medical facilities, dining facilities, and some limited supporting retail facilities.

Office (Service)

General Office Building - A general office building houses one or more tenants and is the location where affairs of a business, commercial or industrial organization, and professional activity are conducted. The building or buildings may be limited to one tenant or contain a mixture of tenants including professional services, insurance companies, investment brokers, company headquarters, and services for the tenants such as a bank or savings and loan, a restaurant or cafeteria, and several retail facilities. Also included in this category are office parks, and other office uses not specified above.

Medical Office Building – A building that provides diagnoses and outpatient care on a routine basis but is unable to provide prolonged in-house medical and surgical care. One or more private physicians or dentists generally operate this type of facility.

Commercial/Retail

General Retail – General retail includes a variety of land uses that include shopping centers, home improvement stores, hardware stores selling a complete assortment of food, household goods and materials, apparel, servicing items. A shopping center is an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. It is related to its market area in terms of size, location, and type of store. Shopping centers provide on-site parking facilities. Some centers may include non-merchandising uses such as small office professional services, post offices, banks, health clubs, video rentals, and recreational facilities such as ice-skating rinks or video arcades.

Restaurant - This land use consists of sit-down eating establishments. Quality and high-turnover (sit-down) restaurants are included in this category. Quality restaurants usually have a turnover rate of at least one hour or longer. The turnover rate for a high-turnover (sit-down) restaurant is usually less than one hour.

Fast Food Restaurant - This category includes fast food restaurants with or without drive-through windows, such as McDonalds, Burger King, Dunkin Donuts, and Taco Bell. Some establishments may include an indoor or outdoor playground.

Convenience Store/Gas Station - Any convenience market that sells convenience foods, newspapers, magazines, and often, beer and wine and may have gasoline pumps. Gas stations generally are located at intersections or freeway interchanges and may include facilities for servicing, repairing, fueling motor vehicles and may have convenience stores. Convenience stores/gas stations that have a fast-food restaurant contained within should be calculated on a separate basis based on the appropriate independent variable.

Bank - This land use includes walk-in and drive-in banks. Walk-in banks are generally free-standing buildings with their own parking lots. These banks do not have drive-in windows. Drive-in banks provide banking facilities for the motorist while in a vehicle; many also serve patrons who walk into the building. Savings and loan companies should also be included in this category.

Hotel/Motel – A place of lodging that provides sleeping accommodations, small restaurants, lounges, and meeting spaces. Some hotels or motels may provide banquet rooms or other retail and service shops.

Furniture and Appliance Sales - A store specializing in the sale of furniture, household appliances and goods and often, carpeting.

Theater – This land use consists of a movie or live theater and contains audience seating, single or multiple auditoriums, lobby, offices and refreshment stands.

Self-Storage Facilities - A self-serve storage unit or vault that is rented for the storage of goods. Each unit is physically separated from other units and access is usually provided through an overhead door or other common access point.

Industrial (Basic)

General Industrial – General industrial includes a variety of land uses such as light industrial, manufacturing, salvage, facilities for preparation/assembly and warehouse/distribution of goods. Other uses include materials testing laboratories, high-tech facilities and assemblers of technical equipment. Most facilities are free standing and devoted to a single use. Also included in this category are any other industrial uses not specified above.

Manufacturing – Facilities where the primary activity is the conversion or fabrication of raw materials to finished products. In addition to production of goods, manufacturing facilities may also have ancillary office, warehouse and associated functions.

Warehousing – These facilities are primarily devoted to the storage of materials. These facilities differ from mini warehouse in that they are generally not self-service in nature.

Institutional

Private School - Private schools serve students between the kindergarten and middle school or high school levels. Private schools are usually centrally located in residential communities in order to facilitate student access and have no student drivers.

Community College - Community college provides two and four-year advanced degrees. Vocational and technical schools are other uses that may fall under this category.

Day Care Center - A day care center is a facility where care for pre-school age children is provided, normally during the daytime hours. Day care facilities generally include classrooms, offices, eating areas, and playgrounds. Some centers also provide after-school care for older children.

Hospital - A hospital is any institution where medical or surgical care is given to non-ambulatory and ambulatory patients, and overnight accommodations are provided.

Nursing Home - A nursing home is any facility whose primary purpose is to care for persons who are unable to care for themselves. The term applies to rest homes, chronic care, and convalescent homes.

Religious Facilities – Churches, synagogues or houses of worship that provide public worship services, and generally house an assembly hall or sanctuary, meeting rooms, classrooms, and occasionally dining, catering, or party facilities.

Activity Centers – A recreational center or private club such as a YMCA that may offer classes and clubs for adults and children; a day care or a nursery school, meeting rooms, swimming pools and whirlpools; saunas, tennis, racquetball and handball courts, exercise classes, weightlifting equipment and locker rooms. Some may offer a small restaurant or snack bar within.

U.S. Post Office – A building that contains service windows for mailing packages and letters, post office boxes, offices, sorting and distributing facilities for mail and vehicle storage areas.

C. Calculation of Vehicle-Miles of New Demand

2019-2029 Vehicle-Mile Trip Generation, Rockwall Roadway Impact Fee Study

Based on June 2019 Land Use Assumptions by City of Rockwall; ITE 10th-Trip Gen., NCTCOG Avg. Trip Lengths; FNI employee densities.

Estimated Residential Growth Vehicle-Mile Trip Generation (single family detached, typ.)

Service Area	Added Dwelling Units	Vehicle-Miles per DU	Total Vehicle-Miles
1	1,740	3.12	5,426
2	917	3.12	2,860
3	2,030	3.12	6,331
4	757	3.12	2,361

Estimated Basic Employment Growth Vehicle-Mile Generation (general light industrial, typ.)

Service Area	Added Employees	Square Feet per emp.	Total Square Feet	Vehicle-Miles Per 1000/SF	Total Vehicle-Miles
1	750	1500	1,125,000	1.77	1,992
2	102	1500	153,000	1.77	271
3	9	1500	13,500	1.77	24
4	0	1500	0	1.77	0

Estimated Service Employment Growth Vehicle-Mile Generation (general office building, typ.)

Service Area	Added Employees	Square Feet per emp.	Total Square Feet	Vehicle-Miles Per 1000/SF	Total Vehicle-Miles
1	1,726	500	863,000	3.92	3,384
2	130	500	65,000	3.92	255
3	2,242	500	1,121,000	3.92	4,396
4	169	500	84,500	3.92	331

Estimated Retail Employment Growth Vehicle-Mile Generation (retail/shopping center, typ.)

Service Area	Added Employees	Square Feet per emp.	Total Square Feet	Vehicle-Miles Per 1000/SF	Total Vehicle-Miles
1	1,654	1000	1,654,000	1.77	2,929
2	164	1000	164,000	1.77	290
3	1,271	1000	1,271,000	1.77	2,251
4	69	1000	69,000	1.77	122

2013-2023 Vehicle-mile Generation Summary

Service Area	Residential Growth Vehicle-Miles	Basic Growth Vehicle-Miles	Service Growth Vehicle-Miles	Retail Growth Vehicle-Miles	Total Growth Vehicle-Miles
1	5,426	1,992	3,384	2,929	**13,731**
2	2,860	271	255	290	**3,676**
3	6,331	24	4,396	2,251	**13,001**
4	2,361	0	331	122	**2,814**
Total	16,977	2,286	8,367	5,592	**33,222**

D. Existing Capital Improvements

EXISTING CAPITAL IMPROVEMENTS

Definitions

LANES	The total number of lanes in both directions available for travel.
TYPE	The type of roadway (used in determining capacity): DA = divided arterial UA = undivided arterial UC = undivided collector
PK-HR VOLUME	The existing volume of cars on the roadway segment traveling during the afternoon (P.M.) peak hour of travel. A and B indicate the two directions of travel. Direction A is a northbound or eastbound and direction B is southbound or westbound. If only one half of the roadway is located within the service area (see % in service area), the opposing direction will have no volume in the service area.
% IN SERVICE AREA	If the roadway is located on the boundary of the service area (with the city limits running along the centerline of the roadway), then half of the roadway is inventoried in the service area and the other half is not. This value is either 50% or 100%.
VEH-MI SUPPLY PK-HR	The number of total service units (vehicle-miles) supplied within the service area, based on the length and established capacity of the roadway type.
VEH-MI TOTAL DEMAND PK-HR	The total service unit (vehicle-mile) demand created by existing traffic on the roadway segment in the afternoon peak hour.
EXCESS CAPACITY PK-HR VEH-MI	The number of service units supplied but unused by existing traffic in the afternoon peak hour.
EXISTING DEFICIENCIES PK-HR VEH-MI	The number of service units of demand in excess of the service units supplied.

NOTE: Excess capacity and existing deficiencies are calculated separately for each direction. It is possible to have excess capacity in one direction and an existing deficiency in the other. When both directions have excess capacity or deficiencies, the total for both directions are presented.

2019 Rockwall Roadway Impact Fee Study Update
Existing Capital Improvements Analysis

Serv Area	Roadway	From	To	Length (mi)	No. of Lanes	Type	PM Pk Cap per Lane	Pct. in Serv. Area	IF on CIP	Peak Hour Volume A	B	Total	VMT Supply Pk Hr Total	VMT Demand Pk Hr Total	Excess VMT Capacity	Exist. VMT Deficiency
1	Goliad	N . City Limit	FM 552	0.57	2	UA	575	100%	N	300	300	600	656	342	314	0
1	Goliad	FM 552	Ridge Road W.	0.67	2	UA	575	100%	N	450	460	910	771	610	161	0
1	Goliad	Ridge Road W.	Quail Run	0.45	2	UA	575	100%	N	600	618	1218	518	548	0	31
1	Goliad	Quail Run	Caruth	0.48	2	UA	575	100%	N	830	804	1634	556	790	0	234
1	Goliad	Caruth	Heath	1.00	2	UA	575	100%	N	850	820	1670	1146	1664	0	518
1	Goliad	Heath	Olive	0.27	2	UA	575	100%	N	900	900	1800	311	486	0	176
1	Goliad	Olive	Washington	0.18	6	DA	600	100%	N	1135	1088	2223	650	401	249	0
1	Goliad	Washington	Ridge Road	0.65	6	DA	600	100%	N	1810	1040	2850	2355	1864	497	7
1	Goliad	Ridge Road	IH 30 WB FR	0.99	6	DA	600	100%	N	1158	642	1800	3554	1777	1777	0
1	Ridge Road	Goliad	Yellow Jacket	0.58	4	DA	600	100%	N	1275	900	2175	1384	1254	173	43
1	Ridge Road	Yellow Jacket	IH 30 WB FR	0.61	4	DA	600	100%	N	1371	1138	2509	1464	1530	38	104
1	John King	City Limit (near Goliad)	FM552	1.28	4	DA	600	50%	Y	0	275	275	1536	352	1184	0
1	John King	FM 552	Quail Run	1.29	4	DA	600	50%	Y	0	500	500	1548	645	903	0
1	John King	Quail Run	SH 66	1.04	4	DA	600	50%	Y	0	550	550	1248	572	676	0
1	John King	SH 66	IH 30 WB FR	1.47	4	DA	600	50%	Y	0	615	615	1764	904	860	0
1	Yellow Jacket	Ridge Road	Goliad	0.89	4	DC	500	100%	N	228	274	502	1780	447	1333	0
1	Yellow Jacket	Goliad	T.L. Townsend	0.28	4	DC	500	100%	N	126	87	213	560	60	500	0
1	Townsend	IH 30 WB FR	Yellow Jacket	0.27	4	DA	600	100%	N	160	142	302	648	82	566	0
1	FM 552	Goliad	E. City Limits	0.71	2	UA	575	100%	N	359	355	714	817	507	310	0
1	Lakeshore	Goliad	Lake Forest	0.95	4	DC	500	100%	N	391	319	710	1900	675	1226	0
1	Lakeshore	Lake Forest	Rusk	1.29	4	DC	500	100%	N	195	159	354	2580	457	2123	0
1	Quail Run	Goliad	John King Blvd	1.13	2	UA	575	100%	N	168	172	340	1300	384	915	0
1	Heath	Goliad	SH 66	0.60	2	UC	475	100%	N	176	101	277	567	165	402	0
1	Rusk	Lake Ray Hubbard	Cemetery	0.53	4	DA	600	100%	N	1161	675	1836	1277	977	300	0
1	Rusk	Cemetery	Goliad	0.22	6	DA	600	100%	N	1361	875	2236	802	498	304	0
1	Rusk	Goliad	Fanin	0.10	4	DA	600	100%	N	330	330	660	236	65	171	0
1	SH66	Heath	John King Blvd	0.51	2	UA	575	100%	N	623	371	994	584	505	104	24
Sub-Total SA1				*5.08*									*32,508*	*18,560*	*15,085*	*1,137*
2	Cornelius	FM 1141	FM 549	1.04	2	UC	475	100%	N	50	50	100	988	104	884	0
2	FM 1141	City Limit (Clem)	FM 552	0.64	2	UA	575	100%	N	61	60	121	736	77	659	0
2	FM 1141	John King Blvd	Cornelius	0.40	2	UA	575	100%	N	120	80	200	460	80	380	0
2	John King	City Limit (near Goliad)	FM552	1.28	4	DA	600	50%	Y	300	0	300	1536	384	1152	0
2	John King	FM 552	Quail Run	1.29	4	DA	600	50%	Y	550	0	550	1548	710	839	0
2	John King	Quail Run	SH 66	1.04	4	DA	600	50%	Y	650	0	650	1248	676	572	0
2	John King	SH 66	IH 30 WB FR	1.47	4	DA	600	50%	Y	825	0	825	1764	1213	551	0
2	SH66	John King Blvd	Stodghill (FM 549)	1.31	2	UA	575	100%	N	550	245	795	1507	1041	465	0
2	Stodghill (FM 549)	IH 30 WB FR	SH 66	0.88	2	UA	575	100%	N	449	300	749	1012	659	353	0
Sub-Total SA2				*9.35*									*10,799*	*4,944*	*5,854*	*0*
3	Ridge	IH 30 EB FR	Horizon	0.63	4	DA	600	100%	N	892	1031	1923	1512	1211	301	0
3	Ridge	Horizon	S. City Limit	1.24	4	DA	600	100%	N	880	955	1835	2976	2275	701	0
3	Horizon	IH 30 EB FR	Ridge	0.31	4	DA	600	100%	N	700	800	1500	744	465	279	0
3	Horizon	Ridge	Ralph Hall	0.23	4	DA	600	100%	N	719	816	1535	552	353	199	0
3	Horizon	Ralph Hall	Tubbs	0.48	4	DA	600	100%	N	611	775	1386	1152	665	487	0
3	Horizon	Tubbs	FM 549	1.85	2	UA	575	100%	N	411	494	905	2128	1674	453	0
3	Ralph Hall	Horizon	Market Center	0.68	4	DA	600	100%	N	890	950	1840	1632	1251	381	0
3	Ralph Hall	Market Center	Goliad	0.36	4	DA	600	100%	N	892	957	1849	864	666	198	0
3	Goliad	IH 30 EB FR	SH 276	0.13	6	DA	600	100%	N	1550	1700	3250	452	408	44	0
3	Goliad	SH 276	Ralph Hall	0.20	6	DA	600	100%	N	1355	1587	2942	713	582	130	0
3	Goliad	Ralph Hall	Sids	0.41	6	DA	600	100%	N	805	1089	1894	1473	775	698	0
3	Goliad	Sids	John King Blvd	1.01	2	UA	575	100%	N	680	807	1487	1162	1502	0	340
3	Goliad	John King Blvd	FM 549	0.88	2	UA	575	50%	N	0	825	825	504	723	0	219
3	Goliad	FM 549	S. City Limit	0.28	2	UA	575	50%	N	0	1025	1025	160	285	0	125
3	John King Blvd	IH 30 EB FR	SH 276	0.89	4	DA	600	50%	Y	0	871	871	1063	772	291	0
3	John King Blvd	SH 276	Goliad	1.34	4	DA	600	50%	Y	0	225	225	1608	302	1307	0
3	S. FM549	Goliad	Horizon (FM3097)	1.28	2	UA	575	100%	N	398	413	811	1472	1038	434	0
3	SH 276	Goliad	John King Blvd	1.01	2	UA	575	100%	N	645	743	1388	1162	1402	0	240
3	T.L. Townsend	IH 30 EB FR	SH 276	0.56	2	UA	575	100%	N	33	86	119	644	67	577	0
Sub-Total SA 3				*2.23*									*21,972*	*16,417*	*6,480*	*925*
4	SH 276	John King Blvd	FM 549	0.74	2	UA	575	100%	N	600	820	1420	854	1055	0	201
4	SH 276	FM 549	Rochelle	1.01	2	UA	575	100%	N	545	969	1514	1162	1529	30	398
4	SH 276	Rochelle	E. City Limits	0.68	2	UA	575	100%	N	245	475	720	779	488	291	0
4	Goliad	John King Blvd	FM 549	0.88	2	UA	575	50%	N	805	0	805	504	706	0	202
4	Goliad	FM 549	S. City Limit	0.28	2	UA	575	50%	N	605	0	605	160	168	0	8
4	John King Blvd	IH 30 EB FR	SH 276	0.89	4	DA	600	50%	Y	656	0	656	1063	581	482	0
4	John King Blvd	SH 276	Goliad	1.34	4	DA	600	50%	Y	225	0	225	1608	302	1307	0
4	FM 549	IH 30 EB FR	SH 276	0.89	2	UA	575	100%	N	346	409	755	1019	669	350	0
4	FM 549	SH 276	FM 1139	1.84	2	UA	575	100%	N	268	275	543	2116	999	1117	0
4	FM 1139	Goliad (SH205)	E. City Limits	0.43	2	UC	475	100%	N	368	375	743	409	320	89	0
Sub-Total SA 4				8.96746									*9674*	*6816*	*3666*	*808*
Total				**25.62**									**74,952**	**46,738**	**31,085**	**2,871**

Notes:
DA- Divided Arterial
UA- Undivided Arterial
UC- Undivided Collector

E. Roadway Improvement Plan Projects

ROADWAY IMPROVEMENTS PLAN PROJECTS

Definitions

LANES	The total number of lanes in both directions available for travel.
TYPE	The type of roadway (used in determining capacity): DA = divided arterial SA = special arterial (similar to DA)
PK-HR VOLUME	the existing volumes of cars on the roadway segment traveling during the afternoon (P.M.) peak hour of travel.
% IN SERVICE AREA	If the roadway is located on the boundary of the service area (with the city limits running along the centerline of the roadway), then half of the roadway is inventoried in the service area and the other half is not. This value is either 50% or 100%.
VEH-MI SUPPLY TOTAL	The number of total service units (vehicle-miles) supplied within the service area, based on the length and established capacity of the roadway type.
VEH-MI TOTAL DEMAND PK-HR	The total service unit (vehicle-mile) demand created by existing traffic on the roadway segment in the afternoon peak hour.
EXCESS CAPACITY PK-HR VEH-MI	The number of service units supplied but unused by existing traffic in the afternoon peak hour.
FINANCE COST	Estimate of the cost of financing the cost of project development. Included for recoupment projects along John King Boulevard. Not applied for new recoupment and future projects added under this updated Impact Fee CIP
ROW	Estimated value of private owned right of way needed to be acquired for construction of the roadway improvements.

Table 8
2019 Rockwall Roadway Impact Fee Study Update
Roadway Capital Improvements Plan

Serv Area Number	CIP Year	Roadway	From	To	Length (mi)	No. of Lanes	Rdwy. Type	Lane Capacity	Pct. in Serv. Area	VMT Supply Pk Hr Total	VMT Demand Pk Hr Total	Excess VMT Capacity	CIP VMT Deficiency	Project Status	Roadway Costs				Project Cost
															Engineering	*ROW*	*Construction**	*Finance*	
1/2	2007	John King	City Limit (near G	FM552	1.28	4	DA	600	50%	1536	352	1184	0	R	$363,513	$893,017	$3,000,276	$3,716,172	$7,972,977
1/2	2007	John King	FM 552	Quail Run	1.29	4	DA	600	50%	1548	645	903	0	R	$366,353	$899,994	$3,023,715	$3,745,205	$8,035,266
1/2	2007	John King	Quail Run	SH 66	1.04	4	DA	600	50%	1248	572	676	0	R	$295,354	$725,576	$2,437,724	$3,019,390	$6,478,044
1/2	2007	John King	SH 66	IH 30 WB FR	1.47	4	DA	600	50%	1764	904	860	0	R	$417,472	$1,025,574	$3,445,629	$4,267,792	$9,156,466
1	2019	SH 205 (Goliad St)	Olive	Live Oak	0.33	5	SA	450	100%	588	567	21	0	N	$236,600	$17,300	$3,380,500	$0	$3,634,400
1	2019	SH 205 (Goliad St)	Live Oak	N. City Limit	2.98	4	DA	600	100%	7152	3791	3362	0	N	$2,481,248	$314,700	$35,446,400	$0	$38,242,348
Sub-total SA 1					**8.39**					**13836**	**6831**	**7006**	**0**		**$4,160,539**	**$3,876,160**	**$50,734,244**	**$14,748,559**	**$73,519,502**
2/1	2007	John King	City Limit (near G	FM552	1.28	4	DA	600	50%	1536	384	1152	0	R	$363,513	$893,017	$3,000,276	$3,716,172	$7,972,977
2/1	2007	John King	FM 552	Quail Run	1.29	4	DA	600	50%	1548	710	839	0	R	$366,353	$899,994	$3,023,715	$3,745,205	$8,035,266
2/1	2007	John King	Quail Run	SH 66	1.04	4	DA	600	50%	1248	676	572	0	R	$295,354	$725,576	$2,437,724	$3,019,390	$6,478,044
2/1	2007	John King	SH 66	IH 30 WB FR	1.47	4	DA	600	50%	1764	1213	551	0	R	$417,472	$1,025,574	$3,445,629	$4,267,792	$9,156,466
Sub-total SA 2					**5.08**					**6096**	**2982**	**3114**	**0**		**$1,442,691**	**$3,544,160**	**$11,907,344**	**$14,748,559**	**$31,642,754**
3/4	2007	John King Blvd	IH 30 EB FR	SH 276	0.89	4	DA	600	50%	1063	772	291	0	R	$107,472	$231,933	$1,098,543	$2,455,941	$3,893,889
3/4	2007	John King Blvd	SH 276	Goliad	1.34	4	DA	600	50%	1608	302	1307	0	R	$162,580	$350,860	$1,661,837	$3,715,260	$5,890,537
3	2019	SH 205 (Goliad St)	Sids	John King Blvd	0.96	6	DA	600	100%	3474	1435	2039	0	N	$974,148	$101,900	$13,916,400	$0	$14,992,448
3	2019	FM3097/Horizon	Ridge Road	County Line Rd	1.13	4	DA	600	100%	2705	1562	1143	0	R	$0	$0	$900,000	$0	$900,000
3	2019	FM740/Ridge Rd	Horizon	S. City Limit	1.10	4	DA	600	100%	2640	2019	622	0	R	$0	$0	$472,902	$0	$472,902
Sub-total SA 3					**5.42**					**11489**	**6088**	**5401**	**0**		**$1,244,200**	**$684,694**	**$18,049,682**	**$6,171,201**	**$26,149,776**
4/3	2007	John King Blvd	IH 30 EB FR	SH 276	0.89	4	DA	600	50%	1063	581	482	0	R	$107,472	$231,933	$1,098,543	$2,455,941	$3,893,889
4/3	2007	John King Blvd	SH 276	Goliad	1.34	4	DA	600	50%	1608	302	1307	0	R	$162,580	$350,860	$1,661,837	$3,715,260	$5,890,537
4	2019	FM 549 (Corp Crossing)	IH30	SH276	0.87	4	DA	600	100%	2080	654	1425	0	R	$0	$0	$4,724,665	$0	$4,724,665
Sub-total SA 4					**3.09**					**4751**	**1537**	**3214**	**0**		**$270,052**	**$582,794**	**$7,485,045**	**$6,171,201**	**$14,509,091**
Totals:					**13.80**					**36,172**	**17,438**	**18,734**	**0**		**$7,117,483**	**$8,687,808**	**$88,176,313**	**$41,839,518**	**$145,821,123**

Notes:

DA- Divided Arterial

SA- Special Arterial with two-way left turn lane (TWLTL)

N- New Impact Fee Project

R- Impact Fee Recoupment Project

Red font = added in this Impact Fee CIP

A

City of Rockwall

Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

SH 205

Olive St to Live Oak St

Roadway Information:			
Functional Classification:	Arterial	No. of Lanes:	5
Length (lf):	1,725		
Right-of-Way Width (ft.):	70		
Median Type:	TWLTL		
Pavement Width (BOC to BOC):	45		
Description:	Widen existing roadway to thoroughfare standard		

Roadway Construction Cost Estimate:

I. Paving Construction Cost Estimate

Item No.	Item Description	Quantity	Unit	Unit Cost	Item Cost
1	Acquire ROW	0	SF	$ 1.00	$ -
2	Right of Way Preparation	18	STA	$ 4,000.00	$ 72,000
3	Remove Existing Pavement	18	STA	$ 1,000.00	$ 18,000
4	Unclassified Street Excavation	3,200	CY	$ 20.00	$ 64,000
5	8" Lime Stabilized Subgrade	9,100	SY	$ 10.00	$ 91,000
6	Lime for Stabilization (48 lb/SY)	200	TON	$ 180.00	$ 36,000
7	10" Concrete Pavement w/ Integral Curb	8,700	SY	$ 75.00	$ 652,500
8	4" Concrete Sidewalk and Ramps	20,700	SY	$ 55.00	$ 1,138,500
9	Solid Sod	22,400	SY	$ 5.00	$ 112,000
				Paving Estimate Subtotal:	**$ 2,184,000**

II. Non-Paving Construction Components

Item No.	Item Description	Pct. Of Paving	Item Cost
10	Pavement Markings & Signage	2%	$ 43,700
11	Traffic Control	4%	$ 87,400
12	Erosion Control	3%	$ 65,600
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)	20%	$ 436,800
14	Utility Adjustments	5%	$ 109,200
	Other Components Estimate Subtotal:		**$ 742,700**

III. Special Construction Components

Item No.	Item Description	Notes	Allowance	Item Cost
15	Drainage Structures	None	$ -	$ -
16	Bridge Structures	None	$ -	$ -
17	Traffic Signals	None	$ -	$ -
		Special Components Estimate Subtotal:		**$ -**

I, II, & III Construction Subtotal:		$ 2,926,700
Mobilization	5%	$ 146,400
Contingency	10%	$ 307,400
Construction Cost Estimate Total:		**$ 3,380,500**

Impact Fee Cost Estimate Summary

Item Description	Notes	Allowance	Item Cost
Construction		-	$ 3,380,500
Engineering/Survey/Testing		7.0%	$ 236,600
Right-of-Way Acquisition	Cost per sq. ft.: $ 1.00	$ 17,300	$ 17,300
	Impact Fee Project Cost Estimate Total:		**$ 3,634,400**
	Estimated Finance Cost (11.9%; i.e. 3% over 10 years)		**$ 432,400**

2019 Roadway Impact Fee
City of Rockwall

Freese and Nichols, Inc.
Updated: 7/2019

B

City of Rockwall

Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

SH 205

Live Oak St to N. City Limit

Roadway Information:			
Functional Classification:	Arterial	No. of Lanes:	4
Length (lf):	15,735		
Right-of-Way Width (ft.):	85		
Median Type:	Raised		
Pavement Width (BOC to BOC):	50		
Description:	Widen existing roadway to thoroughfare standard		

Roadway Construction Cost Estimate:

I. Paving Construction Cost Estimate

Item No.	Item Description	Quantity	Unit	Unit Cost	Item Cost
1	Acquire ROW	157,400	SF	$ 1.00	$ 157,400
2	Right of Way Preparation	158	STA	$ 4,000.00	$ 632,000
3	Remove Existing Pavement	158	STA	$ 1,000.00	$ 158,000
4	Unclassified Street Excavation	32,100	CY	$ 20.00	$ 642,000
5	8" Lime Stabilized Subgrade	94,500	SY	$ 10.00	$ 945,000
6	Lime for Stabilization (48 lb/SY)	1,990	TON	$ 180.00	$ 358,200
7	10" Concrete Pavement w/ Integral Curb	87,500	SY	$ 75.00	$ 6,562,500
8	4" Concrete Sidewalk and Ramps	188,820	SY	$ 55.00	$ 10,385,100
9	Solid Sod	361,900	SY	$ 5.00	$ 1,809,500
				Paving Estimate Subtotal:	**$ 21,492,300**

II. Non-Paving Construction Components

Item No.	Item Description	Pct. Of Paving	Item Cost
10	Pavement Markings & Signage	2%	$ 429,900
11	Traffic Control	4%	$ 859,700
12	Erosion Control	3%	$ 644,800
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)	20%	$ 4,298,500
14	Utility Adjustments	5%	$ 1,074,700
	Other Components Estimate Subtotal:		**$ 7,307,600**

III. Special Construction Components

Item No.	Item Description	Notes	Allowance	Item Cost
15	Drainage Structures	1 minor	$ 150,000	$ 150,000
16	Bridge Structures	175' long bridge south of Lakeshore Blvd	$ 1,139,600	$ 1,139,600
17	Traffic Signals	3 Existing Signals; 1 new @ N John King	$ 600,000	$ 600,000
		Special Components Estimate Subtotal:		**$ 1,889,600**

I, II, & III Construction Subtotal:		$ 30,689,500
Mobilization	5%	$ 1,534,500
Contingency	10%	$ 3,222,400
Construction Cost Estimate Total:		**$ 35,446,400**

Impact Fee Cost Estimate Summary

Item Description	Notes	Allowance	Item Cost
Construction		-	$ 35,446,400
Engineering/Survey/Testing		7.0%	$ 2,481,200
Right-of-Way Acquisition	Cost per sq. ft.: $ 1.00	$ 314,700	$ 314,700
	Impact Fee Project Cost Estimate Total:		**$ 38,242,300**
	Estimated Finance Cost (11.9%; i.e. 3% over 10 years)		**$ 4,550,800**

2019 Roadway Impact Fee
City of Rockwall

Freese and Nichols, Inc.
Updated: 7/2019

C

City of Rockwall

Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

SH 205

Sids Rd to John King Blvd

Roadway Information:			
Functional Classification:	Arterial	No. of Lanes:	6
Length (lf):	5,095		
Right-of-Way Width (ft.):	120		
Median Type:	Raised		
Pavement Width (BOC to BOC):	74		
Description:	Widen existing roadway to thoroughfare standard		

Roadway Construction Cost Estimate:

I. Paving Construction Cost Estimate

Item No.	Item Description	Quantity	Unit	Unit Cost	Item Cost
1	Acquire ROW	101,900	SF	$ 1.00	$ 101,900
2	Right of Way Preparation	51	STA	$ 4,000.00	$ 204,000
3	Remove Existing Pavement	51	STA	$ 1,000.00	$ 51,000
4	Unclassified Street Excavation	15,400	CY	$ 20.00	$ 308,000
5	8" Lime Stabilized Subgrade	44,200	SY	$ 10.00	$ 442,000
6	Lime for Stabilization (48 lb/SY)	930	TON	$ 180.00	$ 167,400
7	10" Concrete Pavement w/ Integral Curb	41,900	SY	$ 75.00	$ 3,142,500
8	4" Concrete Sidewalk and Ramps	61,140	SY	$ 55.00	$ 3,362,700
9	Solid Sod	173,200	SY	$ 5.00	$ 866,000
				Paving Estimate Subtotal:	**$ 8,543,600**

II. Non-Paving Construction Components

Item No.	Item Description	Pct. Of Paving	Item Cost
10	Pavement Markings & Signage	2%	$ 170,900
11	Traffic Control	4%	$ 341,800
12	Erosion Control	3%	$ 256,400
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)	20%	$ 1,708,800
14	Utility Adjustments	5%	$ 427,200
	Other Components Estimate Subtotal:		**$ 2,905,100**

III. Special Construction Components

Item No.	Item Description	Notes	Allowance	Item Cost
15	Drainage Structures	2 Minor crossings	$ 300,000	$ 300,000
16	Bridge Structures	None	$ -	$ -
17	Traffic Signals	1 Existing @ John King; 1 new @ Sids	$ 300,000	$ 300,000
		Special Components Estimate Subtotal:		**$ 600,000**

I, II, & III Construction Subtotal:		$ 12,048,700
Mobilization	5%	$ 602,500
Contingency	10%	$ 1,265,200
Construction Cost Estimate Total:		**$ 13,916,400**

Impact Fee Cost Estimate Summary

Item Description	Notes	Allowance	Item Cost
Construction		-	$ 13,916,400
Engineering/Survey/Testing		7.0%	$ 974,100
Right-of-Way Acquisition	Cost per sq. ft.: $ 1.00	$ 101,900	$ 101,900
	Impact Fee Project Cost Estimate Total:		**$ 14,992,400**
	Estimated Finance Cost (11.9%; i.e. 3% over 10 years)		**$ 1,784,000**

2019 Roadway Impact Fee
City of Rockwall

Freese and Nichols, Inc.
Updated: 7/2019

D

City of Rockwall

Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

SH 205

John King Blvd to S. City Limit

Roadway Information:			
Functional Classification:	Arterial	No. of Lanes:	6
Length (lf):	13,358		
Right-of-Way Width (ft.):	120		
Median Type:	Raised		
Pavement Width (BOC to BOC):	74		
Description:	Widen existing roadway to thoroughfare standard		

Roadway Construction Cost Estimate:

I. Paving Construction Cost Estimate

Item No.	Item Description	Quantity	Unit	Unit Cost	Item Cost
1	Acquire ROW	267,200	SF	$ 1.00	$ 267,200
2	Right of Way Preparation	134	STA	$ 4,000.00	$ 536,000
3	Remove Existing Pavement	134	STA	$ 1,000.00	$ 134,000
4	Unclassified Street Excavation	40,300	CY	$ 20.00	$ 806,000
5	8" Lime Stabilized Subgrade	115,800	SY	$ 10.00	$ 1,158,000
6	Lime for Stabilization (48 lb/SY)	2,440	TON	$ 180.00	$ 439,200
7	10" Concrete Pavement w/ Integral Curb	109,900	SY	$ 75.00	$ 8,242,500
8	4" Concrete Sidewalk and Ramps	160,300	SY	$ 55.00	$ 8,816,500
9	Solid Sod	454,200	SY	$ 5.00	$ 2,271,000
				Paving Estimate Subtotal:	**$ 22,403,200**

II. Non-Paving Construction Components

Item No.	Item Description	Pct. Of Paving	Item Cost
10	Pavement Markings & Signage	2%	$ 448,100
11	Traffic Control	4%	$ 896,200
12	Erosion Control	3%	$ 672,100
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)	20%	$ 4,480,700
14	Utility Adjustments	5%	$ 1,120,200
	Other Components Estimate Subtotal:		**$ 7,617,300**

III. Special Construction Components

Item No.	Item Description	Notes	Allowance	Item Cost
15	Drainage Structures	1 Minor crossing, 2 major crossing	$ 750,000	$ 750,000
16	Bridge Structures	None	$ -	$ -
17	Traffic Signals	1 Existing Signal @ Lofland Cir	$ 150,000	$ 150,000
		Special Components Estimate Subtotal:		**$ 900,000**

I, II, & III Construction Subtotal:		$ 30,920,500
Mobilization	5%	$ 1,546,100
Contingency	10%	$ 3,246,700
Construction Cost Estimate Total:		**$ 35,713,300**

Impact Fee Cost Estimate Summary

Item Description	Notes	Allowance	Item Cost
Construction		-	$ 35,713,300
Engineering/Survey/Testing		7.0%	$ 2,499,900
Right-of-Way Acquisition	Cost per sq. ft.: $ 1.00	$ 267,200	$ 267,200
	Impact Fee Project Cost Estimate Total:		**$ 38,480,400**
	Estimated Finance Cost (11.9%; i.e. 3% over 10 years)		**$ 4,579,100**

2019 Roadway Impact Fee
City of Rockwall

Freese and Nichols, Inc.
Updated: 7/2019

F. Roadway Improvements Plan Cost Analysis

ROADWAY IMPROVEMENTS PLAN COST ANALYSIS

Definitions

LANES	The total number of lanes in both directions available for travel.
TYPE	The type of roadway (used in determining capacity): DA = divided arterial SA = special arterial
% IN SERVICE AREA	If the roadway is located on the boundary of the service area (with the city limits running along the centerline of the roadway), then half of the roadway is inventoried in the service area and the other half is not. This value is either 50% or 100%.
TOTAL SEGMENT COST	The estimated cost (in dollars) of the entire segment of the proposed improvement.
TOTAL COST IN SERVICE AREA	The estimated cost (in dollars) of the portion of the proposed roadway improvement within the service area.

2019 Rockwall Roadway Impact Fee Study Update
Roadway Capital Improvements Plan

Serv Area Number	CIP Year	Roadway	From	To	Length (mi)	No. of Lanes	Rdwy. Type	Pct. in Serv. Area	Roadway Costs				Project Cost
									Engineering	*ROW*	*Construction**	*Finance*	
1/2	2007	John King	City Limit (near G	FM552	1.28	4	DA	50%	$363,513	$893,017	$3,000,276	$3,716,172	$7,972,977
1/2	2007	John King	FM 552	Quail Run	1.29	4	DA	50%	$366,353	$899,994	$3,023,715	$3,745,205	$8,035,266
1/2	2007	John King	Quail Run	SH 66	1.04	4	DA	50%	$295,354	$725,576	$2,437,724	$3,019,390	$6,478,044
1/2	2007	John King	SH 66	IH 30 WB FR	1.47	4	DA	50%	$417,472	$1,025,574	$3,445,629	$4,267,792	$9,156,466
1	2019	SH 205 (Goliad St)	Olive	Live Oak	0.33	5	SA	100%	$236,600	$17,300	$3,380,500	$0	$3,634,400
1	2019	SH 205 (Goliad St)	Live Oak	N. City Limit	2.98	4	DA	100%	$2,481,248	$314,700	$35,446,400	$0	$38,242,348
Sub-total SA 1					**8.39**				**$4,160,539**	**$3,876,160**	**$50,734,244**	**$14,748,559**	**$73,519,502**
2/1	2007	John King	City Limit (near G	FM552	1.28	4	DA	50%	$363,513	$893,017	$3,000,276	$3,716,172	$7,972,977
2/1	2007	John King	FM 552	Quail Run	1.29	4	DA	50%	$366,353	$899,994	$3,023,715	$3,745,205	$8,035,266
2/1	2007	John King	Quail Run	SH 66	1.04	4	DA	50%	$295,354	$725,576	$2,437,724	$3,019,390	$6,478,044
2/1	2007	John King	SH 66	IH 30 WB FR	1.47	4	DA	50%	$417,472	$1,025,574	$3,445,629	$4,267,792	$9,156,466
Sub-total SA 2					**5.08**				**$1,442,691**	**$3,544,160**	**$11,907,344**	**$14,748,559**	**$31,642,754**
3/4	2007	John King Blvd	IH 30 EB FR	SH 276	0.89	4	DA	50%	$107,472	$231,933	$1,098,543	$2,455,941	$3,893,889
3/4	2007	John King Blvd	SH 276	Goliad	1.34	4	DA	50%	$162,580	$350,860	$1,661,837	$3,715,260	$5,890,537
3	2019	SH 205 (Goliad St)	Sids	John King Blvd	0.96	6	DA	100%	$974,148	$101,900	$13,916,400	$0	$14,992,448
3	2019	FM3097/Horizon	Ridge Road	County Line Rd	1.13	4	DA	100%	$0	$0	$900,000	$0	$900,000
3	2019	FM740/Ridge Rd	Horizon	S. City Limit	1.10	4	DA	100%	$0	$0	$472,902	$0	$472,902
Sub-total SA 3					**5.42**				**$1,244,200**	**$684,694**	**$18,049,682**	**$6,171,201**	**$26,149,776**
4/3	2007	John King Blvd	IH 30 EB FR	SH 276	0.89	4	DA	50%	$107,472	$231,933	$1,098,543	$2,455,941	$3,893,889
4/3	2007	John King Blvd	SH 276	Goliad	1.34	4	DA	50%	$162,580	$350,860	$1,661,837	$3,715,260	$5,890,537
4	2019	FM 549 (Corp Crossing)	IH30	SH276	0.87	4	DA	100%	$0	$0	$4,724,665	$0	$4,724,665
Sub-total SA 4					**3.09**				**$270,052**	**$582,794**	**$7,485,045**	**$6,171,201**	**$14,509,091**
Totals:					**13.80**				**$7,117,483**	**$8,687,808**	**$88,176,313**	**$41,839,518**	**$145,821,123**

Notes:

DA- Divided Arterial

SA- Special Arterial with two-way left turn lane (TWLTL)

N- New Impact Fee Project

R- Impact Fee Recoupment Project

G. Service Area Analysis Summary

2019 Rockwall Roadway Impact Fee Study

Service Area Analysis Summary (John King @ 4D + Project Additions)

	1	2	3	4	5	6	7	8	9	10	11	12	13
Service Area	Capacity Supplied by CIP (veh-mi)	Existing Utilization	Existing Deficiencies	Net Capacity Supplied by CIP	Total Project Cost of CIP	Project Cost of CIP with 50% Credit	Cost of Net Capacity Supplied	Cost to Meet Existing Utilization	Projected 10yr Demand (veh-miles)	Pcnt. of CIP Attributable to New Dev. (10-yr)	Cost Attributable to New Dev.	Fee per Service Unit @ 50% Discount	*Actual Cost per Service Unit (veh-mi)*
1	13,836	6,831	1,137	5,869	$73,550,103	$36,775,052	$15,598,596	$21,176,456	13,731	100.0	$15,598,596	$1,136.00	*$2,272.00*
2	6,096	2,982	0	3,114	$31,656,236	$15,828,118	$8,084,777	$7,743,341	3,676	100.0	$8,084,777	$2,199.00	*$4,398.00*
3	11,489	6,088	925	4,476	$26,175,186	$13,087,593	$5,098,520	$7,989,073	13,001	100.0	$5,098,520	$392.00	*$784.00*
4	4,751	1,537	808	2,405	$14,519,597	$7,259,799	$3,675,714	$3,584,085	2,814	100.0	$3,675,714	$1,306.00	*$2,612.00*
Totals	36,172	17,438	2,871	15,864	$145,901,123	$72,950,562	$31,993,304	$40,957,258	33,222	100.0	$31,993,304	$963.00	*$1,926.00*

Dbase D + Project Additions

1. TOTAL VEH-MI OF CAPACITY SUPPLIED BY CIP (TVMCAP)
2. TOTAL VEH-MI OF EXISTING DEMAND (VMEXT)
3. TOTAL VEH-MI OF EXISTING DEFICENCIES (VMDEF)
4. NET AMOUNT OF ROADWAY CAPACITY SUPPLIED (NVMCAP) =
   NVMCAP =TVMCAP-VMEXT-VMDEF
5. TOTAL COST OF CIP WITHIN STUDY AREA (TVMCOST)
6. TOTAL COST OF CIP IN SERVICE AREA w/50% CREDIT (TVMCOST)
7. COST OF NET CAPACITY SUPPLIED (NCVMCAP) =
   NCVMCAP = (NVMCAP/TVMCAP)*TVMCOST
8. COST TO MEET EXISTING NEEDS AND USAGE (EXCOST) =
   EXCOST = TVMCOST-NCVMCAP
9. TOTAL VEH-MI OF NEW DEMAND OVER TEN YEARS (TNEWDEM)
10. PERCENT OF CIP ATTRIBUTABLE TO NEW DEVELOPMENT (NPCNT) =
    IF TNEWDEM > NVMCAP, NPCNT = 100%
    IF TNEWDEM < NVMCAP, NPCNT = (TNEWDEM / NVMCAP)*100
11. COST OF CIP ATTRIBUTABLE TO NEW DEVELOPMENT (NCVMDEM) =
    NCVMDEM = (TNEWDEM / NVMCAP) * NCVMCAP
12. MAXIMUM FEE PER SERVICE UNIT (50%) =
    MAX FEE = NCVMDEM / TNEWDEM
13. ACTUAL COST PER SERVICE UNIT (100%)

2019 – 2029 WATER & WASTEWATER IMPACT FEE UPDATE

Submitted To

CITY OF ROCKWALL

Submitted By

BIRKHOFF, HENDRICKS & CARTER, L.L.P.
PROFESSIONAL ENGINEERS
TBPE Firm No. 526

September 2019

CITY OF ROCKWALL
2019 - 2029 WATER & WASTEWATER IMPACT FEE UPDATE

TABLE OF CONTENTS

Matthew Hickey 9/16/19

09/16/19

CITY OF ROCKWALL
2019 – 2029 WATER & WASTEWATER IMPACT FEE UPDATE

SECTION 1 – INTRODUCTION

A. GENERAL

In accordance with the requirements of Chapter 395.052 of the Local Government Code, this report establishes the City of Rockwall's Capital Improvement Plan for water and wastewater impact fees and calculates the maximum allowable fee for each. Land use assumptions for impact fees were generated under a separate document prepared by the City of Rockwall's Planning Department.

Chapter 395, of the Local Government Code is an act that provides guidelines for financing capital improvements required by new development in municipalities, counties, and certain other local governments. The basis for determination of an impact fee requires the preparation and adoption of a land use plan and growth assumption, and the preparation of a 10-year capital improvement plan. The capital improvement plan requires an analysis of total capacity, the level of current usage and commitments of capacity of existing capital improvements. From these two phases, a maximum impact fee is calculated.

The Act allows the maximum impact fee to be charged if revenues from future ad valorem taxes, and water and sewer bills are included as a credit in the analysis. If not, the Act allows the maximum fee to be set at 50% of the calculated maximum fee. The following items were included in the impact fee calculation:

1. The portion of the cost of the new infrastructure that is to be paid by the City, including engineering, property acquisition and construction cost.

2. Existing excess capacity in lines and facilities that will serve future growth and which were paid for in whole or part by the City.

3. Engineering and quality control fees for construction projects.

4. Interest and other finance charges on bonds issued by the City to cover its portion of the cost. 5% is assumed for this analysis.

The engineering analysis portion of the Water and Wastewater Fee determines utilized capacity cost of the major water distribution and wastewater collection facilities between the year 2019 and the year 2029. Facilities in this analysis include, water pump stations, water storage tanks, water transmission lines and wastewater collection lines. The North Texas Municipal Water District (NTMWD) water treatment, and water distribution components were excluded from this analysis. The study period is a ten-year period with 2019 as the base year. The impact fee calculations for the water and wastewater systems are based on land use assumptions prepared by the City of Rockwall. Prior to this impact fee update, the City's Water Distribution and Wastewater Collection hydraulic models were updated for 2019, 2029 and buildout conditions. The hydraulic model results are available for review from the City of Rockwall. The equivalency factors utilized in this analysis conform to the American Water Works Association Standards (C700 - C703).

B. WATER & WASTEWATER IMPACT FEE GLOSSARY

1. Advisory Committee means the capital improvements advisory committee established by the City for purposes of reviewing and making recommendations to the City Council on adoption of the City's impact fee program.

2. Area-Related Facility means a capital improvement or facility expansion which is designated in the impact fee capital improvements plan and which is not a site-related facility. Area-Related Facility may include capital improvements that are located off-site, or within or on the perimeter of the development site.

3. Assessment means the determination of the amount of the maximum impact fee per service unit that can be imposed on new development.

4. Capital Improvement means either a water facility or a wastewater facility with a life expectancy of three or more years, to be owned and operated by or on behalf of the City.

5. City means the City of Rockwall, Texas.

6. Credit means the amount of the reduction of an impact fee due, determined under this ordinance or pursuant to administrative guidelines that is equal to the value of area-related

facilities provided by a property owner pursuant to the City's subdivision or zoning regulations or requirements, for the same type of facility.

7. Debt Service means the 20-year financing costs of projects applied to all eligible existing and proposed water and wastewater facilities.

8. Facility Expansion means either a water facility expansion or a sewer facility expansion.

9. Impact Fee means either a fee for water facilities or a fee for wastewater facilities, imposed on new development by the City pursuant to Chapter 395 of the Texas Local Government Code in order to generate revenue to fund or recoup the costs of capital improvements or facility expansion necessitated by and attributable to such new development. Impact fees do not include the dedication of rights-of-way or easements for such facilities, or the construction of such improvements, imposed pursuant to the City's zoning or subdivision regulations.

10. Impact Fee Capital Improvements Plan means either a water capital improvements plan or a wastewater capital improvement plan adopted or revised pursuant to the impact fee regulations.

11. Land Use Assumptions means the projections of population and growth, and associated changes in land uses, densities and intensities over at least a ten-year period, as adopted by the City and as may be amended from time to time, upon which the capital improvements plans are based.

12. Land Use Equivalency Table means a table converting the demands for capital improvements generated by various land uses to numbers of service units, as may be amended from time to time.

13. New Development means the subdivision of land; the construction, reconstruction, redevelopment, conversion, structural alteration, relocation, or enlargement of any structure; or any use or extension of the use of land; any of which increases the number of service units.

14. Recoupment means the imposition of an impact fee to reimburse the City for capital improvements that the City had previously oversized to serve new development.

15. Service Area means either a water service area or wastewater service area which impact fees for capital improvements or facility expansion will be collected for new development occurring within such area, and within which fees so collected will be expended for those types of improvements or expansions identified in the type of capital improvements plan applicable to the service area.

16. Service Unit means the applicable standard units of measure shown on the land use equivalency table in the Impact Fees Capital Improvements Plan that can be converted to water meter equivalents, for water or for wastewater facilities, which serves as the standardized measure of consumption, use or generation attributable to the new unit of development.

17. Site-Related Facility means an improvement or facility which is for the primary use or benefit of a new development, and/or which is for the primary purpose of safe and adequate provision of water or wastewater facilities to serve the new development, and which is not included in the impact fees capital improvements plan and for which the property owner is solely responsible under subdivision or other applicable development regulations.

18. Utility Connection means installation of a water meter for connecting a new development to the City's water system, or connection to the City's wastewater system.

19. Wastewater Facility means a wastewater interceptor or main, lift station or other facility included within and comprising an integral component of the City's collection system for wastewater. Wastewater facility includes land, easements or structure associated with such facilities. Wastewater facility excludes site-related facilities.

20. Wastewater Facility Expansion means the expansion of the capacity of any existing wastewater improvement for the purpose of serving new development, but does not include the repair, maintenance, modernization, or expansion of an existing sewer facility to serve existing development.

21. Wastewater Capital Improvements Plan means the adopted plan, as may be amended from time to time, which identifies the wastewater facilities or wastewater expansions and their associated costs which are necessitated by and which are attributable to new development, for a period not to exceed 10 years.

22. Water Facility means a water main, pump station, storage tank or other facility included within and comprising an integral component of the City's water storage or distribution system. Water facility includes CCN acquisition, land, easements or structures associated with such facilities. Water facility excludes site-related facilities.

23. Water Facility Expansion means the expansion of the capacity of any existing water facility for the purpose of serving new development, but does not include the repair, maintenance, modernization, or expansion of an existing water improvement to serve existing development.

24. Water Capital Improvements Plan means the adopted plan, as may be amended from time to time, which identifies the water facilities or water expansions and their associated costs which are necessitated by and which are attributable to new development, for a period not to exceed 10 years.

25. Water Meter means a device for measuring the flow of water to a development, whether for domestic or for irrigation purposes.

C. LAND USE ASSUMPTIONS *(Prepared By: City of Rockwall Planning Department)*

The impact fee land use assumptions utilized in this update were prepared by the City of Rockwall's Planning Department and are presented in a separate document. The land use assumptions projected an ultimate residential population of approximately 149,525 in the City of Rockwall's ultimate planning boundary.

The residential and non-residential growth provided by the City for the year 2019 through 2029 is summarized in Table No. 1.

TABLE NO. 1

Residential and Non-Residential Growth from 2019 to 2029

Year	LUA Residential Population *	Residential Population Served **	Non-Residential Uses*** Employees	
2019	49,616	44,748	25,369	
2029	73,228	64,768	34,064	
Res. Growth Rate	**1.48**		**Non-Res. Growth Rate**	**1.34**

** Residential Population Inside Planning Boundary*
*** Residential Population Served Inside Existing City of Rockwall City Limit Boundary*
**** Basic – Industrial Land Uses*
**** Service – Office & Institutional Land Uses*
**** Retail – Commercial Land Uses*

As shown in Table No. 1, increases in the residential population and non-residential uses will occur during the 10-year capital recovery period. The water demand and wastewater flows from the residential and non-residential uses dictate the ultimate size of facilities, while the rate of growth is important to determine the timing of system improvements to meet the City's growing needs. The eligible water impact fee facilities are shown **on Exhibit 1**. The eligible wastewater facilities are shown on **Exhibit 2** in this report.

SECTION II

WATER & WASTEWATER C.I.P. AND IMPACT FEE ANALYSIS

A. DEFINITION OF A SERVICE UNIT – WATER AND WASTEWATER

Chapter 395 of the Local Government Code requires that impact fees be based on a defined service unit. A "service unit" means a standardized measure of consumption, use generation, or discharge attributable to an individual unit of development calculated in accordance with generally accepted engineering or planning standards. This impact fee defines a water and wastewater service unit to be a *5/8-inch water meter* and has referred to this service unit as a Single Family Living Unit Equivalent (SFLUE). The SFLUE is based on the continuous duty capacity of a 5/8-inch water meter. This is the City of Rockwall's typical meter used for a single family detached dwelling, and therefore is considered to be equivalent to one "living unit". Other meter sizes can be compared to the 5/8-inch meter through a ratio of water flows as published by the American Water Works Association as shown in **Table No. 2** below. This same ratio is then used to determine the proportional water and wastewater impact fee amount for each water meter size.

TABLE NO. 2

Living Unit Equivalencies For Various Types and Sizes of Water Meters

Meter Type	Meter Size	Continuous Duty Maximum Rate (gpm) [(a)]	Ratio to 5/8" Meter
Simple	5/8"	10	1.0
Simple	1"	25	2.5
Simple	1-1/2"	50	5.0
Simple	2"	80	8.0
Compound	2"	80	8.0
Turbine (Irrigation)	2"	160	16.0
Compound	3"	160	16.0
Turbine (Irrigation)	3"	350	35.0
Compound	4"	250	25.0
Turbine (Irrigation)	4"	650	65.0
Compound	6"	500	50.0
Turbine (Irrigation)	6"	1,400	140.0
Compound	8"	800	80.0
Turbine (Irrigation)	8"	2,400	240.0
Turbine	10"	3,500	350.0
Turbine	12"	4,400	440.0

[(a)] *Source: AWWA Standard C700 - C703*

B. CALCULATION OF WATER & WASTEWATER - LIVING UNIT EQUIVALENTS

The City of Rockwall provided the existing water meter count by size category as of December 2018. In total, there are 15,680 domestic water and irrigation meters serving an existing population of 49,616 residents and business. **Table No. 3** shows the number of existing meters, the living unit equivalent factor and the total number of living unit equivalents for each sized water meter.

Similar, the City provided the number of wastewater accounts by corresponding water meter size. This number of wastewater accounts is 15,053. **Table No. 4** illustrates the existing wastewater accounts and the SFLUE's. The difference between the water and wastewater accounts is irrigation meters are not included in the wastewater accounts.

The residential growth rate of 1.48 in **Table 1** was applied to 5/8-inch through 1-1/2-inch meters. The non-residential growth rate of 1.34 in **Table 1** was applied to 2-inch through 12-inch meters. Utilizing these growth rates in a straight-line extrapolation of the existing water and wastewater accounts, the numbers of new accounts was calculated for the year 2029. City records indicate the historical growth of 5/8-inch and 1-inch meters is approximately 96% 5/8-inch meters and 4% 1-inch meters for the base meter sizes. These percentages were applied to the total growth of 5/8-inch and 1-inch meters. Living unit equivalents were then applied to the water meters and wastewater accounts for 2019 and 2029, resulting in a total number of living units. The difference in the total number of 2019 and 2029 living units results in the new living unit equivalents during the impact fee period. The calculation of living unit equivalents is summarized in **Table 3 and Table 4**.

TABLE NO. 3

Water Living Unit Equivalents 2019 – 2029

Meter Size	2019			2029			New Living Unit Equivalents During Impact Fee Period
	Number of Water Meters	Living Unit Equivalent Ratio for 5/8" Used	Total Number of Living Units	Number of Water Meters	Living Unit Equivalent Ratio for 5/8" Used	Total Number of Living Units	
5/8"	14,261	1.0	14,261	21,108	1.0	21,108	6,847
1"	597	2.5	1,493	882	2.5	2,205	712
1-1/2"	188	5.0	940	278	5.0	1,390	450
2"	617	8.0	4,936	827	8.0	6,616	1,680
3"	5	16.0	80	7	16.0	112	32
4"	10	25.0	250	13	25.0	325	75
6"	2	50.0	100	3	50.0	150	50
8"	0	80.0	0	0	80.0	0	0
10"	0	350.0	0	0	350.0	0	0
12"	0	440.0	0	0	440.0	0	0
Totals	**15,680**		**22,060**	**23,118**		**31,906**	**9,846**

TABLE NO. 4

Wastewater Living Unit Equivalents 2019 – 2029

Meter Size	2019			2029			New Living Unit Equivalents During Impact Fee Period
	Number of Wastewater Accounts	Living Unit Equivalent Ratio for 5/8" Used	Total Number of Living Units	Number of Water Meters	Living Unit Equivalent Ratio for 5/8" Used	Total Number of Living Units	
5/8"	14,179	1.0	14,179	20,956	1.0	20,956	6,777
1"	377	2.5	943	587	2.5	1,468	525
1-1/2"	126	5.0	630	186	5.0	930	300
2"	358	8.0	2,864	480	8.0	3,840	976
3"	5	16.0	80	7	16.0	112	32
4"	6	25.0	150	8	25.0	200	50
6"	2	50.0	100	3	50.0	150	50
8"	0	80.0	0	0	80.0	0	0
10"	0	350.0	0	0	350.0	0	0
12"	0	440.0	0	0	440.0	0	0
Totals	**15,053**		**18,946**	**22,227**		**27,656**	**8,710**

C. COST OF FACILITIES

Unit costs for proposed water and wastewater lines larger than 12 inches in diameter that are anticipated to be constructed between 2019 and 2029 by private development include the City's oversize cost participation only. These water and wastewater lines are colored green on **Exhibits 1 and 2**. Oversize cost participation from City is based on availability of funds. For City participation, the developer must bid the 12-inch as a base and the oversize as an additive alternate. City initiated water and wastewater lines include the full cost of the proposed facility. These water and wastewater lines are colored red on **Exhibits 1 and 2**. Developer initiated water and wastewater line projects which are 12 inches or less in diameter are not included in this Impact Fee analysis, as the cost for these size lines are the responsibility of the developer. These water and wastewater lines are colored light blue (cyan) on **Exhibits 1 and 2**.

Actual construction costs of the various existing elements of the water and wastewater systems were utilized where the information was known. The existing cost of facilities was determined from Contractor's final pay requests, City purchase orders, bid tabulation forms and developer's agreements. Existing water and wastewater facilities included in the impact fee analysis are only those with excess capacity available for future growth are colored dark blue on **Exhibits 1 and 2**.

Cost data for existing water and wastewater facilities included in the impact fee analysis were provided by the City. A 5% debt service, over a period of 20-years, has been added to all projects. Actual costs were used for those existing projects where records were available.

D. WATER DISTRIBUTION SYSTEM

Computer hydraulic models for the years 2019, 2029 and Buildout were prepared and analyzed by Birkhoff, Hendricks & Carter, L.L.P. The models were developed and water demand distributed from residential population and non-residential land use projections prepared by the City of Rockwall's Planning Department. The projected developed land areas from the City's Land Use Assumptions follow closely to the construction of major facilities in the system. These facilities include pump stations, storage tanks, and major distribution lines. All computer models were run for the Maximum Hourly Demands in a three-day extended period simulation to ensure proper sizing of the facilities to meet peak demands.

1. Existing Pump Stations, Ground Storage Reservoirs & Elevated Storage Tanks

The existing water distribution system included in the impact fee analysis (As of December 2018) includes the facilities summarized in **Table No. 5** and **Table No. 6**.

TABLE NO. 5

Water Distribution System -- Existing Pump Stations & Ground Storage

Pump Station	Number of Pumps	Rated Capacity (MGD)	Number of Ground Storage Tanks	Total Ground Storage Available (Gallons)
Heath Street 698.75	6	17.7	1	3,000,000
Eastside 698.75	6	25.9	1	3,000,000
698.75 Subtotal:	**12**	**43.6**	**2**	**6,000,000**
Eastside 780	3	8.6	1	1,000,000
780 Subtotal:	**3**	**8.6**	**1**	**1,000,000**
Total:	**15**	**52.2**	**3**	**7,000,000**

TABLE NO. 6

Existing Elevated Storage Tanks

Elevated Storage Tanks	Capacity in Million Gallons
Southside Elevated Storage Tank	1.0
Country Lane Elevated Storage Tank	2.0
Springer Elevated Storage Tank	2.0
Total	**5.0**

The pump stations and ground storage facilities were analyzed with the maximum daily demand, while elevated storage acts dynamically and therefore was analyzed utilizing the difference between the Maximum Hourly Demand and the Maximum Daily Demand.

2. Distribution Lines

The distribution lines consist of all lines within the Service Area planning boundary supplying water to customers in the City of Rockwall. Existing and proposed distribution lines vary in size from 5/8-inch services to 48-inch transmission lines and pump station piping. The cost of water lines includes construction cost, appurtenances (water valves, fire hydrants, taps and the like), utility relocations, purchase of easements and engineering costs. Financing cost over a 20-year term is included for each project.

Unit cost for proposed capital improvement water lines 12-inches and larger in diameter classified as City initiated, or City participation in oversize water lines. Developer's initiated water line projects, 12 inches or less in diameter were not included in this Impact Fee analysis, as the cost for these size lines are the responsibility of the developer.

3. Water Supply

The City of Rockwall currently receives all of its water supply from the North Texas Municipal Water District (NTMWD). Rockwall's allocation of the capital cost of services as a Member of the NTMWD was specifically excluded from the impact fee analysis.

If included, Rockwall's share of the NTMWD capital cost could include the original construction cost, expansion cost and financing cost of the following components:

a) Water Rights Cost in Lake Lavon and other Sources

b) Raw Water Intake Structures

c) Raw Water Pump Stations

d) Treatment Plant and Expansion

e) High Service Pump Stations

f) Transmission Lines

g) NTMWD Owned Ground Storage Facilities

NTMWD has indicated that determining Rockwall's portion of cost for these items would not be possible, thus these costs have not been included in this analysis.

4. Water Distribution System Capital Improvement Projects for Impact Fees

In order to meet the demands of the anticipated growth over the next 10-years, as provided in the Land Use Assumptions prepared by the City of Rockwall, certain water distribution system improvements are required. **Exhibit 1** shows the recommended water system improvements and **Table No. 7** itemizes each project and the project cost in 2019 dollars. These recommended improvements form the basis for the water system impact fee calculation.

The capital improvement plan for impact fees provides for system improvements within the defined Service Area Planning Boundary. Most of the capital improvements are within the city limits, as requested by the City due to new State of Texas Annexation Laws.

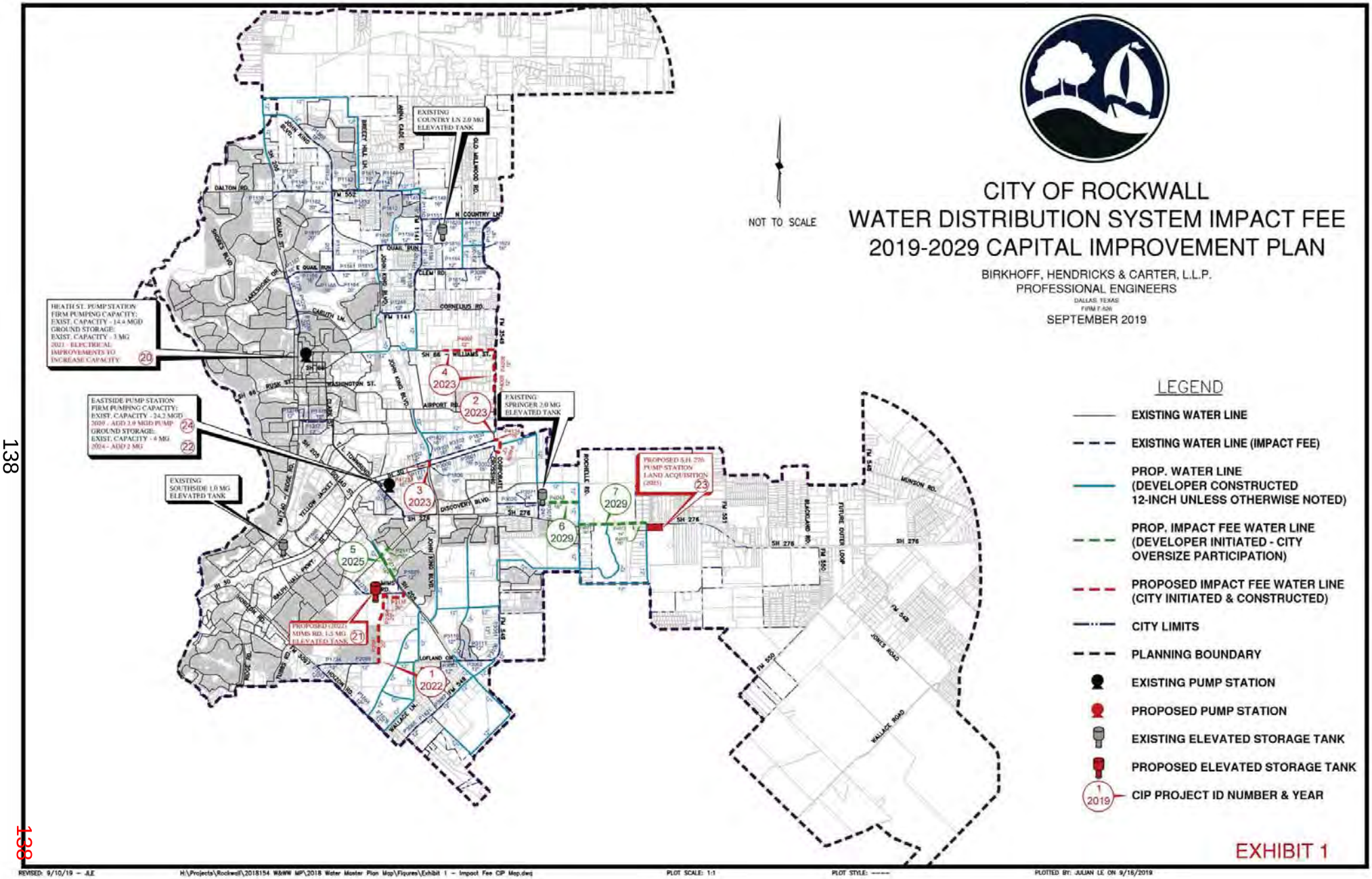

CITY OF ROCKWALL
WATER DISTRIBUTION SYSTEM IMPACT FEE
2019-2029 CAPITAL IMPROVEMENT PLAN
BIRKHOFF, HENDRICKS & CARTER, L.L.P.
PROFESSIONAL ENGINEERS
DALLAS, TEXAS
FIRM F-526
SEPTEMBER 2019
NOT TO SCALE
EXISTING COUNTRY LN 2.0 MG ELEVATED TANK
HEATH ST. PUMP STATION
FIRM PUMPING CAPACITY:
EXIST. CAPACITY - 14.4 MGD
GROUND STORAGE:
EXIST. CAPACITY - 3 MG
2021 - ELECTRICAL IMPROVEMENTS TO INCREASE CAPACITY
EASTSIDE PUMP STATION
FIRM PUMPING CAPACITY:
EXIST. CAPACITY - 24.2 MGD
2039 - ADD 3.9 MGD PUMP
GROUND STORAGE:
EXIST. CAPACITY - 4 MG
2024 - ADD 2 MG
EXISTING SOUTHSIDE 1.0 MG ELEVATED TANK
EXISTING SPRINGER 2.0 MG ELEVATED TANK
PROPOSED SH 276 PUMP STATION LAND ACQUISITION (2025)
PROPOSED (2022) MIMS RD. 1.5 MG ELEVATED TANK
LEGEND
EXISTING WATER LINE
EXISTING WATER LINE (IMPACT FEE)
PROP. WATER LINE (DEVELOPER CONSTRUCTED 12-INCH UNLESS OTHERWISE NOTED)
PROP. IMPACT FEE WATER LINE (DEVELOPER INITIATED - CITY OVERSIZE PARTICIPATION)
PROPOSED IMPACT FEE WATER LINE (CITY INITIATED & CONSTRUCTED)
CITY LIMITS
PLANNING BOUNDARY
EXISTING PUMP STATION
PROPOSED PUMP STATION
EXISTING ELEVATED STORAGE TANK
PROPOSED ELEVATED STORAGE TANK
CIP PROJECT ID NUMBER & YEAR
EXHIBIT 1
REVISED: 9/10/19 - JLE
H:\Projects\Rockwall\2018154 W&WW MP\2018 Water Master Plan Map\Figures\Exhibit 1 - Impact Fee CIP Map.dwg
PLOT SCALE: 1:1
PLOT STYLE: ----
PLOTTED BY: JULIAN LE ON 9/16/2019

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Table No. 7

10-Year Water System Capital Improvement Plan for Impact Fees

PROPOSED WATER LINES

CIP #	Year	1=City Participation in Cost Oversize 2=City Initiated and Funded	Service Area	Water Line Projects	Length (FT)	Size	Opinion of Construction Cost (A)	Debt Service (B)	Total Project Cost
1	2022	2	698.75	Mims Road / County Line Road Looping Water Lines (Pipes 2096, 2097, 2118)	6,151	20"	$ 1,402,428	$ 736,275	$ 2,138,703
2	2023	2	780	IH-30 - F.M. 3549/Corporate Crossing (Pipes 4039, 4124)	1,287	12"-16"	$ 531,800	$ 279,195	$ 810,995
3	2023	2	780	John King Blvd. 780 Water Lines North (Pipes 4123)	423	16"	$ 274,950	$ 144,349	$ 419,299
4	2023	2	780	S.H. 66 - F.M. 3549 780 Service Area Loop (Pipes 4007, 4008, 4009)	6,394	12"	$ 767,280	$ 402,822	$ 1,170,102
5	2025	1	698.75	S.H. 205 Water Lines (Pipes 2117, 2136)	2,496	16"	$ 149,760	$ 78,624	$ 228,384
6	2029	1	780	Springer Ln. 16" Water Line (Pipe 4043)	2,714	16"	$ 162,840	$ 85,491	$ 248,331
7	2029	1	780	S.H. 276 Pump Station Transmission Main West (Pipes 4071, 4072, 4073)	3,329	16"	$ 270,300	$ 141,908	$ 412,208
				Subtotal: Proposed Water Lines			**$ 3,559,358**	**$ 1,868,664**	**$ 5,428,022**

PROPOSED PUMPING AND STORAGE FACILITIES

CIP #	Year	Service Area	Pump Station, Ground Storage & Elevated Storage Project		Added Capacity	Opinion of Construction Cost (A)	Debt Service (B)	Total Project Cost
20	2021	698.75	Heath Street Pump Station Improvements		7.0 MGD	$ 2,730,000	$ 1,433,250	$ 4,163,250
21	2022	780	Mims 1.5 MG EST & Purchase 2-Acres		1.5 MG	$ 3,421,075	$ 1,796,064	$ 5,217,139
22	2024	698.75/780	Eastside Ground Storage Reservoir No. 3		2.0 MG	$ 2,855,600	$ 1,499,190	$ 4,354,790
23	2025	780	Proposed SH 276 Pump Station Land Acquisition		10 Acres	$ 590,340	$ 309,929	$ 900,269
24	2029	698.75/780	Eastside 780 Service Area 2.9 MGD Pump		2.9 MGD	$ 1,878,025	$ 985,963	$ 2,863,988
			Subtotal: Proposed Pumping and Storage Facilities			**$ 11,475,040**	**$ 6,024,396**	**$ 17,499,436**

PLANNING EXPENSES

Year		Project Description			Engineering Services	Debt Service (B)	Total Project Cost
2019		Water & Wastewater System Master Plan & Impact Fee Analysis			$ 74,675		$ 74,675
		Subtotal: Planning Expenses			**$ 74,675**	**$ -**	**$ 74,675**
		GRAND TOTAL: WATER DISTRIBUTION 10-YEAR CIP			**$ 15,109,073**	**$ 7,893,060**	**$ 23,002,133**

(A) Opinion of Cost includes:
a) Engineer's Opinion of Construction Cost
b) Professional Services Fees (Survey, Engineering, Testing, Legal)
c) Cost of Easement or Land Acquisitions

(B) Debt Service Based on 20-Year Simple Interest Bonds at 5%

5. Utilized Capacity

Utilized capacity for the water distribution system was calculated based on the water line size required for each model year (2019, 2029 and buildout). Analysis of the water distribution system is based on the maximum daily demand, maximum hourly demand, and the minimum hourly demand. Pump station capacity is generally based on the maximum daily system demand while transmission and distribution facilities are sized based on either the maximum hourly demand or the minimum hourly demand, whichever demand is greater for a particular water line. Often times, the capacity of water lines are determined by the flows generated by the minimum hourly demand. The minimum hourly flows are usually higher in those lines that are used to refill elevated storage. For each line segment in the water distribution model, the maximum buildout flow rate in the line was compared to the flow rate in the same line segment for the 2019 and the 2029 models.

The percent utilized capacity was then calculated for each year based on the buildout capacity. The utilized capacity during the Impact Fee period is the difference between the year 2029 capacity and the year 2019 capacity. **Table No. 8** below summarizes the project cost and utilized capacity cost over the Capital Recovery Period (CRP) of 2019 - 2029 for each element of the Water Distribution System. The utilized capacity for each water distribution facility, both existing and proposed, is presented in detail in Impact Fee Capacity Calculation **Table Nos. 9, 10, 11, 12, 13 and 14.**

Table No. 8

Summary of Eligible Water Distribution Project Cost and Utilized Capacity Cost

Water System Facility	20-Year Project Cost	Utilized Capacity ($) In the CRP
Existing Pump Stations & Storage	$24,635,679	$8,804,864
Existing Transmission/Distribution Lines	$14,222,504	$2,863,156
Proposed Pump Stations & Storage	$17,499,436	$15,502,253
Proposed Transmission/Distribution Lines	$5,428,022	$3,005,499
CCN Acquisition	$5,048,042	$656,510
Planning Expenses	$74,675	$74,675
Total:	**$66,908,358**	**$30,906,957**

TABLE NO. 9
Water Pump Station Facilities

Pump Station Improvements			Year Const.	Projected Capacity (MGD)	Pump Station Cost ($) Const.	Engineering & Testing	20 Year Debt Service @ 5% Simple Interest	Total 20 Yr. Project Cost $	Capacity Utilized (%) 2019	2029	In The CRF Period	Capacity Utilized ($) 2019	2029	In The CRF Period
PUMP STATIONS														
Existing Pump Station Facilities														
Heath Street Original Construction	[6]		Unknown	7.7	$ 1,363,700		$ 715,943	$ 2,079,643	49%	100%	51%	$ 1,013,029	$ 2,079,643	$ 1,066,614
Eastside 698.75 Original Pump Station	[5]		1992	8.0	$ 1,245,503		$ 653,889	$ 1,899,392	100%	100%	0%	$ 1,899,392	$ 1,899,392	$ -
Eastside 698.75 Replace Pump 1 & 2, Install Pump 4	[3]		1999	9.9	$ 357,909	$ 39,000	$ 208,377	$ 605,286	100%	100%	0%	$ 605,286	$ 605,286	$ -
Eastside 698.75 Install Pump 6	[1]		2004	7.5	$ 130,000	$ 143,080	$ 143,367	$ 416,447	100%	100%	0%	$ 416,447.0	$ 416,447.0	$ -
Eastside 780 Pump Station	[3]		2007	8.7	$ 1,629,000	$ 226,522	$ 974,149	$ 2,829,671	42%	96%	54%	$ 1,188,462	$ 2,716,484	$ 1,528,022
Existing Pump Station Subtotal:					**$ 4,726,112**	**$ 408,602**	**$ 2,695,725**	**$ 7,830,439**				**$ 5,122,616**	**$ 7,717,252**	**$ 2,594,636**
Proposed Pump Station Facilities														
Heath St. Electrical Improvements & Emergency Generators to Increase Pump Capacity	[1]	**	2021	+7	$ 2,481,818	$ 248,182	$ 1,433,250	$ 4,163,250	0%	100%	100%	$ -	$ 4,163,250	$ 4,163,250
Proposed SH 276 Land Acquisition (10-Acres)	[1]		2025		$ 550,340	$ 40,000	$ 309,929	$ 900,269	0%	100%	100%	$ -	$ 900,269	$ 900,269
Eastside 780 Install Pump 4	[1]	**	2029	+2.9	$ 1,707,295	$ 170,730	$ 985,963	$ 2,863,988	0%	96%	96%	$ -	$ 2,749,428	$ 2,749,428
Proposed Pump Station Subtotal:					**$ 4,739,454**	**$ 458,911**	**$ 2,729,142**	**$ 7,927,507**				**$ -**	**$ 7,812,947**	**$ 7,812,947**
Pump Station Grand Total					**$ 9,465,566**	**$ 867,513**	**$ 5,424,867**	**$ 15,757,946**				**$ 5,122,616**	**$ 15,530,199**	**$ 10,407,583**

* Includes Property Acquisition
** 10% of Construction Assumed for Engineering and Testing
(1) Estimated Cost in 2019 Dollars
[4] Number of Pumps

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TABLE NO. 10
Ground Storage Reservoirs

Pump Station	Year Const.	Capacity (MG)	Capital Cost ($) Const.	Eng. & Testing	20 Year Debt Service @ 5% Simple Interest	Total 20 Yr. Project Cost $	Capacity Utilized (%) 2019	2029	In the CRF Period	Capacity Utilized ($) 2019	2029	In the CRF Period
EXISTING GROUND STORAGE RESERVOIRS												
Eastside No. 2 1	2006	4.0	$ 2,420,695	$ 67,524	$ 1,306,315	$ 3,794,534	67.0%	78.0%	11.0%	$ 2,542,338	$ 2,959,737	$ 417,399
Heath St. No. 1 1	1986	3.0	$ 825,810		$ 433,550	$ 1,259,360	77.0%	100.0%	23.0%	$ 969,707	$ 1,259,360	$ 289,653
Existing Ground Storage Subtotal		**7.00**	**$ 3,246,505**	**$ 67,524**	**$ 1,739,865**	**$ 5,053,894**				**$ 3,512,045**	**$ 4,219,097**	**$ 707,052**
PROPOSED GROUND STORAGE RESERVOIRS												
Eastside No. 3 (Tank Buried) 2*	2024	2.0	$ 2,596,000	$ 259,600	$ 1,499,190	$ 4,354,790	0.0%	78%	78.3%	$ -	$ 3,411,252	$ 3,411,252
Proposed Ground Storage Subtotal		**2.00**	**$ 2,596,000**	**$ 259,600**	**$ 1,499,190**	**$ 4,354,790**				**$ -**	**$ 3,411,252**	**$ 3,411,252**
Ground Storage Grand Total		**9.00**	**$ 5,842,505**	**$ 327,124**	**$ 3,239,055**	**$ 9,408,684**				**$ 3,512,045**	**$ 7,630,349**	**$ 4,118,304**

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* 10% of Construction Assumed for Engineering and Testing

(1) Actual Cost

(2) Estimated Cost in 2019 Dollars

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TABLE NO. 11
Elevated Storage Tanks

Elevated Storage	Pressure Divide	Year Const.	Storage Capacity (MGD)	Capital Cost ($)				Capacity Utilized (%)			Capacity Utilized ($)		
				Const.	Eng. & Testing	20 Year Debt Service @ 5% Simple Interest	Total 20 Yr. Project Cost $	2019	2029	In the CRF Period	2019	2029	In the CRF Period
EXISTING ELEVATED STORAGE TANKS													
Southside 2	698.75	1992	1.0	$ 1,363,700	$ -	$ 715,943	$ 2,079,643	100.0%	100.0%	0.0%	$ 2,079,643	$ 2,079,643	$ -
Springer 1	698.75	2004	2.0	$ 2,158,000	$ 215,800	$ 1,246,245	$ 3,620,045	16.0%	51.0%	35.0%	$ 579,207	$ 1,846,223	$ 1,267,016
Country Ln. 1	780	2008	2.0	$ 3,863,300	$ 105,000	$ 2,083,358	$ 6,051,658	30.0%	100.0%	70.0%	$ 1,815,497	$ 6,051,658	$ 4,236,161
Existing Elevated Storage Subtotal			**5.0**	**$ 7,385,000**	**$ 320,800**	**$ 4,045,546**	**$ 11,751,346**				**$ 4,474,348**	**$ 9,977,524**	**$ 5,503,176**
PROPOSED ELEVATED STORAGE TANKS													
Mims 2*	698.75	2022	2.0	$ 3,110,068	$ 311,007	$ 1,796,064	$ 5,217,139	0.0%	82.0%	82.0%	$ -	$ 4,278,054	$ 4,278,054
Existing Elevated Storage Subtotal			**2.0**	**$ 3,110,068**	**$ 311,007**	**$ 1,796,064**	**$ 5,217,139**				**$ -**	**$ 4,278,054**	**$ 4,278,054**
Elevated Storage Grand Total			**5.0**	**$ 10,495,068**	**$ 631,807**	**$ 5,841,610**	**$ 16,968,485**				**$ 4,474,348**	**$ 14,255,578**	**$ 9,781,230**

* 10% of Construction Assumed for Engineering and Testing
(1) Actual Cost
(2) Estimated Cost in 2019 Dollars

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TABLE NO. 12
Existing Impact Fee Water Lines

1 - City Participation in Cost Oversize

2 - City Initiated and Funded

	Pipe Number	Pressure Plane	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Intersest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost ($)	(%) Utilized Capacity			($) Utilized Capacity		
											2019	2029	During Fee Period	2019	2029	During Fee Period
FM 552 WATER LINE (SH 205 TO MIDDLE SCHOOL)																
2	P1138	698.75	652	16		$82.70	$53,918		$28,307	$82,225	100%	100%	0%	$82,225	$82,225	$0
2	P1139	698.75	371	16		$82.70	$30,680		$16,107	$46,787	100%	100%	0%	$46,787	$46,787	$0
2	P1140	698.75	1,125	16		$82.70	$93,034		$48,843	$141,877	100%	100%	0%	$141,877	$141,877	$0
2	P1141	698.75	1,803	16		$82.70	$149,102		$78,278	$227,380	100%	100%	0%	$227,380	$227,380	$0
	Subtotal:		**3,951**		**2007**		**$326,734**	**5%**	**$171,535**	**$498,269**				**$498,269**	**$498,269**	**$0**
FM 552 WATER LINE (MIDDLE SCHOOL TO FM 1141)																
1	P1142	698.75	1,823	16		$3.98	$7,257		$3,810	$11,067	100%	100%	0%	$11,067	$11,067	$0
1	P1143	698.75	358	16		$3.98	$1,425		$748	$2,173	100%	100%	0%	$2,173	$2,173	$0
1	P1144	698.75	968	16		$3.98	$3,854		$2,023	$5,877	100%	100%	0%	$5,877	$5,877	$0
1	P1145	698.75	1,197	16		$3.98	$4,765		$2,502	$7,267	100%	100%	0%	$7,267	$7,267	$0
1	P1811	698.75	1,492	16		$3.98	$5,940		$3,119	$9,059	100%	100%	0%	$9,059	$9,059	$0
1	P1812	698.75	266	16		$3.98	$1,059		$556	$1,615	100%	100%	0%	$1,615	$1,615	$0
	Subtotal:		**6,104**		**2006**		**$24,300**	**5%**	**$12,758**	**$37,058**				**$37,058**	**$37,058**	**$0**
FM 1141 WATER LINE (FM 552 TO COUNTRY LANE)																
1	P1149	698.75	432	16		$19.92	$8,605		$4,518	$13,123	100%	100%	0%	$13,123	$13,123	$0
1	P1150	698.75	1,285	16		$19.92	$25,595		$13,437	$39,032	100%	100%	0%	$39,032	$39,032	$0
	Subtotal:		**1,717**		**2006**		**$34,200**	**5%**	**$17,955**	**$52,155**				**$52,155**	**$52,155**	**$0**
FM 1141 WATER LINE (COUNTRY LANE TO CLEM ROAD)																
2	P1155	698.75	1,674	16		$125.19	$209,566		$110,022	$319,588	100%	100%	0%	$319,588	$319,588	$0
2	P1156	698.75	724	16		$125.19	$90,637		$47,584	$138,221	23%	45%	22%	$31,791	$62,199	$30,409
2	P1157	698.75	1,063	16		$125.19	$133,076		$69,865	$202,941	22%	45%	23%	$44,647	$91,323	$46,676
	Subtotal:		**3,461**		**2008**		**$433,279**	**5%**	**$227,471**	**$660,750**				**$396,026**	**$473,110**	**$77,085**

TABLE NO. 12
Existing Impact Fee Water Lines

1 - City Participation in Cost Oversize

2 - City Initiated and Funded

	Pipe Number	Pressure Plane	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Intersest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost ($)	(%) Utilized Capacity			($) Utilized Capacity		
											2019	2029	During Fee Period	2019	2029	During Fee Period
COUNTRY LANE WATER LINE (FM 1141 TO COUNTRY LANE ELEVATED STORAGE TANK)																
2	P1151	698.75	1,158	20		$109.56	$126,874		$66,609	$193,483	100%	100%	0%	$193,483	$193,483	$0
2	P1810	698.75	611	24		$109.56	$66,943		$35,145	$102,088	100%	100%	0%	$102,088	$102,088	$0
	Subtotal:		**1,769**		**2008**		**$193,817**	**5%**	**$101,754**	**$295,571**				**$295,571**	**$295,571**	**$0**
700 SERVICE AREA WATER LINE IMPROVEMENTS																
16" Country Ln. from Country Ln. EST to FM 549; 16" FM 549 from Country Ln. to Clem Road; 12" Clem Rd. from FM549 to FM 1141; 16" & 12" FM 1441 from Clem Rd. to SH 205 Bypass)																
2	P1152	698.75	2,128	16		$61.16	$130,142		$68,325	$198,467	100%	100%	0%	$198,467	$198,467	$0
2	P1153	698.75	2,026	16		$61.16	$123,904		$65,050	$188,954	100%	100%	0%	$188,954	$188,954	$0
2	P1154	698.75	3,019	12		$61.16	$184,633		$96,932	$281,565	84%	89%	5%	$236,515	$250,593	$14,078
2	P1158	698.75	2,686	16		$61.16	$164,268		$86,241	$250,509	41%	58%	17%	$102,709	$145,295	$42,587
2	P1249	698.75	1,965	12		$61.16	$120,174		$63,091	$183,265	94%	100%	6%	$172,269	$183,265	$10,996
2	P1814	698.75	242	12		$61.16	$14,800		$7,770	$22,570	100%	100%	0%	$22,570	$22,570	$0
2	P1822	698.75	221	16		$61.16	$13,516		$7,096	$20,612	100%	100%	0%	$20,612	$20,612	$0
2	P1823	698.75	1,509	16		$61.16	$92,286		$48,450	$140,736	54%	83%	29%	$75,997	$116,811	$40,813
2	P3099	780	1,486	12		$61.16	$90,879		$47,711	$138,590	100%	100%	0%	$138,590	$138,590	$0
2	P3100	780	1,382	16		$61.16	$84,519		$44,372	$128,891	100%	100%	0%	$128,891	$128,891	$0
	Subtotal:		**16,664**		**2008**		**$1,019,122**	**5%**	**$535,038**	**$1,554,159**				**$1,285,574**	**$1,394,048**	**$108,474**
HAYS ROAD WATER LINE (FM 552 TO QUAIL RUN ROAD)																
2	P1162	698.75	894	20		$210.52	$188,201		$98,806	$287,007	40%	45%	5%	$114,803	$129,153	$14,350
2	P1163	698.75	1,505	20		$210.52	$316,826		$166,334	$483,160	63%	65%	2%	$304,391	$314,054	$9,663
2	P1819	698.75	684	20		$210.52	$143,993		$75,596	$219,589	36%	39%	3%	$79,052	$85,640	$6,588
2	P1833	698.75	816	20		$210.52	$171,781		$90,185	$261,966	57%	63%	6%	$149,321	$165,039	$15,718
	Subtotal:		**3,899**		**2002**		**$820,800**	**5%**	**$430,921**	**$1,251,722**				**$647,567**	**$693,886**	**$46,319**
QUAIL RUN ROAD WATER LINE I (SH 205 (GOLIAD) TO HAYS ROAD)																
1	P1164	698.75	482	20		$15.88	$7,654		$4,018	$11,672	81%	85%	4%	$9,454	$9,921	$467
1	P1165	698.75	419	16		$15.88	$6,654		$3,493	$10,147	80%	85%	5%	$8,118	$8,625	$507
1	P1166	698.75	1,211	16		$15.88	$19,231		$10,096	$29,327	77%	84%	7%	$22,582	$24,635	$2,053
1	P1167	698.75	1,005	16		$15.88	$15,960		$8,379	$24,339	77%	84%	7%	$18,741	$20,445	$1,704
	Subtotal:		**3,117**		**2002**		**$49,500**	**5%**	**$25,986**	**$75,485**				**$58,895**	**$63,626**	**$4,731**
QUAIL RUN ROAD WATER LINE II (HAYS ROAD TO SH 205 BYPASS)																
2	P1161	698.75	1,541	12		$85.74	$132,122		$69,364	$201,486	100%	100%	0%	$201,486	$201,486	$0
2	P1815	698.75	1,394	12		$85.74	$119,518		$62,747	$182,265	100%	100%	0%	$182,265	$182,265	$0
	Subtotal:		**2,935**		**2008**		**$251,640**	**5%**	**$132,111**	**$383,751**				**$383,751**	**$383,751**	**$0**

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TABLE NO. 12
Existing Impact Fee Water Lines

1 - City Participation in Cost Oversize

2 - City Initiated and Funded

	Pipe Number	Pressure Plane	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Intersest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost ($)	(%) Utilized Capacity 2019	(%) Utilized Capacity 2029	(%) Utilized Capacity During Fee Period	($) Utilized Capacity 2019	($) Utilized Capacity 2029	($) Utilized Capacity During Fee Period
QUAIL RUN ROAD WATER LINE III (SH 205 BYPASS TO FM 1141)																
2	P1159	698.75	1,888	12		$92.26	$174,185		$91,447	$265,632	100%	100%	0%	$265,632	$265,632	$0
2	P1160	698.75	1,582	12		$92.26	$145,954		$76,626	$222,580	50%	61%	11%	$111,290	$135,774	$24,484
2	P1820	698.75	985	16		$92.26	$90,875		$47,709	$138,584	100%	100%	0%	$138,584	$138,584	$0
	Subtotal:		**4,455**		**2008**		**$411,014**	**5%**	**$215,782**	**$626,796**				**$515,506**	**$539,990**	**$24,484**
SH 205 WATER LINE (DARRIN DRIVE TO QUAIL RUN ROAD)																
2	P1228	698.75	449	24		$132.11	$59,316		$31,141	$90,457	73%	85%	12%	$66,034	$76,888	$10,855
2	P1229	698.75	1,865	24		$132.11	$246,380		$129,349	$375,729	73%	85%	12%	$274,282	$319,370	$45,087
2	P1230	698.75	1,613	24		$132.11	$213,089		$111,872	$324,961	72%	90%	18%	$233,972	$292,465	$58,493
	Subtotal:		**3,927**		**2003**		**$518,785**	**5%**	**$272,362**	**$791,147**				**$574,288**	**$688,723**	**$114,435**
IH 30 EASTBOUND SERVICE ROAD WATER LINE (WEST OF SH 205 BYPASS TO FM 549)																
2	P1771	698.75	609	16		$153.22	$93,313		$48,989	$142,302	100%	100%	0%	$142,302	$142,302	$0
2	P1806	698.75	136	16		$153.22	$20,838		$10,940	$31,778	100%	100%	0%	$31,778	$31,778	$0
2	P3000	780	1,404	16		$153.22	$215,125		$112,941	$328,066	58%	100%	42%	$190,278	$328,066	$137,788
2	P3001	780	2,768	16		$153.22	$424,120		$222,663	$646,783	48%	100%	52%	$310,456	$646,783	$336,327
2	P3002	780	808	16		$153.22	$123,804		$64,997	$188,801	36%	59%	23%	$67,968	$111,393	$43,424
	Subtotal:		**5,725**		**2004**		**$877,200**	**5%**	**$460,530**	**$1,337,730**				**$742,782**	**$1,260,322**	**$517,539**
IH 30 WESTBOUND SERVICE ROAD WATER LINE (FM 549 TO ENTERPRISE)																
2	P1532	698.75	685	16		$115.23	$78,934		$41,440	$120,374	95%	100%	5%	$114,355	$120,374	$6,019
2	P1533	698.75	2,506	16		$115.23	$288,773		$151,606	$440,379	100%	100%	0%	$440,379	$440,379	$0
2	P1827	698.75	187	16		$115.23	$21,548		$11,313	$32,861	100%	100%	0%	$32,861	$32,861	$0
2	P3101	780	648	16		$115.23	$74,671		$39,202	$113,873	100%	100%	0%	$113,873	$113,873	$0
2	P3102	780	1,285	16		$115.23	$148,074		$77,739	$225,813	100%	100%	0%	$225,813	$225,813	$0
	Subtotal:		**5,311**		**2004**		**$612,000**	**5%**	**$321,300**	**$933,300**				**$927,281**	**$933,300**	**$6,019**
TOWNSEND DRIVE WATER LINE (EASTSIDE PS TO SH 276)																
2	P3091	780	2,646	20		$181.55	$480,393		$252,206	$732,599	43%	74%	31%	$315,018	$542,123	$227,106
	Subtotal:		**2,646**		**2007**		**$480,393**	**5%**	**$252,206**	**$732,599**				**$315,018**	**$542,123**	**$227,106**

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TABLE NO. 12
Existing Impact Fee Water Lines

1 - City Participation in Cost Oversize

2 - City Initiated and Funded

	Pipe Number	Pressure Plane	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Intersest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost ($)	(%) Utilized Capacity			($) Utilized Capacity		
											2019	2029	During Fee Period	2019	2029	During Fee Period
SPRINGER ROAD WATER LINE (FM 549 TO SPRINGER ELEVATED STORAGE TANK)																
2	P3020	780	2,669	16		$76.53	$204,256		$107,234	$311,490	72%	76%	4%	$224,273	$236,732	$12,460
Subtotal:			**2,669**		**2004**		**$204,256**	**5%**	**$107,234**	**$311,490**				**$224,273**	**$236,732**	**$12,460**
SPRINGER ELEVATED STORAGE TANK WATER LINE (SPRINGER ROAD TO SH 276)																
2	P3071	780	225	24		$147.72	$33,238		$17,450	$50,688	32%	38%	6%	$16,220	$19,261	$3,041
2	P3072	780	861	24		$147.72	$127,189		$66,774	$193,963	57%	67%	10%	$110,559	$129,955	$19,396
Subtotal:			**1,086**		**2004**		**$160,427**	**5%**	**$84,224**	**$244,651**				**$126,779**	**$149,216**	**$22,437**
MIMS ROAD WATER LINE (SIDS ROAD TO SH 205)																
2	P1739	698.75	2,233	16		$100.71	$224,876		$118,060	$342,936	100%	100%	0%	$342,936	$342,936	$0
2	P1828	698.75	1,340	12		$100.71	$134,946		$70,847	$205,793	77%	100%	23%	$158,461	$205,793	$47,332
Subtotal:			**3,573**		**2008**		**$359,822**	**5%**	**$188,907**	**$548,729**				**$501,397**	**$548,729**	**$47,332**
FM 549 WATER LINE I (FONTANNA RANCH ADDITION TO OAKS OF BUFFALO WAY ADDITION)																
2	P3061	780	2,835	12		$90.67	$257,043		$134,948	$391,991	18%	59%	41%	$70,558	$231,275	$160,716
2	P3062	780	1,124	12		$90.67	$101,911		$53,503	$155,414	100%	100%	0%	$155,414	$155,414	$0
2	P3063	780	1,435	12		$90.67	$130,108		$68,307	$198,415	47%	50%	3%	$93,255	$99,208	$5,952
2	P3106	780	806	12		$90.67	$73,078		$38,366	$111,444	49%	61%	12%	$54,608	$67,981	$13,373
3	P3110	780	594	12		$90.67	$53,857		$28,275	$82,132	31%	48%	17%	$25,461	$39,423	$13,962
4	P3111	780	821	12		$90.67	$74,438		$39,080	$113,518	100%	100%	0%	$113,518	$113,518	$0
Subtotal:			**7,615**		**2008**		**$690,436**	**5%**	**$362,479**	**$1,052,914**				**$512,814**	**$706,819**	**$194,003**

TABLE NO. 12
Existing Impact Fee Water Lines

1 - City Participation in Cost Oversize

2 - City Initiated and Funded

	Pipe Number	Pressure Plane	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Intersest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost ($)	(%) Utilized Capacity 2019	(%) Utilized Capacity 2029	(%) Utilized Capacity During Fee Period	($) Utilized Capacity 2019	($) Utilized Capacity 2029	($) Utilized Capacity During Fee Period
FM 549 WATER LINE II (STANDING OAK LANE TO JEFF BOYD DRIVE)																
2	P1821	698.75	475	12		$32.08	$15,238		$8,000	$23,238	13%	30%	17%	$3,021	$6,971	$3,950
2	P3067	780	1,260	12		$32.08	$40,422		$21,221	$61,643	10%	38%	28%	$6,164	$23,424	$17,260
2	P3068	780	2,252	12		$32.08	$72,246		$37,929	$110,175	14%	20%	6%	$15,425	$22,035	$6,611
	Subtotal:		**3,987**		**2008**		**$127,907**	**5%**	**$67,150**	**$195,056**				**$24,610**	**$52,430**	**$27,821**
FM 3097 WATER LINE (BUFFALO CREEK WWTPP TO WALLACE LANE)																
2	P1663	698.75	2,324	12		$95.50	$221,938		$116,517	$338,455	22%	70%	48%	$74,460	$236,919	$162,458
2	P1664	698.75	2,335	12		$95.50	$222,988		$117,069	$340,057	5%	78%	73%	$17,003	$265,244	$248,242
2	P1829	698.75	1,457	12		$95.50	$139,141		$73,049	$212,190	0%	72%	72%	$0	$152,777	$152,777
	Subtotal:		**6,116**		**2008**		**$584,067**	**5%**	**$306,635**	**$890,702**				**$91,463**	**$654,940**	**$563,477**
COUNTY LINE ROAD WATER LINE I (FM 3097 TO RANCH TRAIL)																
2	P1734	698.75	2,324	12		$95.79	$222,625		$116,878	$339,503	37%	81%	44%	$125,616	$274,997	$149,381
	Subtotal:		**2,324**		**2008**		**$222,625**	**5%**	**$116,878**	**$339,503**				**$125,616**	**$274,997**	**$149,381**
JOHN KING / BREEZY HILL WATER LINE (FM 552 TO BREEZY HILL)																
1	P1868	698.75	2,632	16		$18.04	$47,493		$24,934	$72,427	21%	77%	56%	$15,210	$55,769	$40,559
1	P1869	698.75	2,662	16		$18.04	$48,035		$25,218	$73,253	16%	67%	51%	$11,720	$49,080	$37,359
	Subtotal:		**5,294**		**2014**		**$95,528**	**5%**	**$50,152**	**$145,680**				**$26,930**	**$104,849**	**$77,918**
BOYDSTUN STREET WATER LINE (FROM GOLIAD STREET TO CLARK STREET)																
2	P1376	698.75	171	12		$225.86	$38,622		$20,277	$58,899	84%	100%	16%	$49,475	$58,899	$9,424
2	P1377	698.75	403	12		$225.86	$91,020		$47,786	$138,806	85%	100%	15%	$117,985	$138,806	$20,821
2	P1378	698.75	1,194	12		$225.86	$269,673		$141,579	$411,252	96%	100%	4%	$394,802	$411,252	$16,450
	Subtotal:		**1,768**		**2018**		**$399,315**	**5%**	**$209,642**	**$608,957**				**$562,262**	**$608,957**	**$46,695**
COUNTY LINE ROAD WATER LINE II (FROM LYNNE DRIVE TO RENEE DRIVE)																
2	P2098	698.75	1,782	12		$240.78	$429,069		$225,261	$654,330	2%	93%	91%	$13,087	$608,527	$595,440
	Subtotal:		**1,782**		**2019**		**$429,069**	**5%**	**$225,261**	**$654,330**				**$13,087**	**$608,527**	**$595,440**
EXISTING TOTAL:			**101,895**				**$9,326,237**		**$4,896,271**	**$14,222,504**				**$8,938,972**	**$11,802,128**	**$2,863,156**

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TABLE NO. 13
Proposed Impact Fee Water Lines

1 - City Participation in Cost Oversize

2 - City Initiated and Funded

**Average Unit Costs are Based in 2019 Dollars Unless Otherwise Indicated and Includes 20% for Engineering and Easements.*

Pipe Number	Pressure Plane	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost ($)	(%) Utilized Capacity 2019	(%) Utilized Capacity 2029	(%) Utilized Capacity During Fee Period	($) Utilized Capacity 2019	($) Utilized Capacity 2029	($) Utilized Capacity During Fee Period
1 - MIMS ROAD / COUNTY LINE ROAD LOOPING WATER LINES															
Pipes P2096 & P2097 Along Future Thouroghfare and Renee Drive from Mims Road South to County Line Road; Pipe 2118 Along Mims Road to Goliad Street															
2 P2096 *	698.75	2,162	20		$228.00	$492,936		$258,792	$751,728	0%	97%	97%	$0	$729,176	$729,176
2 P2097 *	698.75	2,459	20		$228.00	$560,652		$294,342	$854,994	0%	95%	95%	$0	$812,244	$812,244
2 P2118 *	698.75	1,530	20		$228.00	$348,840		$183,141	$531,981	0%	71%	71%	$0	$377,707	$377,707
Subtotal:		**6,151**		**2022**		**$1,402,428**	**5%**	**$736,275**	**$2,138,703**				**$0**	**$1,919,127**	**$1,919,127**
2 - I.H.-30 - FM 3549/CORPORATE CROSSING															
Creating 780 Service Area North of IH-30 (*16" Diameter Cost Based on Bore Across IH-30 & FM549*)															
2 P4039 *	780	575	12		$120.00	$69,000		$36,225	$105,225	0%	28%	28%	$0	$29,463	$29,463
2 P4124 *	780	712	16		$650.00	$462,800		$242,970	$705,770	0%	33%	33%	$0	$232,904	$232,904
		1,287		**2023**		**$531,800**	**5%**	**$279,195**	**$810,995**				**$0**	**$262,367**	**$262,367**
3 - JOHN KING BLVD 780 WATER LINES NORTH															
Pipe P4123 is a Bore Across IH-30															
2 P4123 *	780	423	16		$650.00	$274,950		$144,349	$419,299	0%	21%	21%	$0	$88,053	$88,053
		423		**2023**		**$274,950**	**5%**	**$144,349**	**$419,299**				**$0**	**$88,053**	**$88,053**
4 - S.H. 66 - F.M. 3549 780 SA LOOP															
From the Termination of the Existing S.H. 66 12" Water Line East to F.M. 549, South Along F.M. 549 from S.H. 66 to Eastridge Church of Christ 16" Existing Water Line															
2 P4007 *	780	3,439	12		$120.00	$412,680		$216,657	$629,337	0%	38%	38%	$0	$239,148	$239,148
2 P4008 *	780	2,174	12		$120.00	$260,880		$136,962	$397,842	0%	11%	11%	$0	$43,763	$43,763
2 P4009 *	780	781	12		$120.00	$93,720		$49,203	$142,923	0%	12%	12%	$0	$17,151	$17,151
Subtotal:		**6,394**		**2023**		**$767,280**	**5%**	**$402,822**	**$1,170,102**				**$0**	**$300,062**	**$300,062**
5 - S.H. 205 WATER LINES															
Pipe P2117 southwest from Graystone Drive to S.H. 205. Pipe P2136 southeast along S.H. 205.															
1 P2117 *	698.75	846	16		$60.00	$50,760		$26,649	$77,409	0%	100%	100%	$0	$77,409	$77,409
1 P2136 *	698.75	1,650	16		$60.00	$99,000		$51,975	$150,975	0%	100%	100%	$0	$150,975	$150,975
Subtotal:		**2,496**		**2025**		**$149,760**	**5%**	**$78,624**	**$228,384**				**$0**	**$228,384**	**$228,384**

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TABLE NO. 13
Proposed Impact Fee Water Lines

1 - City Participation in Cost Oversize

2 - City Initiated and Funded

**Average Unit Costs are Based in 2019 Dollars Unless Otherwise Indicated and Includes 20% for Engineering and Easements.*

Pipe Number	Pressure Plane	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost ($)	(%) Utilized Capacity			($) Utilized Capacity		
										2019	2029	During Fee Period	2019	2029	During Fee Period
6 - SPRINGER LN. 16" WATER LINE															
From Springer Elevated Storage Tank East to Rochelle Road															
1 P4043 *	780	2,714	16		$60.00	$162,840		$85,491	$248,331	0%	51%	51%	$0	$126,649	$126,649
Subtotal:		**2,714**		**2029**		**$162,840**	**5%**	**$85,491**	**$248,331**				**$0**	**$126,649**	**$126,649**
7 - S.H. 276 PUMP STATION TRANSMISSION MAIN WEST															
From Proposed S.H. 276 Pump Station West Along S.H. 276 to Proposed Subdivision															
1 P4071 *	780	1,906	16		$60.00	$114,360		$60,039	$174,399	0%	28%	28%	$0	$48,832	$48,832
1 P4072 *	780	1,906	16		$60.00	$114,360		$60,039	$174,399	0%	14%	14%	$0	$24,416	$24,416
1 P4073 *	780	693	16		$60.00	$41,580		$21,830	$63,410	0%	12%	12%	$0	$7,609	$7,609
Subtotal:		**4,505**		**2029**		**$270,300**	**5%**	**$141,908**	**$412,208**				**$0**	**$80,857**	**$80,857**
PROPOSED TOTAL:		**23,970**				**$3,559,358**		**$1,868,664**	**$5,428,022**				**$0**	**$3,005,499**	**$3,005,499**

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TABLE NO. 14
CCN Acquisition

Elevated Storage		Year Acquired	Area (Ac.)	Capital Cost ($) Purchase Price				Capacity Utilized (%) 2019	2029	In the CRF Period	Capacity Utilized ($) 2019	2029	In the CRF Period
CCN Acquisition													
Aquasourse		2013	284.0	$ 3,402,318			$ 3,402,318	100.0%	100.0%	0.0%	$ 3,402,318	$ 3,402,318	$ -
RCH W.S.C.		2007-2009	803.0	$ 332,847			$ 332,847	29.0%	30.0%	1.0%	$ 96,526	$ 99,854	$ 3,328
Mt. Zion W.S.C.		2011	468.0	$ 325,725			$ 325,725	15.0%	64.0%	49.0%	$ 48,859	$ 208,464	$ 159,605
Blaclland W.S.C.		2005-2012	1,251.0	$ 987,152			$ 987,152	8.0%	58.0%	50.0%	$ 78,972	$ 572,548	$ 493,576
Total			**2,806.0**	**$ 5,048,042**	**$ -**	**$ -**	**$ 5,048,042**				**$ 3,626,675**	**$ 4,283,184**	**$ 656,510**

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E. WASTEWATER COLLECTION SYSTEM

Computer models for the years 2019, 2029 and Buildout were prepared by Birkhoff, Hendricks & Carter L.L.P. The models were developed and peak flows calculated from the residential population and non-residential land use projections prepared by the City of Rockwall's Planning Department. Computer models were run to determine peak wet weather flow to insure proper sizing of the collection system.

1. Collection Lines

The natural creeks, whose basins will collect wastewater through the installed system of collection lines that flow into the geographic treatment area serviced by the NTMWD.

The wastewater collection system analysis covered all of the drainage basins within the Service Area planning boundary. Each collection system was analyzed for line sizes 12-inches in diameter and larger. Eliminating line sizes smaller than 12-inches in diameter from the study leaves only the interceptor and trunk lines included in the study. The wastewater project costs include necessary appurtenances (manholes, lift stations, aerial crossings and the like), purchase of easements, utility relocation, pavement removal and replacement, and engineering costs. For existing Impact Fee projects, actual costs were utilized where known. Future project cost estimates were based on 2019 average unit cost per linear foot and includes engineering, easements, and construction cost.

All eligible wastewater collection line projects in the Service Area planning boundary were included in the impact fee analysis. Eligible existing and proposed wastewater facilities are shown on **Exhibit 2** and have capacity for future growth.

2. Treatment

The North Texas Municipal Water District (NTMWD) provides the City of Rockwall with the entirety of wastewater treatment. NTMWD owns and operates the Squabble Creek and Buffalo Creek Wastewater Treatment Plants (WWTP). Excess flows above the permit levels of the Squabble Creek and Buffalo Creek WWTP's are conveyed to the NTMWD Buffalo Creek Regional system. Rockwall pays NTMWD for the cost of this service according to the City's percentage of wastewater flow contributions in any given year.

This Impact Fee study includes the cost of NTMWD regional collection and transportation, and facilities located within the City's Service Area planning boundary that were paid for by NTMWD. Existing treatment plant and future treatment plant expansion costs of NTMWD were included in this Impact Fee analysis.

3. Wastewater System Capital Improvement Projects for Impact Fees

The 10-year Wastewater System Capital Improvement Plan for Impact Fees was developed by Birkhoff, Hendricks & Carter L.L.P. **Exhibit 2** shows the recommended system improvements and **Table No. 15** itemizes each project and the project cost. These recommended improvements form the basis for the Wastewater System Impact Fee Calculation.

The capital improvement plan for impact fees provides for system improvements within the defined Service Area Planning Boundary.

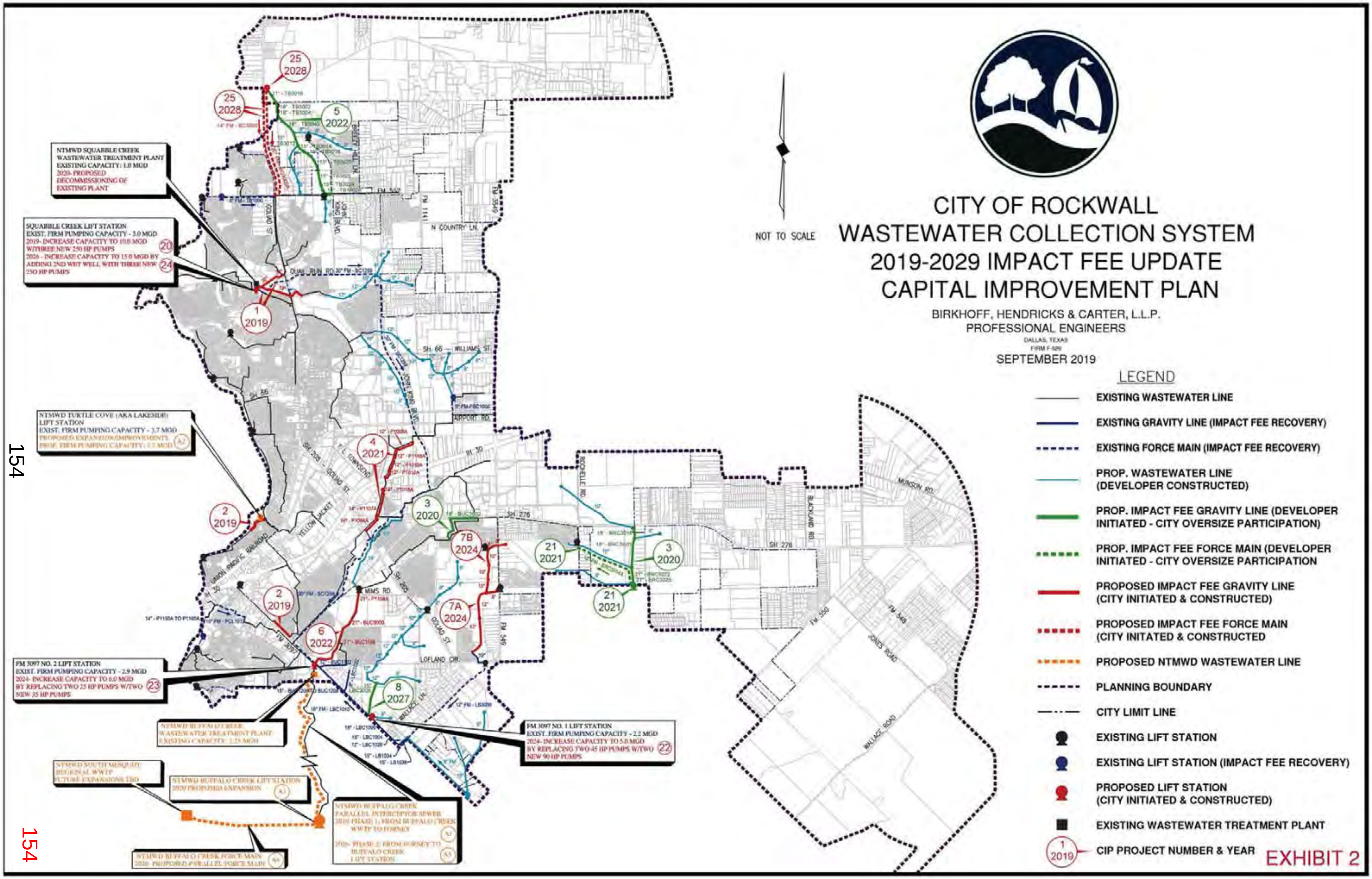
CITY OF ROCKWALL
WASTEWATER COLLECTION SYSTEM
2019-2029 IMPACT FEE UPDATE
CAPITAL IMPROVEMENT PLAN
BIRKHOFF, HENDRICKS & CARTER, L.L.P.
PROFESSIONAL ENGINEERS
DALLAS, TEXAS
SEPTEMBER 2019
NOT TO SCALE
LEGEND
EXISTING WASTEWATER LINE
EXISTING GRAVITY LINE (IMPACT FEE RECOVERY)
EXISTING FORCE MAIN (IMPACT FEE RECOVERY)
PROP. WASTEWATER LINE (DEVELOPER CONSTRUCTED)
PROP. IMPACT FEE GRAVITY LINE (DEVELOPER INITIATED - CITY OVERSIZE PARTICIPATION)
PROP. IMPACT FEE FORCE MAIN (DEVELOPER INITIATED - CITY OVERSIZE PARTICIPATION
PROPOSED IMPACT FEE GRAVITY LINE (CITY INITIATED & CONSTRUCTED)
PROPOSED IMPACT FEE FORCE MAIN (CITY INITATED & CONSTRUCTED
PROPOSED NTMWD WASTEWATER LINE
PLANNING BOUNDARY
CITY LIMIT LINE
EXISTING LIFT STATION
EXISTING LIFT STATION (IMPACT FEE RECOVERY)
PROPOSED LIFT STATION (CITY INITIATED & CONSTRUCTED)
EXISTING WASTEWATER TREATMENT PLANT
CIP PROJECT NUMBER & YEAR
EXHIBIT 2
NTMWD SQUABBLE CREEK WASTEWATER TREATMENT PLANT
EXISTING CAPACITY: 1.0 MGD
2020- PROPOSED DECOMMISSIONING OF EXISTING PLANT
SQUABBLE CREEK LIFT STATION
EXIST. FIRM PUMPING CAPACITY - 3.0 MGD
2019- INCREASE CAPACITY TO 10.0 MGD W/THREE NEW 250 HP PUMPS
2026 - INCREASE CAPACITY TO 15.0 MGD BY ADDING 2ND WET WELL WITH THREE NEW 250 HP PUMPS
NTMWD TURTLE COVE (AKA LAKESIDE) LIFT STATION
EXIST. FIRM PUMPING CAPACITY - 3.7 MGD
FM 3097 NO. 2 LIFT STATION
EXIST. FIRM PUMPING CAPACITY - 2.9 MGD
2024- INCREASE CAPACITY TO 6.0 MGD BY REPLACING TWO 25 HP PUMPS W/TWO NEW 35 HP PUMPS
FM 3097 NO. 1 LIFT STATION
EXIST. FIRM PUMPING CAPACITY - 2.2 MGD
2024- INCREASE CAPACITY TO 5.0 MGD BY REPLACING TWO 45 HP PUMPS W/TWO NEW 90 HP PUMPS
25 2028
5 2022
1 2019
4 2021
3 2020
7B 2024
7A 2024
21 2021
2 2019
6 2022
8 2027
GOLIAD ST
N COUNTRY LN
FM 1141
FM 3549
FM 552
SH 66
WILLIAMS ST
JOHN KING BLVD
AIRPORT RD
IH 30
T.L. TOWNSEND
SH 205
SH 276
MIMS RD
LOFLAND CIR
FM 549
FM 3097
ROCHELLE RD
BLACKLAND RD
FM 550
FM 548
JONES ROAD
WALLACE ROAD
MUNSON RD
UNION PACIFIC RAILROAD
YELLOW JACKET

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Table No. 15

10-Year Wastewater System Capital Improvement Plan for Impact Fees

PROPOSED WASTEWATER LINES

CIP #	Year	1=City Participation in Cost Oversize 2=City Initiated and Funded (X) = CIP Project ID Number	Project	Size (Diameter)	Opinion of Project Cost (A)	Debt Service (B)	Total Project Cost
1	2019	2	Quail Run & Memorial Lift Station Bypass Trunk Sewer	18"-30"	$ 2,159,050	$ 1,133,500	$ 3,292,550
2	2019	2	Turtle Cove & Windmill Ridge Sewer Improvements	8"-12"	$ 800,000	$ 420,000	$ 1,220,000
3	2020	1	Proposed Brushy Creek Trunk Sewer & Timber Creek Lift Station Abandonment	18"-21"	$ 285,896	$ 150,095	$ 435,991
4	2021	2	Buffalo Creek Existing Gravity Sewer - 12" & 14" Pipe Burst	12"-14"	$ 1,281,901	$ 672,997	$ 1,954,898
5	2022	1	Proposed Thompson Branch Trunk Sewer	15"-21"	$ 339,296	$ 178,131	$ 517,427
6	2022	2	Proposed Lower Buffalo Creek East Trunk Sewer & Mims Rd. Lift Station Abandonment	21"	$ 1,734,075	$ 910,389	$ 2,644,464
7A	2024	2	Fontana Ranch Lift Station Abandonment & Gravity Relief Sewer	8"-12"	$ 985,844	$ 517,568	$ 1,503,412
7B	2024	2	Lofland Farms Lift Station Abandonment & Gravity Relief Sewer	8"-10"	$ 510,375	$ 267,947	$ 778,322
8	2027	1	Proposed Little Buffalo Creek Trunk Sewer	15"	$ 52,223	$ 27,417	$ 79,640
			Subtotal: Proposed Wastewater Lines		**$ 8,148,660**	**$ 4,278,044**	**$ 12,426,704**

PROPOSED WASTEWATER FACILITIES

CIP #	Year	1=City Participation in Cost Oversize 2=City Initiated and Funded (X) = CIP Project ID Number	Project	Capacity (MGD)	Opinion of Project Cost (A)	Debt Service (B)	Total Project Cost
20	2019	2	Squabble Creek Lift Station Improvements - Install Three 250-HP Pumps, Electrical Upgrades & Standby Pump System	10.0 MGD	$ 2,800,769	$ 1,470,404	$ 4,271,173
21	2021	1	Proposed Brushy Creek Lift Station & 12" Force Main	3.3 MGD	$ 1,610,000	$ 845,250	$ 2,455,250
22	2024	2	FM 3097 No. 1 Lift Station Improvements - Replace Two 45-HP Pumps w/Two 90-HP Pumps	5.0 MGD	$ 575,000	$ 301,875	$ 876,875
23	2024	2	FM 3097 No. 2 Lift Station Improvements - Replace Two 25-HP Pumps w/Two 35-HP Pumps	6.0 MGD	$ 862,500	$ 452,813	$ 1,315,313
24	2026	2	Squabble Creek Lift Station Improvements - Add 2nd Wet Well w/Three New 250-HP Pumps	15.0 MGD	$ 4,600,000	$ 2,415,000	$ 7,015,000
25	2028	2	Proposed Bluff Creek Lift Station & Parallel Force Mains (14" & 20")	2.4 MGD	$ 5,865,000	$ 3,079,125	$ 8,944,125
			Subtotal: Proposed Wastewater Facilities		**$ 16,313,269**	**$ 8,564,467**	**$ 24,877,736**
Total City of Rockwall Proposed Wastewater System Improvements					**$ 24,461,929**	**$ 12,842,511**	**$ 37,304,440**

(A) Opinion of Cost includes:

a) Engineer's Opinion of Construction Cost
b) Professional Services Fees (Survey, Engineering, Testing, Legal)
c) Cost of Easement or Land Acquisitions

(B) Debt Service Based on 20-Year Simple Interest Bonds at 5%

Table No. 15 (Continued)

10-Year Wastewater System Capital Improvement Plan for Impact Fees

NTMWD REGIONAL SYSTEM

CIP #	Year		3=Funded by NTMWD, 100% City Responsibility 4=Part of NTMWD Buffalo Interceptor System, assumed 59% City Responsibility 5=Part of NTMWD Regional Systems, assumed 2.915% City Responsibility NTMWD Wastewater Line & Facility Projects	Size/ Added Capacity	Opinion of Project Cost (A)	Debt Service (B)	Total Project Cost
A1	2019	4	NTMWD Buffalo Creek Parallel Interceptor Sewer - Phase 1: From Buffalo Creek WWTP to Forney	TBD	$ 11,835,394	$ -	$ 11,835,394
A2	2020	3	NTMWD Turtle Cove (a.k.a. Lakeside) Lift Station Expansion/Replacement	+1.6 MGD	$ 4,600,000	$ -	$ 4,600,000
A3	2020	4	NTMWD Buffalo Creek Lift Station Expansion	TBD	$ 17,868,150	$ -	$ 17,868,150
A4	2020	4	NTMWD Buffalo Creek Parallel Force Main	TBD	$ 1,681,500	$ -	$ 1,681,500
A5	2026	4	NTMWD Buffalo Creek Parallel Interceptor - Phase 2: From Forney to Buffalo Creek Lift Station	TBD	$ 7,924,880	$ -	$ 7,924,880
A6	2019-2029	5	10-Year CIP for NTMWD Sewer System (Rockwall Responsibility Only)	N/A	$ 5,435,164	$ -	$ 5,435,164
A7	2019-2029	5	10-Year CIP for NTMWD Regional Wastewater System (Rockwall Responsibility Only)	N/A	$ 11,619,512	$ -	$ 11,619,512
			Total: NTMWD Wastewater System Improvements:		**$ 60,964,600**	**$ -**	**$ 60,964,600**

(A) Opinion of Cost includes:

a) Engineer's Opinion of Construction Cost

b) Professional Services Fees (Survey, Engineering, Testing, Legal)

c) Cost of Easement or Land Acquisitions

Notes: 1. City obligations estimated based on City of Rockwall's contracted proportion or historical usage of NTMWD Regional Systems.

2. 10-Year CIP for NTMWD Regional Systems based on project listings provided for "Summary of Sewer System CIP" and "Summary of Regional Wastewater System CIP", both dated May 11, 2018.

PLANNING EXPENSES

	Project Description	Engineering Services	Opinion of Project Cost (A)
2029	Wastewater Masterplan & Impact Fee Update	$ 59,850	$ 59,850
		Total: Planning Expenses:	**$ 59,850**
Grand Total, City of Rockwall & NTMWD Wastewater System Improvements:			**$ 98,328,890**

4. Utilized Capacity

Utilized capacity for the wastewater collection system was calculated based on land use assumptions prepared by the City of Rockwall. The population and non-residential growth in each wastewater drainage basin was determined utilizing the City's growth projections. These growth rates were utilized to calculate 2019, 2029 and buildout peak design flows.

The percent-utilized capacity was calculated for the design flow of each study year based on the buildout capacity. The utilized capacity during the Impact Fee period is the difference between the year 2019 capacity and the year 2029 capacity. **Table No. 16** below summarizes the project cost and utilized cost over the impact fee period of 2019 – 2029. The utilized capacity for each eligible existing and proposed wastewater collection line is presented in detail in the Impact Fee Capacity Calculation **Table Nos. 17 and 18**. **Table No. 19** summarizes the utilized capacity of lift stations eligible for impact fee recovery. **Table 20** summarizes the utilized capacity of NTMWD facilities eligible for impact fee recovery. **Table 21** includes the summary of utilized capacity allocation between the City of Rockwall and NTMWD.

TABLE NO. 16

Summary of Eligible Wastewater System Project Cost and Utilized Capacity Cost

Wastewater System Facility	20-Year Project Cost	Utilized Capacity ($) in the CRP Period
Existing Wastewater Collection Line	$12,344,474	$3,863,647
Existing Wastewater Facilities	$6,402,514	$629,875
Proposed Wastewater Collection Line	$12,426,705	$9,608,437
Proposed Wastewater Facilities	$24,877,736	$18,193,334
NTMWD Facilities	$60,964,600	$9,627,128
Planning Expenses	$59,850	$59,850
Total:	**$117,075,879**	**$41,982,271**

TABLE NO. 17
Existing Impact Fee Wastewater Lines

	Pipe Number	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Interest Rate %	Debt Service Utilizing Simple	Total 20 Year Project Cost ($)	(%) Utilized Capacity			($) Utilized Capacity		
										2019	2029	During Fee Period	2019	2029	During Fee Period
SQUABBLE / CARUTH LAKE SEWER															
From the Squabble Creek Wastewater Treatment Plant to SH 205 to Caruth Lane															
2	SC1008	158	36		$74.89	$11,844		$6,218	$18,062	72%	89%	17%	$12,946	$15,994	$3,048
2	SC1112	663	36		$74.89	$49,676		$26,080	$75,756	72%	89%	17%	$54,307	$67,179	$12,872
2	SC1114	275	36		$74.89	$20,614		$10,822	$31,436	72%	89%	17%	$22,740	$27,999	$5,259
2	SC1116	125	36		$74.89	$9,382		$4,926	$14,308	72%	89%	17%	$10,346	$12,729	$2,383
2	SC1118	902	27		$74.89	$67,561		$35,469	$103,030	68%	87%	20%	$69,891	$90,065	$20,174
2	SC1120	293	24		$74.89	$21,927		$11,512	$33,439	68%	87%	20%	$22,683	$29,231	$6,548
2	SC1154	313	24		$74.89	$23,404		$12,287	$35,691	68%	87%	20%	$24,210	$31,198	$6,989
2	SC1290	1,345	36		$74.89	$100,702		$52,868	$153,570	72%	89%	17%	$110,598	$136,445	$25,847
2	SC1292	173	36		$74.89	$12,959		$6,803	$19,762	72%	89%	17%	$14,232	$17,558	$3,326
2	SC1294	389	36		$74.89	$29,123		$15,290	$44,413	72%	89%	17%	$31,917	$39,422	$7,505
2	SC1296	16	27		$74.89	$1,176		$617	$1,793	72%	89%	17%	$1,285	$1,590	$305
2	SC1298	170	27		$74.89	$12,761		$6,700	$19,461	72%	89%	17%	$13,945	$17,242	$3,297
2	SC1300	124	27		$74.89	$9,285		$4,875	$14,160	72%	89%	17%	$10,151	$12,556	$2,405
2	SC1302	464	24		$74.89	$34,759		$18,248	$53,007	68%	87%	20%	$35,958	$46,338	$10,380
2	SC1334	219	36		$74.89	$16,402		$8,611	$25,013	72%	89%	17%	$18,084	$22,281	$4,197
2	SC1336	541	36		$74.89	$40,481		$21,252	$61,733	72%	89%	17%	$44,626	$54,941	$10,315
	Subtotal:	**6,170**		**1997**		**$462,056**	**5%**	**$242,578**	**$704,634**				**$497,919**	**$622,768**	**$124,850**
DALTON ROAD FORCE MAIN															
Begins at the Intersection of Dalton Road and Beacon Hill Drive and Extends East to SH 205															
2	TB1000	155	8		$51.43	$7,959		$4,178	$12,137	100%	100%	0%	$12,137	$12,137	$0
2	TB1040	3,409	8		$51.43	$175,324		$92,046	$267,370	100%	100%	0%	$267,370	$267,370	$0
	Subtotal:	**3,564**		**2002**		**$183,283**	**5%**	**$96,224**	**$279,507**				**$279,507**	**$279,507**	**$0**

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TABLE NO. 17
Existing Impact Fee Wastewater Lines

	Pipe Number	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Interest Rate %	Debt Service Utilizing Simple	Total 20 Year Project Cost ($)	(%) Utilized Capacity			($) Utilized Capacity		
										2019	2029	During Fee Period	2019	2029	During Fee Period
SH 205 GRAVITY SEWER															
From Dalton Road / FM 522 to Quail Run Road															
2	SC1104	407	18		$78.32	$31,874		$16,734	$48,608	28%	42%	14%	$13,415	$20,355	$6,939
2	SC1106	347	18		$78.32	$27,185		$14,272	$41,457	26%	41%	15%	$10,978	$17,017	$6,039
2	SC1108	78	18		$78.32	$6,115		$3,210	$9,325	27%	41%	14%	$2,512	$3,828	$1,316
2	SC1316	233	18		$78.32	$18,218		$9,564	$27,782	27%	41%	14%	$7,425	$11,338	$3,912
2	SC1318	402	18		$78.32	$31,488		$16,531	$48,019	27%	42%	15%	$12,991	$20,070	$7,079
2	SC1320	778	18		$78.32	$60,918		$31,982	$92,900	26%	41%	15%	$24,601	$38,133	$13,532
2	SC1322	496	18		$78.32	$38,883		$20,414	$59,297	26%	40%	14%	$15,473	$23,794	$8,321
2	SC1324	281	18		$78.32	$22,037		$11,569	$33,606	26%	41%	15%	$8,798	$13,749	$4,951
2	SC1326	518	18		$78.32	$40,577		$21,303	$61,880	27%	41%	14%	$16,797	$25,442	$8,645
2	SC1328	277	18		$78.32	$21,720		$11,403	$33,123	29%	42%	13%	$9,680	$14,001	$4,322
2	SC1330	474	18		$78.32	$37,100		$19,477	$56,577	29%	42%	13%	$16,534	$23,916	$7,382
2	SC1332	329	18		$78.32	$25,754		$13,521	$39,275	29%	43%	14%	$11,543	$16,869	$5,326
2	TB1012	508	18		$78.32	$39,759		$20,873	$60,632	33%	43%	11%	$19,897	$26,375	$6,478
2	TB1028	174	18		$78.32	$13,593		$7,136	$20,729	32%	43%	11%	$6,629	$8,991	$2,362
	Subtotal:	**5,302**		**2003**		**$415,221**	**5%**	**$217,989**	**$633,210**				**$177,273**	**$263,878**	**$86,604**
SIGNAL RIDGE FORCE MAIN															
From Signal Ridge Lift Station to Ridge Road															
2	BUC1210	4,662	10		$110.66	$515,915		$270,855	$786,770	93%	100%	7%	$730,029	$786,770	$56,741
	Subtotal:	**4,662**				**$515,915**	**5%**	**$270,855**	**$786,770**				**$730,029**	**$786,770**	**$56,741**
AMITY LANE FORCE MAIN															
From Amity Lane Lift Station to Airport Road															
2	SC1002	1,193	6		$18.53	$22,103		$11,604	$33,707	35%	100%	65%	$11,848	$33,707	$21,859
	Subtotal:	**1,193**		**2007**		**$22,103**	**5%**	**$11,604**	**$33,707**				**$11,848**	**$33,707**	**$21,859**

TABLE NO. 17
Existing Impact Fee Wastewater Lines

	Pipe Number	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Interest Rate %	Debt Service Utilizing Simple	Total 20 Year Project Cost ($)	(%) Utilized Capacity			($) Utilized Capacity		
										2019	2029	During Fee Period	2019	2029	During Fee Period
FM 3097 SANITARY SEWER IMPROVEMENTS															
From FM 3097 LS No. 2 to FM549; 12" on County road from FM 3097 to Valerie Place; 8" on Ranch Trail from FM 3097 to 1,500-LF East															
2	BUC1040	441	15		$150.81	$66,506		$34,916	$101,422	39%	96%	58%	$39,193	$97,809	$58,617
2	BUC1042	299	24		$150.81	$45,039		$23,645	$68,684	43%	95%	51%	$29,805	$65,001	$35,196
2	BUC1044	109	24		$150.81	$16,380		$8,599	$24,979	47%	94%	46%	$11,847	$23,415	$11,568
2	BUC1162	1,788	12		$150.81	$269,645		$141,564	$411,209	99%	100%	0%	$408,380	$410,339	$1,958
2	BUC1200	390	15		$150.81	$58,764		$30,851	$89,615	42%	99%	57%	$37,573	$89,057	$51,484
2	BUC1202	109	18		$150.81	$16,366		$8,592	$24,958	42%	99%	57%	$10,464	$24,803	$14,339
2	BUC1204	200	18		$150.81	$30,190		$15,850	$46,040	41%	99%	58%	$18,983	$45,753	$26,770
2	BUC1206	200	15		$150.81	$30,097		$15,801	$45,898	39%	99%	60%	$18,012	$45,613	$27,602
2	BUC1208	433	15		$150.81	$65,269		$34,266	$99,535	38%	95%	57%	$37,709	$94,909	$57,200
2	LBC1002	250	12		$150.81	$37,774		$19,831	$57,605	16%	73%	56%	$9,497	$41,952	$32,455
2	LBC1004	1,193	15		$150.81	$179,972		$94,485	$274,457	14%	73%	58%	$39,787	$199,880	$160,094
2	LBC1006	1,282	18		$150.81	$193,280		$101,472	$294,752	13%	73%	60%	$39,070	$214,661	$175,591
2	LBC1016	539	15		$150.81	$81,324		$42,695	$124,019	34%	100%	66%	$42,323	$124,019	$81,696
2	LBC1022	1,506	8		$150.81	$227,061		$119,207	$346,268	52%	84%	32%	$180,397	$291,710	$111,312
	Subtotal:	**8,738**		**2007**		**$1,317,667**	**5%**	**$691,774**	**$2,009,441**				**$923,040**	**$1,768,921**	**$845,882**

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TABLE NO. 17
Existing Impact Fee Wastewater Lines

Pipe Number	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Interest Rate %	Debt Service Utilizing Simple	Total 20 Year Project Cost ($)	(%) Utilized Capacity			($) Utilized Capacity		
									2019	2029	During Fee Period	2019	2029	During Fee Period
SQUABBLE CREEK TO BUFFALO CREEK WASTEWATER TRANSFER FORCE MAIN														
From Squabble Creek Wastewater Treatment Plant to FM 3097														
2 SC1340	1,137	30		$124.90	$141,978		$74,538	$216,516	32%	67%	35%	$69,966	$144,751	$74,785
2 SC1259	20,471	30		$124.90	$2,556,676		$1,342,255	$3,898,931	32%	67%	35%	$1,259,918	$2,606,616	$1,346,699
2 SC1261	19,232	30		$124.90	$2,402,049		$1,261,076	$3,663,125	32%	67%	35%	$1,183,718	$2,448,969	$1,265,251
2 SC1260	623	30		$124.90	$77,792		$40,841	$118,633	32%	67%	35%	$38,336	$79,312	$40,976
Subtotal:	**41,463**		**2011**		**$5,178,495**	**5%**	**$2,718,710**	**$7,897,205**				**$2,551,938**	**$5,279,648**	**$2,727,711**
Existing Wastewater Line Total	**71,091**				**$8,094,740**		**$4,249,734**	**$12,344,474**				**$5,171,554**	**$9,035,199**	**$3,863,647**

Notes:

1 - City Participate in Cost Oversize

2 - City Initiated and Funded

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TABLE NO. 18

Proposed Impact Fee CIP Wastewater Lines

	Pipe Number	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.) *	Total Capital Cost ($)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost ($)	(%) Utilized Capacity			($) Utilized Capacity		
										2019	2029	During Fee Period	2019	2029	During Fee Period
1 - QUAIL RUN & MEMORIAL LIFT STATION BYPASS TRUNK SEWER															
2	SC1206	51	18		$436.24	$22,388		$11,754	$34,142	0%	97%	97%	$0	$33,057	$33,057
2	SC1208	414	18		$436.24	$180,565		$94,797	$275,362	0%	97%	97%	$0	$266,607	$266,607
2	SC1210	160	18		$436.24	$69,580		$36,529	$106,109	0%	97%	97%	$0	$102,735	$102,735
2	SC1212	197	18		$436.24	$86,014		$45,157	$131,171	0%	97%	97%	$0	$126,993	$126,993
2	SC1214	182	18		$436.24	$79,583		$41,781	$121,364	0%	97%	97%	$0	$117,485	$117,485
2	SC1216	42	18		$436.24	$18,204		$9,557	$27,761	0%	97%	97%	$0	$26,874	$26,874
2	SC1218	519	18		$436.24	$226,531		$118,929	$345,460	0%	97%	97%	$0	$334,399	$334,399
2	SC1220	510	18		$436.24	$222,300		$116,707	$339,007	0%	97%	97%	$0	$328,134	$328,134
2	SC1222	306	18		$436.24	$133,350		$70,009	$203,359	0%	97%	97%	$0	$196,814	$196,814
2	SC1224	37	18		$436.24	$16,311		$8,563	$24,874	0%	97%	97%	$0	$24,075	$24,075
2	SC1226	182	18		$436.24	$79,610		$41,795	$121,405	0%	97%	97%	$0	$117,497	$117,497
2	SC1228	446	18		$436.24	$194,542		$102,135	$296,677	0%	97%	97%	$0	$287,128	$287,128
2	SC1236	92	24		$436.24	$40,143		$21,075	$61,218	0%	41%	41%	$0	$24,896	$24,896
2	SC1238	40	24		$436.24	$17,402		$9,136	$26,538	0%	41%	41%	$0	$10,831	$10,831
2	SC1240	75	24		$436.24	$32,919		$17,282	$50,201	0%	44%	44%	$0	$22,211	$22,211
2	SC1242	85	24		$436.24	$36,902		$19,374	$56,276	0%	44%	44%	$0	$24,855	$24,855
2	SC1244	121	24		$436.24	$52,929		$27,788	$80,717	0%	44%	44%	$0	$35,660	$35,660
2	SC1246	161	30		$436.24	$70,113		$36,809	$106,922	0%	44%	44%	$0	$47,140	$47,140
2	SC1248	183	30		$436.24	$79,671		$41,827	$121,498	0%	43%	43%	$0	$52,727	$52,727
2	SC1252	224	30		$436.24	$97,766		$51,327	$149,093	0%	43%	43%	$0	$64,599	$64,599
2	SC1254	500	30		$436.24	$218,121		$114,513	$332,634	0%	43%	43%	$0	$143,599	$143,599
2	SC1256	240	30		$436.24	$104,711		$54,973	$159,684	0%	43%	43%	$0	$68,936	$68,936
2	SC1230	182	36		$436.24	$79,396		$41,683	$121,079	0%	50%	50%	$0	$61,124	$61,124
	Subtotal:	**4,949**		**2019**		**$2,159,050**	**5%**	**$1,133,500**	**$3,292,551**				**$0**	**$2,518,376**	**$2,518,376**
2 - TURTLE COVE & WINDMILL RIDGE SEWER IMPROVEMENTS															
2	BB1040A	1,553	8		$269.98	$419,263		$220,113	$639,376	0%	99%	99%	$0	$630,992	$630,992
2	LS1260A	1,410	12		$269.98	$380,737		$199,887	$580,624	0%	94%	94%	$0	$543,957	$543,957
	Subtotal:	**2,963**		**2019**		**$800,000**	**5%**	**$420,000**	**$1,220,000**				**$0**	**$1,174,949**	**$1,174,949**
3 - PROPOSED BRUSHY CREEK TRUNK SEWER															
1	BUC3002	3,382	15		$24.00	$81,174		$42,616	$123,790	0%	100%	100%	$0	$123,790	$123,790
1	BRC3018	724	18		$48.00	$34,748		$18,243	$52,991	0%	48%	48%	$0	$25,539	$25,539
1	BRC3020	1,948	18		$48.00	$93,513		$49,094	$142,607	0%	55%	55%	$0	$78,962	$78,962
1	BRC3022	1,045	21		$72.00	$75,242		$39,502	$114,744	0%	59%	59%	$0	$67,981	$67,981
1	BRC3026	17	21		$72.00	$1,219		$640	$1,859	0%	57%	57%	$0	$1,057	$1,057
	Subtotal:	**7,116**		**2020**		**$285,896**	**5%**	**$150,095**	**$435,991**				**$0**	**$297,329**	**$297,329**

TABLE NO. 18

Proposed Impact Fee CIP Wastewater Lines

	Pipe Number	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.) *	Total Capital Cost ($)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost ($)	(%) Utilized Capacity			($) Utilized Capacity		
										2019	2029	During Fee Period	2019	2029	During Fee Period
4 - BUFFALO CREEK EXISTING GRAVITY SEWER - 12" & 14" PIPE BURST															
Pipe Burst Exsiting 8" and 10" to 12" and Existing 12" to 14" from northwest of John King and IH 30 to S.H. 205 Goliad															
2	BUC1008A	1,314	12		$192.00	$252,369		$132,494	$384,863	0%	29%	29%	$0	$110,863	$110,863
2	BUC1010A	755	12		$192.00	$144,970		$76,109	$221,079	0%	34%	34%	$0	$75,022	$75,022
2	BUC1012A	660	12		$192.00	$126,802		$66,571	$193,373	0%	34%	34%	$0	$65,620	$65,620
2	BUC1148A	766	12		$192.00	$147,096		$77,225	$224,321	0%	34%	34%	$0	$76,115	$76,115
2	BUC1018A	188	14		$192.00	$36,073		$18,938	$55,011	0%	42%	42%	$0	$23,219	$23,219
2	BUC1094A	1,155	14		$192.00	$221,669		$116,376	$338,045	0%	46%	46%	$0	$156,886	$156,886
2	BUC1098A	1,838	14		$192.00	$352,922		$185,284	$538,206	0%	44%	44%	$0	$237,802	$237,802
	Subtotal:	**6,677**		**2021**		**$1,281,901**	**5%**	**$672,997**	**$1,954,898**				**$0**	**$745,527**	**$745,527**
5 - PROPOSED THOMPSON BRANCH TRUNK SEWER															
1	TB1002A	720	15		$24.00	$17,287		$9,076	$26,363	0%	93%	93%	$0	$24,620	$24,620
1	TB3012	899	15		$24.00	$21,582		$11,331	$32,913	0%	94%	94%	$0	$31,021	$31,021
1	TB3014	501	15		$24.00	$12,028		$6,315	$18,343	0%	96%	96%	$0	$17,633	$17,633
1	TB3018	644	15		$24.00	$15,457		$8,115	$23,572	0%	96%	96%	$0	$22,658	$22,658
1	TB3020	1,038	15		$24.00	$24,910		$13,078	$37,988	0%	96%	96%	$0	$36,632	$36,632
1	TB3022	982	15		$24.00	$23,572		$12,375	$35,947	0%	96%	96%	$0	$34,658	$34,658
1	TB3034	388	15		$24.00	$9,307		$4,886	$14,193	0%	96%	96%	$0	$13,558	$13,558
1	TB3002	544	18		$48.00	$26,114		$13,710	$39,824	0%	99%	99%	$0	$39,497	$39,497
1	TB3004	714	18		$48.00	$34,275		$17,994	$52,269	0%	99%	99%	$0	$51,840	$51,840
1	TB3040	1,089	18		$48.00	$52,276		$27,445	$79,721	0%	95%	95%	$0	$75,546	$75,546
1	BLC3016	1,312	21		$72.00	$94,494		$49,609	$144,103	0%	70%	70%	$0	$100,463	$100,463
1	BC3006	67	27		$120.00	$7,994		$4,197	$12,191	0%	28%	28%	$0	$3,397	$3,397
	Subtotal:	**8,899**		**2022**		**$339,296**	**5%**	**$178,131**	**$517,427**				**$0**	**$451,523**	**$451,523**
6 - PROPOSED LOWER BUFFALO CREEK EAST TRUNK SEWER															
2	BUC1104A	1,506	21		$264.00	$397,554		$208,716	$606,270	0%	100%	100%	$0	$606,270	$606,270
2	BUC1168	3,640	21		$264.00	$960,968		$504,508	$1,465,476	0%	100%	100%	$0	$1,465,476	$1,465,476
2	BUC3000	1,423	21		$264.00	$375,553		$197,165	$572,718	0%	100%	100%	$0	$572,718	$572,718
	Subtotal:	**6,568**		**2022**		**$1,734,075**	**5%**	**$910,389**	**$2,644,464**				**$0**	**$2,644,464**	**$2,644,464**
7A - FONTANA RANCH LIFT STATION ABANDONMENT & GRAVITY RELIEF SEWER															
2	LB1004A	1,238	8		$100.00	$123,764		$64,976	$188,740	0%	79%	79%	$0	$148,599	$148,599
2	LB3014	930	12		$192.00	$178,560		$93,744	$272,304	0%	81%	81%	$0	$219,938	$219,938
2	LB3016	740	12		$192.00	$142,080		$74,592	$216,672	0%	81%	81%	$0	$175,016	$175,016
2	LB3018	1,240	12		$192.00	$238,080		$124,992	$363,072	0%	74%	74%	$0	$268,153	$268,153
2	LB3020	815	12		$192.00	$156,480		$82,152	$238,632	0%	81%	81%	$0	$192,750	$192,750
2	LB3028	765	12		$192.00	$146,880		$77,112	$223,992	0%	81%	81%	$0	$180,921	$180,921
	Subtotal:	**5,728**		**2024**		**$985,844**	**5%**	**$517,568**	**$1,503,412**				**$0**	**$1,185,377**	**$1,185,377**

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TABLE NO. 18

Proposed Impact Fee CIP Wastewater Lines

	Pipe Number	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.) *	Total Capital Cost ($)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost ($)	(%) Utilized Capacity			($) Utilized Capacity		
										2019	2029	During Fee Period	2019	2029	During Fee Period
7B - LOFTLAND FARMS LIFT STATION ABANDONMENT & GRAVITY RELIEF SEWER															
2	LB1000A	380	8		$100.00	$38,000		$19,950	$57,950	0%	69%	69%	$0	$40,142	$40,142
2	LB3002	1,238	8		$100.00	$123,775		$64,982	$188,757	0%	57%	57%	$0	$107,993	$107,993
2	LB3022	910	10		$120.00	$109,200		$57,330	$166,530	0%	73%	73%	$0	$121,185	$121,185
2	LB3024	935	10		$120.00	$112,200		$58,905	$171,105	0%	73%	73%	$0	$124,541	$124,541
2	LB3026	1,060	10		$120.00	$127,200		$66,780	$193,980	0%	64%	64%	$0	$124,690	$124,690
	Subtotal:	**4,523**		**2026**		**$510,375**	**5%**	**$267,947**	**$778,322**				**$0**	**$518,551**	**$518,551**
8 - PROPOSED LITTLE BUFFALO CREEK TRUNK SEWER															
1	LBC3006	2,176	15		$24.00	$52,223		$27,417	$79,640	0%	91%	91%	$0	$72,341	$72,341
	Subtotal:	**2,176**		**2027**		**$52,223**	**5%**	**$27,417**	**$79,640**				**$0**	**$72,341**	**$72,341**
Sewer Line CIP Total		**49,599**				**$8,148,660**		**$4,278,044**	**$12,426,705**				**$0**	**$9,608,437**	**$9,608,437**

Notes: 1 - City Participate in Cost Oversize
2 - City Initiated and Funded

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TABLE NO. 19
Impact Fee Wastewater Facilities

Pump Station		Year Const.	Capacity (MGD)	Capital Cost ($) Const.	Eng. & Testing	20 Year Debt Service @ 5% Simple Interest	Total 20 Yr. Project Cost $	Capacity Utilized (%) 2019	2029	In the CRF Period	Capacity Utilized ($) 2019	2029	In the CRF Period
EXISTING LIFT STATIONS													
Dalton Road Lift Station & Force Main	1	2002	1.2	$ 272,178	$ 40,200	$ 163,998	$ 476,376	43%	43%	0%	$ 204,842	$ 204,842	$ -
Amity Lane Lift Station	1	2006	0.4	$ 167,009	$ 18,800	$ 97,550	$ 283,359	34%	35%	1%	$ 96,342	$ 99,176	$ 2,834
Chandlers Marina Lift Station	1	2007	0.4	$ 244,331	$ 16,500	$ 136,936	$ 397,767	72%	76%	4%	$ 286,392	$ 302,303	$ 15,911
FM 3097 No. 1 Lift Station & 16" Force Main	1	2007	2.2	$ 450,460	$ 21,000	$ 247,517	$ 718,977	15%	100%	85%	$ 107,847	$ 718,977	$ 611,130
FM 3097 No. 2 Lift Station	1	2007	2.9	$ 525,845	$ 25,000	$ 289,194	$ 840,039	100%	100%	0%	$ 840,039	$ 840,039	$ -
Chandlers Deep Lift Station	1	2012	0.7	$ 196,555	$ 61,000	$ 135,216	$ 392,771	70%	70%	0%	$ 274,940	$ 274,940	$ -
Squabble Creek Transfer Lift Station	1	2012	2.9	$ 1,500,346	$ 165,325	$ 874,477	$ 2,540,148	100%	100%	0%	$ 2,540,148	$ 2,540,148	$ -
Existing Wastewater Facility Subtotal			**13.20**	**$ 3,820,685**	**$ 377,685**	**$ 2,204,144**	**$ 6,402,514**				**$ 4,350,550**	**$ 4,980,425**	**$ 629,875**
PROPOSED WASTEWATER TREATMENT PLANT & LIFT STATION/FORCE MAIN IMPROVEMENTS													
Squabble Creek Lift Station Improvements (Install Three 250-HP Pumps & Electrical Upgrades)	1	2019	10.0	$ 2,690,519	$ 110,250	$ 1,470,404	$ 4,271,173	73.6%	100%	26%	$ 3,141,918	$ 4,271,173	$ 1,129,255
Proposed Brushy Creek Lift Station & 12" Force Main	2*	2021	3.3	$ 1,400,000	$ 210,000	$ 845,250	$ 2,455,250	0.0%	49%	49%	$ -	$ 1,196,674	$ 1,196,674
FM 3097 No. 1 Lift Station Improvements (Replace Two 45-HP Pumps w/Two 90-HP Pumps)	2*	2024	2.8	$ 500,000	$ 75,000	$ 301,875	$ 876,875	6.6%	75%	68%	$ 57,611	$ 656,306	$ 598,695
FM 3097 No. 2 Lift Station Improvements (Replace Two 25-HP Pumps w/Two 35-HP Pumps)	2*	2024	3.1	$ 750,000	$ 112,500	$ 452,813	$ 1,315,313	50.2%	99%	49%	$ 660,068	$ 1,304,571	$ 644,503
Squabble Creek Lift Station Improvements (Add 2nd Wet Well w/Three New 250-HP Pumps)	2*	2026	5.0	$ 4,000,000	$ 600,000	$ 2,415,000	$ 7,015,000	0.0%	95%	95%	$ -	$ 6,631,139	$ 6,631,139
Proposed Bluff Creek Lift Station & Parallel Force Main (14" & 20")	2*	2028	2.4	$ 5,100,000	$ 765,000	$ 3,079,125	$ 8,944,125	0.0%	89%	89%	$ -	$ 7,993,066	$ 7,993,066
Proposed Wastewater Facility Subtotal			**26.60**	**$ 14,440,519**	**$ 1,872,750**	**$ 8,564,467**	**$ 24,877,736**				**$ 3,859,596**	**$ 22,052,930**	**$ 18,193,334**
Total			**39.80**	**$ 18,261,204**	**$ 2,250,435**	**$ 10,768,611**	**$ 31,280,250**				**$ 8,210,146**	**$ 27,033,355**	**$ 18,823,209**

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* 15% of Construction Assumed for Engineering and Testing
(1) Actual Cost
(2) Estimated Cost in 2019 Dollars

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TABLE NO. 20
WASTEWATER COLLECTION SYSTEM -- PROPOSED NTMWD FACILITIES

CIP #	Project Description		Year Const.	Length (FT)	Size/Added Capacity	Capital Cost ($)			Capacity Utilized			Capacity Utilized (%)			Capacity Utilized ($)		
						City of Rockwall Participation Cost	Eng. & Testing	Total Project Cost	2019	2029	In The CRF Period	2019	2029	In The CRF Period	2019	2029	In The CRF Period
North Texas Municipal Water District (NTMWD) Proposed Facility Improvements																	
A1	NTMWD Buffalo Creek Parallel Incerceptor Sewer - Phase 1: From Buffalo Creek WWTP to Forney	4	2019	TBD	TBD	$ 11,835,394		$ 11,835,394				33%	49%	16%	$ 3,927,269	$ 5,796,236	$ 1,868,967
A2	NTMWD Turtle Cove (a.k.a. Lakeside) Lift Station Expansion/Replacement	3	2020	TBD	+1.6 MGD	$ 4,600,000		$ 4,600,000				33%	49%	16%	$ 1,526,391	$ 2,252,793	$ 726,402
A3	NTMWD Buffalo Creek Lift Station Expansion	4	2020	TBD	TBD	$ 17,868,150		$ 17,868,150				33%	49%	16%	$ 5,929,083	$ 8,750,703	$ 2,821,620
A4	NTMWD Buffalo Creek Parallel Force Main	4	2020	TBD	TBD	$ 1,681,500	Included in Const. Cost	$ 1,681,500	Utilized Capacity for Regional NTMWD Treatment Facilities calculated using proportion of years 2019 & 2029 population to build-out population.			33%	49%	16%	$ 557,962	$ 823,494	$ 265,532
A5	NTMWD Buffalo Creek Parallel Interceptor - Phase 2: From Forney to Buffalo Creek Lift Station	4	2026	TBD	TBD	$ 7,924,880		$ 7,924,880				33%	49%	16%	$ 2,629,666	$ 3,881,111	$ 1,251,445
A6	10-Year CIP for NTMWD Sewer System (Rockwall Responsibility Only)	5	2019-2029	N/A	N/A	$ 5,435,164		$ 5,435,164				33%	49%	16%	$ 1,803,518	$ 2,661,803	$ 858,285
A7	10-Year CIP for NTMWD Regional Wastewater System (Rockwall Responsibility Only)	5	2019-2029	N/A	N/A	$ 11,619,512		$ 11,619,512				33%	49%	16%	$ 3,855,634	$ 5,690,511	$ 1,834,877
Proposed NTMWD Facility Total						**$ 60,964,600**		**$ 60,964,600**							**$ 20,229,523**	**$ 29,856,651**	**$ 9,627,128**

Notes: 1. City obligations estimated based on City of Rockwall's historical usage of NTMWD Regional Systems.
2. 10-Year CIP for NTMWD Regional Systems based on project listings provided for "Summary of Sewer System CIP" and "Summary of Regional Wastewater System CIP", both dated May 11, 2018.
3. Funded by NTMWD, 100% City Responsibility
4. Part of NTMWD Buffalo Interceptor System, assumed 59% City Responsibility
5. Part of NTMWD Regional Systems, assumed 2.915% City Responsibility
6. Utilized capacities for NTMWD facilities were determined using the proportion of the existing and projected 2029 population as compared to the build-out population.

TABLE NO. 21

Summary of Utilized Capacity Allocation between City of Rockwall & NTMWD Wastewater System

	CITY OF ROCKWALL Utilized Capacity		NTMWD Utilized Capacity		TOTAL	
	($)	%	($)	%	($)	%
Existing Wastewater System	$ 4,493,522	100.00%	$ -	0.00%	$ 4,493,522	100%
Proposed Wastewater System & Planning Cost	$ 27,861,621	74.32%	$ 9,627,128	25.68%	$ 37,488,749	100%
TOTAL	**$ 32,355,143**	**77.07%**	**$ 9,627,128**	**22.93%**	**$ 41,982,271**	**100%**

F. CALCULATION OF MAXIMUM IMPACT FEES - WATER & WASTEWATER

Chapter 395, of the Local Government Code allows the maximum impact fee to be charged if revenues from Future Ad Valorem Taxes, and water and sewer bills are included as a credit in the analysis. If not, the Act allows the maximum assessable fee to be set at 50% of the calculated maximum fee. The maximum impact fees for the water and wastewater systems are calculated separately by dividing the cost of the capital improvements or facility expansions necessitated and attributable to new development in the Service Area within the ten year period by the number of living units anticipated to be added to City within the ten year period. To simplify collection, we recommend the fee remain fixed throughout the 5-year period, unless changed by Council.

The **Water System** impact fee for a 5/8" meter is calculated as follows:

Maximum Impact Fee = (Eligible Existing Facility Cost + Eligible Proposed Facility Cost) / Number of New Living Unit Equivalent over the Next 10-Years

= ($12,324,530 + $18,582,427) / 9,846 = $30,906,957 / 9,846

Calculated Water Maximum Impact Fee = $3,139.04 *

* Maximum Allowable Water Impact Fee is 50% of the Calculated Water Maximum Impact Fee

Maximum Assessable Water Impact Fee = $3,139.04 X 50% = $1,569.52

The **Wastewater System** impact fee for a 5/8" water meter is calculated as follows:

Maximum Impact Fee = (Eligible Existing Facility Cost + Eligible Proposed Facility Cost) / Number of New Living Unit Equivalent over the Next 10-Years

= ($4,493,522 + $37,488,749) / 8,710 = $41,982,271 / 8,710

Calculated Water Maximum Impact Fee = $4,820.01 *

* Maximum Allowable Water Impact Fee is 50% of the Calculated Water Maximum Impact Fee

Maximum Assessable Wastewater Impact Fee = $4,820.01 X 50% = $2,410.00

Table No. 22 summarizes the per service unit equivalent maximum assessable impact fee that can be charged based on the calculated 50% credit above.

TABLE NO. 22

Maximum Assessable Water & Wastewater Impact Fee

Maximum Assessable Water Impact Fee per Living Unit Equivalent: **$1,569.52**

Maximum Assessable Wastewater Impact Fee per Living Unit Equivalent: **$2,410.00**

Typical Land Use	Meter Type	Meter Size	Living Unit Equivalent	Max. Assessable Impact Fee				
				Water	City of Rockwall Wastewater	NTMWD Wastewater	Wastewater Total	Grand Total
Single Family Residential	Simple	5/8"	1.0	$ 1,569.52	$ 1,855.70	$ 554.30	$ 2,410.00	$ 3,979.52
Single Family Residential	Simple	1"	2.5	$ 3,923.80	$ 4,639.25	$ 1,385.75	$ 6,025.00	$ 9,948.80
Single Family Residential	Simple	1-1/2"	5.0	$ 7,847.60	$ 9,278.50	$ 2,771.50	$ 12,050.00	$ 19,897.60
Single Family Residential	Simple	2"	8.0	$ 12,556.16	$ 14,845.60	$ 4,434.40	$ 19,280.00	$ 31,836.16
Comm./Retail	Compound	2"	8.0	$ 12,556.16	$ 14,845.60	$ 4,434.40	$ 19,280.00	$ 31,836.16
Comm./Retail/ Irrigation	Turbine	2"	16.0	$ 25,112.32	$ 29,691.20	$ 8,868.80	$ 38,560.00	$ 63,672.32
Comm./Retail/ Multi Family	Compound	3"	16.0	$ 25,112.32	$ 29,691.20	$ 8,868.80	$ 38,560.00	$ 63,672.32
Comm./Retail/ Irrigation/ Multi Family	Turbine	3"	35.0	$ 54,933.20	$ 64,949.50	$ 19,400.50	$ 84,350.00	$ 139,283.20
Comm./Retail/ Multi Family	Compound	4"	25.0	$ 39,238.00	$ 46,392.50	$ 13,857.50	$ 60,250.00	$ 99,488.00
Comm./Retail/ Irrigation/ Multi Family	Turbine	4"	65.0	$102,018.80	$120,620.50	$ 36,029.50	$156,650.00	$ 258,668.80
Industrial	Compound	6"	50.0	$ 78,476.00	$ 92,785.00	$ 27,715.00	$120,500.00	$ 198,976.00
Industrial/ Irrigation	Turbine	6"	140.0	$219,732.80	$259,798.00	$ 77,602.00	$337,400.00	$ 557,132.80
Industrial	Compound	8"	80.0	$125,561.60	$148,456.00	$ 44,344.00	$192,800.00	$ 318,361.60
Industrial/ Irrigation	Turbine	8"	240.0	$376,684.80	$445,368.00	$133,032.00	$578,400.00	$ 955,084.80

2019-2029 WATER & WASTEWATER IMPACT FEE UPDATE

BIRKHOFF, HENDRICKS & CARTER, L.L.P.
PROFESSIONAL ENGINEERS
DALLAS, TEXAS

SEPTEMBER 2019

CITY OF ROCKWALL

ORDINANCE NO. 19-XX

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS, AMENDING THE MUNICIPAL CODE OF ORDINANCES OF THE CITY OF ROCKWALL, AS HERETOFORE AMENDED, BY AMENDING ARTICLE III, *IMPACT FEE REGULATIONS*, OF CHAPTER 38, *SUBDIVISIONS*, FOR THE PURPOSE OF AMENDING THE IMPACT FEES FOR WATER, WASTEWATER, AND ROADWAY FACILITIES BY UPDATING THE LAND USE ASSUMPTIONS AND CAPITAL IMPROVEMENTS PLAN FOR SAID FACILITIES; ESTABLISHING UPDATED SERVICE AREAS FOR SUCH FACILITIES; PROVIDING FOR DEFINITIONS; PROVIDING FOR COLLECTION AND ASSESSMENT; PROVIDING FOR A SEVERABILITY CLAUSE; PROVIDING FOR REMEDIES; PROVIDING FOR CONFLICTS; AND PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the City of Rockwall adopted its impact fee program for roadway impact fees by *Ordinance No. 08-21*, and its impact fee program for water and wastewater impact fees by *Ordinance No. 90-22*; and

WHEREAS, the City of Rockwall has prepared studies updating its land use assumptions (*see Exhibit 'A'*), capital improvements plan (*see Exhibits 'B' & 'C'*) and impact fees for water, wastewater, and roadway facilities and associated service areas and equivalency tables; and

WHEREAS, the City of Rockwall has recalculated the maximum impact fee for water, wastewater, and roadway facilities that may be assessed against new development based on such land use assumptions and capital improvements plan; and

WHEREAS, a public hearing, following written endorsement of the impact fee update study by the Capital Improvements Advisory Committee (CIAC) [*Planning & Zoning Commission*], was held before the City Council and testimony was taken on *October 21, 2019*, to consider proposed amendments to land use assumptions, capital improvements plan and impact fees for water, wastewater, and roadway facilities and associated service areas and equivalency tables, and corresponding changes to rates of assessment and collection for impact fees; and

WHEREAS, the City published notice of such public hearing in a newspaper of general circulation within the City in accordance with the requirements of Chapter 395 of the Texas Local Government Code; and

WHEREAS, the City Council finds that the collection of impact fees for new developments at revised rates in order to fund water, wastewater, and roadway improvements to serve such developments substantially furthers the public health, safety and general welfare; and

WHEREAS, the City Council finds that changes to the land use assumptions, capital improvements plan and impact fee assessment and collection rates are fully warranted, as presented in the impact fee update studies prepared by the City's engineering consultants; and

WHEREAS, the City Council further finds that the collection rates for water, wastewater, and roadway impact fees are reasonable and further the public health, safety and general welfare;

WHEREAS, the City Council further finds that the collection rates for water, wastewater, and roadway facilities are substantially less than the City's actually costs of mitigating the impacts from new development on the City's water, wastewater, and roadway systems;

NOW, THEREFORE, **BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS:**

SECTION 1. ***Municipal Code of Ordinances.*** *Sections 38-360 & 38-361* of Chapter 38, *Subdivisions*,

of the City of Rockwall's Municipal Code of Ordinances are hereby repealed in their entirety replaced with the provisions contained in *Exhibit 'A'* of this ordinance; and

SECTION 2. ***Land Use Assumptions.*** The land use assumptions for water, wastewater, and roadway impact fees are hereby updated and amended, as set forth in *Exhibit 'B': Land Use Assumptions for Impact Fees* of this ordinance, which herein after shall be referred to as *Exhibit 'B'*, and incorporated herein by reference; and

SECTION 3. ***Service Areas.*** The service areas for roadway impact fees hereby is updated and amended as depicted in *Figure 3: Roadway Service Area* of *Exhibit 'B'* of this ordinance, and the service areas for water and wastewater impact fees hereby are updated and amended as depicted in *Figure 4: Water/Wastewater Service Area* of *Exhibit 'B'* of this ordinance.

SECTION 4. ***Capital Improvements Plans.*** The capital improvements plan for roadway impact fees hereby is updated and amended as set forth in *Exhibit 'C': 2019 Update of Roadway Impact Fees* of this ordinance -- *which herein after shall be referred to as Exhibit 'C', and incorporated herein by reference* --, and the capital improvements plan for water and wastewater impact fees hereby are updated and amended, as set forth in *Exhibit 'D': 2019-2029 Water & Wastewater Impact Fee Update* of this ordinance -- *which herein after shall be referred to as Exhibit 'D', and incorporated herein by reference* --; and

SECTION 5. ***Land Use Equivalency Tables.*** The land use equivalency table that converts land uses into the total service units for roadway impact fees hereby is updated and amended as set forth in *Table 3: Land-Use Vehicle Mile Equivalency Table* of *Exhibit 'C'* of this ordinance; and, the land use equivalency table that coverts land uses into number of living unit equivalents (*service units*) for water and wastewater impact fees, hereby is updated and amended, as set forth in *Table No. 22: Maximum Assessable Water & Wastewater Impact Fee* of *Exhibit 'D'* of this ordinance.

SECTION 6. ***Impact Fee Assessment.*** The amount of the roadway impact fees to be assessed per roadway service area hereby is established as set forth in *Section 1* of *Section 362.(a)(1)* of *Exhibit 'A'* of this ordinance, and the amount of the water and wastewater impact fees to be assessed per living unit equivalent hereby is established as set forth in *Schedule 1* of *Section 362.(b)(1)* of *Exhibit 'A'* of this ordinance.

SECTION 7. ***Impact Fee Collection.*** The amount of the roadway impact fees to be collected per roadway service area hereby is established as set forth in *Schedule 2* of *Section 362.(a)(2)* of *Exhibit 'A'* of this ordinance, and the water and wastewater impact fees to be collected per living unit equivalent hereby is established as set forth in *Schedule 2* of *Section 362.(b)(2)* of *Exhibit 'A'* of this ordinance.

SECTION 8. ***Ordinances Cumulative.*** All ordinances of the City of Rockwall in conflict with the provisions of this ordinance be, and the same are hereby superseded to the extent of that conflict.

SECTION 9. ***Severability.*** If any section, paragraph, or provision of this ordinance or the application of that section, paragraph, or provision to any person, firm, corporation or situation is for any reason judged invalid, the adjudication shall not affect any other section, paragraph, or provision of this ordinance or the application of any other section, paragraph or provision to any other person, firm, corporation or situation, nor shall adjudication affect any other section, paragraph, or provision of the Subdivision Regulations of the City of Rockwall, Texas, and the City Council declares that it would have adopted the valid portions and applications of the ordinance without the invalid parts and to this end the provisions for this ordinance are declared to be severable.

SECTION 10. ***Effective Date.*** This ordinance shall take effect immediately.

PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS, THIS THE 4TH DAY OF NOVEMBER, 2019.

Jim Pruitt, *Mayor*

ATTEST:

Kristy Cole, *City Secretary*

APPROVED AS TO FORM:

Frank J. Garza, *City Attorney*

1st Reading: *October 21, 2019*

2nd Reading: *November 4, 2019*

SECTION 38-360: LAND USE ASSUMPTIONS REPORT

See *Ordinance No. 19-XX* for the 2019 Land Use Assumptions Report.

SECTION 38-361: SCHEDULES FOR IMPACT FEES

(a) *Roadway Impact Fees.*

(1) *Schedule 1: Roadway Impact Fee Assessment*. The following schedule is for roadway impact fee assessment.

Service Area	Cost Per Service Unit
1	$2,272.00
2	$4,398.00
3	$784.00
4	$2,612.00

(2) *Schedule 1: Roadway Impact Fee Collection*. The following schedule is for roadway impact fee collection.

Service Area	Cost Per Service Unit
1	$320.00
2	$320.00
3	$320.00
4	$320.00

(b) *Water & Wastewater Impact Fees.*

(1) *Schedule 1: Maximum Water & Wastewater Impact Fees*. The following schedule is the maximum impact fees per single-family living unit equivalent for water and wastewater facilities. The below impact fees per service unit depicted in each column also apply to new developments that were unplatted and which did not require platting at the time of development within the period listed.

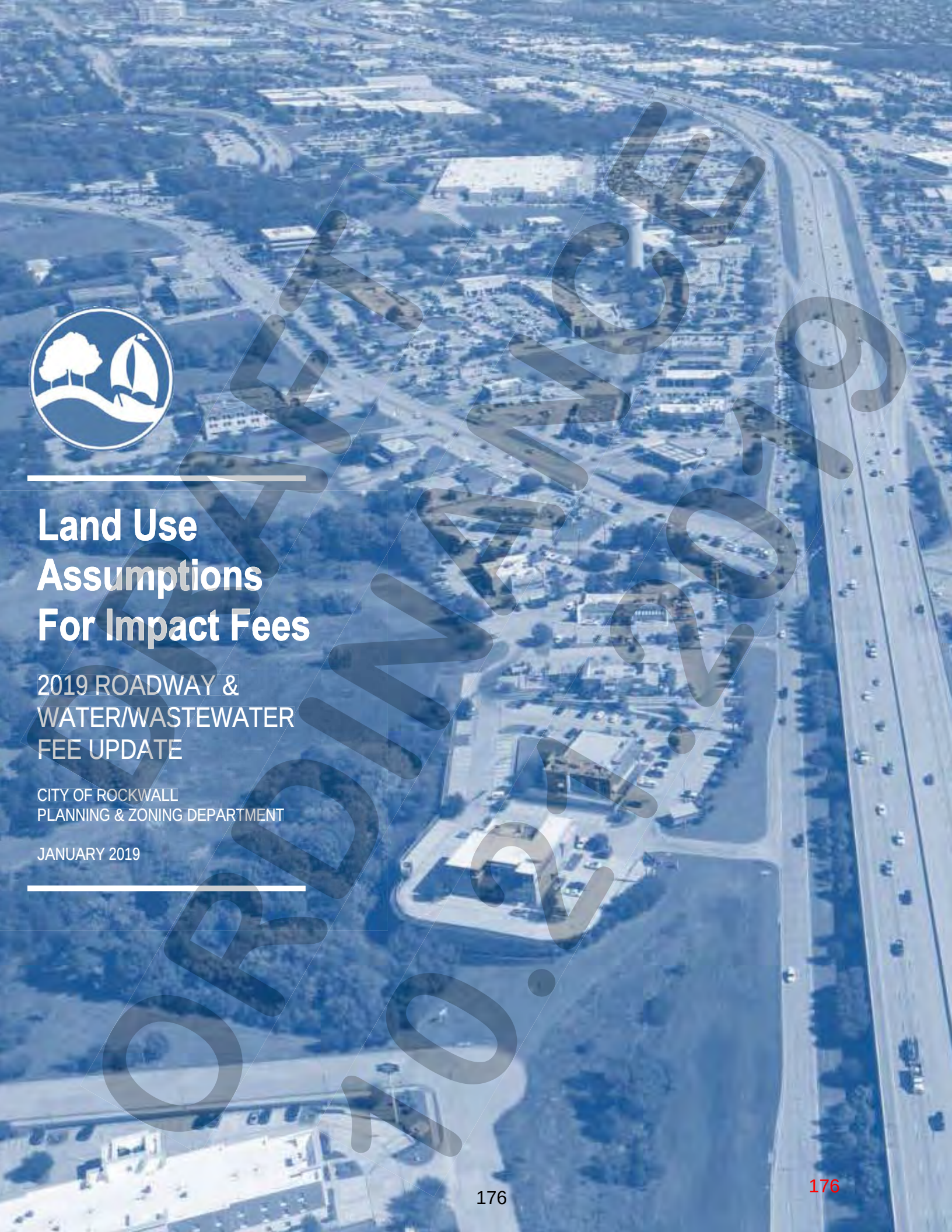
	Land Platted or Replatted between 07/16/1990 & 06/02/2008 [1]	Land Platted or Replatted between 06/02/2008 & 10/20/2014	Land Platted or Replatted between 10/20/2014 & 11/04/2019	Land Platted after 11/04/2019
Water (per SFLUE)	$848.00	$4,229.03	$3,111.05	$3,139.04
Wastewater (per SFLUE)	$3,340.00	$783.49	$2,472.58	$4,820.01

Notes:
[1]: For nonresidential uses, assessment was expressed as SFLUEs per acre: 2.11 SFLUE/acre for water impact fees and 2.17 SFLUE/acre for wastewater impact fees, within the period listed.

(2) *Schedule 2: Impact Fees to be Paid Per Service Unit for Water and Wastewater Facilities.*

	Per Living Unit Equivalent (5/8" Water Meter)
Water Facilities	$1,569.52
Wastewater Facilities	$2,410.00

Exhibit 'B':
Land Use Assumptions for Impact Fees
2019 Roadway & Water/Wastewater Fee Update



Land Use Assumptions For Impact Fees

2019 ROADWAY & WATER/WASTEWATER FEE UPDATE

CITY OF ROCKWALL
PLANNING & ZONING DEPARTMENT

JANUARY 2019

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ACKNOWLEDGEMENTS

CITY COUNCIL

- JIM PRUITT, *MAYOR*
- KEVIN FOWLER, *MAYOR PRO-TEM*
- JOHN HOHENSHELT
- BENNIE DANIELS
- DANA MACALIK
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- PATRICK TROWBRIDGE

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[*PLANNING AND ZONING COMMISSION*]

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- ERIC CHODUN, *VICE-CHAIRMAN*
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- MARK MOELLER
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- JEREMY WHITE, PE, *ENGINEER*
- SARAH HAGER, *EIT*

BUILDING INSPECTIONS DEPARTMENT

- JEFFERY WIDMER, *CHIEF BUILDING OFFICIAL*

ADDITIONAL ACKNOWLEDGEMENTS

- BIRKHOFF, HENDRICKS & CARTER, LLP
- FREESE & NICHOLS, INC.

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FORWARD

What are *Impact Fees? Impact Fees* are charges that are imposed by local governments against new development for the purpose of generating revenue for or to recoup the cost of capital facilities (*i.e. infrastructure*) that are necessitated by and attributable to new development. These fees are generally implemented to reduce the economic burden of a municipality and its taxpayers when addressing the need for adequate capital improvements to accommodate growth. Impact fees are typically paid to a municipality in advance of the completion of a particular development project, and are based on a defined methodology and calculation that is derived from the cost of the facility and the scope/impact of the development.

PURPOSE

Chapter 395, *Financing Capital Improvements Required by New Development in Municipalities, Counties, and Certain Other Local Governments*, of the Texas Local Government Code outlines the process for adopting and updating impact fees for political subdivisions. On October 20, 2014, the City of Rockwall adopted roadway and water/wastewater impact fees through *Ordinance No. 14-47*. According to the statutory requirements stipulated by the Texas Local Government Code impact fees are required to be updated at a minimum of every five (5) years [*§395.052*].

In approaching an update to existing impact fees it is important for a city to assess its growth and employment potential, and establish land use assumptions that will guide development for a ten (10) year planning period (*i.e. 2019-2029*) [*§395.001(5)*]. These land use assumptions form the basis for the preparation of the *Impact Fee Capital Improvement Plan* for water, wastewater, and roadway facilities.

In order to determine the need and timing of capital improvements to serve future development, a rational estimate of the future growth of the City is required. The purpose of this report is to formulate growth and employment projections based upon assumptions pertaining to the type, location, quantity and timing of future development within the City, and to establish and document the methodology used for preparing these land use assumptions.

ELEMENTS OF THE LAND USE ASSUMPTIONS REPORT

This report contains the following components:

- *Methodology*: This component of the report contains the systematic and theoretical analysis of the methods and principals used to prepare the projections and land use assumptions contain within this report.
- *Data Collection Zones and Service Areas*: This component provides an explanation of the data collection zones (*i.e. Land Use Districts established in the OURHometown 2040 Comprehensive Plan*) and the Roadway, Water and Wastewater Impact Fee Service Areas for capital facilities.
- *Base Year Data*: This component provides information on population, housing and employment in the City of Rockwall as of January 1, 2019 for each capital facility service area.
- *Ten-Year Growth Projections*: This component provides assumptions with respect to the population, housing and employment data for the City of Rockwall in ten (10) years (*i.e. 2029*). This information is broken out by the capital facility service area.
- *Build Out Analysis:* This component provides projections for population, housing and employment under the assumption that the City and its Extraterritorial Jurisdiction (ETJ) are developed to their carrying capacity, or their *Built Out*.
- *Summary*: This component provides a synopsis of the land use assumptions contained within this report.
- *Appendices:* This component contains information that was important in deriving the population, housing and employment projections for 2019-2029.

METHODOLOGY

Building off the base year and build out projections contained in the OURHometown Vision 2040 Comprehensive Plan, and the growth assumptions and capital improvement needs estimated to support future growth, it is possible to develop an impact fee structure that fairly allocates improvement cost to growing areas of the City with relation to the growths' potential impact on the entire infrastructure system. The data contained in this report has been formulated using reasonable and generally accepted planning principles.

These land use assumptions and future growth projections take into consideration several factors influencing development patterns, including:

- The character, type, density and quantity of existing development.
- The current zoning patterns as documented on the City's zoning map and the anticipated future land uses as established in the OURHometown Vision 2040 Comprehensive Plan, which contains the City's Future Land Use Plan.
- The availability of land and infrastructure to support future expansion of development.
- The current and historical growth trends of both population and employment within the City.
- The location and configuration of vacant parcels of land and their ability to support development.
- The growth of employment utilizing previously established and generally accepted data from ESRI's ArcGIS *Business Analyst*.
- Local knowledge concerning future development projects or anticipated development within the city.

LAND USE ASSUMPTIONS REPORT METHODOLOGY

The following is the general methodology that was used for the preparation of this report:

(1) Population, housing and employment data was collected from the United States Census Bureau, North Central Texas Council of Governments (*NCTCOG*), the City of Rockwall's Geographic Information Systems (GIS) Division, the City of Rockwall's Building Inspection Department and other acceptable sources. This information was then analyzed and used to provide base information for all service areas from which projections could be extrapolated [see *Service Areas and Data Collection Zones*].

(2) The base year (*i.e. January 1, 2019*) estimates for housing, population and employment were calculated based on the information collected [see *Base Year Data*].

(3) From the base year and the information gathered from various sources a growth rate was established by examining recent growth trends experienced by the City over the last ten (10) years. This growth rate was then applied to each of the impact fee service areas to project the base year data over the ten (10) year planning period (*i.e. 2019-2029*) [see *Ten Year Growth Assumptions*].

(4) After the projections for housing, population and employment were prepared for the ten (10) year planning period, city staff made adjustments to account for known or anticipated development activity within the planning periods. In making these adjustments city staff took into consideration the recommendations made within the newly adopted OURHometown Vision 2040 Comprehensive Plan, existing public works data, and demographic information provided by the GIS Division and the Building Inspections Department.

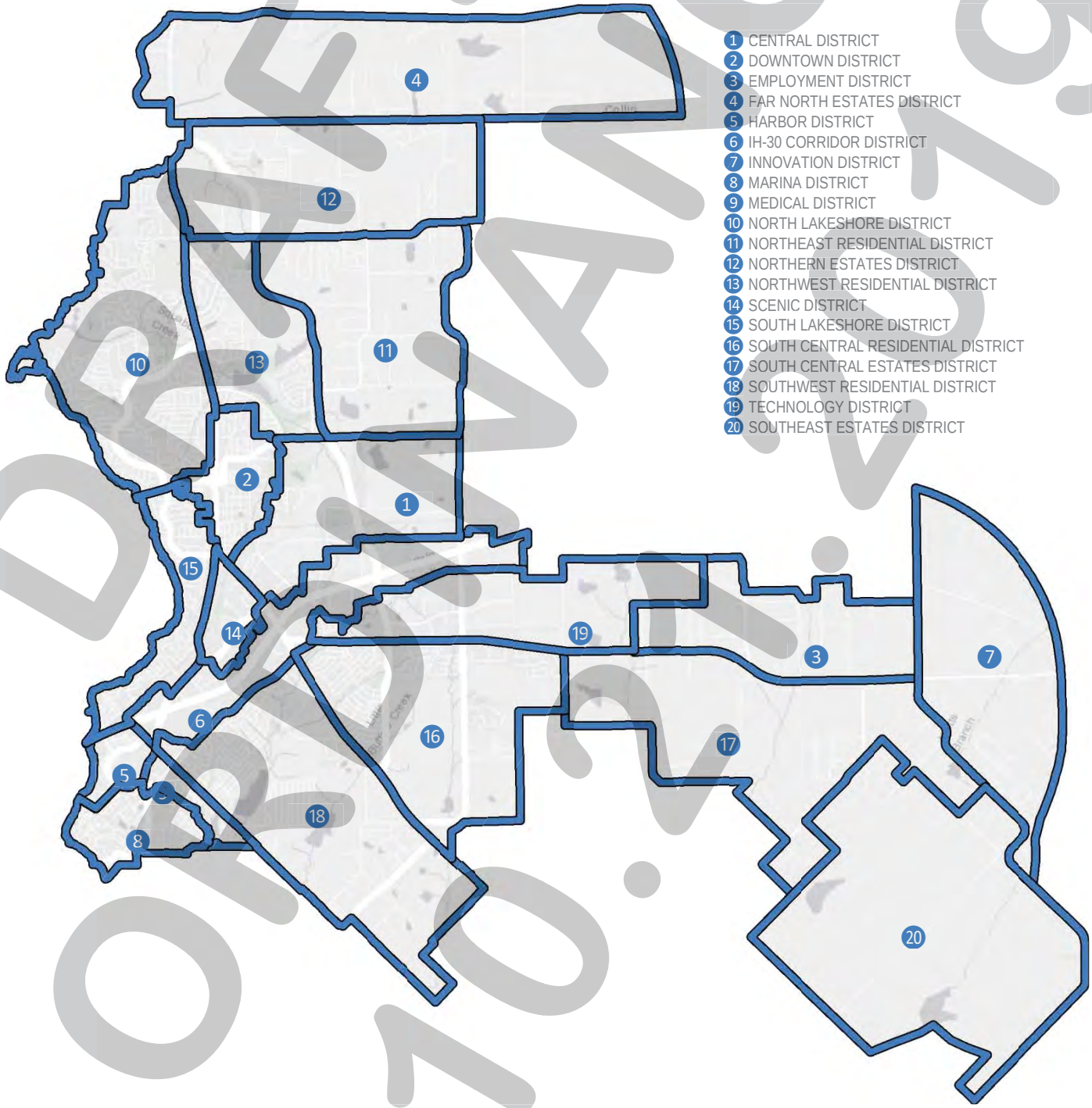
(5) Finally, the City's *Build Out* projections for housing, population and employment were calculated by establishing the City's carrying capacity in terms of developable acres and projecting population forward using the previously established Compound Annual Growth Rate (CAGR) to establish a *Build Out Year*. The housing and employment information were then projected to the *Build Out Year* [see *Build Out Projections*].

DATA COLLECTION ZONES AND SERVICE AREAS

DATA COLLECTION ZONES

The *Data Collection Zones* used for this study were taken from the OURHometown Vision 2040 Comprehensive Plan, which breaks the City down into 20 *Land Use Districts* (*see Figure 1*). These districts were created as a way of breaking down the overall *Future Land Use Plan* to create strategies to help manage growth and land uses in the future. They were also intended to be used as a tool by the City's various boards, commissions and the City Council when contemplating policy changes that could affect certain areas of the City.

FIGURE 1: DATA COLLECTION ZONES
NOTE: The Data Collection Zones are the Land Use Districts contained in the OURHometown Vision 2040 Comprehensive Plan.



SERVICE AREAS

The Texas Local Government Code (TLGC) requires that service areas be established within the corporate boundaries of a political subdivision for the purpose of ensuring that capital improvements service the areas generating need. The boundaries for impact fees are defined as follows:

- *Roadway Impact Fees* refers to a service area that is limited to the corporate boundaries of a political subdivision or city, and cannot extend into the Extraterritorial Jurisdiction (ETJ) or for a distance exceeding more than six (6) miles. The City of Rockwall is divided into four (4) service areas that are depicted in *Figure 3*.

- *Water and Wastewater Impact Fees* refers to a service area that includes a city's corporate boundaries and Extraterritorial Jurisdiction (ETJ), which is depicted in *Figure 2*. This service area is depicted in *Figure 4*.

SUMMARY OF DATA

As opposed to the databases calculated in 2007 and 2013 -- *which utilized Traffic Survey Zones (TSZ) as the data collection zones* -- the current database utilizes the following geographic areas:

- *Land Use Districts from the OURHometown Vision 2040 Comprehensive Plan.* These geographic areas better conformed to the City's corporate boundaries, and were drafted with the OURHometown Vision 2040 Comprehensive Plan as the geographic regions intended to be used for all future long-range planning/data collection exercises.

- *Service Areas.* The Service Areas correlate to the Water, Wastewater and Roadway Service Areas identified in *Figures 3 & 4*. As previously stated, the corporate boundaries of the City of Rockwall serve as the limits for the Roadway Service Areas and the Water and Waste Water Service Areas include the corporate boundaries and the Extraterritorial Jurisdiction (ETJ) of the City.

Additionally, all databases and projections utilized the following variables:

- *Households (2019).* The *Residential Address Point* feature class in the City's Geographic Information Systems (GIS) software includes all residential addresses (i.e. *single-family, duplex, multi-family, group home/quarters, etc.*) existing as of January 1, 2019. The total number of residential address points (*i.e. households*) was queried from this layer to establish the base years' numbers.

FIGURE 2: CITY OF ROCKWALL CITY LIMITS AND EXTRATERRITORIAL JURISDICTION (ETJ)
NOTE: The City Limits of Rockwall are depicted in RED. The Extraterritorial Jurisdiction (ETJ) is depicted in BLUE.

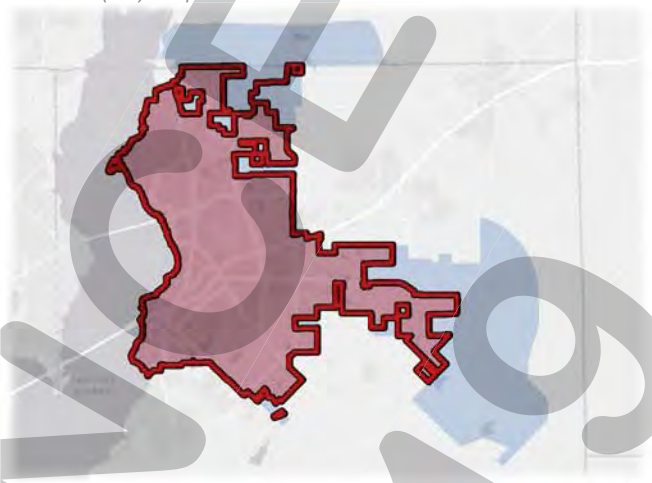


FIGURE 3: ROADWAY SERVICE AREAS
This is the derived service area structure for roadway facilities. These service areas conform to the current city limits of the City of Rockwall and are divided by John King Boulevard and Interstate Highway 30.
NOTE: RED: Service Area 1; BLUE: Service Area 2; GREEN: Service Area 3; YELLOW: Service Area 4

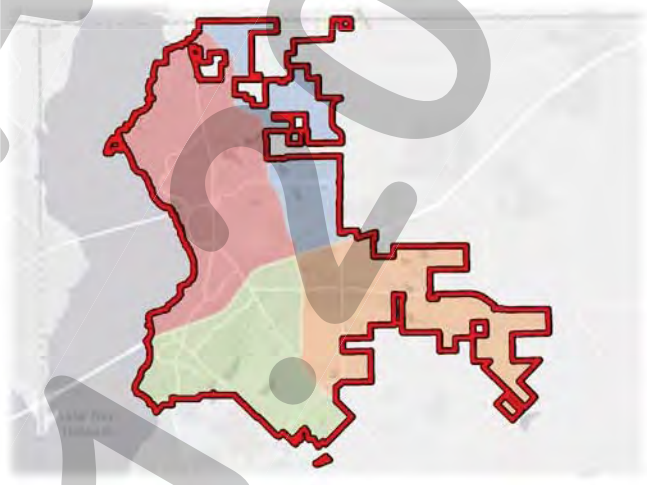
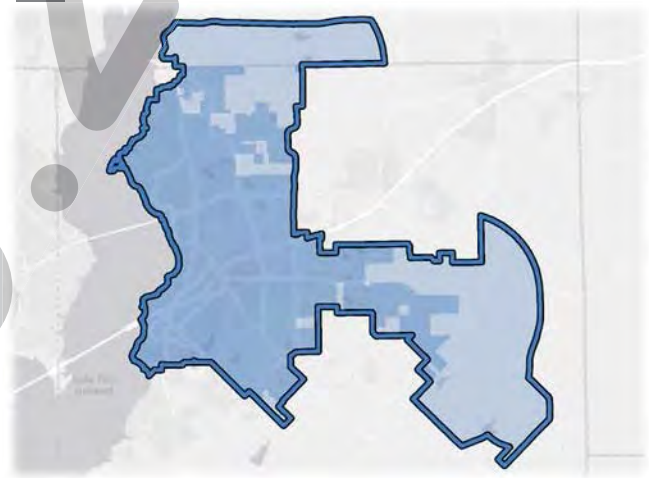


FIGURE 4: WATER/WASTE WATER SERVICE AREAS
This is the derived service area structure for water/wastewater facilities. These service areas conform to the current city limits and Extraterritorial Jurisdiction (ETJ).
NOTE: BLUE: Service Area



- *Households (2029).* This is the projected household data by service area for the year 2029, which represents a ten (10) year growth projection. This information was derived by staff using the stated databases and proper projection techniques.
- *Population (2019)*. This is the existing population for the base year (i.e. *2019*). This information was calculated utilizing the number of households existing as of January 1, 2019, the occupancy, rate and the average household size as established by the United States Census Bureau for each Census Block.
- *Population (2029)*. This is the projected population by service area for the year 2029, which represents a ten (10) year growth projection. This information was derived by staff using the stated databases and proper projection techniques.
- *Employment (2019).* Employment data was aggregated to three (3) employment sectors, which include *Basic*, *Retail* and *Service* as provided by the Business Analyst tool available from ESRI (*the City's provider for its geospatial database software*). These service sectors serve as the basis for non-residential trip generation. The following is a summary of these employment sectors followed by corresponding North American Industry Classification System (NAICS) code:
    - *Basic.* Land use activities that produce goods and services such as those that are exported outside the local economy. These include manufacturing, construction, transportation, wholesale trade, warehousing and other industrial uses (NAICS Code: *#210000 - #422999*).
    - *Retail.* Land use activities that provide for the retail sale of goods that primarily serve households and whose location choice is oriented toward the residential sector. These include uses such as grocery stores, restaurants, etc. (NAICS Code: *#440000 - #454390*).
    - *Service.* Land use activities that provide personal and professional services. These include such uses as financial, insurance, government, and other professional and administrative offices (NAICS Code *#520000 - #928199*).
- *Employment (2029).* The projected employment data was aggregated to three (3) employment sectors, which include *Basic*, *Retail* and *Service* as provided by the Business Analyst tool available from ESRI. These service sectors were then projected by service area to the year 2029, which represents a ten (10) year growth projection. This information was derived by staff using the stated databases and proper projection techniques.

BASE YEAR DATA

This section documents the methods used to derive the base year data for the City of Rockwall as of January 1, 2019. This *benchmark* information provides data for the corporate limits and Extraterritorial Jurisdiction (ETJ) of the City, and creates a starting point in which to extrapolate the ten (10) year growth projections that are depicted in the following section (*see Ten-Year Growth Projections*). This information was initially developed with the OURHometown Vision 2040 Comprehensive Plan, but has been updated to include the additional growth that has taken place since the original numbers were derived and the numbers for January 1, 2019.

HOUSEHOLDS

Utilizing the City's Geographic Information System (GIS) software, the residential addresses for each data collection zone (*i.e. Land Use Districts*) were queried. This provided the raw housing data that was then reviewed to remove any vacant lots or anomalies in the data set. Based on this process, the City of Rockwall was shown to have 16,690 households inside the City's corporate limits and 1,700 households in the City's Extraterritorial Jurisdiction (ETJ) as of January 1, 2019. The total number of households is 18,390. Staff should note that this query included all residential housing types (*i.e. multi-family, single-family, and group homes*) from the data sets.

POPULATION

The City of Rockwall generally uses the North Central Texas Council of Government's (NCTCOG) population estimates as the City's official population; however, for the purposes of this planning study it was necessary to calculate a baseline population that was specific to January 1, 2019. This was also necessary in order to estimate the population of the City's Extraterritorial Jurisdiction (ETJ).

To calculate the population as of January 1, 2019, the City's Geographic Information Systems (GIS) Division utilized the following formula to derive the population estimate for each of the data collection zones:

$$\sum_{d=1}^{20} POP = ((a * o) * f)$$

Where:

POP = Population as of January 1, 2019
d = Land Use District
a = Number of Residential Address Points in Each District
o = Occupancy Rate [per U.S. Census Bureau]
f = Density Factor per Census Block [U.S. Census Bureau]

Using this methodology the base year population as of January 1, 2019 was established to be 44,575 residents inside the corporate limits and 5,041 people residing in the Extraterritorial Jurisdiction (ETJ).

EMPLOYMENT

The base employment data was calculated using ArcGIS *Business Analyst*, which is software that provides location-based market information. Utilizing this tool, the City's Geographic Information Systems (GIS) Division was able to query employment and business information relating to each data collection zone (*i.e. Land Use District*). This information was then broken down into one (1) of the three (3) employment categories (*i.e. Basic, Service, or Retail*). Based on the analysis, the City's corporate limits were shown to have a total employment of 24,083 jobs on January 1, 2019. Of the total employment 2,505 jobs were classified as *Basic*, 12,403 jobs were classified as *Service*, and 9,175 jobs were classified as *Retail*. The Extraterritorial Jurisdiction (ETJ) was shown to have an additional 643 jobs, with 535 jobs being classified as *Service* and 108 jobs being classified as *Retail*. In addition, the GIS Division calculated the total non-residential building square footages (*i.e. improvements*) relating to all of these employment types at ~14,444,596 SF inside the City's corporate boundaries and Extraterritorial Jurisdiction (ETJ), with ~3,209,401 SF being classified as *Basic*, ~5,374,068 SF being classified as *Service*, and ~5,861,127 SF being classified as *Retail*. The total non-residential square footage of land area 139,424,433.67 (or 3,200.74-acres), with 11,967,581.81 SF being classified as *Basic*, 58,451,896.18 SF being classified as *Service*, and 69,004,955.68 SF being classified as *Retail*.

TEN-YEAR GROWTH PROJECTIONS

GROWTH ASSUMPTIONS

In this planning study, growth is characterized in two (2) forms: 1) Population (*i.e. residential land use*), and 2) Employment (*i.e. non-residential land use*). To calculate a reasonable growth rate for population and employment it was necessary for staff to make a series of assumptions on which to base the ten (10) year growth projections. These assumptions are summarized as follows:

- Future growth identified within this study will conform to the *Future Land Use Plan* depicted in the OURHometown Vision 2040 Comprehensive Plan.
- Infrastructure will continue to be development driven, and the City will continue to be able to finance any other necessary improvements needed to accommodate future growth.
- School facilities will continue to be sufficient to accommodate any increases in population.
- Densities will generally conform to the land classifications and *District Strategies* identified within the OURHometown Vision 2040 Comprehensive Plan, and as depicted on the Future Land Use Map.
- The residential and non-residential carrying capacity for the City or its *build out* will occur simultaneously.

The ten (10) year projections for population are based on the growth rate, which was previously discussed and staff's consideration of past development trends. The ten (10) year projections for employment are based on the overall carrying capacity for non-residential development compared to the current non-residential development in the City. *Tables 1 & 2* detail the ten (10) year projections for households, population and employment for the service areas associated with roadway and water/wastewater impact fees.

POPULATION GROWTH RATE ANALYSIS

The City of Rockwall has experienced steady residential population growth (*see Figure 5*) over the last 18-years and -- *with the City being ~48.29% vacant and taking into account the City's current availability of water and wastewater infrastructure* -- staff anticipates that the population growth will continue to be fairly steady. It should be noted, however, that the City has seen a slight decline in the population growth percentage over the last five (5) years. From 2000 to 2018, the population growth percentage was 5.08%, but when looking at the last five (5) years this number drops to 1.79% (*see Table 3*).

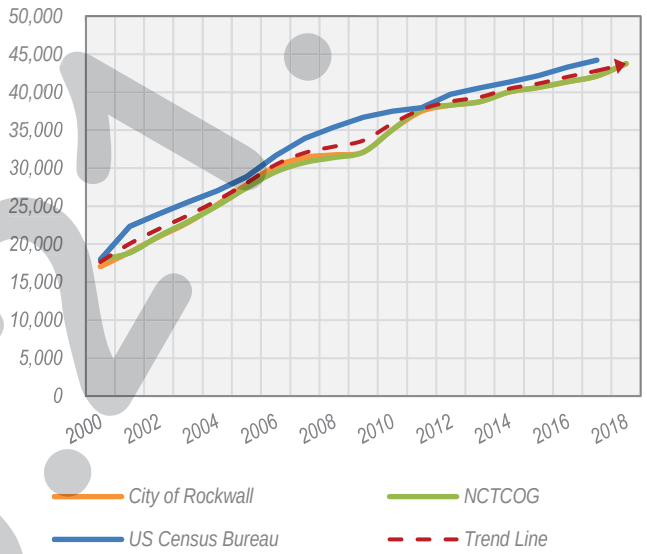
TABLE 1: SUMMARY OF TEN-YEAR GROWTH (ALL ROADWAY SERVICE AREAS)

	2019	2029	Increase
Households	16,690	22,135	24.60%
Population	44,575	59,898	25.58%
Total Employment	24,083	32,366	25.59%
Basic	2,505	3,367	25.60%
Service	12,403	16,669	25.59%
Retail	9,175	12,330	25.59%

TABLE 2: SUMMARY OF TEN-YEAR GROWTH (WATER/WASTE WATER SERVICE AREA)

	2019	2029	Increase
Households	18,390	26,609	30.89%
Population	49,616	73,228	32.24%
Total Employment	25,369	34,065	25.53%
Basic	2,505	3,367	25.60%
Service	13,473	18,082	25.49%
Retail	9,391	12,616	25.56%

FIGURE 5: POPULATION BY AGENCY, 2000-2018



To calculate the ten (10) year population projections, City staff utilized the *Compound Annual Growth Rate (CAGR)* method. CAGR allows for a general assessment of growth when considering periodic increases and decreases in residential

population growths that coincide with changing economic conditions. The formula for CAGR is as follows:

$$CAGR = \left(\frac{x}{y}\right)^{\left(\frac{1}{n}\right)} - 1$$

Where:
CAGR = Compound Annual Growth Rate
x = End Value
y = Beginning Value
n = Number of Years

In 2007, a CAGR of four (4) percent was used to calculate the ten (10) year population projections; however, based on the five (5) year annual growth rate and the number depicted in *Table 3*, staff utilized a more conservative three (3) percent annual growth rate. In assessing the past growth rates, staff used several sources including the North Central Texas Council of Governments (NCTCOG), the U.S. Census Bureau, and the City of Rockwall. Based on a three (3) percent CAGR, the following chart shows the anticipated population growth over the next ten (10) years:

TABLE 4: TEN (10) YEAR POPULATION GROWTH
This table shows the projected ten (10) year population growth at a three (3) percent Compound Annual Growth Rate (CAGR).

Year	Population
2019	44,575
2020	45,907
2021	47,284
2022	48,703
2023	50,164
2024	51,669
2025	53,219
2026	54,815
2027	56,460
2028	58,154
2029	59,898

TABLE 3: CITY OF ROCKWALL GROWTH RATES

Data Source	Growth Rate
2014 – 2017 US Census	*1.70%*
2010 – 2017 US Census	*2.08%*
2000 – 2017 US Census	*5.13%*
2014 – 2018 Single Family Permits	*1.82%*
2010 – 2018 Single Family Permits	*4.80%*
2000 – 2018 Single Family Permits	*-2.93%*
Future Growth Projection	*3.0%*

PROJECTED POPULATION FOR 2029

Utilizing the three (3) percent Compound Annual Growth Rate (CAGR) established in the previous section, staff projects that the population for the City will be 59,898 in 2029 (*see Table 4 and Figure 6*). This estimate does appear to be consistent with trends that have been observed at the county and regional level (*see Figure 7 for a comparison of the City's population growth versus the County's population growth*). Although, the growth rate has slowed over the last five (5) years this is seen as a temporary trend and not a sign indicative of the City's future growth trend.

In determining this population projection, staff observed how this projection would relate to the City's projected building permits, and the additional population added to the City on an annual basis (*see Table 5*). Taking this into consideration, the estimated average annual building permits anticipated over this time period is approximately 522. This represents a decrease of approximately 121 permits annually from the estimates completed in 2014. This estimate -- *while still likely high in some years due to shifts in market demand* -- is a more conservative estimate than what was used in 2014. It should be noted that this estimate takes into consideration the type of development likely to occur in a given area (*i.e. single-family or multi-family*).

FIGURE 6: TEN (10) YEAR POPULATION GROWTH
This chart shows the projected ten (10) year population growth at a three (3) percent Compound Annual Growth Rate (CAGR).

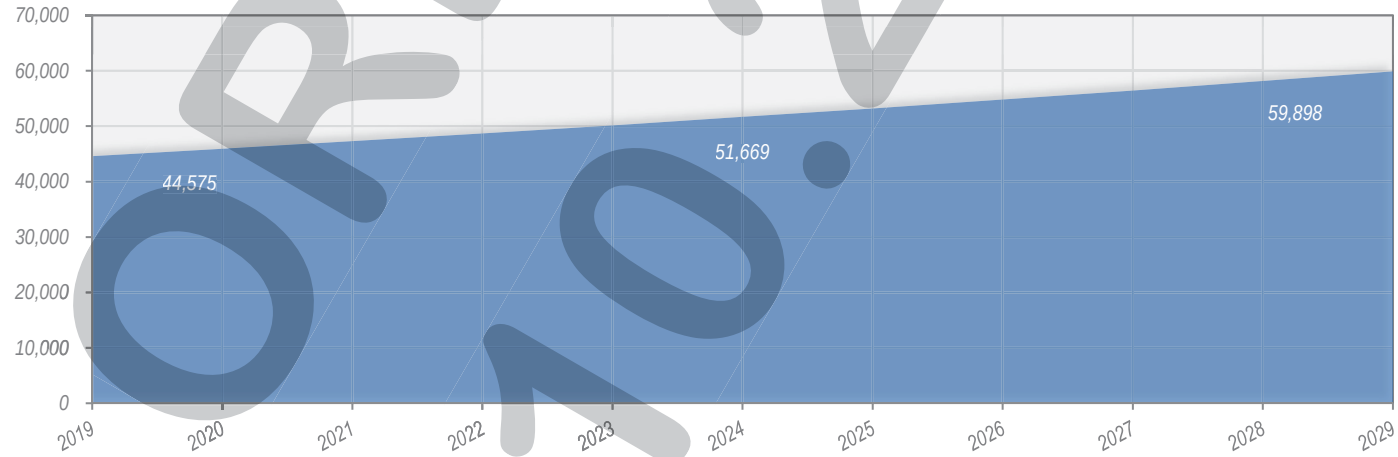
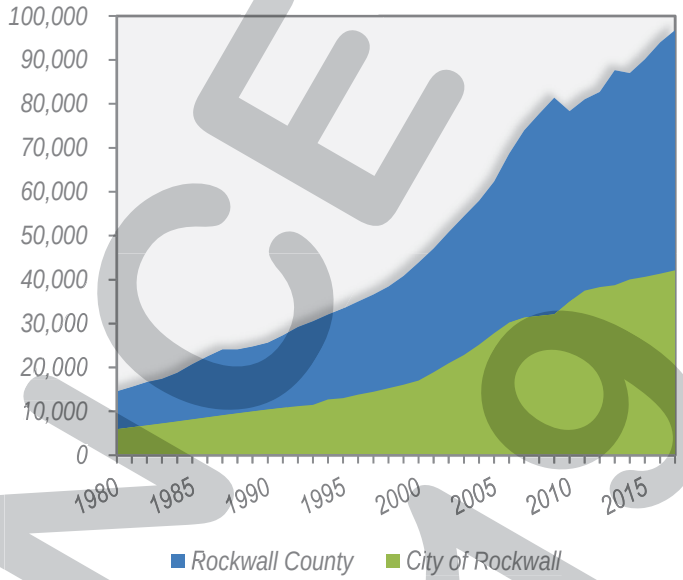


TABLE 5: PROJECTED BUILDING PERMITS

Year	Population	New Residents	New Building Permits
2019	44,575	825	294
2020	45,907	1,332	474
2021	47,284	1,377	490
2022	48,703	1,419	505
2023	50,164	1,461	520
2024	51,669	1,505	536
2025	53,219	1,550	552
2026	54,815	1,597	568
2027	56,460	1,644	585
2028	58,154	1,694	603
2029	59,898	1,745	621
Average Number of Annual Permits:			522

FIGURE 7: CITY POPULATION VS COUNTY POPULATION, 1980-2017



PROJECTED EMPLOYMENT FOR 2029

Employment data for the year 2029 was calculated by taking the information established in the base year analysis -- *which was obtained through the ArcGIS Business Analyst tool* -- and the corresponding ratio of employment to population, and extrapolating this information out to January 1, 2029. These estimates are summarized in Appendix C, *Employment Breakdown by Roadway Service Area*, and Appendix D, *Employment Breakdown by Water/Wastewater Service Area*.

BUILD OUT ANALYSIS

A *Build Out Projection* for a city (also referred to as the city's *Carrying Capacity*) is an estimate of the location and density of all potential development, employment and population that a city can support within its future corporate boundaries.

ESTABLISHING HOUSEHOLDS AND POPULATION AT THE CITY'S BUILD OUT

As part of the newly adopted OURHometown Vision 2040 Comprehensive Plan, City staff calculated the number of households and residents at *Build Out*. In establishing the City's households and population at *Build Out* staff made the following assumptions:

- All vacant or undeveloped land within the City's corporate boundaries will develop with the maximum density permitted for the current zoning per the Unified Development Code (UDC).
- All Agricultural (AG) District property is assumed to be vacant or undeveloped and will develop at the maximum density permitted in accordance to the property's' designation on the Future Land Use Map contained in the OURHometown Vision 2040 Comprehensive Plan.
- All property within the Extraterritorial Jurisdiction (ETJ) is assumed to be vacant and will be developed in conformance with the Future Land Use Map at the maximum density permitted by the OURHometown Vision 2040 Comprehensive Plan.
- The City's ETJ is fixed and will not increase in the future.

Taking these assumptions into consideration, staff utilized Geographical Information Systems (GIS) software to calculate all the undeveloped land within the city's corporate boundaries, including the ETJ. Once calculated the acreages were broken down by land use and multiplied by the maximum density permitted for each of the land uses as established within the Unified Development Code (UDC) and the Comprehensive Plan. These totals were then multiplied by the average people per household [*i.e. 2.81 per the US Census Bureau*] to establish the unadjusted population at *Build Out*. Staff then reviewed the projected densities coupled with current land use patterns, and adjusted the numbers to account for known or anticipated development activity. Based on the final *Build Out* population (*i.e. 149,525*), staff projected the population forward using the previously established three (3) percent Compound Annual Growth Rate (CAGR) [*see the Ten-Year Growth Assumptions section*] until the build out population was reached (*see Table 6*). This established a build out year of 2060. The following formula lays out the methodology used to calculate these numbers:

TABLE 6: PROJECTED POPULATION @ 3% COMPOUND ANNUAL GROWTH (CAGR)

Year	Population	New Residents
2018	43,750	1,630
2019	44,570	820
2020	45,907	1,337
2021	47,284	1,377
2022	48,703	1,419
2023	50,164	1,461
2024	51,669	1,505
2025	53,219	1,550
2026	54,815	1,597
2027	56,460	1,644
2028	58,154	1,694
2029	59,898	1,745
2030	61,695	1,797
2031	63,546	1,851
2032	65,453	1,906
2033	67,416	1,964
2034	69,439	2,022
2035	71,522	2,083
2036	73,667	2,146
2037	75,877	2,210
2038	78,154	2,276
2039	80,498	2,345
2040	82,913	2,415
2041	85,401	2,487
2042	87,963	2,562
2043	90,602	2,639
2044	93,320	2,718
2045	96,119	2,800
2046	99,003	2,884
2047	101,973	2,970
2048	105,032	3,059
2049	108,183	3,151
2050	111,429	3,245
2051	114,771	3,343
2052	118,215	3,443
2053	121,761	3,546
2054	125,414	3,653
2055	129,176	3,762
2056	133,052	3,875
2057	137,043	3,992
2058	141,154	4,111
2059	145,389	4,235
2060	149,751	*BO:* 149,525

$$BO = P + CP + EP$$

$$CP = (\sum[(LU_1 xD_1) \dots (LU_x \, xD_x)] \,) x \; AHS$$

$$EP = (LDR \; x \; 2.5) + (MDR \; x \; 3.5) + (HDR \; x \; 5)$$

Where:

BO = Build Out Population
P = Population as of January 1, 2019
CP = Population of Vacant or Undeveloped Land in the City Limits
EP = Population of Vacant or Undeveloped Land in the ETJ
LU = Vacant Available Land Inside the City Limits for a Land Use
D = Maximum Density Permitted for a Land Use per UDC
AHS = Average Household Size [2.81185 per US Census Bureau]
LDR = Low Density Residential Acreage Available in ETJ
MDR = Medium Density Residential Acreage Available in ETJ
HDR = High Density Residential Acreage Available in ETJ

ESTABLISHING EMPLOYMENT AT THE CITY'S BUILD OUT

To calculate employment at *Build Out*, staff utilized the employment numbers calculated with the base year analysis, and -- *based on the estimated current year population* -- calculated ratios between employment and population for the City and its Extraterritorial Jurisdiction (ETJ). These ratios were then used to extrapolate the number of employees for basic, service and retail sectors for the ten (10) year and build out projections.

SUMMARY

The following is a summary of staff's findings when preparing the *Land Use Assumption Report* in preparation for the update of the Roadway, Water and Wastewater Impact Fees for 2019:

- The average annual growth rate as calculated by staff is three (3) percent. This growth rate was established based on data from the US Census, North Texas Council of Governments (NCTCOG), the City and County of Rockwall. Using this growth rate staff projected the following population numbers:
  - The population of the City of Rockwall as of January 1, 2019 was 44,691. This is expected to increase by 25.39% in the next ten (10) years to an estimated 59,898 by January 1, 2029.
  - The population for the City of Rockwall and its Extraterritorial Jurisdiction (ETJ) as of January 1, 2019 was 49,743. This is expected to increase by 32.07% in the next ten (10) years to an estimated 73,228 by January 1, 2029.
- The estimated employment for the City of Rockwall as of January 1, 2019 was 24,083 jobs, with another 1,286 jobs existing within its Extraterritorial Jurisdiction (ETJ). Staff estimates this number to climb to 32,366 jobs within the current city limits, and another 1,699 jobs within the current Extraterritorial Jurisdiction (ETJ) by January 1, 2029.
- Staff has established that there are currently 8,204.17 undeveloped acres of land within the city limits. This represents ~48.29% of the current land in the City. Additionally, the City of Rockwall has access to another 14,083.24-acres of land within its current Extraterritorial Jurisdiction (ETJ). Approximately 75.11% (10,577.67-acres) of the land within this area is vacant.
- According to staff's estimate, the City of Rockwall is expected to be built out in the year 2060, with a total population of 149,525.

APPENDIX A: SUMMARY OF ROADWAY SERVICE AREAS

SERVICE AREA 1

DISTRICTS	ESTIMATES (JANUARY 1, 2019) HU	POP	EMP	PROJECTIONS (JANUARY 1, 2029) HU	POP	EMP	BUILD OUT PROJECTIONS (2060) HU	POP	EMP
Central District	216	455	2,332	427	899	3,134	816	1,714	4,331
Downtown District	971	2,332	3,105	1,056	2,519	4,173	1,060	2,531	5,767
IH-30 Corridor District	-	-	2,825	-	-	3,797	-	-	5,247
North Lakeshore District	3,884	11,081	944	4,318	12,324	1,269	4,326	12,350	1,753
Northern Estates District	3	9	4	12	34	5	184	513	7
Northwest Residential District	1,422	3,974	667	2,291	6,401	896	2,324	6,493	1,239
Scenic District	1,084	2,280	1,161	1,217	2,559	1,560	1,248	2,624	2,156
South Lakeshore District	1,578	3,317	968	1,578	3,317	1,301	1,595	3,352	1,798
	9,158	23,448	12,006	10,898	28,053	16,135	11,553	29,577	22,298

SERVICE AREA 2

DISTRICTS	ESTIMATES (JANUARY 1, 2019) HU	POP	EMP	PROJECTIONS (JANUARY 1, 2029) HU	POP	EMP	BUILD OUT PROJECTIONS (2060) HU	POP	EMP
IH-30 Corridor District	1	3	205	-	-	276	-	-	381
South Central Estates District	37	112	122	148	448	164	2,504	7,611	227
South Central Residential District	795	2,417	-	1,487	4,522	-	2,399	7,293	-
Technology District	47	100	824	162	367	1,107	1,748	4,760	1,530
	880	2,632	1,151	1,797	5,336	1,547	6,651	19,664	2,138

SERVICE AREA 3

DISTRICTS	ESTIMATES (JANUARY 1, 2019) HU	POP	EMP	PROJECTIONS (JANUARY 1, 2029) HU	POP	EMP	BUILD OUT PROJECTIONS (2060) HU	POP	EMP
Harbor District	552	1,255	2,766	1,040	2,364	3,717	1,713	3,893	5,137
IH-30 Corridor District	-	-	2,613	-	-	3,512	-	-	4,853
Marina District	1,423	3,441	630	1,525	3,702	847	1,537	3,734	1,170
Medical District	-	-	1,897	-	-	2,549	-	-	3,523
South Central Residential District	1,089	3,310	371	1,089	3,310	499	1,089	3,310	689
Southwest Residential District	2,257	7,260	1,900	3,695	11,847	2,553	3,943	12,509	3,529
Technology District	615	1,292	63	618	1,298	85	658	1,383	117
	5,936	16,558	10,240	7,966	22,520	13,762	8,940	24,829	19,018

SERVICE AREA 4

DISTRICTS	ESTIMATES (JANUARY 1, 2019) HU	POP	EMP	PROJECTIONS (JANUARY 1, 2029) HU	POP	EMP	BUILD OUT PROJECTIONS (2060) HU	POP	EMP
Central District	92	193	167	182	382	224	349	735	310
IH-30 Corridor District	-	-	71	-	-	95	-	-	132
Northeast Residential	361	1,009	438	762	2,129	589	1,786	4,988	813
Northern Estates District	263	735	10	529	1,478	13	1,066	2,984	19
	716	1,937	686	1,473	3,990	922	3,201	8,707	1,274

GRAND TOTAL	16,690	44,575	24,083	22,135	59,898	32,366	30,345	82,777	44,728

APPENDIX B: SUMMARY OF WATER/WASTEWATER SERVICE AREA

DISTRICTS	ESTIMATES (JANUARY 1, 2019)			PROJECTIONS (JANUARY 1, 2029)			BUILD OUT PROJECTIONS (2060)		
	HU	POP	EMP	HU	POP	EMP	HU	POP	EMP
Central District	308	648	2,499	609	1,281	3,358	1,165	2,449	4,641
Downtown District	971	2,332	3,105	1,056	2,519	4,173	1,060	2,531	5,767
Employment District	314	971	880	532	1,645	1,162	630	1,952	5,538
Far North Estates District	230	674	96	676	1,980	127	4,426	12,950	-
Harbor District	552	1,255	2,766	1,040	2,364	3,717	1,713	3,893	5,741
IH-30 Corridor District	1	3	5,714	-	-	7,679	-	-	10,612
Innovation District	268	822	66	794	2,438	87	5,323	16,407	415
Marina District	1,423	3,441	630	1,525	3,701	847	1,537	3,734	1,170
Medical District	-	-	1,897	-	-	2,549	-	-	3,523
North Lakeshore District	3,884	11,081	944	4,317	12,324	1,269	4,326	12,350	1,753
Northeast Residential District	629	1,758	438	1,244	3,476	589	2,384	6,658	813
Northern Estates District	512	1,439	14	1,090	3,065	19	2,626	7,390	26
Northwest Residential District	1,422	3,974	667	2,291	6,401	896	2,324	6,493	1,239
Scenic District	1,084	2,280	1,161	1,217	2,558	1,560	1,248	2,624	2,156
South Lakeshore District	1,578	3,317	968	1,578	3,317	1,301	1,595	3,352	1,798
South Central Residential District	1,970	5,987	371	3,265	9,923	499	3,618	10,998	689
South Central Estates District	315	956	366	824	2,502	486	3,760	11,428	1,762
Southwest Residential District	2,267	7,286	1,900	3,772	12,068	2,553	4,229	13,344	3,529
Technology District	662	1,392	887	780	1,665	1,192	2,406	6,143	1,647
Southeast Estates District	-	-	-	-	-	-	8,168	24,829	441
	18,390	49,616	25,369	26,609	73,228	34,064	52,538	149,525	53,262

APPENDIX C: EMPLOYMENT BREAKDOWN BY ROADWAY SERVICE AREAS

SERVICE AREA 1

DISTRICTS	ESTIMATES (JANUARY 1, 2019) BASIC	SERVICE	RETAIL	PROJECTIONS (JANUARY 1, 2029) BASIC	SERVICE	RETAIL	BUILD OUT PROJECTIONS (2060) BASIC	SERVICE	RETAIL
Central District	973	633	726	1,308	851	976	1,807	1,176	1,348
Downtown District	608	1,104	1,393	817	1,484	1,872	1,129	2,050	2,587
IH-30 Corridor District	599	916	1,310	805	1,231	1,761	1,112	1,701	2,433
North Lakeshore District	-	608	336	-	817	452	-	1,129	624
Northern Estates District	-	4	-	-	5	-	-	7	-
Northwest Residential District	-	531	136	-	714	183	-	986	253
Scenic District	-	650	511	-	874	687	-	1,207	949
South Lakeshore District	-	572	396	-	769	532	-	1,062	735
	2,180	5,018	4,808	2,930	6,744	6,462	4,049	9,320	8,930

SERVICE AREA 2

DISTRICTS	ESTIMATES (JANUARY 1, 2019) BASIC	SERVICE	RETAIL	PROJECTIONS (JANUARY 1, 2029) BASIC	SERVICE	RETAIL	BUILD OUT PROJECTIONS (2060) BASIC	SERVICE	RETAIL
IH-30 Corridor District	-	-	205	-	-	276	-	-	381
South Central Estates District	-	94	28	-	126	38	-	175	52
South Central Residential District	-	-	-	-	-	-	-	-	-
Technology District	298	283	243	400	380	327	553	526	451
	298	377	476	400	507	640	553	700	884

SERVICE AREA 3

DISTRICTS	ESTIMATES (JANUARY 1, 2019) BASIC	SERVICE	RETAIL	PROJECTIONS (JANUARY 1, 2029) BASIC	SERVICE	RETAIL	BUILD OUT PROJECTIONS (2060) BASIC	SERVICE	RETAIL
Harbor District	27	2,456	283	36	3,301	380	50	4,561	526
IH-30 Corridor District	-	845	1,768	-	1,136	2,376	-	1,569	3,284
Marina District	-	267	363	-	359	488	-	496	674
Medical District	-	1,651	246	-	2,219	331	-	3,066	457
South Central Residential District	-	331	40	-	445	54	-	615	74
Southwest Residential District	-	924	976	-	1,242	1,312	-	1,716	1,813
Technology District	-	44	19	-	59	26	-	82	35
	27	6,518	3,695	36	8,760	4,966	50	12,105	6,862

SERVICE AREA 4

DISTRICTS	ESTIMATES (JANUARY 1, 2019) BASIC	SERVICE	RETAIL	PROJECTIONS (JANUARY 1, 2029) BASIC	SERVICE	RETAIL	BUILD OUT PROJECTIONS (2060) BASIC	SERVICE	RETAIL
Central District	-	167	-	-	224	-	-	310	-
IH-30 Corridor District	-	-	71	-	-	95	-	-	132
Northeast Residential	-	313	125	-	421	168	-	581	232
Northern Estates District	-	10	-	-	13	-	-	19	-
	-	490	196	-	659	263	-	910	364

GRAND TOTAL	2,505	12,403	9,175	3,367	16,669	12,330	4,652	23,035	17,040

APPENDIX D: EMPLOYMENT BREAKDOWN BY WATER/WASTEWATER SERVICE AREA

	ESTIMATES (JANUARY 1, 2019)			ESTIMATES (JANUARY 1, 2029)			BUILD OUT (2060)		
DISTRICTS	BASIC	SERVICE	RETAIL	BASIC	SERVICE	RETAIL	BASIC	SERVICE	RETAIL
Central District	973	800	726	1,308	1,075	976	1,807	1,486	1,348
Downtown District	608	1,104	1,393	817	1,484	1,872	1,129	2,050	2,587
Employment District	-	742	138	-	980	182	-	4,670	869
Far North Estates District	-	86	10	-	114	13	-	-	-
Harbor District	27	2,456	283	36	3,301	380	50	5,103	589
IH-30 Corridor District	599	1,761	3,354	805	2,367	4,507	1,112	3,271	6,229
Innovation District	-	54	12	-	71	16	-	340	76
Marina District	-	267	363	-	359	488	-	496	674
Medical District	-	1,651	246	-	2,219	331	-	3,066	457
North Lakeshore District	-	608	336	-	817	452	-	1,129	624
Northeast Residential District	-	313	125	-	421	168	-	581	232
Northern Estates District	-	14	-	-	19	-	-	26	-
Northwest Residential District	-	531	136	-	714	183	-	986	253
Scenic District	-	650	511	-	874	687	-	1,207	949
South Lakeshore District	-	572	396	-	769	532	-	1,062	735
South Central Residential District	-	331	40	-	445	54	-	615	74
South Central Estates District	-	282	84	-	375	112	-	1,358	404
Southwest Residential District	-	924	976	-	1,242	1,312	-	1,716	1,813
Technology District	298	327	262	400	439	352	553	607	487
Southeast Estates District	-	-	-	-	-	-	-	189	252
	2,505	13,473	9,391	3,367	18,082	12,616	4,652	29,958	18,651

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Exhibit 'C':
2019 Update of Rodway Impact Fees

2019 Update of Roadway Impact Fees

Final Report

Submitted By:

September 16, 2019

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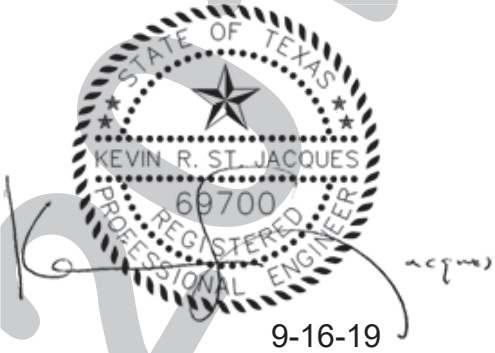
City of Rockwall

2019 Update of Roadway Impact Fees

Final Report



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Submitted By:

FREESE AND NICHOLS

September 16, 2019

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Chapter 1: Introduction

Shrinking funds available for transportation improvements on city thoroughfares limit many cities from upgrading infrastructure to meet increasing travel demands. To meet the needs of new growth, many cities collect "impact fees" from new development to help fund transportation improvements necessitated by such development. What is unique about impact fees is that they often finance roadway improvements that are considered "offsite" to new development. However, when considering the traffic implications created by new development on the roadway system, impact fees provide a means by which infrastructure may keep pace with new development.

Texas initially authorized the use of impact fees with the 1987 legislature. Now codified in Chapter 395 of the Texas Local Government Codes, the legislation authorizes cities to collect fees from new developments to finance new construction or expansion of capital improvements such as water treatment and distribution facilities, storm and wastewater facilities, and transportation facilities. The law stipulates that all fees collected from new development must not exceed the maximum amount calculated by the methodology described therein.

The law also mandates that impact fee systems be updated periodically to ensure that an appropriate cost per service unit is calculated commensurate with an impact fee capital improvements program. The law also mandates that as new transportation improvements are completed, actual costs are inserted into the cost per service unit calculation to reflect a more accurate reading of service area costs as opposed to estimated costs that were established at the onset of the impact fee system. Finally, new capital improvement projects may be added to the program, subject to meeting eligibility requirements.

In September 2001, Chapter 395 was amended which revised called for several technical and administrative changes of impact fee systems including:

- Expansion of the permissible service area structure for roadway facilities from three to six miles;
- A credit for the portion of ad valorem tax revenues generated by improvements over the program period, or the credit equal to 50% of the total projected cost of implementing the capital improvements plan;
- A city's share of costs on the federal or Texas highway system, including matching funds and costs related to utility line relocation, the establishment of curbs and gutters, sidewalks, drainage appurtenances, and rights-of-way;
- Increase in the time period of update of impact fee land use assumptions and capital improvements plan from a three to five-year period;
- Changes in compliance requirements as they relate to annual reporting; and
- Consolidation of the land use assumptions and capital improvements plan hearings.

The implementation and administration of roadway impact fee systems offers several advantages to both a city and new development among which include: 1) a systematic, structured approach to assessment of fees, 2) a clear, equitable distribution of costs associated with the impact of new development, 3) the ability to pool funds for project initiation within a service area, 4) assurance that fees collected will be spent in the area where new development is occurring, 5) up-front knowledge of fees to be imposed, 6)

credits for developer participation, and 7) ability for developers to demonstrate that, pursuant to city guidelines, specific unit equivalencies (service unit generation) may be different from those presented in the land use equivalency table.

Recognizing the need to provide adequate facilities and desiring to have equitable funding of transportation improvements, the City of Rockwall embarked in the development of a roadway impact fee system in January 2008 and is updating the program to comply with legislative requirements identified in Chapter 395. The program was updated in 2013. This update amends the roadway capital improvements program based on updated land use assumptions as well as, input by the designated impact fee Capital Improvements Advisory Committee. To assist with this study, the City of Rockwall retained Freese and Nichols, Inc. to update the roadway impact fee system.

Study Methodology

To update the roadway impact fee for the City of Rockwall, a series of work tasks were undertaken and are described below:

1. Meetings were held with the City of Rockwall Staff and the Capital Improvement Advisory Committee to discuss the approach and roadway methodology to be used in the study update.

2. Impact fee service areas were reviewed and amended for any city annexations. Roadway service areas are contained to the current city limits.

3. The vehicle-mile of travel (VMT) during the PM peak hour was retained as the unit of measure for the roadway impact fee system.

4. A roadway conditions inventory was conducted on Rockwall thoroughfares for lane geometries, roadway classifications and segment lengths. New arterial and/or collector streets not previously assessed were added to the program database.

5. The existing roadway network was evaluated based on traffic volume count data collected May 2019, to determine roadway capacity, current utilization, and if any capacity deficiencies exist within each impact fee service area.

6. Projected 10-year growth, in terms of vehicle-miles of demand, was calculated for the service areas based on updated land use assumptions (projections of population and employment growth) prepared by Rockwall City Staff in June 2019 and supplemented with the updated land use equivalency table. The Land Use Assumptions for Impact Fees report was reviewed and approved by the Capital Improvements Advisory Committee (CIAC) prior to development of VMT growth projections and capital improvements plan (CIP) update.

7. The existing impact fee CIP was evaluated with updated traffic count data to ensure that excess capacity remained within each impact fee project for retention in the system. The analysis of the existing impact fee CIP revealed excess capacity and therefore could remain in the impact fee program.

8. A roadway impact fee CIP was reviewed and amended relative to projected growth from the updated land use assumptions, analysis of existing system deficiencies, likelihood of project initiation over the short-term, the Rockwall Comprehensive Plan, and input by the CIAC and City Staff. The CIP was amended for John King Boulevard to include portions of the roadway that were previously out of the city and the addition of several new projects to the program.

9. Roadway costs associated with construction, engineering, right-of-way, and project financing for recoupment projects were provided by the City. Cost estimates for new projects were prepared by Freese and Nichols. Costs for study updates are eligible for recovery and were included in the total project cost. Roadway cost data was compiled and distributed by service area.

10. The cost of capacity supplied, cost attributable to new development and the maximum cost per service unit was calculated for each service area. A credit of 50% was applied to the overall cost of the capital improvements program for use in the calculation of the cost per service unit.

11. This report was prepared to document the procedures, findings, and conclusions of the study.

Organization of Report

This report describes the background information, analysis, and findings of the study in six parts, with a chapter devoted to each:

- Roadway Impact Fee Service Areas (Chapter 2)
- Roadway Impact Fee Service Units (Chapter 3)
- Existing Conditions Analysis (Chapter 4)
- Projected Conditions Analysis (Chapter 5)
- Calculation of Impact Fees (Chapter 6)
- Conclusion (Chapter 7)

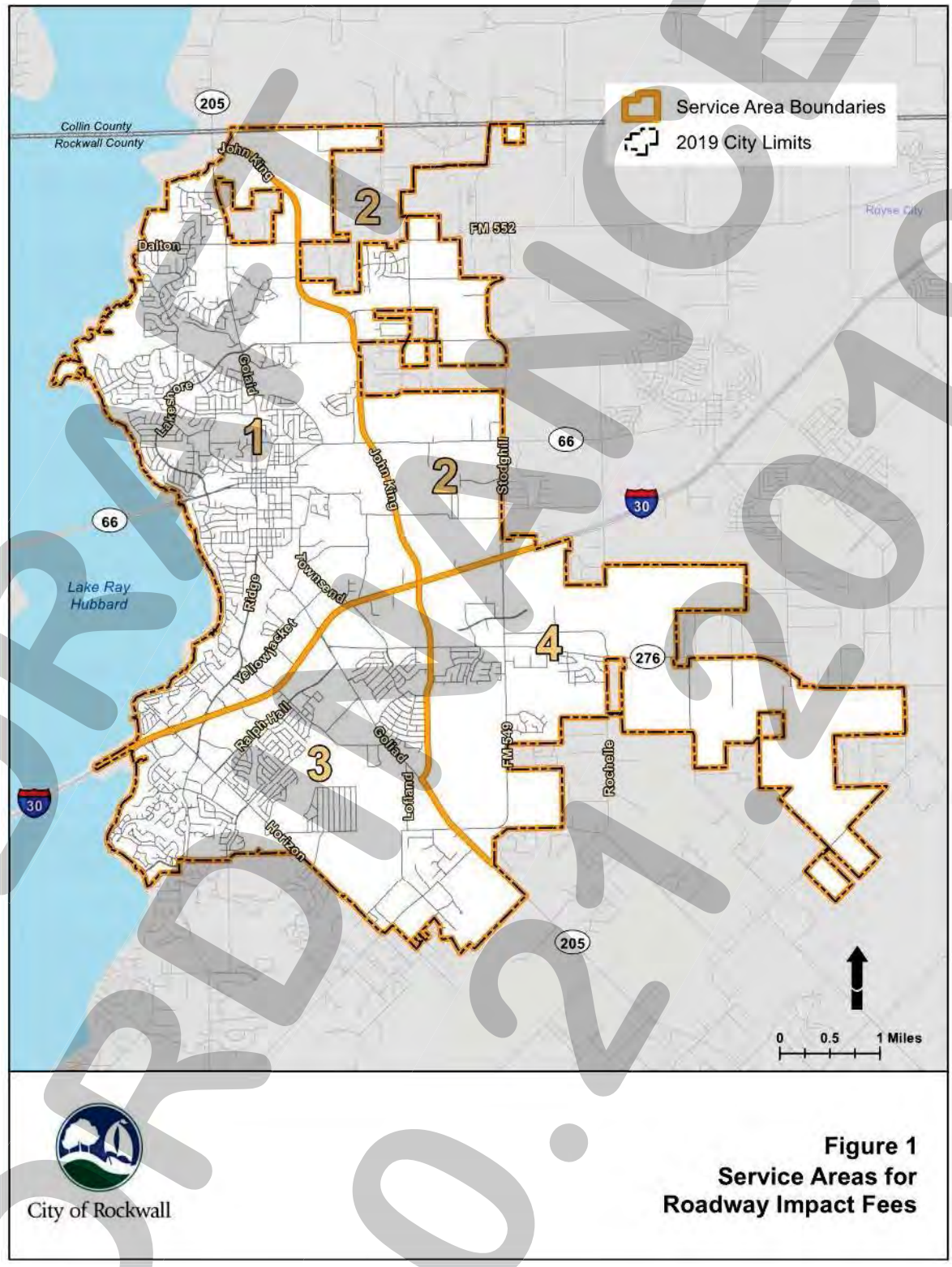
Chapter 2: Roadway Impact Fee Service Areas

Chapter 395 requires that service areas be defined for impact fees to ensure that facility improvements are in proximity to the area that is generating the need. Legislation mandates that roadway service areas be limited to a six-mile maximum and must be located within the current city limits. Roadway service areas are different from other impact fee service areas, which can include the city limits and Extra-Territorial Jurisdiction (ETJ). This is primarily because roadway systems are "open" to both local and regional use as opposed to a defined limit of service that is provided with water and wastewater systems. The result is that new development can only be assessed an impact fee based on the cost of necessary capital improvements within that service area.

The service area structure was developed using the criteria defined in Chapter 395 as it relates to conformance with city limits and the six-mile boundary limits. Other considerations included use of physical or natural features, potential roadway projects and their relation to undeveloped areas of the community, and the planning areas used in long-range plan efforts (for consideration of service area expansion due to possible annexation).

Four service areas were initially developed for the program in 2007 and have been retained in each of the program updates and are generally delineated by John King Boulevard and IH-30. Changes to the service area structure include city annexations on the northern and southern sector of the city. The service area structure for Rockwall is illustrated in **Figure 1**.

Figure 1: Service Areas for Roadway Impact Fees



Chapter 3: Roadway Impact Fee Service Units

An important aspect of the impact fee system is the determination of the proper service unit to be used to calculate and assess impact fees for new developments. As defined in Chapter 395, "Service unit means a standardized measure of consumption, use, generation, or discharge attributable to an individual unit of development in accordance with generally accepted engineering or planning standards for a particular category of capital improvements or facility expansions."

To determine the roadway impact fee for a development, the service unit must accurately identify the impact that the development will have on the transportation system serving the development. This impact is a combination of the number of new trips generated by the development, the peaking characteristics of the land-use(s) within the development, and the length of each new trip on the transportation system.

The correct service unit must also reflect the supply, which is provided by the roadway system, and the demand placed on the system during the time in which peak, or design, conditions are present on the system. Transportation facilities are designed and constructed to accommodate volumes expected to occur during the peak hours (design hours). These volumes typically occur during the morning (AM) and evening (PM) rush hours as motorists travel to and from work.

The vehicle-mile was retained as the service unit for calculating and assessing transportation impact fees in Rockwall. The vehicle-mile as a service unit establishes a way to relate the intensity of land development to the demand on the system with published trip generation data. It also recognizes state legislation requirements with regards to trip length.

The PM peak hour was retained as the time period for assessing impacts because the greatest demand for roadway capacity occurs during this hour. Roadways are sized to meet this demand, and roadway capacity can more easily be defined on an hourly basis. Traffic volume data collected in May 2019 was used as the basis for the system update.

Service Units

Service units create a link between supply (roadway projects) and demand (development). Both can be expressed as a combination of the number of vehicles traveling during the peak hour and the distance traveled by these vehicles in miles.

Service Unit Supply

For roadway capital projects improvement, the number of service units provided during the peak hour is simply the product of the capacity of the roadway in one hour and the length of the project. For example:

> Given a four-lane divided roadway project with a 600 vehicle per hour per lane capacity and a length of two miles, the number of service units provided is:
>
> *600 vehicles per hour per lane x 4 lanes x 2 miles = 4,800 vehicle-miles*

Service Unit Demand

The demand placed on the system can be expressed in a similar manner. For example, a development generating 100 vehicle trips in the PM peak hour with an average trip length of two miles would generate:

100 vehicle-trips x 2 miles/trip = 200 vehicle-miles

Likewise, the existing demand placed on the roadway network is calculated in the same manner with a known traffic volume (peak hour roadway tube counts) on a street and a given segment length.

Service Units for New Development

An important objective in the development of the impact fee system is the development of a specific service unit equivalency for individual developments. The vehicle-miles generated by a new development are a function of the trip generation and average trip length characteristics of that development. The following describes the process used to develop the vehicle-equivalency table, which relates land use types and sizes to the resulting vehicle-miles of demand created by that development.

Travel characteristics were reviewed and deemed to be similar in nature to the previous system update, and therefore no changes were made to the resultant land use equivalency table.

Trip Generation

Trip generation information for the PM peak hour was based on data published in the Tenth Edition of *Trip Generation* by the Institute of Transportation Engineers (ITE). *Trip Generation* is a reference publication that contains travel characteristics of over 160 land uses across the nation and is based on empirical data gathered from over 4,600 studies that were reported to the Institute by public agencies, developers and consulting firms. Data contained in this publication is generally accepted for use in studies by transportation engineers throughout the nation. Data not available was drawn from other published information. Rates were established for specific land use types within the broader categories of residential, office, commercial, industrial and institutional land uses. Within each of the land use categories, a rate was also established for any land uses not specifically identified.

Adjustments

The actual "traffic impact" of a specific site for impact fee purposes is based on the amount of traffic added to the street system as a result of new development. To accurately estimate new trips generated, adjustments must be made to trip generation rates and equations to account for pass-by and diverted trips. The added traffic is adjusted so that each development is assigned only for a portion of trips associated with a specific development and thus reducing the possibility of over-counting by counting only primary trips generated. Trip generation rates were reduced by percentages presented in **Table 1** to isolate the primary trip purpose.

Pass-by trips are those trips that are already on a route for a different purpose and simply stop at a development on that route. For example, a stop at a convenience store on the way home from the office is a pass-by trip for the convenience store. A pass-by trip does not create an additional burden on the street system and therefore should not be counted in the assessment of impact fees of a convenience store.

A diverted trip is a similar situation, except that a diversion is made from the regular route to make an interim stop. For example, a trip from work to home using Ridge Road (from IH-30) would be a diverted trip if the travel path were changed Yellow Jacket and Goliad for the purpose of stopping at a retail site. On a system-wide basis, this trip places a slightly additional burden on the street system but in many cases, this burden is minimal.

Table 1 contains the documented estimates of trip rate adjustments used in determining the appropriate rate to use in the impact fee calculation process. Adjustments were based on studies documented in the ITE trip generation manual.

The resulting recommended trip rates are illustrated as part of Table 3 Land Use/Vehicle Mile Equivalency Table illustrated later in this chapter. Rates were developed in lieu of equations to simplify the assessment of impact fees by the City and likewise, the estimation of impact fees by persons who may be required to pay an impact fee in conjunction with a development project.

A local study may also be conducted to confirm rates in *Trip Generation* or change rates to reflect local conditions. In such cases, a minimum of three sites should be counted. Selected sites should be isolated in nature with driveways that specifically serve the development and not other land uses. The results should be plotted on the scatter diagram of the selected land use contained in *Trip Generation* for comparison purposes. It is recommended that no change be approved unless the results show a variation of at least fifteen percent across the range of sample sizes surveyed. *Trip Generation* was used as the primary source of information for this study.

Trip Length

Trip lengths (in miles) are used in conjunction with site trip generation to estimate vehicle-miles of travel. Trip length data was based on information generated in the 1995 North Central Texas Council of Governments (NCTCOG) Workplace Survey and the National Workplace Survey. These travel characteristics were applied to Rockwall to determine average trips lengths for common land use types.

Table 2 summarizes the derived average trip lengths for major land use categories. These trip lengths represent the average distance that a vehicle will travel between an origin and destination of which either the origin or destination contains the land-use category identified below. Data compiled by the Workplace Survey represents the best available information on trip lengths for this area.

Table 1: Trip Reduction Estimates (PM Peak Hour) *

ITE Code	Land Use Category	Pass-by Trips	Diverted Trips
110	General Light Industrial	0	0
130	Industrial Park	0	0
150	Manufacturing	0	0
151	Mini-Warehousing	0	0
210	Single-Family Detached Housing	0	0
220	Apartment	0	0
250	Retirement Community	0	0
540	Junior/Community College	0	0
560	Church/Place of Worship	0	0
565	Day Care Center	0	0
610	Hospital	0	0
710	General Office Building	0	0
750	Office Park	0	0
760	Research Center	0	0
815	Discount Store	17%	35%
820	Shopping Center	34%	26%
831	Quality Restaurant	44	27
832	High-Turnover Restaurant (Sit-down)	43	26
834	Fast Food Restaurant w/Drive-thru	50	23
843	Auto Parts Sales	41	13
848	Tire Store	36	38
851	Convenience Market	66	22
862	Convenience Market w/Gas Pumps	63	26
862	Home Improvement Store	48	24
863	Electronics Superstore	40	33
880	Pharmacy with Drive-thru	49	13
881	Pharmacy without Drive-thru	49	13
912	Bank with Drive-thru	47	26

DU = Dwelling Unit, GFA = Gross Floor Area; (*) Expressed as percent of total PM peak hour trips generated.
Source: Trip Generation, ITE 10th Edition, 2018

Table 2: Average Trip Lengths

Land Use Category	Average Trip Length (miles)	Localized Trip Length (miles)	Adjusted Trip Length (miles)
General Office	12.06	6.81	3.41
General Retail/Shopping Center	4.12	2.33	1.16
Industrial	9.95	5.62	2.81
Residential	11.16	6.31	3.15
Warehousing	8.84	4.99	2.50
Drive-In Bank	2.62	1.48	0.74
Specialty Retail	2.86	1.62	0.81
Hospital	5.18	2.93	1.46
Medical Office/Clinic	9.63	5.44	2.72
School	4.12	2.33	1.16
Hotel	4.15	2.34	1.17
Restaurant	3.74	2.11	1.06
Fast-Food Restaurant	3.53	1.99	1.00
Day Care Center	1.64	0.93	0.46
Supermarket	1.84	1.04	0.52
Pharmacy without Drive-thru	1.93	1.09	0.55

Source: US Census Bureau, NCTCOG, and Freese and Nichols.

Adjustments

The assessment of an individual development's impact fee is based on the premise that each vehicle-trip has an origin and a destination and that the development end should pay for one-half of the cost necessary to complete each trip. Thus, the development is charged only for a portion of the vehicle-trip associated with that development.

To prevent double charging, and to fairly attribute the demand placed on the system to each trip end location, the trip length was adjusted to remove travel on the federal roadway system and then divided by two to reflect half of the vehicle trip to and from the development. Data from the NCTCOG travel forecast model was used to compare vehicle-miles of travel (VMT) by roadway functional class. Data revealed 43% of travel to use the federal system and thus the average trip length was reduced by this percentage to reflect localized travel on city streets (reflected in column 2). The average trip length, localized trip length, and adjustment for one-half trip length are illustrated in column 3 of Table 2. Where specific land uses were considered to exhibit different trip length characteristics than those identified in Table 3, engineering judgment was used to estimate the average trip length. Finally, as the service area structure was based on a six-mile boundary, those land uses that exhibited trip lengths greater than six miles were limited to this threshold.

Service Unit Equivalency Table

The result of combining the trip generation and trip length information is an equivalency table which establishes the service unit rate for various land uses. These service unit rates are based on an appropriate development unit for each land use. For example, a dwelling unit is the basis for residential uses, while 1,000 gross square feet of floor area is the basis for office, commercial, and retail uses. Other less common land uses are based on appropriate independent variables.

Separate rates have been established for specific land uses within the broader categories of residential, commercial, industrial and institutional to reflect the differences between land uses within the categories. However, even with these specific land use types, information is not available for every conceivable land use, so limitations do exist.

The updated equivalency table is illustrated in **Table 3**. Table 3 is reflective of adjusted trip rates (detailed in Table 1) and trip lengths (Table 2).

ROADWAY IMPACT FEE SERVICE UNITS

Table 3: Land-Use Vehicle-Mile Equivalency Table

CATEGORY	LAND USE	DEVELOPMENT UNITS (X)	TRIP RATE	LOCAL TRIP LENGTH (mi.)	TOTAL SERVICE UNITS (VEH-MI / DEV UNIT)
RESIDENTIAL					
	SINGLE-FAMILY DETACHED	D.U.	0.99	3.15	3.12
	APARTMENT/TOWNHOUSE	D.U.	0.56	3.15	1.77
	RETIREMENT COMMUNITY	D.U.	0.16	2.27	0.36
	INDEPENDENT SR. LIVING FACILITY	D.U.	0.30	2.27	0.68
OFFICE					
	GENERAL OFFICE BLDG	1000 GFA	1.15	3.41	3.92
	CORPORATE HEADQUARTERS BLDG	1000 GFA	0.60	3.41	2.05
	MEDICAL-DENTAL OFFICE BLDG	1000 GFA	3.46	2.72	9.42
	U.S. POST OFFICE	1000 GFA	3.36	2.26	7.60
	BUSINESS PARK	1000 GFA	0.42	3.41	1.43
	RESEARCH AND DEVELOPMENT CENTER	1000 GFA	0.49	3.41	1.67
COMMERCIAL					
	RETAIL/SHOPPING CENTER	1000 GLA	1.52	1.16	1.77
	QUALITY RESTAURANT	1000 GFA	3.75	1.06	3.97
	FAST FOOD RESTAURANT WITH DRIVE-THROUGH	1000 GFA	8.82	1.00	8.79
	HIGH TURNOVER RESTAURANT	1000 GFA	3.03	1.10	3.33
	GAS STATION w/CONVENIENCE MARKET	1000 GFA	2.40	0.50	1.20
	CONVENIENCE MARKET WITH GASOLINE PUMPS	1000 GFA	5.42	0.50	2.71
	GROCERY/SUPERMARKET	1000 GFA	2.40	0.52	1.25
	DISCOUNT CLUB	1000 GFA	2.93	1.12	3.29
	AUTO SALES	1000 GFA	2.43	1.26	3.07
	BANK	1000 GFA	7.73	0.74	5.74
	PHARMACY/DRUGSTORE WITH DRIVE-THROUGH	1000 GFA	3.91	0.55	2.13
	APPAREL STORE	1000 GFA	2.88	0.96	2.76
	MOVIE THEATER	SCREENS	14.60	0.93	13.61
	FURNITURE STORE	1000 GFA	0.08	1.32	0.11
	HOME IMPROVEMENT SUPERSTORE	1000 GFA	0.65	1.16	0.76
	HARDWARE/PAINT STORE	1000 GFA	1.23	0.45	0.56
	BUILDING MATERIALS/LUMBER STORE	1000 GFA	1.55	0.45	0.70
	NURSERY (GARDEN CENTER)	1000 GFA	5.21	0.74	3.87
	NURSERY (WHOLESALE)	1000 GFA	3.89	0.74	2.89
	HOTEL	ROOMS	0.38	1.17	0.45
	MOTEL	ROOMS	0.38	1.17	0.45
	ALL SUITES HOTEL	ROOMS	0.36	1.17	0.42
	AUTO CARE CENTER	1000 GFA	3.75	0.81	3.03
	QUICK LUBE SHOP	1000 GFA	2.43	0.81	1.96
	AUTO PARTS SALES	1000 GFA	0.77	0.81	0.62
	TIRE STORE	1000 GFA	3.98	1.16	4.63
	MINI-WAREHOUSE/SELF STORAGE	1000 GFA	0.17	1.79	0.30
INDUSTRIAL					
	GENERAL LIGHT INDUSTRIAL	1000 GFA	0.63	2.81	1.77
	MANUFACTURING	1000 GFA	0.67	2.90	1.95
	INDUSTRIAL PARK	1000 GFA	0.40	2.82	1.13
	WAREHOUSING	1000 GFA	0.19	2.50	0.47
INSTITUTIONAL					
	PRIVATE SCHOOL (K-12)	STUDENTS	0.17	1.16	0.20
	JUNIOR/COMMUNITY COLLEGE	STUDENTS	0.11	1.19	0.13
	UNIVERSITY/COLLEGE	STUDENTS	0.15	1.41	0.21
	DAY CARE CENTER	STUDENTS	0.20	0.46	0.09
	HOSPITAL	BEDS	0.97	1.46	1.42
	NURSING HOME	BEDS	0.59	1.46	0.86
	ASSISTED LIVING CENTER	BEDS	0.26	1.46	0.38
	PLACE OF WORSHIP	1000 GFA	0.49	0.70	0.34

* THIS REPRESENTS TOTAL SERVICE UNIT EQUIVALENCY FOR LAND USES NOT SPECIFIED IN THIS CATEGORY. ACTUAL EQUIVALENCY MAY VARY AND MAY BE DEMONSTRATED BY PROPERTY OWNER TO BE DIFFERENT.

DU = Dwelling Unit
GFA = Gross Floor Area
GLA = Gross Leasable Area

Chapter 4: Existing Conditions Analysis

Chapter 395 identifies specific requirements necessary in the capital improvements plan for impact fees. The existing conditions, including defining the existing roadway system, and analysis of the total capacity, the level of current usage, and commitments for usage of the existing roadway, are required as part of the capital improvements plan. This chapter discusses the existing conditions.

Existing Conditions

An inventory of the collector and arterial roadway facilities within the city limits was conducted to determine existing conditions throughout Rockwall. This analysis determines the capacity provided by the existing roadway system, the demand currently placed on the system, and the potential existence of deficiencies on the system. Updated data for the inventory was obtained from traffic volume counts conducted by the City and field reconnaissance of current roadway sections.

The roadways were divided into segments based on volume changes, major intersections, service area boundaries, and capacity changes. For each roadway segment, the length, number of lanes, cross-section, and PM peak hour volume data were obtained. Lane capacities were assigned to each segment based on functional street classification, associated roadway lane capacities and the present number of lanes. Lane capacities used in the analysis are shown in **Table 4.**

Table 4: Roadway Facility Vehicle-Mile Lane Capacities

Roadway Facility	Designation	Hourly Vehicle-Mile Capacity per Lane Mile of Roadway Facility
Divided Arterial	DA	600
Divided Collector	DC	500
Undivided Arterial	UA	575
Undivided Collector	UC	475
Special Arterial (with two-way left turn lane)	SA	450

Roadway hourly volume capacities are based on information reflecting Level-of-Service "C" operation, as identified in the transportation element of the Rockwall Comprehensive Plan.

Existing Volumes

Existing directional PM peak hour volumes were obtained from automated traffic counts conducted in May 2019 by the City. Automated traffic counts at 25 separate locations were collected on major roadways (as identified in the Thoroughfare Plan as arterial or collector status) throughout Rockwall. To minimize the total number of counts, data was collected at locations where traffic volumes would typify link volumes on the major segments within the immediate area. For segments not counted, existing volumes were used, or estimates were developed based on data from adjoining roadway counts.

Data was compiled for roadway segments throughout the city and entered into the database for use in calculations. A summary of volumes by roadway segment is included in **Appendix D** as part of the existing capital improvements database.

Vehicle-Miles of Existing Capacity Supply

An analysis of the total capacity for each service area was performed. For each roadway segment, the existing vehicle-miles of capacity supplied were calculated using the following equation:

Vehicle-Miles of Capacity = Link capacity per peak hour per lane x Number of lanes x Length of segment (miles)

A summary of the current capacity available on the roadway system is shown in **Table 5**. It is important to note that the roadway capacity depicted in Table 5 is system-wide for most major roadways and not restricted to those roadways proposed in the impact fee capital improvements plan. Directional calculations of capacity were performed separately. For a detailed listing of vehicle-miles of capacity by roadway segment, refer to Appendix D.

Vehicle-Miles of Existing Demand

The level of current usage in terms of vehicle-miles was calculated for each roadway segment. The vehicle-miles of existing demand were calculated by the following equation:

Vehicle-Miles of Demand = PM peak hour volume x Length of segment (miles)

Table 5 also lists total vehicle-miles of demand. Appendix D includes a detailed listing of vehicle-miles of demand by directional roadway segment.

Vehicle-Miles of Existing Excess Capacity and Deficiencies

For each roadway segment, the existing vehicle-miles of excess capacity and/or deficiencies were calculated. Each direction was evaluated to determine if vehicle demands exceeded the available capacity. If demand exceeded capacity in one or both directions, the deficiency is deducted from the supply associated with the impact fee capital improvement plan. A summary of peak hour excess capacity and deficiencies are shown in **Table 6**. A detailed listing of the existing excess capacity and deficiencies by roadway segment is also located in Appendix D.

Table 5: Peak Hour Vehicle-Miles of Existing Capacity and Demand

Service Area	Capacity (Veh-Mile)	Demand (Veh-Mile)
1	32,508	18,560
2	10,799	4,944
3	21,972	16,417
4	9,674	6,816
Total	74,952	46,738

Table 6: Peak Hour Vehicle-Miles of Excess Capacity and Deficiencies

Service Area	Excess Capacity (Veh-Mile)	Deficiencies (Veh-Mile)
1	15,085	1,137
2	5,854	0
3	6,480	925
4	3,666	808
Total	31,085	2,871

Chapter 5: Projected Conditions Analysis

Chapter 395 requires a description of all capital improvements or facility expansions and their costs necessitated by and attributable to new development within the service area. This chapter describes the projected growth, vehicle-miles of new demand, capital improvements program, vehicle-miles of new capacity supplied, and costs of the roadway improvements.

Projected Growth

The projected growth for each transportation service area is represented by the increase in the number of new vehicle-miles generated over the 10-year planning period. The basis for the calculation of new demand is the population and employment projections that were prepared as part of a technical report entitled Land Use Assumptions for Roadway Impact Fees by the Rockwall Planning Department in June 2019. Estimates of population and employment were prepared for the years 2019 and 2029.

Population data was provided in terms of the number of dwelling units, households and persons. Employment data is aggregated into three sectors of employees: basic, service and retail. These employment sectors serve as the typical components used in the traffic forecast modeling process. The employment grouping also correlate with the North American Industrial Classification (NAIC) system and include: basic employment (NAIC 210000-422999) generally encompasses the industrial and manufacturing uses; service employment (NAIC 520000-928199) encompasses government, office and professional uses; and retail employment (NAIC 440000-454390) generally includes commercial and retail use.

Projected Vehicle-Miles of New Demand

Projected vehicle-miles of demand were calculated based on the growth expected to occur during the 10-year planning period and the service unit generation for each of the population and employment data components (basic, service and retail). Separate calculations were performed for each data component and were then aggregated for the service area. Vehicle-miles of demand for population growth were based on dwelling units, and vehicle-miles of demand for employment were based on the number of employees and estimates of square footage per employee.

Land Use Equivalency for 10-Year Demand Estimate

Information extracted from the NCTCOG regional travel demand model, used for development of the Mobility 2040, provides information on average trip lengths for the residential and the three types of land uses. These are : 3.12 vehicle-miles per dwelling unit for residential, 1.77 vehicle-miles per thousand square feet for Basic and Retail employment, and 3.92 vehicle-miles per thousand square feet for Service employment.

Table 7 lists the projected vehicle-miles of demand over the 10-year planning period for Rockwall. **Appendix C** contains the projected demand calculation worksheet.

Table 7: Vehicle-Miles of New Demand

Service Area	Projected 10-Year Growth (Vehicle-Miles)
1	13,731
2	3,676
3	13,001
4	2,814
Total	33,222

Capital Improvements Program

Evaluation of Current Impact Fee CIP

At the outset of the update process, capacity of the CIP was evaluated to ensure that excess capacity remained in previously approved impact fee projects. Chapter 395 mandates that only CIP projects with excess capacity are eligible for consideration. The initial impact fee program contained only one project, John King Boulevard, which extended from the northern city limit to Goliad Street (SH205) just north of FM549. Traffic volume count data collected at several locations within this corridor was used to determine if excess capacity remains on this project. The analysis revealed all segments of John King Boulevard to contain excess capacity and therefore can be retained in the program.

New Impact Fee CIP – Recoupment & Future Projects

Recoupment Projects:

John King Boulevard was the lone project identified for the initial impact fee program in 2008 and 2013 update. At the time the impact fee system was initiated, not all portions of this roadway in the north were within the city limits. The segment between FM552 and SH205 was within the county and not eligible for impact fee consideration. With annexations in 2013, additional portions of the facility were included in the program.

Three of the added projects were recently implemented and are considered recoupment. Traffic counts were also conducted on these three to assess whether excess capacity remains in these projects.

Future Projects:

Two new CIP projects are future projects planned for implementation within the next 10 years. Costs estimates for new project segments were prepared by Freese and Nichols.

Actual costs for project recoupment were provided by City Staff. **Figure 2** illustrates the location of this capital improvement in relation to the city and associated service areas. Project costs were broken into general categories of construction, engineering, right-of-way and finance (debt service). The breakout of costs among the various service areas are listed in **Table 8**. The cost of the impact fee program is $145.9 million. When considering the state mandated credit (50%), the cost eligible for impact fee consideration totals $72.9 million. The impact fee CIP also includes the cost of two five-year updates estimated at $40,000 each.

Figure 2: Roadway Impact Fee Capital Improvement Plan

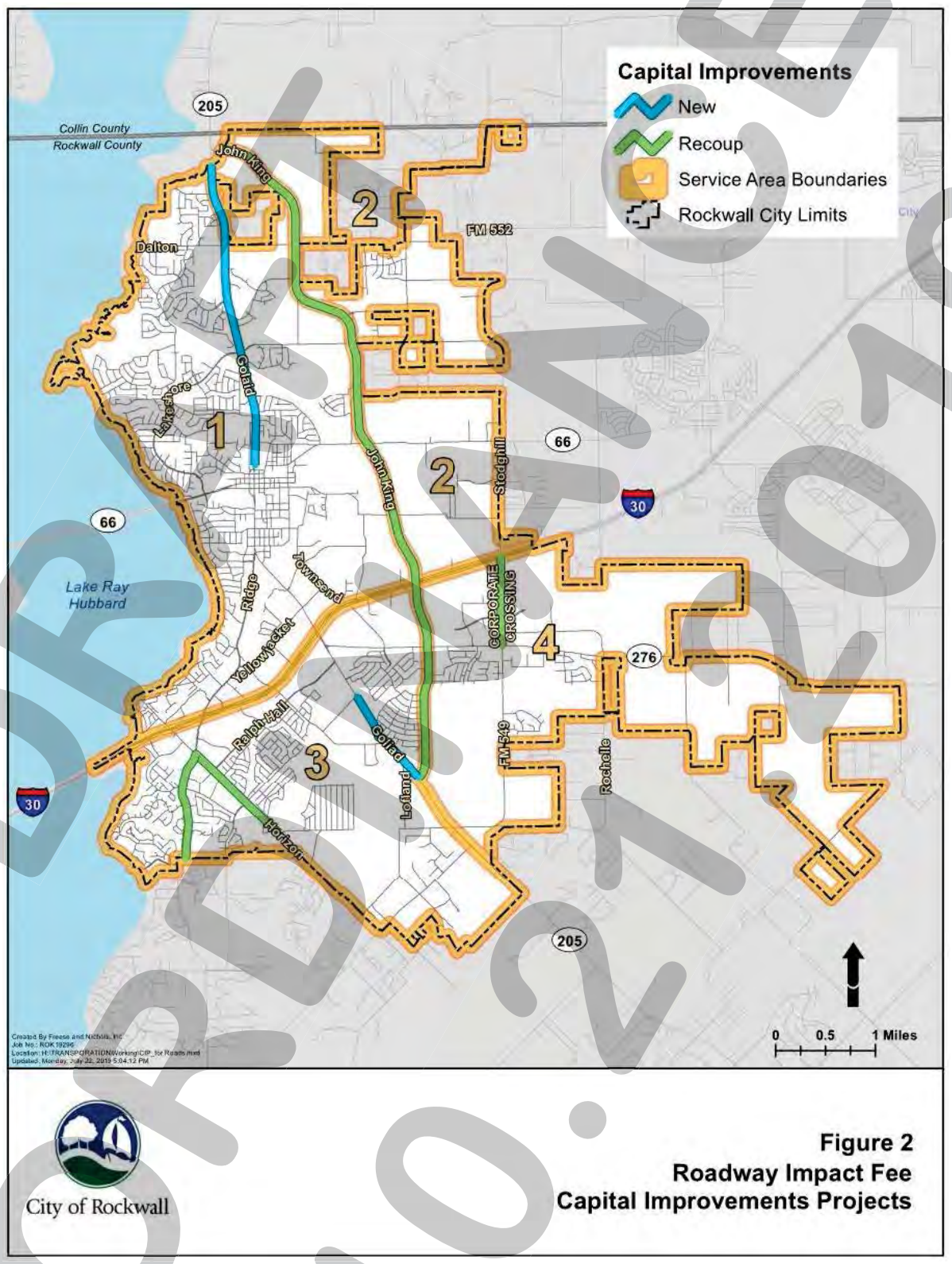


Table 8: Roadway Impact Fee Capital Improvements Plan

2019 Rockwall Roadway Impact Fee Study Update

Serv Area Number	CIP Year	Roadway	From	To	Length (mi)	No. of Lanes	Rdwy. Type	Pct. in Serv. Area	Project Status	Roadway Costs				Project Cost
										Engineering	*ROW*	*Construction**	*Finance*	
1/2	2007	John King	City Limit (near G	FM552	1.28	4	DA	50%	R	$363,513	$893,017	$3,000,276	$3,716,172	$7,972,977
1/2	2007	John King	FM 552	Quail Run	1.29	4	DA	50%	R	$366,353	$899,994	$3,023,715	$3,745,205	$8,035,266
1/2	2007	John King	Quail Run	SH 66	1.04	4	DA	50%	R	$295,354	$725,576	$2,437,724	$3,019,390	$6,478,044
1/2	2007	John King	SH 66	IH 30 WB FR	1.47	4	DA	50%	R	$417,472	$1,025,574	$3,445,629	$4,267,792	$9,156,466
1	2019	SH 205 (Goliad St)	Olive	Live Oak	0.33	4	SA	100%	N	$236,600	$17,300	$3,380,500	$0	$3,634,400
1	2019	SH 205 (Goliad St)	Olive	N. City Limit	2.98	4	DA	100%	N	$2,481,248	$314,700	$35,446,400	$0	$38,242,348
Sub-total SA 1					**8.39**					**$4,160,539**	**$3,876,160**	**$50,734,244**	**$14,748,559**	**$73,519,502**
2/1	2007	John King	City Limit (near G	FM552	1.28	4	DA	50%	R	$363,513	$893,017	$3,000,276	$3,716,172	$7,972,977
2/1	2007	John King	FM 552	Quail Run	1.29	4	DA	50%	R	$366,353	$899,994	$3,023,715	$3,745,205	$8,035,266
2/1	2007	John King	Quail Run	SH 66	1.04	4	DA	50%	R	$295,354	$725,576	$2,437,724	$3,019,390	$6,478,044
2/1	2007	John King	SH 66	IH 30 WB FR	1.47	4	DA	50%	R	$417,472	$1,025,574	$3,445,629	$4,267,792	$9,156,466
Sub-total SA 2					**5.08**					**$1,442,691**	**$3,544,160**	**$11,907,344**	**$14,748,559**	**$31,642,754**
3/4	2007	John King Blvd	IH 30 EB FR	SH 276	0.89	4	DA	50%	R	$107,472	$231,933	$1,098,543	$2,455,941	$3,893,889
3/4	2007	John King Blvd	SH 276	Goliad	1.34	4	DA	50%	R	$162,580	$350,860	$1,661,837	$3,715,260	$5,890,537
3	2019	SH 205 (Goliad St)	Sids	John King Blvd	0.96	6	DA	100%	N	$974,148	$101,900	$13,916,400	$0	$14,992,448
3	2019	FM3097/Horizon	Ridge Road	County Line Rd	1.13	4	DA	100%	R	$0	$0	$900,000	$0	$900,000
3	2019	FM740/Ridge Rd	Horizon	S. City Limit	1.10	4	DA	100%	R	$0	$0	$472,902	$0	$472,902
Sub-total SA 3					**5.42**					**$1,244,200**	**$684,694**	**$18,049,682**	**$6,171,201**	**$26,149,776**
4/3	2007	John King Blvd	IH 30 EB FR	SH 276	0.89	4	DA	50%	R	$107,472	$231,933	$1,098,543	$2,455,941	$3,893,889
4/3	2007	John King Blvd	SH 276	Goliad	1.34	4	DA	50%	R	$162,580	$350,860	$1,661,837	$3,715,260	$5,890,537
4	2019	FM 549 (Corp Crossing)	IH30	SH276	0.87	4	DA	100%	R	$0	$0	$4,724,665	$0	$4,724,665
Sub-total SA 4					**3.09**					**$270,052**	**$582,794**	**$7,485,045**	**$6,171,201**	**$14,509,091**
Totals:					**13.80**					**$7,117,483**	**$8,687,808**	**$88,176,313**	**$41,839,518**	**$145,821,123**

	City portion of construction of John King Blvd. (formerly 205 By-Pass):*	***100%***

Totals:

Engineering Cost	$7,117,483
Right-of-Way Cost	$8,687,808
Construction Cost	$88,176,313
Finance Cost	$41,839,518
TOTAL NET COST	$145,821,123
Future Impact Fee Update C	$80,000
TOTAL IMPLEMENTATION	$145,901,123

Notes: * City's portion of costs incurred. (No particiaption by other agencies.)
Cost figures provided by the City.

Notes:

DA- Divided Arterial

N- New Impact Fee Project

R- Impact Fee Recoupment Project

Projected Vehicle-Miles Capacity Available for New Growth

The vehicle-miles of new capacity supply were calculated similar to the vehicle-miles of existing capacity supplied. The equation used was:

Vehicle-Miles of New Capacity Supplied = Link capacity per peak hour per lane x Num. of lanes within Service Area x Length of segment (miles)

Vehicle-miles of new supply provided by the CIP are listed in **Table 9**. While the project has not been built, there are system deficiencies (by service area) that have been removed from the total supply to properly account for new "net" availability. Table 9 depicts net availability of supply by the CIP. **Appendix E** details capacity calculations provided by the CIP program.

Table 9: Vehicle-Miles of New Capacity Supplied

Service Area	Vehicle-Miles of New Capacity Supplied	Vehicle-Miles of Net New Capacity Supplied
1	13,836	5,869
2	6,096	3,114
3	11,489	4,476
4	4,751	2,405
Total	36,172	15,864

Cost of Roadway Improvements

The total and net cost to implement the roadway improvements plan projects by service area is shown in **Table 10**. If traffic exists on proposed CIP project roadways or there are any deficiencies present in each respective service area, the total system cost is adjusted to reflect the net capacity being made available by the impact fee program. In other words, only the unused portion of the CIP and its associated costs are considered eligible. A detailed listing by project segment in each service area can be found in **Appendix F**. **Appendix G** details system costs by service area.

Table 10: Summary of Roadway Improvements Plan Cost Analysis

Service Area	Actual Cost of Proposed Impact Fee Program	Adjusted Cost (50% Credit) of Proposed Impact Fee Program
1	$73,550,103	$36,775,052
2	$31,656,236	$15,828,118
3	$26,175,186	$13,087,593
4	$14,519,597	$7,259,799
Total	$145,901,123	$72,950,562

State law is specific in identifying that only the portion of the CIP necessitated and attributable to new development is eligible for cost recovery. For example, if only 60% of the net service units supplied by the CIP are needed in the next 10 years, only 60% of the cost (credited at 50% per legislative requirements) may be considered in the calculation of fees. All the capacity provided by the impact fee CIP will be necessitated to address future growth over the 10-year planning period. The cost attributable to new

growth is $31.9 million and represents the citywide cost to implement projects on the impact fee program. **Table 11** depicts CIP costs attributable to new growth by service area.

Table 11: Capital Improvements Plan Costs Attributable to New Development

Service Area	Adjusted Cost (50% Credit) of Net New Capacity	Adjusted Cost (50% Credit) Attributable to New Growth
1	$15,598,596	$15,598,596
2	$8,084,777	$8,084,777
3	$5,098,520	$5,098,520
4	$3,675,714	$3,675,714
Total	$31,993,304	$31,993,304

Chapter 6: Calculation of Impact Fees

This chapter discusses the calculation of the cost per service unit and the calculation of roadway impact fees. The transportation impact fee will vary by the land use, service area, and size of the development. Examples are included to better illustrate the method by which the transportation impact fees are calculated.

Cost Per Service Unit

The cost per service unit is calculated by dividing the cost of the CIP necessitated and attributable to new demand (net cost) by the projected service units of growth over the 10-year planning period.

Generally, the cost per service unit varies by service area because of variations in cost of CIP, projected growth and the number of service units necessitated by new growth between zones. Where net capacity supplied is greater than demand, the cost per service unit is simply the cost of the net capacity divided by the number of service units provided. In this case, only the portion of the CIP necessitated by new development is used in the calculation. If the net capacity supplied is *less* than projected new demand, then the cost per service unit is calculated by dividing the total cost of net supply by the portion of new demand attributable and necessary by development. The result is generally a decrease in the cost per service unit, because such cost is spread over the larger number of service units of growth.

Table 12 lists the results of the cost per service unit calculation by service area. The actual cost per service unit reflects the true burden to the City for the implementation of the roadway capital improvements program. As per state law, a credit for the portion of ad-valorem tax revenues generated by improvements over the program period, or a credit equal to 50% of the total projected cost of implementing the capital improvements plan must be given. Based on this analysis, the maximum collection rate reflects the maximum amount per service unit that can be charged to follow the state statute. **Appendix G** details the maximum fee per service unit calculation for each service area.

Table 12: Cost Per Service Unit Summary

Service Area	Actual Cost Per Service Unit	Maximum Fee per Service Unit (50% Credit)
1	$2,272.00	$1,136.00
2	$4,398.00	$2,199.00
3	$784.00	$392.00
4	$2,612.00	$1,306.00
Total	$1,926.00	$963.00

Calculation of Roadway Impact Fees

The calculation of roadway impact fees for new development involves a two-step process. Step one is the calculation of the total number of service units that will be generated by the development. Step two is the calculation of the impact fee due by the new development.

Step 1: Determine number of service units (vehicle-miles) generated by the development using the equivalency table.

No. of Development Units	x	Vehicle-miles per development unit	=	Development's Vehicle-miles

Step 2: Calculate the impact fee based on the fee per service unit for the service area where the development is located.

Development's Vehicle-miles	x	Fee per vehicle-mile	=	Impact Fee due from Development

Examples: The following fees would be assessed to new developments in Service Area 3 if the cost per service unit were retained at the current collection rate $256.00 (adopted in 2008, retained in 2013).

Single-Family Dwelling

1 dwelling unit x 3.12 vehicle-miles/dwelling unit = 3.12 vehicle-miles
3.12 vehicle-miles x $256.00 /vehicle-mile = $798.72

20,000 square foot (s.f.) Office Building

20 (1,000 s.f. units) x 3.92 vehicle-miles/1,000 s.f. units = 78.40 vehicle-miles
78.40 vehicle-miles x $256.00 /vehicle-mile = $20,070.40

100,000 s.f. Retail Center

100 (1,000 s.f. units) x 1.77 vehicle-miles/1,000 s.f. units = 177.00 vehicle-miles
177.00 vehicle-miles x $256.00 /vehicle-mile = 45,312.00

200,000 s.f. Industrial Development

200 (1,000 s.f. units) x 1.77 vehicle-miles/1,000 s.f. units = 354.00 vehicle-miles
354.00 vehicle-miles x $256.00 /vehicle-mile = $90,624.00.

Chapter 7: Conclusions

Chapter 395 authorizes the assessment and collection of impact fees in Texas for transportation related capital improvements that must be met in order to assess and collect impact fees. This study was conducted to fulfill the requirements of Chapter 395 in developing a transportation-related impact fee for the City of Rockwall.

Three service areas were created for Rockwall. This service area structure was configured so that no point is greater than the six-mile maximum set forth by law. The six-mile limit ensures that roadway improvements are near the development paying the fees that it serves.

Vehicle-miles of travel in the PM peak hour are used as the service unit for calculating and assessing impact fees. Vehicle-miles establish a relationship between the intensity of land development and the demand on the roadway system using published trip generation data and average trip length. The PM peak hour is used as the time period for assessment because typically the greatest demand for roadway capacity occurs during this hour. Additionally, roadways are sized to meet this demand and roadway capacity can more accurately be defined on an hourly basis.

The service units (vehicle-miles) for new development are a function of trip generation and the average trip length for specific land uses. Trip generation information was based on data published by the Institute of Transportation Engineers as reported in the initial study. Where appropriate, trip generation rates were adjusted to reflect the primary trip purpose. This ensures that new development is assigned for the portion of trips associated with that specific development. Average trip length data was based on information compiled by NCTCOG and based on data from a NCTCOG Workplace Survey, statistics from the US Census Bureau National Workplace Survey and tailored to Rockwall.

The result of combining trip generation and trip length information is an equivalency table that establishes a service unit rate for various land uses. Separate rates were established for specific land uses within the broader categories of residential, community, industrial and institutional uses.

An analysis of existing conditions revealed that the current roadway system provides over 74,952 vehicle-miles of capacity. The existing demand placed on the system was determined to be 46,738 vehicle-miles. Evaluation of the existing roadway system found 2,871 vehicle-miles of deficiencies on the existing roadway network.

Projected growth, in terms of vehicle-miles over the 10-year planning period, was based on population and employment data that was prepared in the Land Use Assumptions for Roadway Impact Fees dated August 2019 by the City Planning Department. Based on this growth, the projected vehicle-miles of demand calculated to be 33,222.

Rockwall City Staff identified the roadway impact fee capital improvements program for the 10-year planning period. Projects eligible for this CIP include arterial and collector streets that have been designated on the officially adopted Thoroughfare Plan of the City. Developer funded roadways are not eligible for inclusion in calculating impact fees. Projects totaling $145.9 million, was identified for impact fee consideration based on need, projected growth, project affordability and achievability, financial

considerations, jurisdictional issues, the Thoroughfare Plan, and staff recommendation. The credited (50%) cost attributable to new growth is $72.94 million and represents 100% of the net capacity made available for development by impact fee roadway projects. The recommended CIP program will provide 15,864 vehicle-miles of new net capacity.

The *actual* cost per service unit was calculated to be between $784.00 and $4,398.00 and was based on the total cost of net capacity supplied by the CIP and the demand attributable to new development over the 10-year planning period. State legislation requires that a credit for the portion of ad-valorem tax revenues generated by improvements over the program period, or a credit equal to 50% of the total projected cost of implementing a roadway impact fee capital improvements program be given. Based on a 50% credit, the cost per service unit ranges between $392.00 and $2,199.00.

The determination of fees due from new development is based upon the size of development, its associated service unit generation (equivalency table) and the cost per service unit derived or adopted for each service area.

APPENDICES

City of Rockwall

A. Roadway Impact Fee Definitions

ROADWAY IMPACT FEE DEFINITIONS

Average Trip Length - the average actual travel distance between two points. The average trip length by specific land use varies.

Diverted Trip - similar to pass-by trip, but a diversion is made from the regular route to make an interim stop.

Impact Fee - a charge or assessment imposed by a city against new development to generate revenue for funding or recouping roadway improvements necessitated and attributable to new development.

Land Use Equivalency – correlation of a land use to the rate of vehicle miles CIP of network capacity it would consume

Maximum Fee Per Service Unit - the highest impact fee that may be collected by the City per vehicle-mile of supply. Calculated by dividing the costs of the capital improvements by the total number of vehicle-miles of demand expected in the 10-year planning period.

Pass-by Trip - a trip made as an intermediate stop on the way from an origin to a primary trip destination. For example, a stop at a convenience store on the way to office from home.

PM Peak Hour - the hour when the highest volume of traffic typically occurs. Data collection (May 2019) revealed the peak hour of travel between 5:00 and 6:00 pm for Rockwall.

PM Peak Hour Traffic Counts - the number of vehicles passing a certain point during the peak hours of travel. Traffic counts are conducted during the PM peak hour because the greatest demand for roadway capacity occurs during this hour.

Primary Trip - a trip made for the specific purpose of visiting a destination; for example, from home to office.

Roadway Demand - the demand placed on the roadway network as a result of development. Determined by multiplying the trip generation of a specific land use by the average trip length.

Roadway Supply (or Capacity) - the number of service units provided by a segment of roadway over a period of time. Determined by multiplying the lane capacity by the roadway length.

Service Area - the area within the city boundaries to be served by capital improvements. Criteria for developing the service area structure include; 1) restricted to six-mile limit by legislation (to ensure proximity of roadway improvements to development), 2) conforms to census or forecast model boundaries, 3) projects on CIP as boundaries, 4) effort to match roadway supply with projected demand, or 5) city limit boundaries.

Service Unit - a measure of use or generation attributable to new development for roadway improvements. Also used to measure supply provided by existing and proposed roadway improvements.

Trip - a single, one-direction vehicle movement from an origin to a destination.

Trip Generation - the total trip ends for a land use over a given period or the total of all trips entering and exiting a site during that designated time. Used in the development of the land use equivalency table for Rockwall. Based primarily on data prepared by the Institute of Transportation Engineers (ITE).

Vehicle - for impact fee purposes, any motorized appurtenance that carries passengers and/or goods on the roadway system during peak periods of travel.

Vehicle-mile - a unit used to express both supply and demand provided by, and placed on, the roadway system. A combination of a number of vehicles traveling during a given time period and the distance in which these vehicles travel in miles.

B. Land Use Definitions

LAND USE DEFINITIONS

Residential

Single-Family Detached - Any single-family detached home on an individual lot is included in this category. A typical example of this land use is a home in a suburban subdivision. Also included are duplex residential units and manufactured homes and other residential land uses not specified above.

Multi-Family - This land use includes both low-rise ("walk-up" dwellings) and high-rise multi-family apartments. An apartment is defined as a dwelling unit that is located within the same building with three or more dwelling units. Also included in this land use are residential condominiums, townhomes, triplex and quadplex units. Residential condominiums and townhomes are defined as single-family units that have at least one other single-family unit within the same building structure.

Independent Senior Living Facility - Retirement communities - restricted to adults or senior citizens - contain residential units like apartments or condominiums and are usually self-contained villages. They may also contain special services such as medical facilities, dining facilities, and some limited supporting retail facilities.

Office (Service)

General Office Building - A general office building houses one or more tenants and is the location where affairs of a business, commercial or industrial organization, and professional activity are conducted. The building or buildings may be limited to one tenant or contain a mixture of tenants including professional services, insurance companies, investment brokers, company headquarters, and services for the tenants such as a bank or savings and loan, a restaurant or cafeteria, and several retail facilities. Also included in this category are office parks, and other office uses not specified above.

Medical Office Building – A building that provides diagnoses and outpatient care on a routine basis but is unable to provide prolonged in-house medical and surgical care. One or more private physicians or dentists generally operate this type of facility.

Commercial/Retail

General Retail – General retail includes a variety of land uses that include shopping centers, home improvement stores, hardware stores selling a complete assortment of food, household goods and materials, apparel, servicing items. A shopping center is an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. It is related to its market area in terms of size, location, and type of store. Shopping centers provide on-site parking facilities. Some centers may include non-merchandising uses such as small office professional services, post offices, banks, health clubs, video rentals, and recreational facilities such as ice-skating rinks or video arcades.

Restaurant - This land use consists of sit-down eating establishments. Quality and high-turnover (sit-down) restaurants are included in this category. Quality restaurants usually have a turnover rate of at least one hour or longer. The turnover rate for a high-turnover (sit-down) restaurant is usually less than one hour.

Fast Food Restaurant - This category includes fast food restaurants with or without drive-through windows, such as McDonalds, Burger King, Dunkin Donuts, and Taco Bell. Some establishments may include an indoor or outdoor playground.

Convenience Store/Gas Station - Any convenience market that sells convenience foods, newspapers, magazines, and often, beer and wine and may have gasoline pumps. Gas stations generally are located at intersections or freeway interchanges and may include facilities for servicing, repairing, fueling motor vehicles and may have convenience stores. Convenience stores/gas stations that have a fast-food restaurant contained within should be calculated on a separate basis based on the appropriate independent variable.

Bank - This land use includes walk-in and drive-in banks. Walk-in banks are generally free-standing buildings with their own parking lots. These banks do not have drive-in windows. Drive-in banks provide banking facilities for the motorist while in a vehicle; many also serve patrons who walk into the building. Savings and loan companies should also be included in this category.

Hotel/Motel – A place of lodging that provides sleeping accommodations, small restaurants, lounges, and meeting spaces. Some hotels or motels may provide banquet rooms or other retail and service shops.

Furniture and Appliance Sales - A store specializing in the sale of furniture, household appliances and goods and often, carpeting.

Theater – This land use consists of a movie or live theater and contains audience seating, single or multiple auditoriums, lobby, offices and refreshment stands.

Self-Storage Facilities - A self-serve storage unit or vault that is rented for the storage of goods. Each unit is physically separated from other units and access is usually provided through an overhead door or other common access point.

Industrial (Basic)

General Industrial – General industrial includes a variety of land uses such as light industrial, manufacturing, salvage, facilities for preparation/assembly and warehouse/distribution of goods. Other uses include materials testing laboratories, high-tech facilities and assemblers of technical equipment. Most facilities are free standing and devoted to a single use. Also included in this category are any other industrial uses not specified above.

Manufacturing – Facilities where the primary activity is the conversion or fabrication of raw materials to finished products. In addition to production of goods, manufacturing facilities may also have ancillary office, warehouse and associated functions.

Warehousing – These facilities are primarily devoted to the storage of materials. These facilities differ from mini warehouse in that they are generally not self-service in nature.

Institutional

Private School - Private schools serve students between the kindergarten and middle school or high school levels. Private schools are usually centrally located in residential communities in order to facilitate student access and have no student drivers.

Community College - Community college provides two and four-year advanced degrees. Vocational and technical schools are other uses that may fall under this category.

Day Care Center - A day care center is a facility where care for pre-school age children is provided, normally during the daytime hours. Day care facilities generally include classrooms, offices, eating areas, and playgrounds. Some centers also provide after-school care for older children.

Hospital - A hospital is any institution where medical or surgical care is given to non-ambulatory and ambulatory patients, and overnight accommodations are provided.

Nursing Home - A nursing home is any facility whose primary purpose is to care for persons who are unable to care for themselves. The term applies to rest homes, chronic care, and convalescent homes.

Religious Facilities – Churches, synagogues or houses of worship that provide public worship services, and generally house an assembly hall or sanctuary, meeting rooms, classrooms, and occasionally dining, catering, or party facilities.

Activity Centers – A recreational center or private club such as a YMCA that may offer classes and clubs for adults and children; a day care or a nursery school, meeting rooms, swimming pools and whirlpools; saunas, tennis, racquetball and handball courts, exercise classes, weightlifting equipment and locker rooms. Some may offer a small restaurant or snack bar within.

U.S. Post Office – A building that contains service windows for mailing packages and letters, post office boxes, offices, sorting and distributing facilities for mail and vehicle storage areas.

C. Calculation of Vehicle-Miles of New Demand

2019-2029 Vehicle-Mile Trip Generation, Rockwall Roadway Impact Fee Study

Based on June 2019 Land Use Assumptions by City of Rockwall; ITE 10th-Trip Gen., NCTCOG Avg. Trip Lengths; FNI employee densities.

Estimated Residential Growth Vehicle-Mile Trip Generation (single family detached, typ.)

Service Area	Added Dwelling Units	Vehicle-Miles per DU	Total Vehicle-Miles
1	1,740	3.12	5,426
2	917	3.12	2,860
3	2,030	3.12	6,331
4	757	3.12	2,361

Estimated Basic Employment Growth Vehicle-Mile Generation (general light industrial, typ.)

Service Area	Added Employees	Square Feet per emp.	Total Square Feet	Vehicle-Miles Per 1000/SF	Total Vehicle-Miles
1	750	1500	1,125,000	1.77	1,992
2	102	1500	153,000	1.77	271
3	9	1500	13,500	1.77	24
4	0	1500	0	1.77	0

Estimated Service Employment Growth Vehicle-Mile Generation (general office building, typ.)

Service Area	Added Employees	Square Feet per emp.	Total Square Feet	Vehicle-Miles Per 1000/SF	Total Vehicle-Miles
1	1,726	500	863,000	3.92	3,384
2	130	500	65,000	3.92	255
3	2,242	500	1,121,000	3.92	4,396
4	169	500	84,500	3.92	331

Estimated Retail Employment Growth Vehicle-Mile Generation (retail/shopping center, typ.)

Service Area	Added Employees	Square Feet per emp.	Total Square Feet	Vehicle-Miles Per 1000/SF	Total Vehicle-Miles
1	1,654	1000	1,654,000	1.77	2,929
2	164	1000	164,000	1.77	290
3	1,271	1000	1,271,000	1.77	2,251
4	69	1000	69,000	1.77	122

2013-2023 Vehicle-mile Generation Summary

Service Area	Residential Growth Vehicle-Miles	Basic Growth Vehicle-Miles	Service Growth Vehicle-Miles	Retail Growth Vehicle-Miles	Total Growth Vehicle-Miles
1	5,426	1,992	3,384	2,929	**13,731**
2	2,860	271	255	290	**3,676**
3	6,331	24	4,396	2,251	**13,001**
4	2,361	0	331	122	**2,814**
Total	16,977	2,286	8,367	5,592	**33,222**

City of Rockwall

D. Existing Capital Improvements

EXISTING CAPITAL IMPROVEMENTS

Definitions

LANES	The total number of lanes in both directions available for travel.
TYPE	The type of roadway (used in determining capacity): DA = divided arterial UA = undivided arterial UC = undivided collector
PK-HR VOLUME	The existing volume of cars on the roadway segment traveling during the afternoon (P.M.) peak hour of travel. A and B indicate the two directions of travel. Direction A is a northbound or eastbound and direction B is southbound or westbound. If only one half of the roadway is located within the service area (see % in service area), the opposing direction will have no volume in the service area.
% IN SERVICE AREA	If the roadway is located on the boundary of the service area (with the city limits running along the centerline of the roadway), then half of the roadway is inventoried in the service area and the other half is not. This value is either 50% or 100%.
VEH-MI SUPPLY PK-HR	The number of total service units (vehicle-miles) supplied within the service area, based on the length and established capacity of the roadway type.
VEH-MI TOTAL DEMAND PK-HR	The total service unit (vehicle-mile) demand created by existing traffic on the roadway segment in the afternoon peak hour.
EXCESS CAPACITY PK-HR VEH-MI	The number of service units supplied but unused by existing traffic in the afternoon peak hour.
EXISTING DEFICIENCIES PK-HR VEH-MI	The number of service units of demand in excess of the service units supplied.

NOTE: Excess capacity and existing deficiencies are calculated separately for each direction. It is possible to have excess capacity in one direction and an existing deficiency in the other. When both directions have excess capacity or deficiencies, the total for both directions are presented.

2019 Rockwall Roadway Impact Fee Study Update
Existing Capital Improvements Analysis

Serv Area	Roadway	From	To	Length (mi)	No. of Lanes	Type	PM Pk Cap per Lane	Pct. in Serv. Area	IF on CIP	Peak Hour Volume A	B	Total	VMT Supply Pk Hr Total	VMT Demand Pk Hr Total	Excess VMT Capacity	Exist. VMT Deficiency
1	Goliad	N . City Limit	FM 552	0.57	2	UA	575	100%	N	300	300	600	656	342	314	0
1	Goliad	FM 552	Ridge Road W.	0.67	2	UA	575	100%	N	450	460	910	771	610	161	0
1	Goliad	Ridge Road W.	Quail Run	0.45	2	UA	575	100%	N	600	618	1218	518	548	0	31
1	Goliad	Quail Run	Caruth	0.48	2	UA	575	100%	N	830	804	1634	556	790	0	234
1	Goliad	Caruth	Heath	1.00	2	UA	575	100%	N	850	820	1670	1146	1664	0	518
1	Goliad	Heath	Olive	0.27	2	UA	575	100%	N	900	900	1800	311	486	0	176
1	Goliad	Olive	Washington	0.18	6	DA	600	100%	N	1135	1088	2223	650	401	249	0
1	Goliad	Washington	Ridge Road	0.65	6	DA	600	100%	N	1810	1040	2850	2355	1864	497	7
1	Goliad	Ridge Road	IH 30 WB FR	0.99	6	DA	600	100%	N	1158	642	1800	3554	1777	1777	0
1	Ridge Road	Goliad	Yellow Jacket	0.58	4	DA	600	100%	N	1275	900	2175	1384	1254	173	43
1	Ridge Road	Yellow Jacket	IH 30 WB FR	0.61	4	DA	600	100%	N	1371	1138	2509	1464	1530	38	104
1	John King	City Limit (near Goliad)	FM552	1.28	4	DA	600	50%	Y	0	275	275	1536	352	1184	0
1	John King	FM 552	Quail Run	1.29	4	DA	600	50%	Y	0	500	500	1548	645	903	0
1	John King	Quail Run	SH 66	1.04	4	DA	600	50%	Y	0	550	550	1248	572	676	0
1	John King	SH 66	IH 30 WB FR	1.47	4	DA	600	50%	Y	0	615	615	1764	904	860	0
1	Yellow Jacket	Ridge Road	Goliad	0.89	4	DC	500	100%	N	228	274	502	1780	447	1333	0
1	Yellow Jacket	Goliad	T.L. Townsend	0.28	4	DC	500	100%	N	126	87	213	560	60	500	0
1	Townsend	IH 30 WB FR	Yellow Jacket	0.27	4	DA	600	100%	N	160	142	302	648	82	566	0
1	FM 552	Goliad	E. City Limits	0.71	2	UA	575	100%	N	359	355	714	817	507	310	0
1	Lakeshore	Goliad	Lake Forest	0.95	4	DC	500	100%	N	391	319	710	1900	675	1226	0
1	Lakeshore	Lake Forest	Rusk	1.29	4	DC	500	100%	N	195	159	354	2580	457	2123	0
1	Quail Run	Goliad	John King Blvd	1.13	2	UA	575	100%	N	168	172	340	1300	384	915	0
1	Heath	Goliad	SH 66	0.60	2	UC	475	100%	N	176	101	277	567	165	402	0
1	Rusk	Lake Ray Hubbard	Cemetery	0.53	4	DA	600	100%	N	1161	675	1836	1277	977	300	0
1	Rusk	Cemetery	Goliad	0.22	6	DA	600	100%	N	1361	875	2236	802	498	304	0
1	Rusk	Goliad	Fanin	0.10	4	DA	600	100%	N	330	330	660	236	65	171	0
1	SH66	Heath	John King Blvd	0.51	2	UA	575	100%	N	623	371	994	584	505	104	24
Sub-Total SA1				*5.08*									*32,508*	*18,560*	*15,085*	*1,137*
2	Cornelius	FM 1141	FM 549	1.04	2	UC	475	100%	N	50	50	100	988	104	884	0
2	FM 1141	City Limit (Clem)	FM 552	0.64	2	UA	575	100%	N	61	60	121	736	77	659	0
2	FM 1141	John King Blvd	Cornelius	0.40	2	UA	575	100%	N	120	80	200	460	80	380	0
2	John King	City Limit (near Goliad)	FM552	1.28	4	DA	600	50%	Y	300	0	300	1536	384	1152	0
2	John King	FM 552	Quail Run	1.29	4	DA	600	50%	Y	550	0	550	1548	710	839	0
2	John King	Quail Run	SH 66	1.04	4	DA	600	50%	Y	650	0	650	1248	676	572	0
2	John King	SH 66	IH 30 WB FR	1.47	4	DA	600	50%	Y	825	0	825	1764	1213	551	0
2	SH66	John King Blvd	Stodghill (FM 549)	1.31	2	UA	575	100%	N	550	245	795	1507	1041	465	0
2	Stodghill (FM 549)	IH 30 WB FR	SH 66	0.88	2	UA	575	100%	N	449	300	749	1012	659	353	0
Sub-Total SA2				*9.35*									*10,799*	*4,944*	*5,854*	*0*
3	Ridge	IH 30 EB FR	Horizon	0.63	4	DA	600	100%	N	892	1031	1923	1512	1211	301	0
3	Ridge	Horizon	S. City Limit	1.24	4	DA	600	100%	N	880	955	1835	2976	2275	701	0
3	Horizon	IH 30 EB FR	Ridge	0.31	4	DA	600	100%	N	700	800	1500	744	465	279	0
3	Horizon	Ridge	Ralph Hall	0.23	4	DA	600	100%	N	719	816	1535	552	353	199	0
3	Horizon	Ralph Hall	Tubbs	0.48	4	DA	600	100%	N	611	775	1386	1152	665	487	0
3	Horizon	Tubbs	FM 549	1.85	2	UA	575	100%	N	411	494	905	2128	1674	453	0
3	Ralph Hall	Horizon	Market Center	0.68	4	DA	600	100%	N	890	950	1840	1632	1251	381	0
3	Ralph Hall	Market Center	Goliad	0.36	4	DA	600	100%	N	892	957	1849	864	666	198	0
3	Goliad	IH 30 EB FR	SH 276	0.13	6	DA	600	100%	N	1550	1700	3250	452	408	44	0
3	Goliad	SH 276	Ralph Hall	0.20	6	DA	600	100%	N	1355	1587	2942	713	582	130	0
3	Goliad	Ralph Hall	Sids	0.41	6	DA	600	100%	N	805	1089	1894	1473	775	698	0
3	Goliad	Sids	John King Blvd	1.01	2	UA	575	100%	N	680	807	1487	1162	1502	0	340
3	Goliad	John King Blvd	FM 549	0.88	2	UA	575	50%	N	0	825	825	504	723	0	219
3	Goliad	FM 549	S. City Limit	0.28	2	UA	575	50%	N	0	1025	1025	160	285	0	125
3	John King Blvd	IH 30 EB FR	SH 276	0.89	4	DA	600	50%	Y	0	871	871	1063	772	291	0
3	John King Blvd	SH 276	Goliad	1.34	4	DA	600	50%	Y	0	225	225	1608	302	1307	0
3	S. FM549	Goliad	Horizon (FM3097)	1.28	2	UA	575	100%	N	398	413	811	1472	1038	434	0
3	SH 276	Goliad	John King Blvd	1.01	2	UA	575	100%	N	645	743	1388	1162	1402	0	240
3	T.L. Townsend	IH 30 EB FR	SH 276	0.56	2	UA	575	100%	N	33	86	119	644	67	577	0
Sub-Total SA 3				*2.23*									*21,972*	*16,417*	*6,480*	*925*
4	SH 276	John King Blvd	FM 549	0.74	2	UA	575	100%	N	600	820	1420	854	1055	0	201
4	SH 276	FM 549	Rochelle	1.01	2	UA	575	100%	N	545	969	1514	1162	1529	30	398
4	SH 276	Rochelle	E. City Limits	0.68	2	UA	575	100%	N	245	475	720	779	488	291	0
4	Goliad	John King Blvd	FM 549	0.88	2	UA	575	50%	N	805	0	805	504	706	0	202
4	Goliad	FM 549	S. City Limit	0.28	2	UA	575	50%	N	605	0	605	160	168	0	8
4	John King Blvd	IH 30 EB FR	SH 276	0.89	4	DA	600	50%	Y	656	0	656	1063	581	482	0
4	John King Blvd	SH 276	Goliad	1.34	4	DA	600	50%	Y	225	0	225	1608	302	1307	0
4	FM 549	IH 30 EB FR	SH 276	0.89	2	UA	575	100%	N	346	409	755	1019	669	350	0
4	FM 549	SH 276	FM 1139	1.84	2	UA	575	100%	N	268	275	543	2116	999	1117	0
4	FM 1139	Goliad (SH205)	E. City Limits	0.43	2	UC	475	100%	N	368	375	743	409	320	89	0
Sub-Total SA 4				8.96746									*9674*	*6816*	*3666*	*808*
Total				**25.62**									**74,952**	**46,738**	**31,085**	**2,871**

Notes:
DA- Divided Arterial
UA- Undivided Arterial
UC- Undivided Collector

City of Rockwall

E. Roadway Improvement Plan Projects

ROADWAY IMPROVEMENTS PLAN PROJECTS

Definitions

LANES	The total number of lanes in both directions available for travel.
TYPE	The type of roadway (used in determining capacity): DA = divided arterial SA = special arterial (similar to DA)
PK-HR VOLUME	the existing volumes of cars on the roadway segment traveling during the afternoon (P.M.) peak hour of travel.
% IN SERVICE AREA	If the roadway is located on the boundary of the service area (with the city limits running along the centerline of the roadway), then half of the roadway is inventoried in the service area and the other half is not. This value is either 50% or 100%.
VEH-MI SUPPLY TOTAL	The number of total service units (vehicle-miles) supplied within the service area, based on the length and established capacity of the roadway type.
VEH-MI TOTAL DEMAND PK-HR	The total service unit (vehicle-mile) demand created by existing traffic on the roadway segment in the afternoon peak hour.
EXCESS CAPACITY PK-HR VEH-MI	The number of service units supplied but unused by existing traffic in the afternoon peak hour.
FINANCE COST	Estimate of the cost of financing the cost of project development. Included for recoupment projects along John King Boulevard. Not applied for new recoupment and future projects added under this updated Impact Fee CIP
ROW	Estimated value of private owned right of way needed to be acquired for construction of the roadway improvements.

Table 8
2019 Rockwall Roadway Impact Fee Study Update
Roadway Capital Improvements Plan

Serv Area Number	CIP Year	Roadway	From	To	Length (mi)	No. of Lanes	Rdwy. Type	Lane Capacity	Pct. in Serv. Area	VMT Supply Pk Hr Total	VMT Demand Pk Hr Total	Excess VMT Capacity	CIP VMT Deficiency	Project Status	Roadway Costs				Project Cost
															Engineering	*ROW*	*Construction**	*Finance*	
1/2	2007	John King	City Limit (near G	FM552	1.28	4	DA	600	50%	1536	352	1184	0	R	$363,513	$893,017	$3,000,276	$3,716,172	$7,972,977
1/2	2007	John King	FM 552	Quail Run	1.29	4	DA	600	50%	1548	645	903	0	R	$366,353	$899,994	$3,023,715	$3,745,205	$8,035,266
1/2	2007	John King	Quail Run	SH 66	1.04	4	DA	600	50%	1248	572	676	0	R	$295,354	$725,576	$2,437,724	$3,019,390	$6,478,044
1/2	2007	John King	SH 66	IH 30 WB FR	1.47	4	DA	600	50%	1764	904	860	0	R	$417,472	$1,025,574	$3,445,629	$4,267,792	$9,156,466
1	2019	SH 205 (Goliad St)	Olive	Live Oak	0.33	5	SA	450	100%	588	567	21	0	N	$236,600	$17,300	$3,380,500	$0	$3,634,400
1	2019	SH 205 (Goliad St)	Live Oak	N. City Limit	2.98	4	DA	600	100%	7152	3791	3362	0	N	$2,481,248	$314,700	$35,446,400	$0	$38,242,348
Sub-total SA 1					**8.39**					**13836**	**6831**	**7006**	**0**		**$4,160,539**	**$3,876,160**	**$50,734,244**	**$14,748,559**	**$73,519,502**
2/1	2007	John King	City Limit (near G	FM552	1.28	4	DA	600	50%	1536	384	1152	0	R	$363,513	$893,017	$3,000,276	$3,716,172	$7,972,977
2/1	2007	John King	FM 552	Quail Run	1.29	4	DA	600	50%	1548	710	839	0	R	$366,353	$899,994	$3,023,715	$3,745,205	$8,035,266
2/1	2007	John King	Quail Run	SH 66	1.04	4	DA	600	50%	1248	676	572	0	R	$295,354	$725,576	$2,437,724	$3,019,390	$6,478,044
2/1	2007	John King	SH 66	IH 30 WB FR	1.47	4	DA	600	50%	1764	1213	551	0	R	$417,472	$1,025,574	$3,445,629	$4,267,792	$9,156,466
Sub-total SA 2					**5.08**					**6096**	**2982**	**3114**	**0**		**$1,442,691**	**$3,544,160**	**$11,907,344**	**$14,748,559**	**$31,642,754**
3/4	2007	John King Blvd	IH 30 EB FR	SH 276	0.89	4	DA	600	50%	1063	772	291	0	R	$107,472	$231,933	$1,098,543	$2,455,941	$3,893,889
3/4	2007	John King Blvd	SH 276	Goliad	1.34	4	DA	600	50%	1608	302	1307	0	R	$162,580	$350,860	$1,661,837	$3,715,260	$5,890,537
3	2019	SH 205 (Goliad St)	Sids	John King Blvd	0.96	6	DA	600	100%	3474	1435	2039	0	N	$974,148	$101,900	$13,916,400	$0	$14,992,448
3	2019	FM3097/Horizon	Ridge Road	County Line Rd	1.13	4	DA	600	100%	2705	1562	1143	0	R	$0	$0	$900,000	$0	$900,000
3	2019	FM740/Ridge Rd	Horizon	S. City Limit	1.10	4	DA	600	100%	2640	2019	622	0	R	$0	$0	$472,902	$0	$472,902
Sub-total SA 3					**5.42**					**11489**	**6088**	**5401**	**0**		**$1,244,200**	**$684,694**	**$18,049,682**	**$6,171,201**	**$26,149,776**
4/3	2007	John King Blvd	IH 30 EB FR	SH 276	0.89	4	DA	600	50%	1063	581	482	0	R	$107,472	$231,933	$1,098,543	$2,455,941	$3,893,889
4/3	2007	John King Blvd	SH 276	Goliad	1.34	4	DA	600	50%	1608	302	1307	0	R	$162,580	$350,860	$1,661,837	$3,715,260	$5,890,537
4	2019	FM 549 (Corp Crossing)	IH30	SH276	0.87	4	DA	600	100%	2080	654	1425	0	R	$0	$0	$4,724,665	$0	$4,724,665
Sub-total SA 4					**3.09**					**4751**	**1537**	**3214**	**0**		**$270,052**	**$582,794**	**$7,485,045**	**$6,171,201**	**$14,509,091**
Totals:					**13.80**					**36,172**	**17,438**	**18,734**	**0**		**$7,117,483**	**$8,687,808**	**$88,176,313**	**$41,839,518**	**$145,821,123**

Notes:

DA- Divided Arterial
SA- Special Arterial with two-way left turn lane (TWLTL)
N- New Impact Fee Project
R- Impact Fee Recoupment Project
Red font = added in this Impact Fee CIP

A

City of Rockwall

Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

SH 205

Olive St to Live Oak St

Roadway Information:			
Functional Classification:	Arterial	No. of Lanes:	5
Length (lf):	1,725		
Right-of-Way Width (ft.):	70		
Median Type:	TWLTL		
Pavement Width (BOC to BOC):	45		
Description:	Widen existing roadway to thoroughfare standard		

Roadway Construction Cost Estimate:

I. Paving Construction Cost Estimate

Item No.	Item Description	Quantity	Unit	Unit Cost	Item Cost
1	Acquire ROW	0	SF	$ 1.00	$ -
2	Right of Way Preparation	18	STA	$ 4,000.00	$ 72,000
3	Remove Existing Pavement	18	STA	$ 1,000.00	$ 18,000
4	Unclassified Street Excavation	3,200	CY	$ 20.00	$ 64,000
5	8" Lime Stabilized Subgrade	9,100	SY	$ 10.00	$ 91,000
6	Lime for Stabilization (48 lb/SY)	200	TON	$ 180.00	$ 36,000
7	10" Concrete Pavement w/ Integral Curb	8,700	SY	$ 75.00	$ 652,500
8	4" Concrete Sidewalk and Ramps	20,700	SY	$ 55.00	$ 1,138,500
9	Solid Sod	22,400	SY	$ 5.00	$ 112,000
				Paving Estimate Subtotal:	**$ 2,184,000**

II. Non-Paving Construction Components

Item No.	Item Description	Pct. Of Paving	Item Cost
10	Pavement Markings & Signage	2%	$ 43,700
11	Traffic Control	4%	$ 87,400
12	Erosion Control	3%	$ 65,600
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)	20%	$ 436,800
14	Utility Adjustments	5%	$ 109,200
	Other Components Estimate Subtotal:		**$ 742,700**

III. Special Construction Components

Item No.	Item Description	Notes	Allowance	Item Cost
15	Drainage Structures	None	$ -	$ -
16	Bridge Structures	None	$ -	$ -
17	Traffic Signals	None	$ -	$ -
		Special Components Estimate Subtotal:		**$ -**
		I, II, & III Construction Subtotal:		$ 2,926,700
		Mobilization	5%	$ 146,400
		Contingency	10%	$ 307,400
		Construction Cost Estimate Total:		**$ 3,380,500**

Impact Fee Cost Estimate Summary

Item Description	Notes	Allowance	Item Cost
Construction		-	$ 3,380,500
Engineering/Survey/Testing		7.0%	$ 236,600
Right-of-Way Acquisition	Cost per sq. ft.: $ 1.00	$ 17,300	$ 17,300
	Impact Fee Project Cost Estimate Total:		**$ 3,634,400**
	Estimated Finance Cost (11.9%; i.e. 3% over 10 years)		**$ 432,400**

2019 Roadway Impact Fee
City of Rockwall

Freese and Nichols, Inc.
Updated: 7/2019

B

City of Rockwall

Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

SH 205

Live Oak St to N. City Limit

Roadway Information:			
Functional Classification:	Arterial	No. of Lanes:	4
Length (lf):	15,735		
Right-of-Way Width (ft.):	85		
Median Type:	Raised		
Pavement Width (BOC to BOC):	50		
Description:	Widen existing roadway to thoroughfare standard		

Roadway Construction Cost Estimate:

I. Paving Construction Cost Estimate

Item No.	Item Description	Quantity	Unit	Unit Cost	Item Cost
1	Acquire ROW	157,400	SF	$ 1.00	$ 157,400
2	Right of Way Preparation	158	STA	$ 4,000.00	$ 632,000
3	Remove Existing Pavement	158	STA	$ 1,000.00	$ 158,000
4	Unclassified Street Excavation	32,100	CY	$ 20.00	$ 642,000
5	8" Lime Stabilized Subgrade	94,500	SY	$ 10.00	$ 945,000
6	Lime for Stabilization (48 lb/SY)	1,990	TON	$ 180.00	$ 358,200
7	10" Concrete Pavement w/ Integral Curb	87,500	SY	$ 75.00	$ 6,562,500
8	4" Concrete Sidewalk and Ramps	188,820	SY	$ 55.00	$ 10,385,100
9	Solid Sod	361,900	SY	$ 5.00	$ 1,809,500
				Paving Estimate Subtotal:	**$ 21,492,300**

II. Non-Paving Construction Components

Item No.	Item Description	Pct. Of Paving	Item Cost
10	Pavement Markings & Signage	2%	$ 429,900
11	Traffic Control	4%	$ 859,700
12	Erosion Control	3%	$ 644,800
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)	20%	$ 4,298,500
14	Utility Adjustments	5%	$ 1,074,700
	Other Components Estimate Subtotal:		**$ 7,307,600**

III. Special Construction Components

Item No.	Item Description	Notes	Allowance	Item Cost
15	Drainage Structures	1 minor	$ 150,000	$ 150,000
16	Bridge Structures	175' long bridge south of Lakeshore Blvd	$ 1,139,600	$ 1,139,600
17	Traffic Signals	3 Existing Signals; 1 new @ N John King	$ 600,000	$ 600,000
		Special Components Estimate Subtotal:		**$ 1,889,600**

I, II, & III Construction Subtotal:		$ 30,689,500
Mobilization	5%	$ 1,534,500
Contingency	10%	$ 3,222,400
Construction Cost Estimate Total:		**$ 35,446,400**

Impact Fee Cost Estimate Summary

Item Description	Notes	Allowance	Item Cost
Construction		-	$ 35,446,400
Engineering/Survey/Testing		7.0%	$ 2,481,200
Right-of-Way Acquisition	Cost per sq. ft.: $ 1.00	$ 314,700	$ 314,700
	Impact Fee Project Cost Estimate Total:		**$ 38,242,300**
	Estimated Finance Cost (11.9%; i.e. 3% over 10 years)		**$ 4,550,800**

2019 Roadway Impact Fee
City of Rockwall

Freese and Nichols, Inc.
Updated: 7/2019

C

City of Rockwall

Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

SH 205

Sids Rd to John King Blvd

Roadway Information:			
Functional Classification:	Arterial	No. of Lanes:	6
Length (lf):	5,095		
Right-of-Way Width (ft.):	120		
Median Type:	Raised		
Pavement Width (BOC to BOC):	74		
Description:	Widen existing roadway to thoroughfare standard		

Roadway Construction Cost Estimate:

I. Paving Construction Cost Estimate

Item No.	Item Description	Quantity	Unit	Unit Cost	Item Cost
1	Acquire ROW	101,900	SF	$ 1.00	$ 101,900
2	Right of Way Preparation	51	STA	$ 4,000.00	$ 204,000
3	Remove Existing Pavement	51	STA	$ 1,000.00	$ 51,000
4	Unclassified Street Excavation	15,400	CY	$ 20.00	$ 308,000
5	8" Lime Stabilized Subgrade	44,200	SY	$ 10.00	$ 442,000
6	Lime for Stabilization (48 lb/SY)	930	TON	$ 180.00	$ 167,400
7	10" Concrete Pavement w/ Integral Curb	41,900	SY	$ 75.00	$ 3,142,500
8	4" Concrete Sidewalk and Ramps	61,140	SY	$ 55.00	$ 3,362,700
9	Solid Sod	173,200	SY	$ 5.00	$ 866,000
				Paving Estimate Subtotal:	**$ 8,543,600**

II. Non-Paving Construction Components

Item No.	Item Description	Pct. Of Paving	Item Cost
10	Pavement Markings & Signage	2%	$ 170,900
11	Traffic Control	4%	$ 341,800
12	Erosion Control	3%	$ 256,400
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)	20%	$ 1,708,800
14	Utility Adjustments	5%	$ 427,200
	Other Components Estimate Subtotal:		**$ 2,905,100**

III. Special Construction Components

Item No.	Item Description	Notes	Allowance	Item Cost
15	Drainage Structures	2 Minor crossings	$ 300,000	$ 300,000
16	Bridge Structures	None	$ -	$ -
17	Traffic Signals	1 Existing @ John King; 1 new @ Sids	$ 300,000	$ 300,000
		Special Components Estimate Subtotal:		**$ 600,000**

I, II, & III Construction Subtotal:		$ 12,048,700
Mobilization	5%	$ 602,500
Contingency	10%	$ 1,265,200
Construction Cost Estimate Total:		**$ 13,916,400**

Impact Fee Cost Estimate Summary

Item Description	Notes	Allowance	Item Cost
Construction		-	$ 13,916,400
Engineering/Survey/Testing		7.0%	$ 974,100
Right-of-Way Acquisition	Cost per sq. ft.: $ 1.00	$ 101,900	$ 101,900
	Impact Fee Project Cost Estimate Total:		**$ 14,992,400**
	Estimated Finance Cost (11.9%; i.e. 3% over 10 years)		**$ 1,784,000**

2019 Roadway Impact Fee
City of Rockwall

Freese and Nichols, Inc.
Updated: 7/2019

D

City of Rockwall

Impact Fee Engineer's Opinion of Probable Construction Cost Estimate

SH 205

John King Blvd to S. City Limit

Roadway Information:			
Functional Classification:	Arterial	No. of Lanes:	6
Length (lf):	13,358		
Right-of-Way Width (ft.):	120		
Median Type:	Raised		
Pavement Width (BOC to BOC):	74		
Description:	Widen existing roadway to thoroughfare standard		

Roadway Construction Cost Estimate:

I. Paving Construction Cost Estimate

Item No.	Item Description	Quantity	Unit	Unit Cost	Item Cost
1	Acquire ROW	267,200	SF	$ 1.00	$ 267,200
2	Right of Way Preparation	134	STA	$ 4,000.00	$ 536,000
3	Remove Existing Pavement	134	STA	$ 1,000.00	$ 134,000
4	Unclassified Street Excavation	40,300	CY	$ 20.00	$ 806,000
5	8" Lime Stabilized Subgrade	115,800	SY	$ 10.00	$ 1,158,000
6	Lime for Stabilization (48 lb/SY)	2,440	TON	$ 180.00	$ 439,200
7	10" Concrete Pavement w/ Integral Curb	109,900	SY	$ 75.00	$ 8,242,500
8	4" Concrete Sidewalk and Ramps	160,300	SY	$ 55.00	$ 8,816,500
9	Solid Sod	454,200	SY	$ 5.00	$ 2,271,000
				Paving Estimate Subtotal:	**$ 22,403,200**

II. Non-Paving Construction Components

Item No.	Item Description	Pct. Of Paving	Item Cost
10	Pavement Markings & Signage	2%	$ 448,100
11	Traffic Control	4%	$ 896,200
12	Erosion Control	3%	$ 672,100
13	Drainage Improvements (RCP, Inlets, MH, Outfalls)	20%	$ 4,480,700
14	Utility Adjustments	5%	$ 1,120,200
		Other Components Estimate Subtotal:	**$ 7,617,300**

III. Special Construction Components

Item No.	Item Description	Notes	Allowance	Item Cost
15	Drainage Structures	1 Minor crossing, 2 major crossing	$ 750,000	$ 750,000
16	Bridge Structures	None	$ -	$ -
17	Traffic Signals	1 Existing Signal @ Lofland Cir	$ 150,000	$ 150,000
		Special Components Estimate Subtotal:		**$ 900,000**

I, II, & III Construction Subtotal:		$ 30,920,500
Mobilization	5%	$ 1,546,100
Contingency	10%	$ 3,246,700
Construction Cost Estimate Total:		**$ 35,713,300**

Impact Fee Cost Estimate Summary

Item Description	Notes	Allowance	Item Cost
Construction		-	$ 35,713,300
Engineering/Survey/Testing		7.0%	$ 2,499,900
Right-of-Way Acquisition	Cost per sq. ft.: $ 1.00	$ 267,200	$ 267,200
	Impact Fee Project Cost Estimate Total:		**$ 38,480,400**
	Estimated Finance Cost (11.9%; i.e. 3% over 10 years)		**$ 4,579,100**

2019 Roadway Impact Fee
City of Rockwall

Freese and Nichols, Inc.
Updated: 7/2019

City of Rockwall

F. Roadway Improvements Plan Cost Analysis

ROADWAY IMPROVEMENTS PLAN COST ANALYSIS

Definitions

LANES	The total number of lanes in both directions available for travel.
TYPE	The type of roadway (used in determining capacity): DA = divided arterial SA = special arterial
% IN SERVICE AREA	If the roadway is located on the boundary of the service area (with the city limits running along the centerline of the roadway), then half of the roadway is inventoried in the service area and the other half is not. This value is either 50% or 100%.
TOTAL SEGMENT COST	The estimated cost (in dollars) of the entire segment of the proposed improvement.
TOTAL COST IN SERVICE AREA	The estimated cost (in dollars) of the portion of the proposed roadway improvement within the service area.

2019 Rockwall Roadway Impact Fee Study Update
Roadway Capital Improvements Plan

Serv Area Number	CIP Year	Roadway	From	To	Length (mi)	No. of Lanes	Rdwy. Type	Pct. in Serv. Area	Roadway Costs				Project Cost
									Engineering	*ROW*	*Construction**	*Finance*	
1/2	2007	John King	City Limit (near G	FM552	1.28	4	DA	50%	$363,513	$893,017	$3,000,276	$3,716,172	$7,972,977
1/2	2007	John King	FM 552	Quail Run	1.29	4	DA	50%	$366,353	$899,994	$3,023,715	$3,745,205	$8,035,266
1/2	2007	John King	Quail Run	SH 66	1.04	4	DA	50%	$295,354	$725,576	$2,437,724	$3,019,390	$6,478,044
1/2	2007	John King	SH 66	IH 30 WB FR	1.47	4	DA	50%	$417,472	$1,025,574	$3,445,629	$4,267,792	$9,156,466
1	2019	SH 205 (Goliad St)	Olive	Live Oak	0.33	5	SA	100%	$236,600	$17,300	$3,380,500	$0	$3,634,400
1	2019	SH 205 (Goliad St)	Live Oak	N. City Limit	2.98	4	DA	100%	$2,481,248	$314,700	$35,446,400	$0	$38,242,348
Sub-total SA 1					**8.39**				**$4,160,539**	**$3,876,160**	**$50,734,244**	**$14,748,559**	**$73,519,502**
2/1	2007	John King	City Limit (near G	FM552	1.28	4	DA	50%	$363,513	$893,017	$3,000,276	$3,716,172	$7,972,977
2/1	2007	John King	FM 552	Quail Run	1.29	4	DA	50%	$366,353	$899,994	$3,023,715	$3,745,205	$8,035,266
2/1	2007	John King	Quail Run	SH 66	1.04	4	DA	50%	$295,354	$725,576	$2,437,724	$3,019,390	$6,478,044
2/1	2007	John King	SH 66	IH 30 WB FR	1.47	4	DA	50%	$417,472	$1,025,574	$3,445,629	$4,267,792	$9,156,466
Sub-total SA 2					**5.08**				**$1,442,691**	**$3,544,160**	**$11,907,344**	**$14,748,559**	**$31,642,754**
3/4	2007	John King Blvd	IH 30 EB FR	SH 276	0.89	4	DA	50%	$107,472	$231,933	$1,098,543	$2,455,941	$3,893,889
3/4	2007	John King Blvd	SH 276	Goliad	1.34	4	DA	50%	$162,580	$350,860	$1,661,837	$3,715,260	$5,890,537
3	2019	SH 205 (Goliad St)	Sids	John King Blvd	0.96	6	DA	100%	$974,148	$101,900	$13,916,400	$0	$14,992,448
3	2019	FM3097/Horizon	Ridge Road	County Line Rd	1.13	4	DA	100%	$0	$0	$900,000	$0	$900,000
3	2019	FM740/Ridge Rd	Horizon	S. City Limit	1.10	4	DA	100%	$0	$0	$472,902	$0	$472,902
Sub-total SA 3					**5.42**				**$1,244,200**	**$684,694**	**$18,049,682**	**$6,171,201**	**$26,149,776**
4/3	2007	John King Blvd	IH 30 EB FR	SH 276	0.89	4	DA	50%	$107,472	$231,933	$1,098,543	$2,455,941	$3,893,889
4/3	2007	John King Blvd	SH 276	Goliad	1.34	4	DA	50%	$162,580	$350,860	$1,661,837	$3,715,260	$5,890,537
4	2019	FM 549 (Corp Crossing)	IH30	SH276	0.87	4	DA	100%	$0	$0	$4,724,665	$0	$4,724,665
Sub-total SA 4					**3.09**				**$270,052**	**$582,794**	**$7,485,045**	**$6,171,201**	**$14,509,091**
Totals:					**13.80**				**$7,117,483**	**$8,687,808**	**$88,176,313**	**$41,839,518**	**$145,821,123**

Notes:

DA- Divided Arterial

SA- Special Arterial with two-way left turn lane (TWLTL)

N- New Impact Fee Project

R- Impact Fee Recoupment Project

G. Service Area Analysis Summary

2019 Rockwall Roadway Impact Fee Study
Service Area Analysis Summary (John King @ 4D + Project Additions)

	1	2	3	4	5	6	7	8	9	10	11	12	13
Service Area	Capacity Supplied by CIP (veh-mi)	Existing Utilization	Existing Deficiencies	Net Capacity Supplied by CIP	Total Project Cost of CIP	Project Cost of CIP with 50% Credit	Cost of Net Capacity Supplied	Cost to Meet Existing Utilization	Projected 10yr Demand (veh-miles)	Pcnt. of CIP Attributable to New Dev. (10-yr)	Cost Attributable to New Dev.	Fee per Service Unit @ 50% Discount	*Actual Cost per Service Unit (veh-mi)*
1	13,836	6,831	1,137	5,869	$73,550,103	$36,775,052	$15,598,596	$21,176,456	13,731	100.0	$15,598,596	$1,136.00	*$2,272.00*
2	6,096	2,982	0	3,114	$31,656,236	$15,828,118	$8,084,777	$7,743,341	3,676	100.0	$8,084,777	$2,199.00	*$4,398.00*
3	11,489	6,088	925	4,476	$26,175,186	$13,087,593	$5,098,520	$7,989,073	13,001	100.0	$5,098,520	$392.00	*$784.00*
4	4,751	1,537	808	2,405	$14,519,597	$7,259,799	$3,675,714	$3,584,085	2,814	100.0	$3,675,714	$1,306.00	*$2,612.00*
Totals	36,172	17,438	2,871	15,864	$145,901,123	$72,950,562	$31,993,304	$40,957,258	33,222	100.0	$31,993,304	$963.00	*$1,926.00*

Dbase D + Project Additions

1. TOTAL VEH-MI OF CAPACITY SUPPLIED BY CIP (TVMCAP)
2. TOTAL VEH-MI OF EXISTING DEMAND (VMEXT)
3. TOTAL VEH-MI OF EXISTING DEFICENCIES (VMDEF)
4. NET AMOUNT OF ROADWAY CAPACITY SUPPLIED (NVMCAP) =
   NVMCAP =TVMCAP-VMEXT-VMDEF
5. TOTAL COST OF CIP WITHIN STUDY AREA (TVMCOST)
6. TOTAL COST OF CIP IN SERVICE AREA w/50% CREDIT (TVMCOST)
7. COST OF NET CAPACITY SUPPLIED (NCVMCAP) =
   NCVMCAP = (NVMCAP/TVMCAP)*TVMCOST
8. COST TO MEET EXISTING NEEDS AND USAGE (EXCOST) =
   EXCOST = TVMCOST-NCVMCAP
9. TOTAL VEH-MI OF NEW DEMAND OVER TEN YEARS (TNEWDEM)
10. PERCENT OF CIP ATTRIBUTABLE TO NEW DEVELOPMENT (NPCNT) =
    IF TNEWDEM > NVMCAP, NPCNT = 100%
    IF TNEWDEM < NVMCAP, NPCNT = (TNEWDEM / NVMCAP)*100
11. COST OF CIP ATTRIBUTABLE TO NEW DEVELOPMENT (NCVMDEM) =
    NCVMDEM = (TNEWDEM / NVMCAP) * NCVMCAP
12. MAXIMUM FEE PER SERVICE UNIT (50%) =
    MAX FEE = NCVMDEM / TNEWDEM
13. ACTUAL COST PER SERVICE UNIT (100%)

Exhibit 'D':
2019 – 2029 Water & Wastewater Impact Fee Update

2019 – 2029 WATER & WASTEWATER IMPACT FEE UPDATE

Submitted To

CITY OF ROCKWALL

Submitted By

BIRKHOFF, HENDRICKS & CARTER, L.L.P.
PROFESSIONAL ENGINEERS
TBPE Firm No. 526

September 2019

CITY OF ROCKWALL
2019 - 2029 WATER & WASTEWATER IMPACT FEE UPDATE

TABLE OF CONTENTS

Matthew Hickey 9/16/19

09/16/19

CITY OF ROCKWALL
2019 – 2029 WATER & WASTEWATER IMPACT FEE UPDATE

SECTION I – INTRODUCTION

A. GENERAL

In accordance with the requirements of Chapter 395.052 of the Local Government Code, this report establishes the City of Rockwall's Capital Improvement Plan for water and wastewater impact fees and calculates the maximum allowable fee for each. Land use assumptions for impact fees were generated under a separate document prepared by the City of Rockwall's Planning Department.

Chapter 395, of the Local Government Code is an act that provides guidelines for financing capital improvements required by new development in municipalities, counties, and certain other local governments. The basis for determination of an impact fee requires the preparation and adoption of a land use plan and growth assumption, and the preparation of a 10-year capital improvement plan. The capital improvement plan requires an analysis of total capacity, the level of current usage and commitments of capacity of existing capital improvements. From these two phases, a maximum impact fee is calculated.

The Act allows the maximum impact fee to be charged if revenues from future ad valorem taxes, and water and sewer bills are included as a credit in the analysis. If not, the Act allows the maximum fee to be set at 50% of the calculated maximum fee. The following items were included in the impact fee calculation:

1. The portion of the cost of the new infrastructure that is to be paid by the City, including engineering, property acquisition and construction cost.

2. Existing excess capacity in lines and facilities that will serve future growth and which were paid for in whole or part by the City.

3. Engineering and quality control fees for construction projects.

4. Interest and other finance charges on bonds issued by the City to cover its portion of the cost. 5% is assumed for this analysis.

The engineering analysis portion of the Water and Wastewater Fee determines utilized capacity cost of the major water distribution and wastewater collection facilities between the year 2019 and the year 2029. Facilities in this analysis include, water pump stations, water storage tanks, water transmission lines and wastewater collection lines. The North Texas Municipal Water District (NTMWD) water treatment, and water distribution components were excluded from this analysis. The study period is a ten-year period with 2019 as the base year. The impact fee calculations for the water and wastewater systems are based on land use assumptions prepared by the City of Rockwall. Prior to this impact fee update, the City's Water Distribution and Wastewater Collection hydraulic models were updated for 2019, 2029 and buildout conditions. The hydraulic model results are available for review from the City of Rockwall. The equivalency factors utilized in this analysis conform to the American Water Works Association Standards (C700 - C703).

B. WATER & WASTEWATER IMPACT FEE GLOSSARY

1. Advisory Committee means the capital improvements advisory committee established by the City for purposes of reviewing and making recommendations to the City Council on adoption of the City's impact fee program.

2. Area-Related Facility means a capital improvement or facility expansion which is designated in the impact fee capital improvements plan and which is not a site-related facility. Area-Related Facility may include capital improvements that are located off-site, or within or on the perimeter of the development site.

3. Assessment means the determination of the amount of the maximum impact fee per service unit that can be imposed on new development.

4. Capital Improvement means either a water facility or a wastewater facility with a life expectancy of three or more years, to be owned and operated by or on behalf of the City.

5. City means the City of Rockwall, Texas.

6. Credit means the amount of the reduction of an impact fee due, determined under this ordinance or pursuant to administrative guidelines that is equal to the value of area-related

facilities provided by a property owner pursuant to the City's subdivision or zoning regulations or requirements, for the same type of facility.

7. Debt Service means the 20-year financing costs of projects applied to all eligible existing and proposed water and wastewater facilities.

8. Facility Expansion means either a water facility expansion or a sewer facility expansion.

9. Impact Fee means either a fee for water facilities or a fee for wastewater facilities, imposed on new development by the City pursuant to Chapter 395 of the Texas Local Government Code in order to generate revenue to fund or recoup the costs of capital improvements or facility expansion necessitated by and attributable to such new development. Impact fees do not include the dedication of rights-of-way or easements for such facilities, or the construction of such improvements, imposed pursuant to the City's zoning or subdivision regulations.

10. Impact Fee Capital Improvements Plan means either a water capital improvements plan or a wastewater capital improvement plan adopted or revised pursuant to the impact fee regulations.

11. Land Use Assumptions means the projections of population and growth, and associated changes in land uses, densities and intensities over at least a ten-year period, as adopted by the City and as may be amended from time to time, upon which the capital improvements plans are based.

12. Land Use Equivalency Table means a table converting the demands for capital improvements generated by various land uses to numbers of service units, as may be amended from time to time.

13. New Development means the subdivision of land; the construction, reconstruction, redevelopment, conversion, structural alteration, relocation, or enlargement of any structure; or any use or extension of the use of land; any of which increases the number of service units.

14. Recoupment means the imposition of an impact fee to reimburse the City for capital improvements that the City had previously oversized to serve new development.

15. Service Area means either a water service area or wastewater service area which impact fees for capital improvements or facility expansion will be collected for new development occurring within such area, and within which fees so collected will be expended for those types of improvements or expansions identified in the type of capital improvements plan applicable to the service area.

16. Service Unit means the applicable standard units of measure shown on the land use equivalency table in the Impact Fees Capital Improvements Plan that can be converted to water meter equivalents, for water or for wastewater facilities, which serves as the standardized measure of consumption, use or generation attributable to the new unit of development.

17. Site-Related Facility means an improvement or facility which is for the primary use or benefit of a new development, and/or which is for the primary purpose of safe and adequate provision of water or wastewater facilities to serve the new development, and which is not included in the impact fees capital improvements plan and for which the property owner is solely responsible under subdivision or other applicable development regulations.

18. Utility Connection means installation of a water meter for connecting a new development to the City's water system, or connection to the City's wastewater system.

19. Wastewater Facility means a wastewater interceptor or main, lift station or other facility included within and comprising an integral component of the City's collection system for wastewater. Wastewater facility includes land, easements or structure associated with such facilities. Wastewater facility excludes site-related facilities.

20. Wastewater Facility Expansion means the expansion of the capacity of any existing wastewater improvement for the purpose of serving new development, but does not include the repair, maintenance, modernization, or expansion of an existing sewer facility to serve existing development.

21. Wastewater Capital Improvements Plan means the adopted plan, as may be amended from time to time, which identifies the wastewater facilities or wastewater expansions and their associated costs which are necessitated by and which are attributable to new development, for a period not to exceed 10 years.

22. Water Facility means a water main, pump station, storage tank or other facility included within and comprising an integral component of the City's water storage or distribution system. Water facility includes CCN acquisition, land, easements or structures associated with such facilities. Water facility excludes site-related facilities.

23. Water Facility Expansion means the expansion of the capacity of any existing water facility for the purpose of serving new development, but does not include the repair, maintenance, modernization, or expansion of an existing water improvement to serve existing development.

24. Water Capital Improvements Plan means the adopted plan, as may be amended from time to time, which identifies the water facilities or water expansions and their associated costs which are necessitated by and which are attributable to new development, for a period not to exceed 10 years.

25. Water Meter means a device for measuring the flow of water to a development, whether for domestic or for irrigation purposes.

C. LAND USE ASSUMPTIONS *(Prepared By: City of Rockwall Planning Department)*

The impact fee land use assumptions utilized in this update were prepared by the City of Rockwall's Planning Department and are presented in a separate document. The land use assumptions projected an ultimate residential population of approximately 149,525 in the City of Rockwall's ultimate planning boundary.

The residential and non-residential growth provided by the City for the year 2019 through 2029 is summarized in Table No. 1.

TABLE NO. 1

Residential and Non-Residential Growth from 2019 to 2029

Year	LUA Residential Population *	Residential Population Served **	Non-Residential Uses*** Employees	
2019	49,616	44,748	25,369	
2029	73,228	64,768	34,064	
Res. Growth Rate	**1.48**		**Non-Res. Growth Rate**	**1.34**

** Residential Population Inside Planning Boundary*
*** Residential Population Served Inside Existing City of Rockwall City Limit Boundary*
**** Basic – Industrial Land Uses*
**** Service – Office & Institutional Land Uses*
**** Retail – Commercial Land Uses*

As shown in Table No. 1, increases in the residential population and non-residential uses will occur during the 10-year capital recovery period. The water demand and wastewater flows from the residential and non-residential uses dictate the ultimate size of facilities, while the rate of growth is important to determine the timing of system improvements to meet the City's growing needs. The eligible water impact fee facilities are shown **on Exhibit 1**. The eligible wastewater facilities are shown on **Exhibit 2** in this report.

SECTION II

WATER & WASTEWATER C.I.P. AND IMPACT FEE ANALYSIS

A. DEFINITION OF A SERVICE UNIT – WATER AND WASTEWATER

Chapter 395 of the Local Government Code requires that impact fees be based on a defined service unit. A "service unit" means a standardized measure of consumption, use generation, or discharge attributable to an individual unit of development calculated in accordance with generally accepted engineering or planning standards. This impact fee defines a water and wastewater service unit to be a *5/8-inch water meter* and has referred to this service unit as a Single Family Living Unit Equivalent (SFLUE). The SFLUE is based on the continuous duty capacity of a 5/8-inch water meter. This is the City of Rockwall's typical meter used for a single family detached dwelling, and therefore is considered to be equivalent to one "living unit". Other meter sizes can be compared to the 5/8-inch meter through a ratio of water flows as published by the American Water Works Association as shown in **Table No. 2** below. This same ratio is then used to determine the proportional water and wastewater impact fee amount for each water meter size.

TABLE NO. 2

Living Unit Equivalencies For Various Types and Sizes of Water Meters

Meter Type	Meter Size	Continuous Duty Maximum Rate (gpm) [a]	Ratio to 5/8" Meter
Simple	5/8"	10	1.0
Simple	1"	25	2.5
Simple	1-1/2"	50	5.0
Simple	2"	80	8.0
Compound	2"	80	8.0
Turbine (Irrigation)	2"	160	16.0
Compound	3"	160	16.0
Turbine (Irrigation)	3"	350	35.0
Compound	4"	250	25.0
Turbine (Irrigation)	4"	650	65.0
Compound	6"	500	50.0
Turbine (Irrigation)	6"	1,400	140.0
Compound	8"	800	80.0
Turbine (Irrigation)	8"	2,400	240.0
Turbine	10"	3,500	350.0
Turbine	12"	4,400	440.0

[a] *Source: AWWA Standard C700 - C703*

B. CALCULATION OF WATER & WASTEWATER - LIVING UNIT EQUIVALENTS

The City of Rockwall provided the existing water meter count by size category as of December 2018. In total, there are 15,680 domestic water and irrigation meters serving an existing population of 49,616 residents and business. **Table No. 3** shows the number of existing meters, the living unit equivalent factor and the total number of living unit equivalents for each sized water meter.

Similar, the City provided the number of wastewater accounts by corresponding water meter size. This number of wastewater accounts is 15,053. **Table No. 4** illustrates the existing wastewater accounts and the SFLUE's. The difference between the water and wastewater accounts is irrigation meters are not included in the wastewater accounts.

The residential growth rate of 1.48 in **Table 1** was applied to 5/8-inch through 1-1/2-inch meters. The non-residential growth rate of 1.34 in **Table 1** was applied to 2-inch through 12-inch meters. Utilizing these growth rates in a straight-line extrapolation of the existing water and wastewater accounts, the numbers of new accounts was calculated for the year 2029. City records indicate the historical growth of 5/8-inch and 1-inch meters is approximately 96% 5/8-inch meters and 4% 1-inch meters for the base meter sizes. These percentages were applied to the total growth of 5/8-inch and 1-inch meters. Living unit equivalents were then applied to the water meters and wastewater accounts for 2019 and 2029, resulting in a total number of living units. The difference in the total number of 2019 and 2029 living units results in the new living unit equivalents during the impact fee period. The calculation of living unit equivalents is summarized in **Table 3 and Table 4**.

TABLE NO. 3

Water Living Unit Equivalents 2019 – 2029

Meter Size	2019			2029			New Living Unit Equivalents During Impact Fee Period
	Number of Water Meters	Living Unit Equivalent Ratio for 5/8" Used	Total Number of Living Units	Number of Water Meters	Living Unit Equivalent Ratio for 5/8" Used	Total Number of Living Units	
5/8"	14,261	1.0	14,261	21,108	1.0	21,108	6,847
1"	597	2.5	1,493	882	2.5	2,205	712
1-1/2"	188	5.0	940	278	5.0	1,390	450
2"	617	8.0	4,936	827	8.0	6,616	1,680
3"	5	16.0	80	7	16.0	112	32
4"	10	25.0	250	13	25.0	325	75
6"	2	50.0	100	3	50.0	150	50
8"	0	80.0	0	0	80.0	0	0
10"	0	350.0	0	0	350.0	0	0
12"	0	440.0	0	0	440.0	0	0
Totals	**15,680**		**22,060**	**23,118**		**31,906**	**9,846**

TABLE NO. 4

Wastewater Living Unit Equivalents 2019 – 2029

Meter Size	2019			2029			New Living Unit Equivalents During Impact Fee Period
	Number of Wastewater Accounts	Living Unit Equivalent Ratio for 5/8" Used	Total Number of Living Units	Number of Water Meters	Living Unit Equivalent Ratio for 5/8" Used	Total Number of Living Units	
5/8"	14,179	1.0	14,179	20,956	1.0	20,956	6,777
1"	377	2.5	943	587	2.5	1,468	525
1-1/2"	126	5.0	630	186	5.0	930	300
2"	358	8.0	2,864	480	8.0	3,840	976
3"	5	16.0	80	7	16.0	112	32
4"	6	25.0	150	8	25.0	200	50
6"	2	50.0	100	3	50.0	150	50
8"	0	80.0	0	0	80.0	0	0
10"	0	350.0	0	0	350.0	0	0
12"	0	440.0	0	0	440.0	0	0
Totals	**15,053**		**18,946**	**22,227**		**27,656**	**8,710**

C. COST OF FACILITIES

Unit costs for proposed water and wastewater lines larger than 12 inches in diameter that are anticipated to be constructed between 2019 and 2029 by private development include the City's oversize cost participation only. These water and wastewater lines are colored green on **Exhibits 1 and 2**. Oversize cost participation from City is based on availability of funds. For City participation, the developer must bid the 12-inch as a base and the oversize as an additive alternate. City initiated water and wastewater lines include the full cost of the proposed facility. These water and wastewater lines are colored red on **Exhibits 1 and 2**. Developer initiated water and wastewater line projects which are 12 inches or less in diameter are not included in this Impact Fee analysis, as the cost for these size lines are the responsibility of the developer. These water and wastewater lines are colored light blue (cyan) on **Exhibits 1 and 2**.

Actual construction costs of the various existing elements of the water and wastewater systems were utilized where the information was known. The existing cost of facilities was determined from Contractor's final pay requests, City purchase orders, bid tabulation forms and developer's agreements. Existing water and wastewater facilities included in the impact fee analysis are only those with excess capacity available for future growth are colored dark blue on **Exhibits 1 and 2**.

Cost data for existing water and wastewater facilities included in the impact fee analysis were provided by the City. A 5% debt service, over a period of 20-years, has been added to all projects. Actual costs were used for those existing projects where records were available.

D. WATER DISTRIBUTION SYSTEM

Computer hydraulic models for the years 2019, 2029 and Buildout were prepared and analyzed by Birkhoff, Hendricks & Carter, L.L.P. The models were developed and water demand distributed from residential population and non-residential land use projections prepared by the City of Rockwall's Planning Department. The projected developed land areas from the City's Land Use Assumptions follow closely to the construction of major facilities in the system. These facilities include pump stations, storage tanks, and major distribution lines. All computer models were run for the Maximum Hourly Demands in a three-day extended period simulation to ensure proper sizing of the facilities to meet peak demands.

1. Existing Pump Stations, Ground Storage Reservoirs & Elevated Storage Tanks

The existing water distribution system included in the impact fee analysis (As of December 2018) includes the facilities summarized in **Table No. 5** and **Table No. 6**.

TABLE NO. 5

Water Distribution System -- Existing Pump Stations & Ground Storage

Pump Station	Number of Pumps	Rated Capacity (MGD)	Number of Ground Storage Tanks	Total Ground Storage Available (Gallons)
Heath Street 698.75	6	17.7	1	3,000,000
Eastside 698.75	6	25.9	1	3,000,000
698.75 Subtotal:	**12**	**43.6**	**2**	**6,000,000**
Eastside 780	3	8.6	1	1,000,000
780 Subtotal:	**3**	**8.6**	**1**	**1,000,000**
Total:	**15**	**52.2**	**3**	**7,000,000**

TABLE NO. 6

Existing Elevated Storage Tanks

Elevated Storage Tanks	Capacity in Million Gallons
Southside Elevated Storage Tank	1.0
Country Lane Elevated Storage Tank	2.0
Springer Elevated Storage Tank	2.0
Total	**5.0**

The pump stations and ground storage facilities were analyzed with the maximum daily demand, while elevated storage acts dynamically and therefore was analyzed utilizing the difference between the Maximum Hourly Demand and the Maximum Daily Demand.

2. Distribution Lines

The distribution lines consist of all lines within the Service Area planning boundary supplying water to customers in the City of Rockwall. Existing and proposed distribution lines vary in size from 5/8-inch services to 48-inch transmission lines and pump station piping. The cost of water lines includes construction cost, appurtenances (water valves, fire hydrants, taps and the like), utility relocations, purchase of easements and engineering costs. Financing cost over a 20-year term is included for each project.

Unit cost for proposed capital improvement water lines 12-inches and larger in diameter classified as City initiated, or City participation in oversize water lines. Developer's initiated water line projects, 12 inches or less in diameter were not included in this Impact Fee analysis, as the cost for these size lines are the responsibility of the developer.

3. Water Supply

The City of Rockwall currently receives all of its water supply from the North Texas Municipal Water District (NTMWD). Rockwall's allocation of the capital cost of services as a Member of the NTMWD was specifically excluded from the impact fee analysis.

If included, Rockwall's share of the NTMWD capital cost could include the original construction cost, expansion cost and financing cost of the following components:

a) Water Rights Cost in Lake Lavon and other Sources

b) Raw Water Intake Structures

c) Raw Water Pump Stations

d) Treatment Plant and Expansion

e) High Service Pump Stations

f) Transmission Lines

g) NTMWD Owned Ground Storage Facilities

NTMWD has indicated that determining Rockwall's portion of cost for these items would not be possible, thus these costs have not been included in this analysis.

4. Water Distribution System Capital Improvement Projects for Impact Fees

In order to meet the demands of the anticipated growth over the next 10-years, as provided in the Land Use Assumptions prepared by the City of Rockwall, certain water distribution system improvements are required. **Exhibit 1** shows the recommended water system improvements and **Table No. 7** itemizes each project and the project cost in 2019 dollars. These recommended improvements form the basis for the water system impact fee calculation.

The capital improvement plan for impact fees provides for system improvements within the defined Service Area Planning Boundary. Most of the capital improvements are within the city limits, as requested by the City due to new State of Texas Annexation Laws.

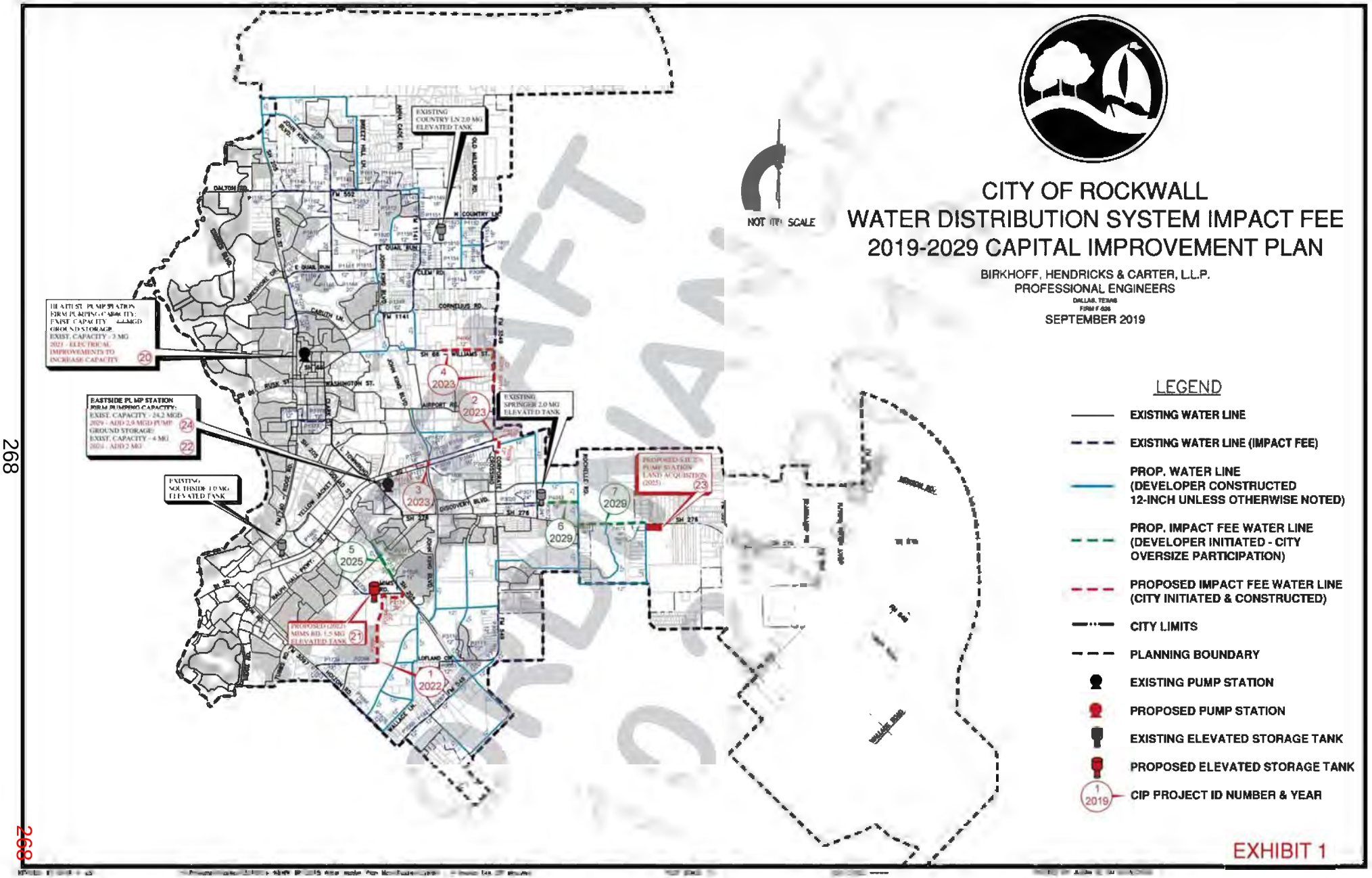

NOT TO SCALE
CITY OF ROCKWALL
WATER DISTRICTION SYSTEM IMPACT FEE
2019-2029 CAPITAL IMPROVEMENT PLAN
BIRKHOFF, HENDRICKS & CARTER, L.L.P.
PROFESSIONAL ENGINEERS
DALLAS, TEXAS
FIRM # 526
SEPTEMBER 2019
LEGEND
EXISTING WATER LINE
EXISTING WATER LINE (IMPACT FEE)
PROP. WATER LINE (DEVELOPER CONSTRUCTED 12-INCH UNLESS OTHERWISE NOTED)
PROP. IMPACT FEE WATER LINE (DEVELOPER INITIATED - CITY OVERSIZE PARTICIPATION)
PROPOSED IMPACT FEE WATER LINE (CITY INITIATED & CONSTRUCTED)
CITY LIMITS
PLANNING BOUNDARY
EXISTING PUMP STATION
PROPOSED PUMP STATION
EXISTING ELEVATED STORAGE TANK
PROPOSED ELEVATED STORAGE TANK
CIP PROJECT ID NUMBER & YEAR
EXISTING COUNTRY LN 2.0 MG ELEVATED TANK
EXISTING SPRINGER 2.0 MG ELEVATED TANK
EXISTING SOUTHSIDE 1.0 MG ELEVATED TANK
EASTSIDE PUMP STATION
PROPOSED (2022) MIMS RD. 1.5 MG ELEVATED TANK
PROPOSED SH 276 PUMP STATION LAND ACQUISITION (2025)
1 2022
2 2023
3 2023
4 2023
5 2025
6 2029
7 2029
20
21
22
23
24
EXHIBIT 1

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Table No. 7

10-Year Water System Capital Improvement Plan for Impact Fees

PROPOSED WATER LINES

CIP #	Year	1=City Participation in Cost Oversize 2=City Initiated and Funded	Service Area	Water Line Projects (X) = Water Line CIP Project ID Number	Length (FT)	Size	Opinion of Construction Cost (A)	Debt Service (B)	Total Project Cost
1	2022	2	698.75	Mims Road / County Line Road Looping Water Lines (Pipes 2096, 2097, 2118)	6,151	20"	$ 1,402,428	$ 736,275	$ 2,138,703
2	2023	2	780	IH-30 - F.M. 3549/Corporate Crossing (Pipes 4039, 4124)	1,287	12"-16"	$ 531,800	$ 279,195	$ 810,995
3	2023	2	780	John King Blvd. 780 Water Lines North (Pipes 4123)	423	16"	$ 274,950	$ 144,349	$ 419,299
4	2023	2	780	S.H. 66 - F.M. 3549 780 Service Area Loop (Pipes 4007, 4008, 4009)	6,394	12"	$ 767,280	$ 402,822	$ 1,170,102
5	2025	1	698.75	S.H. 205 Water Lines (Pipes 2117, 2136)	2,496	16"	$ 149,760	$ 78,624	$ 228,384
6	2029	1	780	Springer Ln. 16" Water Line (Pipe 4043)	2,714	16"	$ 162,840	$ 85,491	$ 248,331
7	2029	1	780	S.H. 276 Pump Station Transmission Main West (Pipes 4071, 4072, 4073)	3,329	16"	$ 270,300	$ 141,908	$ 412,208
				Subtotal: Proposed Water Lines			**$ 3,559,358**	**$ 1,868,664**	**$ 5,428,022**

PROPOSED PUMPING AND STORAGE FACILITIES

CIP #	Year	Service Area	Pump Station, Ground Storage & Elevated Storage Project		Added Capacity	Opinion of Construction Cost (A)	Debt Service (B)	Total Project Cost
20	2021	698.75	Heath Street Pump Station Improvements		7.0 MGD	$ 2,730,000	$ 1,433,250	$ 4,163,250
21	2022	780	Mims 1.5 MG EST & Purchase 2-Acres		1.5 MG	$ 3,421,075	$ 1,796,064	$ 5,217,139
22	2024	698.75/780	Eastside Ground Storage Reservoir No. 3		2.0 MG	$ 2,855,600	$ 1,499,190	$ 4,354,790
23	2025	780	Proposed SH 276 Pump Station Land Acquisition		10 Acres	$ 590,340	$ 309,929	$ 900,269
24	2029	698.75/780	Eastside 780 Service Area 2.9 MGD Pump		2.9 MGD	$ 1,878,025	$ 985,963	$ 2,863,988
			Subtotal: Proposed Pumping and Storage Facilities			**$ 11,475,040**	**$ 6,024,396**	**$ 17,499,436**

PLANNING EXPENSES

Year		Project Description			Engineering Services	Debt Service (B)	Total Project Cost
2019		Water & Wastewater System Master Plan & Impact Fee Analysis			$ 74,675		$ 74,675
		Subtotal: Planning Expenses			**$ 74,675**	$ -	**$ 74,675**
		GRAND TOTAL: WATER DISTRIBUTION 10-YEAR CIP			**$ 15,109,073**	**$ 7,893,060**	**$ 23,002,133**

(A) Opinion of Cost includes:
a) Engineer's Opinion of Construction Cost
b) Professional Services Fees (Survey, Engineering, Testing, Legal)
c) Cost of Easement or Land Acquisitions

(B) Debt Service Based on 20-Year Simple Interest Bonds at 5%

5. Utilized Capacity

Utilized capacity for the water distribution system was calculated based on the water line size required for each model year (2019, 2029 and buildout). Analysis of the water distribution system is based on the maximum daily demand, maximum hourly demand, and the minimum hourly demand. Pump station capacity is generally based on the maximum daily system demand while transmission and distribution facilities are sized based on either the maximum hourly demand or the minimum hourly demand, whichever demand is greater for a particular water line. Often times, the capacity of water lines are determined by the flows generated by the minimum hourly demand. The minimum hourly flows are usually higher in those lines that are used to refill elevated storage. For each line segment in the water distribution model, the maximum buildout flow rate in the line was compared to the flow rate in the same line segment for the 2019 and the 2029 models.

The percent utilized capacity was then calculated for each year based on the buildout capacity. The utilized capacity during the Impact Fee period is the difference between the year 2029 capacity and the year 2019 capacity. **Table No. 8** below summarizes the project cost and utilized capacity cost over the Capital Recovery Period (CRP) of 2019 - 2029 for each element of the Water Distribution System. The utilized capacity for each water distribution facility, both existing and proposed, is presented in detail in Impact Fee Capacity Calculation **Table Nos. 9, 10, 11, 12, 13 and 14.**

Table No. 8

Summary of Eligible Water Distribution Project Cost and Utilized Capacity Cost

Water System Facility	20-Year Project Cost	Utilized Capacity ($) In the CRP
Existing Pump Stations & Storage	$24,635,679	$8,804,864
Existing Transmission/Distribution Lines	$14,222,504	$2,863,156
Proposed Pump Stations & Storage	$17,499,436	$15,502,253
Proposed Transmission/Distribution Lines	$5,428,022	$3,005,499
CCN Acquisition	$5,048,042	$656,510
Planning Expenses	$74,675	$74,675
Total:	**$66,908,358**	**$30,906,957**

TABLE NO. 9
Water Pump Station Facilities

Pump Station Improvements			Year Const.	Projected Capacity (MGD)	Pump Station Cost ($) Const.	Engineering & Testing	20 Year Debt Service @ 5% Simple Interest	Total 20 Yr. Project Cost $	Capacity Utilized (%) 2019	2029	In The CRF Period	Capacity Utilized ($) 2019	2029	In The CRF Period
PUMP STATIONS														
Existing Pump Station Facilities														
Heath Street Original Construction	[6]		Unknown	7.7	$ 1,363,700		$ 715,943	$ 2,079,643	49%	100%	51%	$ 1,013,029	$ 2,079,643	$ 1,066,614
Eastside 698.75 Original Pump Station	[5]		1992	8.0	$ 1,245,503		$ 653,889	$ 1,899,392	100%	100%	0%	$ 1,899,392	$ 1,899,392	$ -
Eastside 698.75 Replace Pump 1 & 2, Install Pump 4	[3]		1999	9.9	$ 357,909	$ 39,000	$ 208,377	$ 605,286	100%	100%	0%	$ 605,286	$ 605,286	$ -
Eastside 698.75 Install Pump 6	[1]		2004	7.5	$ 130,000	$ 143,080	$ 143,367	$ 416,447	100%	100%	0%	$ 416,447.0	$ 416,447.0	$ -
Eastside 780 Pump Station	[3]		2007	8.7	$ 1,629,000	$ 226,522	$ 974,149	$ 2,829,671	42%	96%	54%	$ 1,188,462	$ 2,716,484	$ 1,528,022
			Existing Pump Station Subtotal:		**$ 4,726,112**	**$ 408,602**	**$ 2,695,725**	**$ 7,830,439**				**$ 5,122,616**	**$ 7,717,252**	**$ 2,594,636**
Proposed Pump Station Facilities														
Heath St. Electrical Improvements & Emergency Generators to Increase Pump Capacity	[1]	**	2021	+7	$ 2,481,818	$ 248,182	$ 1,433,250	$ 4,163,250	0%	100%	100%	$ -	$ 4,163,250	$ 4,163,250
Proposed SH 276 Land Acquisition (10-Acres)	[1]		2025		$ 550,340	$ 40,000	$ 309,929	$ 900,269	0%	100%	100%	$ -	$ 900,269	$ 900,269
Eastside 780 Install Pump 4	[1]	**	2029	+2.9	$ 1,707,295	$ 170,730	$ 985,963	$ 2,863,988	0%	96%	96%	$ -	$ 2,749,428	$ 2,749,428
			Proposed Pump Station Subtotal:		**$ 4,739,454**	**$ 458,911**	**$ 2,729,142**	**$ 7,927,507**				**$ -**	**$ 7,812,947**	**$ 7,812,947**
Pump Station Grand Total					**$ 9,465,566**	**$ 867,513**	**$ 5,424,867**	**$ 15,757,946**				**$ 5,122,616**	**$ 15,530,199**	**$ 10,407,583**

* Includes Property Acquisition
** 10% of Construction Assumed for Engineering and Testing
(1) Estimated Cost in 2019 Dollars
[4] Number of Pumps

TABLE NO. 10
Ground Storage Reservoirs

Pump Station	Year Const.	Capacity (MG)	Capital Cost ($) Const.	Eng. & Testing	20 Year Debt Service @ 5% Simple Interest	Total 20 Yr. Project Cost $	Capacity Utilized (%) 2019	2029	In the CRF Period	Capacity Utilized ($) 2019	2029	In the CRF Period
EXISTING GROUND STORAGE RESERVOIRS												
Eastside No. 2 1	2006	4.0	$ 2,420,695	$ 67,524	$ 1,306,315	$ 3,794,534	67.0%	78.0%	11.0%	$ 2,542,338	$ 2,959,737	$ 417,399
Heath St. No. 1 1	1986	3.0	$ 825,810		$ 433,550	$ 1,259,360	77.0%	100.0%	23.0%	$ 969,707	$ 1,259,360	$ 289,653
Existing Ground Storage Subtotal		**7.00**	**$ 3,246,505**	**$ 67,524**	**$ 1,739,865**	**$ 5,053,894**				**$ 3,512,045**	**$ 4,219,097**	**$ 707,052**
PROPOSED GROUND STORAGE RESERVOIRS												
Eastside No. 3 (Tank Buried) 2*	2024	2.0	$ 2,596,000	$ 259,600	$ 1,499,190	$ 4,354,790	0.0%	78%	78.3%	$ -	$ 3,411,252	$ 3,411,252
Proposed Ground Storage Subtotal		**2.00**	**$ 2,596,000**	**$ 259,600**	**$ 1,499,190**	**$ 4,354,790**				**$ -**	**$ 3,411,252**	**$ 3,411,252**
Ground Storage Grand Total		**9.00**	**$ 5,842,505**	**$ 327,124**	**$ 3,239,055**	**$ 9,408,684**				**$ 3,512,045**	**$ 7,630,349**	**$ 4,118,304**

* 10% of Construction Assumed for Engineering and Testing

(1) Actual Cost

(2) Estimated Cost in 2019 Dollars

TABLE NO. 11
Elevated Storage Tanks

Elevated Storage	Pressure Divide	Year Const.	Storage Capacity (MGD)	Capital Cost ($)				Capacity Utilized (%)			Capacity Utilized ($)		
				Const.	Eng. & Testing	20 Year Debt Service @ 5% Simple Interest	Total 20 Yr. Project Cost $	2019	2029	In the CRF Period	2019	2029	In the CRF Period
EXISTING ELEVATED STORAGE TANKS													
Southside 2	698.75	1992	1.0	$ 1,363,700	$ -	$ 715,943	$ 2,079,643	100.0%	100.0%	0.0%	$ 2,079,643	$ 2,079,643	$ -
Springer 1	698.75	2004	2.0	$ 2,158,000	$ 215,800	$ 1,246,245	$ 3,620,045	16.0%	51.0%	35.0%	$ 579,207	$ 1,846,223	$ 1,267,016
Country Ln. 1	780	2008	2.0	$ 3,863,300	$ 105,000	$ 2,083,358	$ 6,051,658	30.0%	100.0%	70.0%	$ 1,815,497	$ 6,051,658	$ 4,236,161
Existing Elevated Storage Subtotal			**5.0**	**$ 7,385,000**	**$ 320,800**	**$ 4,045,546**	**$ 11,751,346**				**$ 4,474,348**	**$ 9,977,524**	**$ 5,503,176**
PROPOSED ELEVATED STORAGE TANKS													
Mims 2*	698.75	2022	2.0	$ 3,110,068	$ 311,007	$ 1,796,064	$ 5,217,139	0.0%	82.0%	82.0%	$ -	$ 4,278,054	$ 4,278,054
Existing Elevated Storage Subtotal			**2.0**	**$ 3,110,068**	**$ 311,007**	**$ 1,796,064**	**$ 5,217,139**				**$ -**	**$ 4,278,054**	**$ 4,278,054**
Elevated Storage Grand Total			**5.0**	**$ 10,495,068**	**$ 631,807**	**$ 5,841,610**	**$ 16,968,485**				**$ 4,474,348**	**$ 14,255,578**	**$ 9,781,230**

* 10% of Construction Assumed for Engineering and Testing
(1) Actual Cost
(2) Estimated Cost in 2019 Dollars

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TABLE NO. 12
Existing Impact Fee Water Lines

1 - City Participation in Cost Oversize

2 - City Initiated and Funded

	Pipe Number	Pressure Plane	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Intersest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost ($)	(%) Utilized Capacity			($) Utilized Capacity		
											2019	2029	During Fee Period	2019	2029	During Fee Period
FM 552 WATER LINE (SH 205 TO MIDDLE SCHOOL)																
2	P1138	698.75	652	16		$82.70	$53,918		$28,307	$82,225	100%	100%	0%	$82,225	$82,225	$0
2	P1139	698.75	371	16		$82.70	$30,680		$16,107	$46,787	100%	100%	0%	$46,787	$46,787	$0
2	P1140	698.75	1,125	16		$82.70	$93,034		$48,843	$141,877	100%	100%	0%	$141,877	$141,877	$0
2	P1141	698.75	1,803	16		$82.70	$149,102		$78,278	$227,380	100%	100%	0%	$227,380	$227,380	$0
	Subtotal:		**3,951**		**2007**		**$326,734**	**5%**	**$171,535**	**$498,269**				**$498,269**	**$498,269**	**$0**
FM 552 WATER LINE (MIDDLE SCHOOL TO FM 1141)																
1	P1142	698.75	1,823	16		$3.98	$7,257		$3,810	$11,067	100%	100%	0%	$11,067	$11,067	$0
1	P1143	698.75	358	16		$3.98	$1,425		$748	$2,173	100%	100%	0%	$2,173	$2,173	$0
1	P1144	698.75	968	16		$3.98	$3,854		$2,023	$5,877	100%	100%	0%	$5,877	$5,877	$0
1	P1145	698.75	1,197	16		$3.98	$4,765		$2,502	$7,267	100%	100%	0%	$7,267	$7,267	$0
1	P1811	698.75	1,492	16		$3.98	$5,940		$3,119	$9,059	100%	100%	0%	$9,059	$9,059	$0
1	P1812	698.75	266	16		$3.98	$1,059		$556	$1,615	100%	100%	0%	$1,615	$1,615	$0
	Subtotal:		**6,104**		**2006**		**$24,300**	**5%**	**$12,758**	**$37,058**				**$37,058**	**$37,058**	**$0**
FM 1141 WATER LINE (FM 552 TO COUNTRY LANE)																
1	P1149	698.75	432	16		$19.92	$8,605		$4,518	$13,123	100%	100%	0%	$13,123	$13,123	$0
1	P1150	698.75	1,285	16		$19.92	$25,595		$13,437	$39,032	100%	100%	0%	$39,032	$39,032	$0
	Subtotal:		**1,717**		**2006**		**$34,200**	**5%**	**$17,955**	**$52,155**				**$52,155**	**$52,155**	**$0**
FM 1141 WATER LINE (COUNTRY LANE TO CLEM ROAD)																
2	P1155	698.75	1,674	16		$125.19	$209,566		$110,022	$319,588	100%	100%	0%	$319,588	$319,588	$0
2	P1156	698.75	724	16		$125.19	$90,637		$47,584	$138,221	23%	45%	22%	$31,791	$62,199	$30,409
2	P1157	698.75	1,063	16		$125.19	$133,076		$69,865	$202,941	22%	45%	23%	$44,647	$91,323	$46,676
	Subtotal:		**3,461**		**2008**		**$433,279**	**5%**	**$227,471**	**$660,750**				**$396,026**	**$473,110**	**$77,085**

TABLE NO. 12
Existing Impact Fee Water Lines

1 - City Participation in Cost Oversize

2 - City Initiated and Funded

	Pipe Number	Pressure Plane	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Intersest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost ($)	(%) Utilized Capacity			($) Utilized Capacity		
											2019	2029	During Fee Period	2019	2029	During Fee Period
COUNTRY LANE WATER LINE (FM 1141 TO COUNTRY LANE ELEVATED STORAGE TANK)																
2	P1151	698.75	1,158	20		$109.56	$126,874		$66,609	$193,483	100%	100%	0%	$193,483	$193,483	$0
2	P1810	698.75	611	24		$109.56	$66,943		$35,145	$102,088	100%	100%	0%	$102,088	$102,088	$0
	Subtotal:		**1,769**		**2008**		**$193,817**	**5%**	**$101,754**	**$295,571**				**$295,571**	**$295,571**	**$0**
700 SERVICE AREA WATER LINE IMPROVEMENTS																
16" Country Ln. from Country Ln. EST to FM 549; 16" FM 549 from Country Ln. to Clem Road; 12" Clem Rd. from FM549 to FM 1141; 16" & 12" FM 1441 from Clem Rd. to SH 205 Bypass)																
2	P1152	698.75	2,128	16		$61.16	$130,142		$68,325	$198,467	100%	100%	0%	$198,467	$198,467	$0
2	P1153	698.75	2,026	16		$61.16	$123,904		$65,050	$188,954	100%	100%	0%	$188,954	$188,954	$0
2	P1154	698.75	3,019	12		$61.16	$184,633		$96,932	$281,565	84%	89%	5%	$236,515	$250,593	$14,078
2	P1158	698.75	2,686	16		$61.16	$164,268		$86,241	$250,509	41%	58%	17%	$102,709	$145,295	$42,587
2	P1249	698.75	1,965	12		$61.16	$120,174		$63,091	$183,265	94%	100%	6%	$172,269	$183,265	$10,996
2	P1814	698.75	242	12		$61.16	$14,800		$7,770	$22,570	100%	100%	0%	$22,570	$22,570	$0
2	P1822	698.75	221	16		$61.16	$13,516		$7,096	$20,612	100%	100%	0%	$20,612	$20,612	$0
2	P1823	698.75	1,509	16		$61.16	$92,286		$48,450	$140,736	54%	83%	29%	$75,997	$116,811	$40,813
2	P3099	780	1,486	12		$61.16	$90,879		$47,711	$138,590	100%	100%	0%	$138,590	$138,590	$0
2	P3100	780	1,382	16		$61.16	$84,519		$44,372	$128,891	100%	100%	0%	$128,891	$128,891	$0
	Subtotal:		**16,664**		**2008**		**$1,019,122**	**5%**	**$535,038**	**$1,554,159**				**$1,285,574**	**$1,394,048**	**$108,474**
HAYS ROAD WATER LINE (FM 552 TO QUAIL RUN ROAD)																
2	P1162	698.75	894	20		$210.52	$188,201		$98,806	$287,007	40%	45%	5%	$114,803	$129,153	$14,350
2	P1163	698.75	1,505	20		$210.52	$316,826		$166,334	$483,160	63%	65%	2%	$304,391	$314,054	$9,663
2	P1819	698.75	684	20		$210.52	$143,993		$75,596	$219,589	36%	39%	3%	$79,052	$85,640	$6,588
2	P1833	698.75	816	20		$210.52	$171,781		$90,185	$261,966	57%	63%	6%	$149,321	$165,039	$15,718
	Subtotal:		**3,899**		**2002**		**$820,800**	**5%**	**$430,921**	**$1,251,722**				**$647,567**	**$693,886**	**$46,319**
QUAIL RUN ROAD WATER LINE I (SH 205 (GOLIAD) TO HAYS ROAD)																
1	P1164	698.75	482	20		$15.88	$7,654		$4,018	$11,672	81%	85%	4%	$9,454	$9,921	$467
1	P1165	698.75	419	16		$15.88	$6,654		$3,493	$10,147	80%	85%	5%	$8,118	$8,625	$507
1	P1166	698.75	1,211	16		$15.88	$19,231		$10,096	$29,327	77%	84%	7%	$22,582	$24,635	$2,053
1	P1167	698.75	1,005	16		$15.88	$15,960		$8,379	$24,339	77%	84%	7%	$18,741	$20,445	$1,704
	Subtotal:		**3,117**		**2002**		**$49,500**	**5%**	**$25,986**	**$75,485**				**$58,895**	**$63,626**	**$4,731**
QUAIL RUN ROAD WATER LINE II (HAYS ROAD TO SH 205 BYPASS)																
2	P1161	698.75	1,541	12		$85.74	$132,122		$69,364	$201,486	100%	100%	0%	$201,486	$201,486	$0
2	P1815	698.75	1,394	12		$85.74	$119,518		$62,747	$182,265	100%	100%	0%	$182,265	$182,265	$0
	Subtotal:		**2,935**		**2008**		**$251,640**	**5%**	**$132,111**	**$383,751**				**$383,751**	**$383,751**	**$0**

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TABLE NO. 12
Existing Impact Fee Water Lines

1 - City Participation in Cost Oversize

2 - City Initiated and Funded

	Pipe Number	Pressure Plane	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Intersest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost ($)	(%) Utilized Capacity 2019	(%) Utilized Capacity 2029	(%) Utilized Capacity During Fee Period	($) Utilized Capacity 2019	($) Utilized Capacity 2029	($) Utilized Capacity During Fee Period
QUAIL RUN ROAD WATER LINE III (SH 205 BYPASS TO FM 1141)																
2	P1159	698.75	1,888	12		$92.26	$174,185		$91,447	$265,632	100%	100%	0%	$265,632	$265,632	$0
2	P1160	698.75	1,582	12		$92.26	$145,954		$76,626	$222,580	50%	61%	11%	$111,290	$135,774	$24,484
2	P1820	698.75	985	16		$92.26	$90,875		$47,709	$138,584	100%	100%	0%	$138,584	$138,584	$0
	Subtotal:		**4,455**		**2008**		**$411,014**	**5%**	**$215,782**	**$626,796**				**$515,506**	**$539,990**	**$24,484**
SH 205 WATER LINE (DARRIN DRIVE TO QUAIL RUN ROAD)																
2	P1228	698.75	449	24		$132.11	$59,316		$31,141	$90,457	73%	85%	12%	$66,034	$76,888	$10,855
2	P1229	698.75	1,865	24		$132.11	$246,380		$129,349	$375,729	73%	85%	12%	$274,282	$319,370	$45,087
2	P1230	698.75	1,613	24		$132.11	$213,089		$111,872	$324,961	72%	90%	18%	$233,972	$292,465	$58,493
	Subtotal:		**3,927**		**2003**		**$518,785**	**5%**	**$272,362**	**$791,147**				**$574,288**	**$688,723**	**$114,435**
IH 30 EASTBOUND SERVICE ROAD WATER LINE (WEST OF SH 205 BYPASS TO FM 549)																
2	P1771	698.75	609	16		$153.22	$93,313		$48,989	$142,302	100%	100%	0%	$142,302	$142,302	$0
2	P1806	698.75	136	16		$153.22	$20,838		$10,940	$31,778	100%	100%	0%	$31,778	$31,778	$0
2	P3000	780	1,404	16		$153.22	$215,125		$112,941	$328,066	58%	100%	42%	$190,278	$328,066	$137,788
2	P3001	780	2,768	16		$153.22	$424,120		$222,663	$646,783	48%	100%	52%	$310,456	$646,783	$336,327
2	P3002	780	808	16		$153.22	$123,804		$64,997	$188,801	36%	59%	23%	$67,968	$111,393	$43,424
	Subtotal:		**5,725**		**2004**		**$877,200**	**5%**	**$460,530**	**$1,337,730**				**$742,782**	**$1,260,322**	**$517,539**
IH 30 WESTBOUND SERVICE ROAD WATER LINE (FM 549 TO ENTERPRISE)																
2	P1532	698.75	685	16		$115.23	$78,934		$41,440	$120,374	95%	100%	5%	$114,355	$120,374	$6,019
2	P1533	698.75	2,506	16		$115.23	$288,773		$151,606	$440,379	100%	100%	0%	$440,379	$440,379	$0
2	P1827	698.75	187	16		$115.23	$21,548		$11,313	$32,861	100%	100%	0%	$32,861	$32,861	$0
2	P3101	780	648	16		$115.23	$74,671		$39,202	$113,873	100%	100%	0%	$113,873	$113,873	$0
2	P3102	780	1,285	16		$115.23	$148,074		$77,739	$225,813	100%	100%	0%	$225,813	$225,813	$0
	Subtotal:		**5,311**		**2004**		**$612,000**	**5%**	**$321,300**	**$933,300**				**$927,281**	**$933,300**	**$6,019**
TOWNSEND DRIVE WATER LINE (EASTSIDE PS TO SH 276)																
2	P3091	780	2,646	20		$181.55	$480,393		$252,206	$732,599	43%	74%	31%	$315,018	$542,123	$227,106
	Subtotal:		**2,646**		**2007**		**$480,393**	**5%**	**$252,206**	**$732,599**				**$315,018**	**$542,123**	**$227,106**

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TABLE NO. 12
Existing Impact Fee Water Lines

1 - City Participation in Cost Oversize

2 - City Initiated and Funded

	Pipe Number	Pressure Plane	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Intersest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost ($)	(%) Utilized Capacity			($) Utilized Capacity		
											2019	2029	During Fee Period	2019	2029	During Fee Period
SPRINGER ROAD WATER LINE (FM 549 TO SPRINGER ELEVATED STORAGE TANK)																
2	P3020	780	2,669	16		$76.53	$204,256		$107,234	$311,490	72%	76%	4%	$224,273	$236,732	$12,460
Subtotal:			**2,669**		**2004**		**$204,256**	**5%**	**$107,234**	**$311,490**				**$224,273**	**$236,732**	**$12,460**
SPRINGER ELEVATED STORAGE TANK WATER LINE (SPRINGER ROAD TO SH 276)																
2	P3071	780	225	24		$147.72	$33,238		$17,450	$50,688	32%	38%	6%	$16,220	$19,261	$3,041
2	P3072	780	861	24		$147.72	$127,189		$66,774	$193,963	57%	67%	10%	$110,559	$129,955	$19,396
Subtotal:			**1,086**		**2004**		**$160,427**	**5%**	**$84,224**	**$244,651**				**$126,779**	**$149,216**	**$22,437**
MIMS ROAD WATER LINE (SIDS ROAD TO SH 205)																
2	P1739	698.75	2,233	16		$100.71	$224,876		$118,060	$342,936	100%	100%	0%	$342,936	$342,936	$0
2	P1828	698.75	1,340	12		$100.71	$134,946		$70,847	$205,793	77%	100%	23%	$158,461	$205,793	$47,332
Subtotal:			**3,573**		**2008**		**$359,822**	**5%**	**$188,907**	**$548,729**				**$501,397**	**$548,729**	**$47,332**
FM 549 WATER LINE I (FONTANNA RANCH ADDITION TO OAKS OF BUFFALO WAY ADDITION)																
2	P3061	780	2,835	12		$90.67	$257,043		$134,948	$391,991	18%	59%	41%	$70,558	$231,275	$160,716
2	P3062	780	1,124	12		$90.67	$101,911		$53,503	$155,414	100%	100%	0%	$155,414	$155,414	$0
2	P3063	780	1,435	12		$90.67	$130,108		$68,307	$198,415	47%	50%	3%	$93,255	$99,208	$5,952
2	P3106	780	806	12		$90.67	$73,078		$38,366	$111,444	49%	61%	12%	$54,608	$67,981	$13,373
3	P3110	780	594	12		$90.67	$53,857		$28,275	$82,132	31%	48%	17%	$25,461	$39,423	$13,962
4	P3111	780	821	12		$90.67	$74,438		$39,080	$113,518	100%	100%	0%	$113,518	$113,518	$0
Subtotal:			**7,615**		**2008**		**$690,436**	**5%**	**$362,479**	**$1,052,914**				**$512,814**	**$706,819**	**$194,003**

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TABLE NO. 12
Existing Impact Fee Water Lines

1 - City Participation in Cost Oversize
2 - City Initiated and Funded

	Pipe Number	Pressure Plane	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Intersest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost ($)	(%) Utilized Capacity 2019	(%) Utilized Capacity 2029	(%) Utilized Capacity During Fee Period	($) Utilized Capacity 2019	($) Utilized Capacity 2029	($) Utilized Capacity During Fee Period
FM 549 WATER LINE II (STANDING OAK LANE TO JEFF BOYD DRIVE)																
2	P1821	698.75	475	12		$32.08	$15,238		$8,000	$23,238	13%	30%	17%	$3,021	$6,971	$3,950
2	P3067	780	1,260	12		$32.08	$40,422		$21,221	$61,643	10%	38%	28%	$6,164	$23,424	$17,260
2	P3068	780	2,252	12		$32.08	$72,246		$37,929	$110,175	14%	20%	6%	$15,425	$22,035	$6,611
	Subtotal:		**3,987**		**2008**		**$127,907**	**5%**	**$67,150**	**$195,056**				**$24,610**	**$52,430**	**$27,821**
FM 3097 WATER LINE (BUFFALO CREEK WWTPP TO WALLACE LANE)																
2	P1663	698.75	2,324	12		$95.50	$221,938		$116,517	$338,455	22%	70%	48%	$74,460	$236,919	$162,458
2	P1664	698.75	2,335	12		$95.50	$222,988		$117,069	$340,057	5%	78%	73%	$17,003	$265,244	$248,242
2	P1829	698.75	1,457	12		$95.50	$139,141		$73,049	$212,190	0%	72%	72%	$0	$152,777	$152,777
	Subtotal:		**6,116**		**2008**		**$584,067**	**5%**	**$306,635**	**$890,702**				**$91,463**	**$654,940**	**$563,477**
COUNTY LINE ROAD WATER LINE I (FM 3097 TO RANCH TRAIL)																
2	P1734	698.75	2,324	12		$95.79	$222,625		$116,878	$339,503	37%	81%	44%	$125,616	$274,997	$149,381
	Subtotal:		**2,324**		**2008**		**$222,625**	**5%**	**$116,878**	**$339,503**				**$125,616**	**$274,997**	**$149,381**
JOHN KING / BREEZY HILL WATER LINE (FM 552 TO BREEZY HILL)																
1	P1868	698.75	2,632	16		$18.04	$47,493		$24,934	$72,427	21%	77%	56%	$15,210	$55,769	$40,559
1	P1869	698.75	2,662	16		$18.04	$48,035		$25,218	$73,253	16%	67%	51%	$11,720	$49,080	$37,359
	Subtotal:		**5,294**		**2014**		**$95,528**	**5%**	**$50,152**	**$145,680**				**$26,930**	**$104,849**	**$77,918**
BOYDSTUN STREET WATER LINE (FROM GOLIAD STREET TO CLARK STREET)																
2	P1376	698.75	171	12		$225.86	$38,622		$20,277	$58,899	84%	100%	16%	$49,475	$58,899	$9,424
2	P1377	698.75	403	12		$225.86	$91,020		$47,786	$138,806	85%	100%	15%	$117,985	$138,806	$20,821
2	P1378	698.75	1,194	12		$225.86	$269,673		$141,579	$411,252	96%	100%	4%	$394,802	$411,252	$16,450
	Subtotal:		**1,768**		**2018**		**$399,315**	**5%**	**$209,642**	**$608,957**				**$562,262**	**$608,957**	**$46,695**
COUNTY LINE ROAD WATER LINE II (FROM LYNNE DRIVE TO RENEE DRIVE)																
2	P2098	698.75	1,782	12		$240.78	$429,069		$225,261	$654,330	2%	93%	91%	$13,087	$608,527	$595,440
	Subtotal:		**1,782**		**2019**		**$429,069**	**5%**	**$225,261**	**$654,330**				**$13,087**	**$608,527**	**$595,440**
EXISTING TOTAL:			**101,895**				**$9,326,237**		**$4,896,271**	**$14,222,504**				**$8,938,972**	**$11,802,128**	**$2,863,156**

TABLE NO. 13
Proposed Impact Fee Water Lines

1 - City Participation in Cost Oversize

2 - City Initiated and Funded

**Average Unit Costs are Based in 2019 Dollars Unless Otherwise Indicated and Includes 20% for Engineering and Easements.*

Pipe Number	Pressure Plane	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost ($)	(%) Utilized Capacity 2019	(%) Utilized Capacity 2029	(%) Utilized Capacity During Fee Period	($) Utilized Capacity 2019	($) Utilized Capacity 2029	($) Utilized Capacity During Fee Period
1 - MIMS ROAD / COUNTY LINE ROAD LOOPING WATER LINES															
Pipes P2096 & P2097 Along Future Thouroghfare and Renee Drive from Mims Road South to County Line Road; Pipe 2118 Along Mims Road to Goliad Street															
2 P2096 *	698.75	2,162	20		$228.00	$492,936		$258,792	$751,728	0%	97%	97%	$0	$729,176	$729,176
2 P2097 *	698.75	2,459	20		$228.00	$560,652		$294,342	$854,994	0%	95%	95%	$0	$812,244	$812,244
2 P2118 *	698.75	1,530	20		$228.00	$348,840		$183,141	$531,981	0%	71%	71%	$0	$377,707	$377,707
Subtotal:		**6,151**		**2022**		**$1,402,428**	**5%**	**$736,275**	**$2,138,703**				**$0**	**$1,919,127**	**$1,919,127**
2 - I.H.-30 - FM 3549/CORPORATE CROSSING															
Creating 780 Service Area North of IH-30 (*16" Diameter Cost Based on Bore Across IH-30 & FM549*)															
2 P4039 *	780	575	12		$120.00	$69,000		$36,225	$105,225	0%	28%	28%	$0	$29,463	$29,463
2 P4124 *	780	712	16		$650.00	$462,800		$242,970	$705,770	0%	33%	33%	$0	$232,904	$232,904
		1,287		**2023**		**$531,800**	**5%**	**$279,195**	**$810,995**				**$0**	**$262,367**	**$262,367**
3 - JOHN KING BLVD 780 WATER LINES NORTH															
Pipe P4123 is a Bore Across IH-30															
2 P4123 *	780	423	16		$650.00	$274,950		$144,349	$419,299	0%	21%	21%	$0	$88,053	$88,053
		423		**2023**		**$274,950**	**5%**	**$144,349**	**$419,299**				**$0**	**$88,053**	**$88,053**
4 - S.H. 66 - F.M. 3549 780 SA LOOP															
From the Termination of the Existing S.H. 66 12" Water Line East to F.M. 549, South Along F.M. 549 from S.H. 66 to Eastridge Church of Christ 16" Existing Water Line															
2 P4007 *	780	3,439	12		$120.00	$412,680		$216,657	$629,337	0%	38%	38%	$0	$239,148	$239,148
2 P4008 *	780	2,174	12		$120.00	$260,880		$136,962	$397,842	0%	11%	11%	$0	$43,763	$43,763
2 P4009 *	780	781	12		$120.00	$93,720		$49,203	$142,923	0%	12%	12%	$0	$17,151	$17,151
Subtotal:		**6,394**		**2023**		**$767,280**	**5%**	**$402,822**	**$1,170,102**				**$0**	**$300,062**	**$300,062**
5 - S.H. 205 WATER LINES															
Pipe P2117 southwest from Graystone Drive to S.H. 205. Pipe P2136 southeast along S.H. 205.															
1 P2117 *	698.75	846	16		$60.00	$50,760		$26,649	$77,409	0%	100%	100%	$0	$77,409	$77,409
1 P2136 *	698.75	1,650	16		$60.00	$99,000		$51,975	$150,975	0%	100%	100%	$0	$150,975	$150,975
Subtotal:		**2,496**		**2025**		**$149,760**	**5%**	**$78,624**	**$228,384**				**$0**	**$228,384**	**$228,384**

TABLE NO. 13
Proposed Impact Fee Water Lines

1 - City Participation in Cost Oversize

2 - City Initiated and Funded

**Average Unit Costs are Based in 2019 Dollars Unless Otherwise Indicated and Includes 20% for Engineering and Easements.*

	Pipe Number	Pressure Plane	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost ($)	(%) Utilized Capacity 2019	(%) Utilized Capacity 2029	(%) Utilized Capacity During Fee Period	($) Utilized Capacity 2019	($) Utilized Capacity 2029	($) Utilized Capacity During Fee Period
6 - SPRINGER LN. 16" WATER LINE																
From Springer Elevated Storage Tank East to Rochelle Road																
1	P4043 *	780	2,714	16		$60.00	$162,840		$85,491	$248,331	0%	51%	51%	$0	$126,649	$126,649
Subtotal:			**2,714**		**2029**		**$162,840**	**5%**	**$85,491**	**$248,331**				**$0**	**$126,649**	**$126,649**
7 - S.H. 276 PUMP STATION TRANSMISSION MAIN WEST																
From Proposed S.H. 276 Pump Station West Along S.H. 276 to Proposed Subdivision																
1	P4071 *	780	1,906	16		$60.00	$114,360		$60,039	$174,399	0%	28%	28%	$0	$48,832	$48,832
1	P4072 *	780	1,906	16		$60.00	$114,360		$60,039	$174,399	0%	14%	14%	$0	$24,416	$24,416
1	P4073 *	780	693	16		$60.00	$41,580		$21,830	$63,410	0%	12%	12%	$0	$7,609	$7,609
Subtotal:			**4,505**		**2029**		**$270,300**	**5%**	**$141,908**	**$412,208**				**$0**	**$80,857**	**$80,857**
PROPOSED TOTAL:			**23,970**				**$3,559,358**		**$1,868,664**	**$5,428,022**				**$0**	**$3,005,499**	**$3,005,499**

TABLE NO. 14
CCN Acquisition

Elevated Storage		Year Acquired	Area (Ac.)	Capital Cost ($) Purchase Price				Capacity Utilized (%) 2019	2029	In the CRF Period	Capacity Utilized ($) 2019	2029	In the CRF Period
CCN Acquisition													
Aquasourse		2013	284.0	$ 3,402,318			$ 3,402,318	100.0%	100.0%	0.0%	$ 3,402,318	$ 3,402,318	$ -
RCH W.S.C.		2007-2009	803.0	$ 332,847			$ 332,847	29.0%	30.0%	1.0%	$ 96,526	$ 99,854	$ 3,328
Mt. Zion W.S.C.		2011	468.0	$ 325,725			$ 325,725	15.0%	64.0%	49.0%	$ 48,859	$ 208,464	$ 159,605
Blaclland W.S.C.		2005-2012	1,251.0	$ 987,152			$ 987,152	8.0%	58.0%	50.0%	$ 78,972	$ 572,548	$ 493,576
Total			**2,806.0**	**$ 5,048,042**	**$ -**	**$ -**	**$ 5,048,042**				**$ 3,626,675**	**$ 4,283,184**	**$ 656,510**

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E. WASTEWATER COLLECTION SYSTEM

Computer models for the years 2019, 2029 and Buildout were prepared by Birkhoff, Hendricks & Carter L.L.P. The models were developed and peak flows calculated from the residential population and non-residential land use projections prepared by the City of Rockwall's Planning Department. Computer models were run to determine peak wet weather flow to insure proper sizing of the collection system.

1. Collection Lines

The natural creeks, whose basins will collect wastewater through the installed system of collection lines that flow into the geographic treatment area serviced by the NTMWD.

The wastewater collection system analysis covered all of the drainage basins within the Service Area planning boundary. Each collection system was analyzed for line sizes 12-inches in diameter and larger. Eliminating line sizes smaller than 12-inches in diameter from the study leaves only the interceptor and trunk lines included in the study. The wastewater project costs include necessary appurtenances (manholes, lift stations, aerial crossings and the like), purchase of easements, utility relocation, pavement removal and replacement, and engineering costs. For existing Impact Fee projects, actual costs were utilized where known. Future project cost estimates were based on 2019 average unit cost per linear foot and includes engineering, easements, and construction cost.

All eligible wastewater collection line projects in the Service Area planning boundary were included in the impact fee analysis. Eligible existing and proposed wastewater facilities are shown on **Exhibit 2** and have capacity for future growth.

2. Treatment

The North Texas Municipal Water District (NTMWD) provides the City of Rockwall with the entirety of wastewater treatment. NTMWD owns and operates the Squabble Creek and Buffalo Creek Wastewater Treatment Plants (WWTP). Excess flows above the permit levels of the Squabble Creek and Buffalo Creek WWTP's are conveyed to the NTMWD Buffalo Creek Regional system. Rockwall pays NTMWD for the cost of this service according to the City's percentage of wastewater flow contributions in any given year.

This Impact Fee study includes the cost of NTMWD regional collection and transportation, and facilities located within the City's Service Area planning boundary that were paid for by NTMWD. Existing treatment plant and future treatment plant expansion costs of NTMWD were included in this Impact Fee analysis.

3. Wastewater System Capital Improvement Projects for Impact Fees

The 10-year Wastewater System Capital Improvement Plan for Impact Fees was developed by Birkhoff, Hendricks & Carter L.L.P. **Exhibit 2** shows the recommended system improvements and **Table No. 15** itemizes each project and the project cost. These recommended improvements form the basis for the Wastewater System Impact Fee Calculation.

The capital improvement plan for impact fees provides for system improvements within the defined Service Area Planning Boundary.

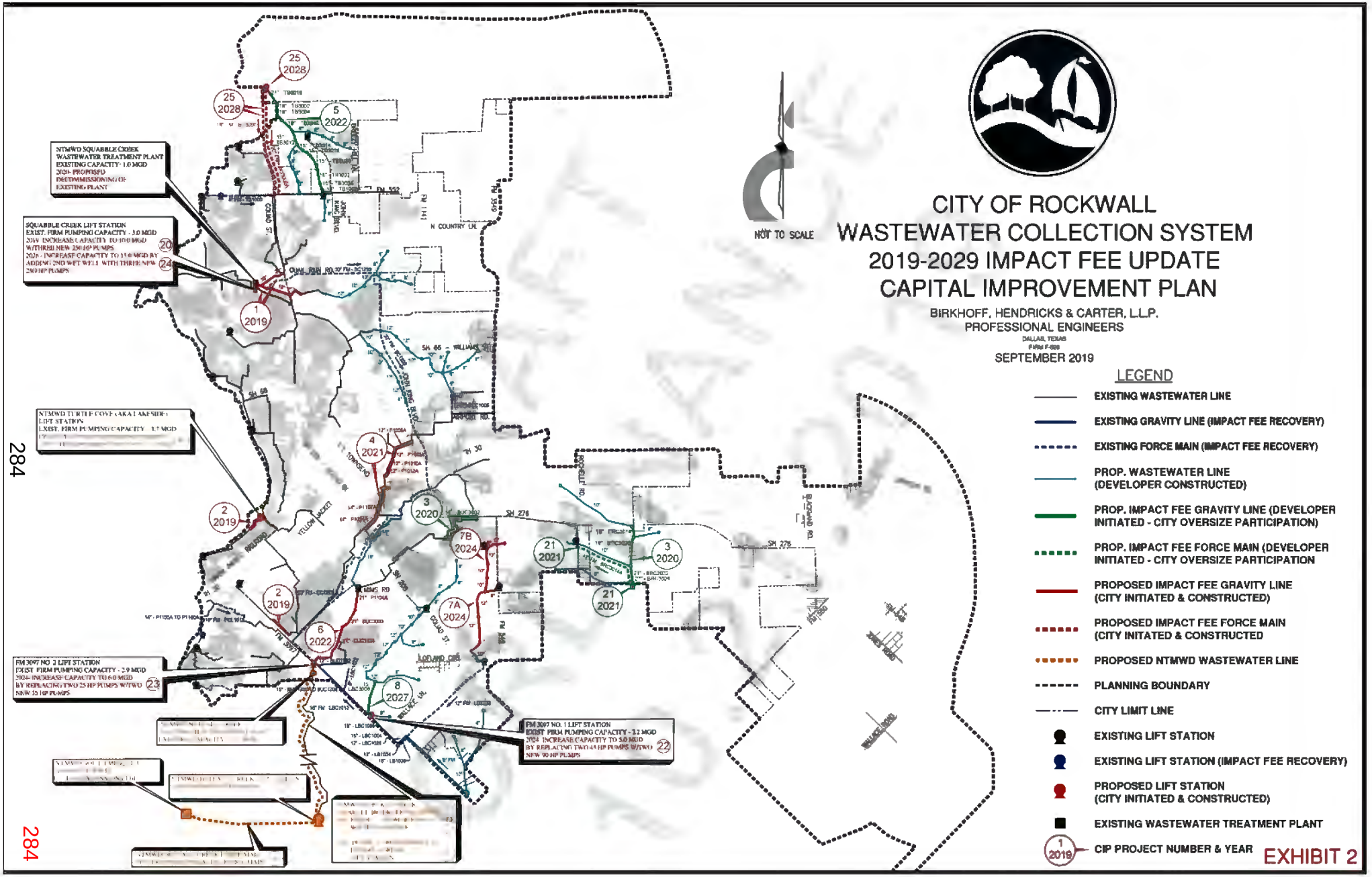
NTMWD SQUABBLE CREEK WASTEWATER TREATMENT PLANT
EXISTING CAPACITY - 1.0 MGD
2029- PROPOSED DECOMMISSIONING OF EXISTING PLANT
SQUABBLE CREEK LIFT STATION
EXIST. FIRM PUMPING CAPACITY - 3.0 MGD
2019- INCREASE CAPACITY TO 10.0 MGD W/THREE NEW 250 HP PUMPS
2029 - INCREASE CAPACITY TO 13.0 MGD BY ADDING 2ND WET WELL WITH THREE NEW 250 HP PUMPS
NTMWD TURTLE COVE (AKA LAKESIDE) LIFT STATION
EXIST. FIRM PUMPING CAPACITY - 1.7 MGD
FM 3097 NO. 2 LIFT STATION
EXIST. FIRM PUMPING CAPACITY - 2.9 MGD
2024- INCREASE CAPACITY TO 6.0 MGD BY REPLACING TWO 25 HP PUMPS W/TWO NEW 35 HP PUMPS
FM 3097 NO. 1 LIFT STATION
EXIST. FIRM PUMPING CAPACITY - 2.2 MGD
2024- INCREASE CAPACITY TO 5.0 MGD BY REPLACING TWO 15 HP PUMPS W/TWO NEW 90 HP PUMPS
NOT TO SCALE
CITY OF ROCKWALL
WASTEWATER COLLECTION SYSTEM
2019-2029 IMPACT FEE UPDATE
CAPITAL IMPROVEMENT PLAN
BIRKHOFF, HENDRICKS & CARTER, L.L.P.
PROFESSIONAL ENGINEERS
DALLAS, TEXAS
FIRM F-526
SEPTEMBER 2019
LEGEND
EXISTING WASTEWATER LINE
EXISTING GRAVITY LINE (IMPACT FEE RECOVERY)
EXISTING FORCE MAIN (IMPACT FEE RECOVERY)
PROP. WASTEWATER LINE (DEVELOPER CONSTRUCTED)
PROP. IMPACT FEE GRAVITY LINE (DEVELOPER INITIATED - CITY OVERSIZE PARTICIPATION)
PROP. IMPACT FEE FORCE MAIN (DEVELOPER INITIATED - CITY OVERSIZE PARTICIPATION
PROPOSED IMPACT FEE GRAVITY LINE (CITY INITIATED & CONSTRUCTED)
PROPOSED IMPACT FEE FORCE MAIN (CITY INITATED & CONSTRUCTED
PROPOSED NTMWD WASTEWATER LINE
PLANNING BOUNDARY
CITY LIMIT LINE
EXISTING LIFT STATION
EXISTING LIFT STATION (IMPACT FEE RECOVERY)
PROPOSED LIFT STATION (CITY INITIATED & CONSTRUCTED)
EXISTING WASTEWATER TREATMENT PLANT
CIP PROJECT NUMBER & YEAR
EXHIBIT 2

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Table No. 15

10-Year Wastewater System Capital Improvement Plan for Impact Fees

PROPOSED WASTEWATER LINES

CIP #	Year	1=City Participation in Cost Oversize 2=City Initiated and Funded (X) = CIP Project ID Number	Project	Size (Diameter)	Opinion of Project Cost (A)	Debt Service (B)	Total Project Cost
1	2019	2	Quail Run & Memorial Lift Station Bypass Trunk Sewer	18"-30"	$ 2,159,050	$ 1,133,500	$ 3,292,550
2	2019	2	Turtle Cove & Windmill Ridge Sewer Improvements	8"-12"	$ 800,000	$ 420,000	$ 1,220,000
3	2020	1	Proposed Brushy Creek Trunk Sewer & Timber Creek Lift Station Abandonment	18"-21"	$ 285,896	$ 150,095	$ 435,991
4	2021	2	Buffalo Creek Existing Gravity Sewer - 12" & 14" Pipe Burst	12"-14"	$ 1,281,901	$ 672,997	$ 1,954,898
5	2022	1	Proposed Thompson Branch Trunk Sewer	15"-21"	$ 339,296	$ 178,131	$ 517,427
6	2022	2	Proposed Lower Buffalo Creek East Trunk Sewer & Mims Rd. Lift Station Abandonment	21"	$ 1,734,075	$ 910,389	$ 2,644,464
7A	2024	2	Fontana Ranch Lift Station Abandonment & Gravity Relief Sewer	8"-12"	$ 985,844	$ 517,568	$ 1,503,412
7B	2024	2	Lofland Farms Lift Station Abandonment & Gravity Relief Sewer	8"-10"	$ 510,375	$ 267,947	$ 778,322
8	2027	1	Proposed Little Buffalo Creek Trunk Sewer	15"	$ 52,223	$ 27,417	$ 79,640
			Subtotal: Proposed Wastewater Lines		**$ 8,148,660**	**$ 4,278,044**	**$ 12,426,704**

PROPOSED WASTEWATER FACILITIES

CIP #	Year	1=City Participation in Cost Oversize 2=City Initiated and Funded (X) = CIP Project ID Number	Project	Capacity (MGD)	Opinion of Project Cost (A)	Debt Service (B)	Total Project Cost
20	2019	2	Squabble Creek Lift Station Improvements - Install Three 250-HP Pumps, Electrical Upgrades & Standby Pump System	10.0 MGD	$ 2,800,769	$ 1,470,404	$ 4,271,173
21	2021	1	Proposed Brushy Creek Lift Station & 12" Force Main	3.3 MGD	$ 1,610,000	$ 845,250	$ 2,455,250
22	2024	2	FM 3097 No. 1 Lift Station Improvements - Replace Two 45-HP Pumps w/Two 90-HP Pumps	5.0 MGD	$ 575,000	$ 301,875	$ 876,875
23	2024	2	FM 3097 No. 2 Lift Station Improvements - Replace Two 25-HP Pumps w/Two 35-HP Pumps	6.0 MGD	$ 862,500	$ 452,813	$ 1,315,313
24	2026	2	Squabble Creek Lift Station Improvements - Add 2nd Wet Well w/Three New 250-HP Pumps	15.0 MGD	$ 4,600,000	$ 2,415,000	$ 7,015,000
25	2028	2	Proposed Bluff Creek Lift Station & Parallel Force Mains (14" & 20")	2.4 MGD	$ 5,865,000	$ 3,079,125	$ 8,944,125
			Subtotal: Proposed Wastewater Facilities		**$ 16,313,269**	**$ 8,564,467**	**$ 24,877,736**
Total City of Rockwall Proposed Wastewater System Improvements					**$ 24,461,929**	**$ 12,842,511**	**$ 37,304,440**

(A) Opinion of Cost includes:

a) Engineer's Opinion of Construction Cost
b) Professional Services Fees (Survey, Engineering, Testing, Legal)
c) Cost of Easement or Land Acquisitions

(B) Debt Service Based on 20-Year Simple Interest Bonds at 5%

Table No. 15 (Continued)

10-Year Wastewater System Capital Improvement Plan for Impact Fees

NTMWD REGIONAL SYSTEM

CIP #	Year	3=Funded by NTMWD, 100% City Responsibility 4=Part of NTMWD Buffalo Interceptor System, assumed 59% City Responsibility 5=Part of NTMWD Regional Systems, assumed 2.915% City Responsibility	NTMWD Wastewater Line & Facility Projects	Size/ Added Capacity	Opinion of Project Cost (A)	Debt Service (B)	Total Project Cost
A1	2019	4	NTMWD Buffalo Creek Parallel Interceptor Sewer - Phase 1: From Buffalo Creek WWTP to Forney	TBD	$ 11,835,394	$ -	$ 11,835,394
A2	2020	3	NTMWD Turtle Cove (a.k.a. Lakeside) Lift Station Expansion/Replacement	+1.6 MGD	$ 4,600,000	$ -	$ 4,600,000
A3	2020	4	NTMWD Buffalo Creek Lift Station Expansion	TBD	$ 17,868,150	$ -	$ 17,868,150
A4	2020	4	NTMWD Buffalo Creek Parallel Force Main	TBD	$ 1,681,500	$ -	$ 1,681,500
A5	2026	4	NTMWD Buffalo Creek Parallel Interceptor - Phase 2: From Forney to Buffalo Creek Lift Station	TBD	$ 7,924,880	$ -	$ 7,924,880
A6	2019-2029	5	10-Year CIP for NTMWD Sewer System (Rockwall Responsibility Only)	N/A	$ 5,435,164	$ -	$ 5,435,164
A7	2019-2029	5	10-Year CIP for NTMWD Regional Wastewater System (Rockwall Responsibility Only)	N/A	$ 11,619,512	$ -	$ 11,619,512
			Total: NTMWD Wastewater System Improvements:		**$ 60,964,600**	**$ -**	**$ 60,964,600**

(A) Opinion of Cost includes:
a) Engineer's Opinion of Construction Cost
b) Professional Services Fees (Survey, Engineering, Testing, Legal)
c) Cost of Easement or Land Acquisitions

Notes: 1. City obligations estimated based on City of Rockwall's contracted proportion or historical usage of NTMWD Regional Systems.
2. 10-Year CIP for NTMWD Regional Systems based on project listings provided for "Summary of Sewer System CIP" and "Summary of Regional Wastewater System CIP", both dated May 11, 2018.

PLANNING EXPENSES

	Project Description	Engineering Services	Opinion of Project Cost (A)
2029	Wastewater Masterplan & Impact Fee Update	$ 59,850	$ 59,850
		Total: Planning Expenses:	**$ 59,850**
Grand Total, City of Rockwall & NTMWD Wastewater System Improvements:			**$ 98,328,890**

4. Utilized Capacity

Utilized capacity for the wastewater collection system was calculated based on land use assumptions prepared by the City of Rockwall. The population and non-residential growth in each wastewater drainage basin was determined utilizing the City's growth projections. These growth rates were utilized to calculate 2019, 2029 and buildout peak design flows.

The percent-utilized capacity was calculated for the design flow of each study year based on the buildout capacity. The utilized capacity during the Impact Fee period is the difference between the year 2019 capacity and the year 2029 capacity. **Table No. 16** below summarizes the project cost and utilized cost over the impact fee period of 2019 – 2029. The utilized capacity for each eligible existing and proposed wastewater collection line is presented in detail in the Impact Fee Capacity Calculation **Table Nos. 17 and 18**. **Table No. 19** summarizes the utilized capacity of lift stations eligible for impact fee recovery. **Table 20** summarizes the utilized capacity of NTMWD facilities eligible for impact fee recovery. **Table 21** includes the summary of utilized capacity allocation between the City of Rockwall and NTMWD.

TABLE NO. 16

Summary of Eligible Wastewater System Project Cost and Utilized Capacity Cost

Wastewater System Facility	20-Year Project Cost	Utilized Capacity ($) in the CRP Period
Existing Wastewater Collection Line	$12,344,474	$3,863,647
Existing Wastewater Facilities	$6,402,514	$629,875
Proposed Wastewater Collection Line	$12,426,705	$9,608,437
Proposed Wastewater Facilities	$24,877,736	$18,193,334
NTMWD Facilities	$60,964,600	$9,627,128
Planning Expenses	$59,850	$59,850
Total:	**$117,075,879**	**$41,982,271**

TABLE NO. 17
Existing Impact Fee Wastewater Lines

	Pipe Number	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Interest Rate %	Debt Service Utilizing Simple	Total 20 Year Project Cost ($)	(%) Utilized Capacity 2019	(%) Utilized Capacity 2029	(%) Utilized Capacity During Fee Period	($) Utilized Capacity 2019	($) Utilized Capacity 2029	($) Utilized Capacity During Fee Period
SQUABBLE / CARUTH LAKE SEWER															
From the Squabble Creek Wastewater Treatment Plant to SH 205 to Caruth Lane															
2	SC1008	158	36		$74.89	$11,844		$6,218	$18,062	72%	89%	17%	$12,946	$15,994	$3,048
2	SC1112	663	36		$74.89	$49,676		$26,080	$75,756	72%	89%	17%	$54,307	$67,179	$12,872
2	SC1114	275	36		$74.89	$20,614		$10,822	$31,436	72%	89%	17%	$22,740	$27,999	$5,259
2	SC1116	125	36		$74.89	$9,382		$4,926	$14,308	72%	89%	17%	$10,346	$12,729	$2,383
2	SC1118	902	27		$74.89	$67,561		$35,469	$103,030	68%	87%	20%	$69,891	$90,065	$20,174
2	SC1120	293	24		$74.89	$21,927		$11,512	$33,439	68%	87%	20%	$22,683	$29,231	$6,548
2	SC1154	313	24		$74.89	$23,404		$12,287	$35,691	68%	87%	20%	$24,210	$31,198	$6,989
2	SC1290	1,345	36		$74.89	$100,702		$52,868	$153,570	72%	89%	17%	$110,598	$136,445	$25,847
2	SC1292	173	36		$74.89	$12,959		$6,803	$19,762	72%	89%	17%	$14,232	$17,558	$3,326
2	SC1294	389	36		$74.89	$29,123		$15,290	$44,413	72%	89%	17%	$31,917	$39,422	$7,505
2	SC1296	16	27		$74.89	$1,176		$617	$1,793	72%	89%	17%	$1,285	$1,590	$305
2	SC1298	170	27		$74.89	$12,761		$6,700	$19,461	72%	89%	17%	$13,945	$17,242	$3,297
2	SC1300	124	27		$74.89	$9,285		$4,875	$14,160	72%	89%	17%	$10,151	$12,556	$2,405
2	SC1302	464	24		$74.89	$34,759		$18,248	$53,007	68%	87%	20%	$35,958	$46,338	$10,380
2	SC1334	219	36		$74.89	$16,402		$8,611	$25,013	72%	89%	17%	$18,084	$22,281	$4,197
2	SC1336	541	36		$74.89	$40,481		$21,252	$61,733	72%	89%	17%	$44,626	$54,941	$10,315
	Subtotal:	**6,170**		**1997**		**$462,056**	**5%**	**$242,578**	**$704,634**				**$497,919**	**$622,768**	**$124,850**
DALTON ROAD FORCE MAIN															
Begins at the Intersection of Dalton Road and Beacon Hill Drive and Extends East to SH 205															
2	TB1000	155	8		$51.43	$7,959		$4,178	$12,137	100%	100%	0%	$12,137	$12,137	$0
2	TB1040	3,409	8		$51.43	$175,324		$92,046	$267,370	100%	100%	0%	$267,370	$267,370	$0
	Subtotal:	**3,564**		**2002**		**$183,283**	**5%**	**$96,224**	**$279,507**				**$279,507**	**$279,507**	**$0**

TABLE NO. 17
Existing Impact Fee Wastewater Lines

	Pipe Number	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Interest Rate %	Debt Service Utilizing Simple	Total 20 Year Project Cost ($)	(%) Utilized Capacity 2019	(%) Utilized Capacity 2029	(%) Utilized Capacity During Fee Period	($) Utilized Capacity 2019	($) Utilized Capacity 2029	($) Utilized Capacity During Fee Period
SH 205 GRAVITY SEWER															
From Dalton Road / FM 522 to Quail Run Road															
2	SC1104	407	18		$78.32	$31,874		$16,734	$48,608	28%	42%	14%	$13,415	$20,355	$6,939
2	SC1106	347	18		$78.32	$27,185		$14,272	$41,457	26%	41%	15%	$10,978	$17,017	$6,039
2	SC1108	78	18		$78.32	$6,115		$3,210	$9,325	27%	41%	14%	$2,512	$3,828	$1,316
2	SC1316	233	18		$78.32	$18,218		$9,564	$27,782	27%	41%	14%	$7,425	$11,338	$3,912
2	SC1318	402	18		$78.32	$31,488		$16,531	$48,019	27%	42%	15%	$12,991	$20,070	$7,079
2	SC1320	778	18		$78.32	$60,918		$31,982	$92,900	26%	41%	15%	$24,601	$38,133	$13,532
2	SC1322	496	18		$78.32	$38,883		$20,414	$59,297	26%	40%	14%	$15,473	$23,794	$8,321
2	SC1324	281	18		$78.32	$22,037		$11,569	$33,606	26%	41%	15%	$8,798	$13,749	$4,951
2	SC1326	518	18		$78.32	$40,577		$21,303	$61,880	27%	41%	14%	$16,797	$25,442	$8,645
2	SC1328	277	18		$78.32	$21,720		$11,403	$33,123	29%	42%	13%	$9,680	$14,001	$4,322
2	SC1330	474	18		$78.32	$37,100		$19,477	$56,577	29%	42%	13%	$16,534	$23,916	$7,382
2	SC1332	329	18		$78.32	$25,754		$13,521	$39,275	29%	43%	14%	$11,543	$16,869	$5,326
2	TB1012	508	18		$78.32	$39,759		$20,873	$60,632	33%	43%	11%	$19,897	$26,375	$6,478
2	TB1028	174	18		$78.32	$13,593		$7,136	$20,729	32%	43%	11%	$6,629	$8,991	$2,362
	Subtotal:	**5,302**		**2003**		**$415,221**	**5%**	**$217,989**	**$633,210**				**$177,273**	**$263,878**	**$86,604**
SIGNAL RIDGE FORCE MAIN															
From Signal Ridge Lift Station to Ridge Road															
2	BUC1210	4,662	10		$110.66	$515,915		$270,855	$786,770	93%	100%	7%	$730,029	$786,770	$56,741
	Subtotal:	**4,662**				**$515,915**	**5%**	**$270,855**	**$786,770**				**$730,029**	**$786,770**	**$56,741**
AMITY LANE FORCE MAIN															
From Amity Lane Lift Station to Airport Road															
2	SC1002	1,193	6		$18.53	$22,103		$11,604	$33,707	35%	100%	65%	$11,848	$33,707	$21,859
	Subtotal:	**1,193**		**2007**		**$22,103**	**5%**	**$11,604**	**$33,707**				**$11,848**	**$33,707**	**$21,859**

TABLE NO. 17
Existing Impact Fee Wastewater Lines

	Pipe Number	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Interest Rate %	Debt Service Utilizing Simple	Total 20 Year Project Cost ($)	(%) Utilized Capacity			($) Utilized Capacity		
										2019	2029	During Fee Period	2019	2029	During Fee Period
FM 3097 SANITARY SEWER IMPROVEMENTS															
From FM 3097 LS No. 2 to FM549; 12" on County road from FM 3097 to Valerie Place; 8" on Ranch Trail from FM 3097 to 1,500-LF East															
2	BUC1040	441	15		$150.81	$66,506		$34,916	$101,422	39%	96%	58%	$39,193	$97,809	$58,617
2	BUC1042	299	24		$150.81	$45,039		$23,645	$68,684	43%	95%	51%	$29,805	$65,001	$35,196
2	BUC1044	109	24		$150.81	$16,380		$8,599	$24,979	47%	94%	46%	$11,847	$23,415	$11,568
2	BUC1162	1,788	12		$150.81	$269,645		$141,564	$411,209	99%	100%	0%	$408,380	$410,339	$1,958
2	BUC1200	390	15		$150.81	$58,764		$30,851	$89,615	42%	99%	57%	$37,573	$89,057	$51,484
2	BUC1202	109	18		$150.81	$16,366		$8,592	$24,958	42%	99%	57%	$10,464	$24,803	$14,339
2	BUC1204	200	18		$150.81	$30,190		$15,850	$46,040	41%	99%	58%	$18,983	$45,753	$26,770
2	BUC1206	200	15		$150.81	$30,097		$15,801	$45,898	39%	99%	60%	$18,012	$45,613	$27,602
2	BUC1208	433	15		$150.81	$65,269		$34,266	$99,535	38%	95%	57%	$37,709	$94,909	$57,200
2	LBC1002	250	12		$150.81	$37,774		$19,831	$57,605	16%	73%	56%	$9,497	$41,952	$32,455
2	LBC1004	1,193	15		$150.81	$179,972		$94,485	$274,457	14%	73%	58%	$39,787	$199,880	$160,094
2	LBC1006	1,282	18		$150.81	$193,280		$101,472	$294,752	13%	73%	60%	$39,070	$214,661	$175,591
2	LBC1016	539	15		$150.81	$81,324		$42,695	$124,019	34%	100%	66%	$42,323	$124,019	$81,696
2	LBC1022	1,506	8		$150.81	$227,061		$119,207	$346,268	52%	84%	32%	$180,397	$291,710	$111,312
Subtotal:		**8,738**		**2007**		**$1,317,667**	**5%**	**$691,774**	**$2,009,441**				**$923,040**	**$1,768,921**	**$845,882**

TABLE NO. 17
Existing Impact Fee Wastewater Lines

Pipe Number	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.)	Total Capital Cost ($)	Debt Service Interest Rate %	Debt Service Utilizing Simple	Total 20 Year Project Cost ($)	(%) Utilized Capacity 2019	(%) Utilized Capacity 2029	(%) Utilized Capacity During Fee Period	($) Utilized Capacity 2019	($) Utilized Capacity 2029	($) Utilized Capacity During Fee Period
SQUABBLE CREEK TO BUFFALO CREEK WASTEWATER TRANSFER FORCE MAIN From Squabble Creek Wastewater Treatment Plant to FM 3097														
2 SC1340	1,137	30		$124.90	$141,978		$74,538	$216,516	32%	67%	35%	$69,966	$144,751	$74,785
2 SC1259	20,471	30		$124.90	$2,556,676		$1,342,255	$3,898,931	32%	67%	35%	$1,259,918	$2,606,616	$1,346,699
2 SC1261	19,232	30		$124.90	$2,402,049		$1,261,076	$3,663,125	32%	67%	35%	$1,183,718	$2,448,969	$1,265,251
2 SC1260	623	30		$124.90	$77,792		$40,841	$118,633	32%	67%	35%	$38,336	$79,312	$40,976
Subtotal:	**41,463**		**2011**		**$5,178,495**	**5%**	**$2,718,710**	**$7,897,205**				**$2,551,938**	**$5,279,648**	**$2,727,711**
Existing Wastewater Line Total	**71,091**				**$8,094,740**		**$4,249,734**	**$12,344,474**				**$5,171,554**	**$9,035,199**	**$3,863,647**

Notes:

1 - City Participate in Cost Oversize

2 - City Initiated and Funded

TABLE NO. 18

Proposed Impact Fee CIP Wastewater Lines

	Pipe Number	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.) *	Total Capital Cost ($)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost ($)	(%) Utilized Capacity 2019	(%) Utilized Capacity 2029	(%) Utilized Capacity During Fee Period	($) Utilized Capacity 2019	($) Utilized Capacity 2029	($) Utilized Capacity During Fee Period
1 - QUAIL RUN & MEMORIAL LIFT STATION BYPASS TRUNK SEWER															
2	SC1206	51	18		$436.24	$22,388		$11,754	$34,142	0%	97%	97%	$0	$33,057	$33,057
2	SC1208	414	18		$436.24	$180,565		$94,797	$275,362	0%	97%	97%	$0	$266,607	$266,607
2	SC1210	160	18		$436.24	$69,580		$36,529	$106,109	0%	97%	97%	$0	$102,735	$102,735
2	SC1212	197	18		$436.24	$86,014		$45,157	$131,171	0%	97%	97%	$0	$126,993	$126,993
2	SC1214	182	18		$436.24	$79,583		$41,781	$121,364	0%	97%	97%	$0	$117,485	$117,485
2	SC1216	42	18		$436.24	$18,204		$9,557	$27,761	0%	97%	97%	$0	$26,874	$26,874
2	SC1218	519	18		$436.24	$226,531		$118,929	$345,460	0%	97%	97%	$0	$334,399	$334,399
2	SC1220	510	18		$436.24	$222,300		$116,707	$339,007	0%	97%	97%	$0	$328,134	$328,134
2	SC1222	306	18		$436.24	$133,350		$70,009	$203,359	0%	97%	97%	$0	$196,814	$196,814
2	SC1224	37	18		$436.24	$16,311		$8,563	$24,874	0%	97%	97%	$0	$24,075	$24,075
2	SC1226	182	18		$436.24	$79,610		$41,795	$121,405	0%	97%	97%	$0	$117,497	$117,497
2	SC1228	446	18		$436.24	$194,542		$102,135	$296,677	0%	97%	97%	$0	$287,128	$287,128
2	SC1236	92	24		$436.24	$40,143		$21,075	$61,218	0%	41%	41%	$0	$24,896	$24,896
2	SC1238	40	24		$436.24	$17,402		$9,136	$26,538	0%	41%	41%	$0	$10,831	$10,831
2	SC1240	75	24		$436.24	$32,919		$17,282	$50,201	0%	44%	44%	$0	$22,211	$22,211
2	SC1242	85	24		$436.24	$36,902		$19,374	$56,276	0%	44%	44%	$0	$24,855	$24,855
2	SC1244	121	24		$436.24	$52,929		$27,788	$80,717	0%	44%	44%	$0	$35,660	$35,660
2	SC1246	161	30		$436.24	$70,113		$36,809	$106,922	0%	44%	44%	$0	$47,140	$47,140
2	SC1248	183	30		$436.24	$79,671		$41,827	$121,498	0%	43%	43%	$0	$52,727	$52,727
2	SC1252	224	30		$436.24	$97,766		$51,327	$149,093	0%	43%	43%	$0	$64,599	$64,599
2	SC1254	500	30		$436.24	$218,121		$114,513	$332,634	0%	43%	43%	$0	$143,599	$143,599
2	SC1256	240	30		$436.24	$104,711		$54,973	$159,684	0%	43%	43%	$0	$68,936	$68,936
2	SC1230	182	36		$436.24	$79,396		$41,683	$121,079	0%	50%	50%	$0	$61,124	$61,124
	Subtotal:	**4,949**		**2019**		**$2,159,050**	**5%**	**$1,133,500**	**$3,292,551**				**$0**	**$2,518,376**	**$2,518,376**
2 - TURTLE COVE & WINDMILL RIDGE SEWER IMPROVEMENTS															
2	BB1040A	1,553	8		$269.98	$419,263		$220,113	$639,376	0%	99%	99%	$0	$630,992	$630,992
2	LS1260A	1,410	12		$269.98	$380,737		$199,887	$580,624	0%	94%	94%	$0	$543,957	$543,957
	Subtotal:	**2,963**		**2019**		**$800,000**	**5%**	**$420,000**	**$1,220,000**				**$0**	**$1,174,949**	**$1,174,949**
3 - PROPOSED BRUSHY CREEK TRUNK SEWER															
1	BUC3002	3,382	15		$24.00	$81,174		$42,616	$123,790	0%	100%	100%	$0	$123,790	$123,790
1	BRC3018	724	18		$48.00	$34,748		$18,243	$52,991	0%	48%	48%	$0	$25,539	$25,539
1	BRC3020	1,948	18		$48.00	$93,513		$49,094	$142,607	0%	55%	55%	$0	$78,962	$78,962
1	BRC3022	1,045	21		$72.00	$75,242		$39,502	$114,744	0%	59%	59%	$0	$67,981	$67,981
1	BRC3026	17	21		$72.00	$1,219		$640	$1,859	0%	57%	57%	$0	$1,057	$1,057
	Subtotal:	**7,116**		**2020**		**$285,896**	**5%**	**$150,095**	**$435,991**				**$0**	**$297,329**	**$297,329**

TABLE NO. 18

Proposed Impact Fee CIP Wastewater Lines

	Pipe Number	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.) *	Total Capital Cost ($)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost ($)	(%) Utilized Capacity 2019	(%) Utilized Capacity 2029	(%) Utilized Capacity During Fee Period	($) Utilized Capacity 2019	($) Utilized Capacity 2029	($) Utilized Capacity During Fee Period
4 - BUFFALO CREEK EXISTING GRAVITY SEWER - 12" & 14" PIPE BURST															
Pipe Burst Exsiting 8" and 10" to 12" and Existing 12" to 14" from northwest of John King and IH 30 to S.H. 205 Goliad															
2	BUC1008A	1,314	12		$192.00	$252,369		$132,494	$384,863	0%	29%	29%	$0	$110,863	$110,863
2	BUC1010A	755	12		$192.00	$144,970		$76,109	$221,079	0%	34%	34%	$0	$75,022	$75,022
2	BUC1012A	660	12		$192.00	$126,802		$66,571	$193,373	0%	34%	34%	$0	$65,620	$65,620
2	BUC1148A	766	12		$192.00	$147,096		$77,225	$224,321	0%	34%	34%	$0	$76,115	$76,115
2	BUC1018A	188	14		$192.00	$36,073		$18,938	$55,011	0%	42%	42%	$0	$23,219	$23,219
2	BUC1094A	1,155	14		$192.00	$221,669		$116,376	$338,045	0%	46%	46%	$0	$156,886	$156,886
2	BUC1098A	1,838	14		$192.00	$352,922		$185,284	$538,206	0%	44%	44%	$0	$237,802	$237,802
	Subtotal:	**6,677**		**2021**		**$1,281,901**	**5%**	**$672,997**	**$1,954,898**				**$0**	**$745,527**	**$745,527**
5 - PROPOSED THOMPSON BRANCH TRUNK SEWER															
1	TB1002A	720	15		$24.00	$17,287		$9,076	$26,363	0%	93%	93%	$0	$24,620	$24,620
1	TB3012	899	15		$24.00	$21,582		$11,331	$32,913	0%	94%	94%	$0	$31,021	$31,021
1	TB3014	501	15		$24.00	$12,028		$6,315	$18,343	0%	96%	96%	$0	$17,633	$17,633
1	TB3018	644	15		$24.00	$15,457		$8,115	$23,572	0%	96%	96%	$0	$22,658	$22,658
1	TB3020	1,038	15		$24.00	$24,910		$13,078	$37,988	0%	96%	96%	$0	$36,632	$36,632
1	TB3022	982	15		$24.00	$23,572		$12,375	$35,947	0%	96%	96%	$0	$34,658	$34,658
1	TB3034	388	15		$24.00	$9,307		$4,886	$14,193	0%	96%	96%	$0	$13,558	$13,558
1	TB3002	544	18		$48.00	$26,114		$13,710	$39,824	0%	99%	99%	$0	$39,497	$39,497
1	TB3004	714	18		$48.00	$34,275		$17,994	$52,269	0%	99%	99%	$0	$51,840	$51,840
1	TB3040	1,089	18		$48.00	$52,276		$27,445	$79,721	0%	95%	95%	$0	$75,546	$75,546
1	BLC3016	1,312	21		$72.00	$94,494		$49,609	$144,103	0%	70%	70%	$0	$100,463	$100,463
1	BC3006	67	27		$120.00	$7,994		$4,197	$12,191	0%	28%	28%	$0	$3,397	$3,397
	Subtotal:	**8,899**		**2022**		**$339,296**	**5%**	**$178,131**	**$517,427**				**$0**	**$451,523**	**$451,523**
6 - PROPOSED LOWER BUFFALO CREEK EAST TRUNK SEWER															
2	BUC1104A	1,506	21		$264.00	$397,554		$208,716	$606,270	0%	100%	100%	$0	$606,270	$606,270
2	BUC1168	3,640	21		$264.00	$960,968		$504,508	$1,465,476	0%	100%	100%	$0	$1,465,476	$1,465,476
2	BUC3000	1,423	21		$264.00	$375,553		$197,165	$572,718	0%	100%	100%	$0	$572,718	$572,718
	Subtotal:	**6,568**		**2022**		**$1,734,075**	**5%**	**$910,389**	**$2,644,464**				**$0**	**$2,644,464**	**$2,644,464**
7A - FONTANA RANCH LIFT STATION ABANDONMENT & GRAVITY RELIEF SEWER															
2	LB1004A	1,238	8		$100.00	$123,764		$64,976	$188,740	0%	79%	79%	$0	$148,599	$148,599
2	LB3014	930	12		$192.00	$178,560		$93,744	$272,304	0%	81%	81%	$0	$219,938	$219,938
2	LB3016	740	12		$192.00	$142,080		$74,592	$216,672	0%	81%	81%	$0	$175,016	$175,016
2	LB3018	1,240	12		$192.00	$238,080		$124,992	$363,072	0%	74%	74%	$0	$268,153	$268,153
2	LB3020	815	12		$192.00	$156,480		$82,152	$238,632	0%	81%	81%	$0	$192,750	$192,750
2	LB3028	765	12		$192.00	$146,880		$77,112	$223,992	0%	81%	81%	$0	$180,921	$180,921
	Subtotal:	**5,728**		**2024**		**$985,844**	**5%**	**$517,568**	**$1,503,412**				**$0**	**$1,185,377**	**$1,185,377**

TABLE NO. 18

Proposed Impact Fee CIP Wastewater Lines

	Pipe Number	Length (Ft.)	Diameter (Inches)	Date of Const.	Avg. Unit Cost ($/Ft.) *	Total Capital Cost ($)	Debt Service Interest Rate %	20 Year Debt Service Utilizing Simple Interest	Total 20 Year Project Cost ($)	(%) Utilized Capacity 2019	(%) Utilized Capacity 2029	(%) Utilized Capacity During Fee Period	($) Utilized Capacity 2019	($) Utilized Capacity 2029	($) Utilized Capacity During Fee Period
7B - LOFTLAND FARMS LIFT STATION ABANDONMENT & GRAVITY RELIEF SEWER															
2	LB1000A	380	8		$100.00	$38,000		$19,950	$57,950	0%	69%	69%	$0	$40,142	$40,142
2	LB3002	1,238	8		$100.00	$123,775		$64,982	$188,757	0%	57%	57%	$0	$107,993	$107,993
2	LB3022	910	10		$120.00	$109,200		$57,330	$166,530	0%	73%	73%	$0	$121,185	$121,185
2	LB3024	935	10		$120.00	$112,200		$58,905	$171,105	0%	73%	73%	$0	$124,541	$124,541
2	LB3026	1,060	10		$120.00	$127,200		$66,780	$193,980	0%	64%	64%	$0	$124,690	$124,690
	Subtotal:	**4,523**		**2026**		**$510,375**	**5%**	**$267,947**	**$778,322**				**$0**	**$518,551**	**$518,551**
8 - PROPOSED LITTLE BUFFALO CREEK TRUNK SEWER															
1	LBC3006	2,176	15		$24.00	$52,223		$27,417	$79,640	0%	91%	91%	$0	$72,341	$72,341
	Subtotal:	**2,176**		**2027**		**$52,223**	**5%**	**$27,417**	**$79,640**				**$0**	**$72,341**	**$72,341**
Sewer Line CIP Total		**49,599**				**$8,148,660**		**$4,278,044**	**$12,426,705**				**$0**	**$9,608,437**	**$9,608,437**

Notes: 1 - City Participate in Cost Oversize
2 - City Initiated and Funded

TABLE NO. 19
Impact Fee Wastewater Facilities

Pump Station		Year Const.	Capacity (MGD)	Capital Cost ($) Const.	Eng. & Testing	20 Year Debt Service @ 5% Simple Interest	Total 20 Yr. Project Cost $	Capacity Utilized (%) 2019	2029	In the CRF Period	Capacity Utilized ($) 2019	2029	In the CRF Period
EXISTING LIFT STATIONS													
Dalton Road Lift Station & Force Main	1	2002	1.2	$ 272,178	$ 40,200	$ 163,998	$ 476,376	43%	43%	0%	$ 204,842	$ 204,842	$ -
Amity Lane Lift Station	1	2006	0.4	$ 167,009	$ 18,800	$ 97,550	$ 283,359	34%	35%	1%	$ 96,342	$ 99,176	$ 2,834
Chandlers Marina Lift Station	1	2007	0.4	$ 244,331	$ 16,500	$ 136,936	$ 397,767	72%	76%	4%	$ 286,392	$ 302,303	$ 15,911
FM 3097 No. 1 Lift Station & 16" Force Main	1	2007	2.2	$ 450,460	$ 21,000	$ 247,517	$ 718,977	15%	100%	85%	$ 107,847	$ 718,977	$ 611,130
FM 3097 No. 2 Lift Station	1	2007	2.9	$ 525,845	$ 25,000	$ 289,194	$ 840,039	100%	100%	0%	$ 840,039	$ 840,039	$ -
Chandlers Deep Lift Station	1	2012	0.7	$ 196,555	$ 61,000	$ 135,216	$ 392,771	70%	70%	0%	$ 274,940	$ 274,940	$ -
Squabble Creek Transfer Lift Station	1	2012	2.9	$ 1,500,346	$ 165,325	$ 874,477	$ 2,540,148	100%	100%	0%	$ 2,540,148	$ 2,540,148	$ -
Existing Wastewater Facility Subtotal			**13.20**	**$ 3,820,685**	**$ 377,685**	**$ 2,204,144**	**$ 6,402,514**				**$ 4,350,550**	**$ 4,980,425**	**$ 629,875**
PROPOSED WASTEWATER TREATMENT PLANT & LIFT STATION/FORCE MAIN IMPROVEMENTS													
Squabble Creek Lift Station Improvements (Install Three 250-HP Pumps & Electrical Upgrades)	1	2019	10.0	$ 2,690,519	$ 110,250	$ 1,470,404	$ 4,271,173	73.6%	100%	26%	$ 3,141,918	$ 4,271,173	$ 1,129,255
Proposed Brushy Creek Lift Station & 12" Force Main	2*	2021	3.3	$ 1,400,000	$ 210,000	$ 845,250	$ 2,455,250	0.0%	49%	49%	$ -	$ 1,196,674	$ 1,196,674
FM 3097 No. 1 Lift Station Improvements (Replace Two 45-HP Pumps w/Two 90-HP Pumps)	2*	2024	2.8	$ 500,000	$ 75,000	$ 301,875	$ 876,875	6.6%	75%	68%	$ 57,611	$ 656,306	$ 598,695
FM 3097 No. 2 Lift Station Improvements (Replace Two 25-HP Pumps w/Two 35-HP Pumps)	2*	2024	3.1	$ 750,000	$ 112,500	$ 452,813	$ 1,315,313	50.2%	99%	49%	$ 660,068	$ 1,304,571	$ 644,503
Squabble Creek Lift Station Improvements (Add 2nd Wet Well w/Three New 250-HP Pumps)	2*	2026	5.0	$ 4,000,000	$ 600,000	$ 2,415,000	$ 7,015,000	0.0%	95%	95%	$ -	$ 6,631,139	$ 6,631,139
Proposed Bluff Creek Lift Station & Parallel Force Main (14" & 20")	2*	2028	2.4	$ 5,100,000	$ 765,000	$ 3,079,125	$ 8,944,125	0.0%	89%	89%	$ -	$ 7,993,066	$ 7,993,066
Proposed Wastewater Facility Subtotal			**26.60**	**$ 14,440,519**	**$ 1,872,750**	**$ 8,564,467**	**$ 24,877,736**				**$ 3,859,596**	**$ 22,052,930**	**$ 18,193,334**
Total			**39.80**	**$ 18,261,204**	**$ 2,250,435**	**$ 10,768,611**	**$ 31,280,250**				**$ 8,210,146**	**$ 27,033,355**	**$ 18,823,209**

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* 15% of Construction Assumed for Engineering and Testing
(1) Actual Cost
(2) Estimated Cost in 2019 Dollars

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TABLE NO. 20
WASTEWATER COLLECTION SYSTEM -- PROPOSED NTMWD FACILITIES

CIP #	Project Description		Year Const.	Length (FT)	Size/Added Capacity	Capital Cost ($)			Capacity Utilized			Capacity Utilized (%)			Capacity Utilized ($)		
						City of Rockwall Participation Cost	Eng. & Testing	Total Project Cost	2019	2029	In The CRF Period	2019	2029	In The CRF Period	2019	2029	In The CRF Period
North Texas Municipal Water District (NTMWD) Proposed Facility Improvements																	
A1	NTMWD Buffalo Creek Parallel Incerceptor Sewer - Phase 1: From Buffalo Creek WWTP to Forney	4	2019	TBD	TBD	$ 11,835,394		$ 11,835,394				33%	49%	16%	$ 3,927,269	$ 5,796,236	$ 1,868,967
A2	NTMWD Turtle Cove (a.k.a. Lakeside) Lift Station Expansion/Replacement	3	2020	TBD	+1.6 MGD	$ 4,600,000		$ 4,600,000				33%	49%	16%	$ 1,526,391	$ 2,252,793	$ 726,402
A3	NTMWD Buffalo Creek Lift Station Expansion	4	2020	TBD	TBD	$ 17,868,150		$ 17,868,150				33%	49%	16%	$ 5,929,083	$ 8,750,703	$ 2,821,620
A4	NTMWD Buffalo Creek Parallel Force Main	4	2020	TBD	TBD	$ 1,681,500	Included in Const. Cost	$ 1,681,500	Utilized Capacity for Regional NTMWD Treatment Facilities calculated using proportion of years 2019 & 2029 population to build-out population.			33%	49%	16%	$ 557,962	$ 823,494	$ 265,532
A5	NTMWD Buffalo Creek Parallel Interceptor - Phase 2: From Forney to Buffalo Creek Lift Station	4	2026	TBD	TBD	$ 7,924,880		$ 7,924,880				33%	49%	16%	$ 2,629,666	$ 3,881,111	$ 1,251,445
A6	10-Year CIP for NTMWD Sewer System (Rockwall Responsibility Only)	5	2019-2029	N/A	N/A	$ 5,435,164		$ 5,435,164				33%	49%	16%	$ 1,803,518	$ 2,661,803	$ 858,285
A7	10-Year CIP for NTMWD Regional Wastewater System (Rockwall Responsibility Only)	5	2019-2029	N/A	N/A	$ 11,619,512		$ 11,619,512				33%	49%	16%	$ 3,855,634	$ 5,690,511	$ 1,834,877
Proposed NTMWD Facility Total						**$ 60,964,600**		**$ 60,964,600**							**$ 20,229,523**	**$ 29,856,651**	**$ 9,627,128**

Notes: 1. City obligations estimated based on City of Rockwall's historical usage of NTMWD Regional Systems.
2. 10-Year CIP for NTMWD Regional Systems based on project listings provided for "Summary of Sewer System CIP" and "Summary of Regional Wastewater System CIP", both dated May 11, 2018.
3. Funded by NTMWD, 100% City Responsibility
4. Part of NTMWD Buffalo Interceptor System, assumed 59% City Responsibility
5. Part of NTMWD Regional Systems, assumed 2.915% City Responsibility
6. Utilized capacities for NTMWD facilities were determined using the proportion of the existing and projected 2029 population as compared to the build-out population.

TABLE NO. 21

Summary of Utilized Capacity Allocation between City of Rockwall & NTMWD Wastewater System

	CITY OF ROCKWALL Utilized Capacity		NTMWD Utilized Capacity		TOTAL	
	($)	%	($)	%	($)	%
Existing Wastewater System	$ 4,493,522	100.00%	$ -	0.00%	$ 4,493,522	100%
Proposed Wastewater System & Planning Cost	$ 27,861,621	74.32%	$ 9,627,128	25.68%	$ 37,488,749	100%
TOTAL	**$ 32,355,143**	**77.07%**	**$ 9,627,128**	**22.93%**	**$ 41,982,271**	**100%**

F. CALCULATION OF MAXIMUM IMPACT FEES - WATER & WASTEWATER

Chapter 395, of the Local Government Code allows the maximum impact fee to be charged if revenues from Future Ad Valorem Taxes, and water and sewer bills are included as a credit in the analysis. If not, the Act allows the maximum assessable fee to be set at 50% of the calculated maximum fee. The maximum impact fees for the water and wastewater systems are calculated separately by dividing the cost of the capital improvements or facility expansions necessitated and attributable to new development in the Service Area within the ten year period by the number of living units anticipated to be added to City within the ten year period. To simplify collection, we recommend the fee remain fixed throughout the 5-year period, unless changed by Council.

The **Water System** impact fee for a 5/8" meter is calculated as follows:

$$\text{Maximum Impact Fee} = \frac{\text{Eligible Existing Facility Cost} + \text{Eligible Proposed Facility Cost}}{\text{Number of New Living Unit Equivalent over the Next 10-Years}}$$

$$= \frac{\$12,324,530 + \$18,582,427}{9,846} = \frac{\$30,906,957}{9,846}$$

Calculated Water Maximum Impact Fee = $3,139.04 *

* Maximum Allowable Water Impact Fee is 50% of the Calculated Water Maximum Impact Fee

Maximum Assessable Water Impact Fee = $3,139.04 X 50% = $1,569.52

The **Wastewater System** impact fee for a 5/8" water meter is calculated as follows:

$$\text{Maximum Impact Fee} = \frac{\text{Eligible Existing Facility Cost} + \text{Eligible Proposed Facility Cost}}{\text{Number of New Living Unit Equivalent over the Next 10-Years}}$$

$$= \frac{\$4,493,522 + \$37,488,749}{8,710} = \frac{\$41,982,271}{8,710}$$

Calculated Water Maximum Impact Fee = $4,820.01 *

* Maximum Allowable Water Impact Fee is 50% of the Calculated Water Maximum Impact Fee

Maximum Assessable Wastewater Impact Fee = $4,820.01 X 50% = $2,410.00

Table No. 22 summarizes the per service unit equivalent maximum assessable impact fee that can be charged based on the calculated 50% credit above.

TABLE NO. 22

Maximum Assessable Water & Wastewater Impact Fee

Maximum Assessable Water Impact Fee per Living Unit Equivalent: $1,569.52

Maximum Assessable Wastewater Impact Fee per Living Unit Equivalent: $2,410.00

Typical Land Use	Meter Type	Meter Size	Living Unit Equivalent	Max. Assessable Impact Fee				
				Water	City of Rockwall Wastewater	NTMWD Wastewater	Wastewater Total	Grand Total
Single Family Residential	Simple	5/8"	1.0	$ 1,569.52	$ 1,855.70	$ 554.30	$ 2,410.00	$ 3,979.52
Single Family Residential	Simple	1"	2.5	$ 3,923.80	$ 4,639.25	$ 1,385.75	$ 6,025.00	$ 9,948.80
Single Family Residential	Simple	1-1/2"	5.0	$ 7,847.60	$ 9,278.50	$ 2,771.50	$ 12,050.00	$ 19,897.60
Single Family Residential	Simple	2"	8.0	$ 12,556.16	$ 14,845.60	$ 4,434.40	$ 19,280.00	$ 31,836.16
Comm./Retail	Compound	2"	8.0	$ 12,556.16	$ 14,845.60	$ 4,434.40	$ 19,280.00	$ 31,836.16
Comm./Retail/ Irrigation	Turbine	2"	16.0	$ 25,112.32	$ 29,691.20	$ 8,868.80	$ 38,560.00	$ 63,672.32
Comm./Retail/ Multi Family	Compound	3"	16.0	$ 25,112.32	$ 29,691.20	$ 8,868.80	$ 38,560.00	$ 63,672.32
Comm./Retail/ Irrigation/ Multi Family	Turbine	3"	35.0	$ 54,933.20	$ 64,949.50	$ 19,400.50	$ 84,350.00	$ 139,283.20
Comm./Retail/ Multi Family	Compound	4"	25.0	$ 39,238.00	$ 46,392.50	$ 13,857.50	$ 60,250.00	$ 99,488.00
Comm./Retail/ Irrigation/ Multi Family	Turbine	4"	65.0	$102,018.80	$120,620.50	$ 36,029.50	$156,650.00	$ 258,668.80
Industrial	Compound	6"	50.0	$ 78,476.00	$ 92,785.00	$ 27,715.00	$120,500.00	$ 198,976.00
Industrial/ Irrigation	Turbine	6"	140.0	$219,732.80	$259,798.00	$ 77,602.00	$337,400.00	$ 557,132.80
Industrial	Compound	8"	80.0	$125,561.60	$148,456.00	$ 44,344.00	$192,800.00	$ 318,361.60
Industrial/ Irrigation	Turbine	8"	240.0	$376,684.80	$445,368.00	$133,032.00	$578,400.00	$ 955,084.80

2019-2029 WATER & WASTEWATER IMPACT FEE UPDATE

BIRKHOFF, HENDRICKS & CARTER, L.L.P.
PROFESSIONAL ENGINEERS
DALLAS, TEXAS

SEPTEMBER 2019

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CITY OF ROCKWALL

CITY COUNCIL CASE MEMO

PLANNING AND ZONING DEPARTMENT
385 S. GOLIAD STREET • ROCKWALL, TX 75087
PHONE: (972) 771-7745 • EMAIL: PLANNING@ROCKWALL.COM

TO:	Mayor and City Council
DATE:	10/21/2019
APPLICANT:	Pat Atkins; *KPA Consulting, Inc.*
CASE NUMBER:	Z2019-021; *Amendment to Planned Development District 79 (PD-79)*

SUMMARY

Hold a public hearing to discuss and consider a request by Pat Atkins of KPA Consulting, Inc. on behalf of the owners Gwen Reed, Saddle Star South Holdings, LLC, and CDT Rockwall/2017, LLC for the approval of a zoning amendment to Planned Development District 79 (PD-79) [*Ordinance No. 16-39*] for the purpose of amending the development standards and concept plan on a 70.408-acre tract of land identified as Tracts 1, 1-03, 1-5 & 2-03 of the P. B. Harrison Survey, Abstract No. 97, City of Rockwall, Rockwall County, Texas, zoned Planned Development District 79 (PD-79) for Single-Family 8.4 (SF-8.4) District land uses, situated within the SH-205 By-Pass Overlay (SH-205 BY-OV) District, located on the north side of John King Boulevard south of Featherstone Drive, and take any action necessary.

BACKGROUND

On January 4, 2016, the City Council approved Planned Development District 79 (PD-79) [*Case No. Z2015-034; Ordinance No. 16-07*], which rezoned a 45.292-acre portion of the subject property from an Agricultural (AG) District to a Planned Development District establishing an entitlement for a single-family residential subdivision consisting of 113 single-family lots. On May 16, 2019, the applicant voluntarily annexed an additional 11.121-acre tract of land [*A2016-001*] and amended Planned Development District 79 (PD-79) [*Z2016-015; Ordinance No. 16-39*], incorporating this property into the subdivision. The annexation created a 55.413-acre residential subdivision. The amendment to PD-79 also increased the lot count from 113 to 138 lots, and granted an increase in the maximum front entry garages from 0% to 50%. On January 22, 2019, the applicant voluntarily annexed an additional 14.995-acre tract of land [*A2018-004*] with the intent of incorporating it into Planned Development District 79 (PD-79).

PURPOSE

On September 13, 2019, the applicant submitted an application requesting to amend PD-79 [*Ordinance No. 16-39*] for the purpose of amending the development standards and concept plan by incorporating the additional 14.995-acre tract of land into the existing 55.413-acre tract of land to create an additional phase (*i.e. Phase III*) for the Saddle Star Estates Subdivision. This amendment would increase the total acreage of the subdivision to 70.408-acres.

ADJACENT LAND USES AND ACCESS

The subject property is located on the north side of John King Boulevard south of Featherstone Drive. The land uses adjacent to the subject property are as follows:

North: Directly north of the subject property is the corporate boundaries of the City of Rockwall followed by two (2) single-family homes on large tracts of land situated within the City's Extraterritorial Jurisdiction (ETJ).

South: Directly south of the subject property is John King Boulevard, which is identified as a P6D (*principle arterial, six [6] lane, divided roadway*) on the City's Master Thoroughfare Plan. Beyond this is a 67.50-acre tract of land (*i.e. Tracts 2-01, 2-04 & 2-05, of the P. B. Harrison Abstract No. 97*) zoned Agricultural (AG) District.

East: Directly east of the subject property is the corporate limits of the City of Rockwall followed by Park Ridge Estates and Windmill Valley Subdivisions. Both subdivisions are situated within the City's Extraterritorial Jurisdiction (ETJ).

West: Directly south of the subject property is John King Boulevard, which is identified as a P6D (*principle arterial, six [6] lane, divided roadway*) on the City's Master Thoroughfare Plan. Beyond this arterial is a vacant property zoned Planned Development District 70 (PD-70) for Single Family 10 (SF-10) District land uses. This is scheduled to be the final phase of the Stone Creek Subdivision.

CHARACTERISTICS OF THE REQUEST

Currently, Planned Development District 79 (PD-79) [*Ordinance No. 16-39*] allows the applicant to construct 138, 70' x 125' single-family lots on 55.413-acres. The proposed amendment would increase the size of the proposed subdivision to 70.408-acres (*i.e. adding an additional 14.995-acres*) and add an additional five (5), 70' x 125' lots and 33, 80' x 125' single family lots. The new lot product would be subject to all of the same standards as the existing lot type; however, the applicant would be incorporating 100% j-swing or traditional swing garages with the 80' x 125' as opposed to the 50% flat front entry currently permitted on 138, 70' x 125' lot product. As a note the applicant would be adding an addition five (5) lots of which 50% would be able to be flat front entry. A summary of the resulting lot mix and development standards is as follows:

Table 2: Lot Dimensional Requirements

Lot Type >	*A*	*B*
Minimum Lot Width [1]	70'	80'
Minimum Lot Depth	125'	125'
Minimum Lot Area	8,750 SF	10,000 SF
Minimum Front Yard Setback [2] & [5]	20'	20'
Minimum Side Yard Setback	5'	5'
Minimum Side Yard Setback (Adjacent to a Street) [2] & [5]	10'	10'
Minimum Length of Driveway Pavement	25'	25'
Maximum Height [3]	30'	30'
Minimum Rear Yard Setback [4]	20'	20'
Minimum Area/Dwelling Unit (SF)	2,700 SF	2,700 SF
Maximum Lot Coverage	65%	65%
Permitted Encroachment into Required Setbacks [5]	Allowed	Allowed

General Notes:

[1]: The minimum lot width shall be measured at the *Front Yard Building Setback*.

[2]: The location of the *Front Yard Building Setback* as measured from the front property line.

[3]: The *Maximum Height* shall be measured to the eave or top plate (whichever is greater) of the single-family home.

[4]: As measured from the rear yard property line.

[5]: Sunrooms, porches, stoops, bay windows, balconies, masonry clad chimneys, eaves and similar architectural features may encroach beyond the *Front Yard Building Setback* by up to ten (10) feet for any property; however, the encroachment shall not exceed five (5) feet on *Side Yard Setbacks (Adjacent to a Street)* and shall not encroach into public right-of-way [a *Sunroom* is an enclosed room no more than 15-feet in width that has glass on at least 50% of each of the encroaching faces].

INFRASTRUCTURE

Based on the applicant's request to rezone the subject property, the following infrastructure will be required to be constructed in order to provide adequate public services to the subject property:

Water: The City does not currently have the rights to serve the proposed 14.995-acre addition to Planned Development District 79 (PD-79). The applicant will need to work with Mt. Zion Water Supply Corporation to secure the right for the City of Rockwall to serve the additional acreage.

Wastewater: The lift station located at John King Boulevard and FM-552 is not currently sized to serve the proposed 14.995-acre addition to Planned Development District 79 (PD-79). The applicant will be required to perform an infrastructure study to determine the upgrades necessary to meet the required capacity.

All proposed infrastructure improvements must meet the Engineering Department's *Standards of Design and Construction*.

CONFORMANCE WITH THE CITY'S CODES

The changes to Planned Development District 79 (PD-79) do not change the conformance of the proposed subdivision with regards to the City's existing codes.

CONFORMANCE WITH OURHOMETOWN VISION 2040 COMPREHENSIVE PLAN

Since the applicant's request does not change the underlying use of the majority of the property and the additional 14.995-acre tract of land being incorporated into the PD is being rezoned in conformance with the Future Land Use Map (*i.e. to a Low Density Residential designation*) the request does not change Planned Development District 79 (PD-79) conformance to the OURHometown Vision 2040 Comprehensive Plan. With regard to the goals and policies contained in this document, the following goals and policies apply to the applicant's request:

(1) *Chapter 8; Section 2.03; Goal 3; Policy 3:* In cases where flat front entry garages (*i.e. even with the front façade of the primary structure*) are requested as part of a development, no greater than 20% should be incorporated into the development. In addition, flat front entry garages should have a minimum of a 25-foot front yard building setback to allow vehicles to be parked in the driveway without overhanging public right-of-way. This type of garage may not be appropriate for all developments and should be generally discouraged.

In this case, Planned Development District 79 (PD-79) was approved with 50% flat front entry garages. The proposed amendment would actually reduce the number of flat front entry garages in the subdivision to 40.625% bringing it closer to conforming to the current goals and policies of the Comprehensive Plan. With this being said the applicant's request to amend the existing Planned Development District is a discretionary decision for the City Council.

NOTIFICATIONS

On September 20, 2019, staff mailed nine (9) notices to property owners and residents within 500-feet of the subject property. Staff also emailed notices to the Stone Creek and Stoney Hollow Homeowner's Associations (HOA's), which are the only HOA's located within 1,500 feet of the subject property participating in the notification program. Additionally, staff posted a sign adjacent to the subject property along N. Goliad Street [*SH-205*] and advertised the public hearings in the Rockwall Herald Banner as required by the Unified Development Code (UDC). At the time this case memo was drafted, staff had received one (1) notice from the City's online portal opposed to the applicant's request.

CONDITIONS OF APPROVAL

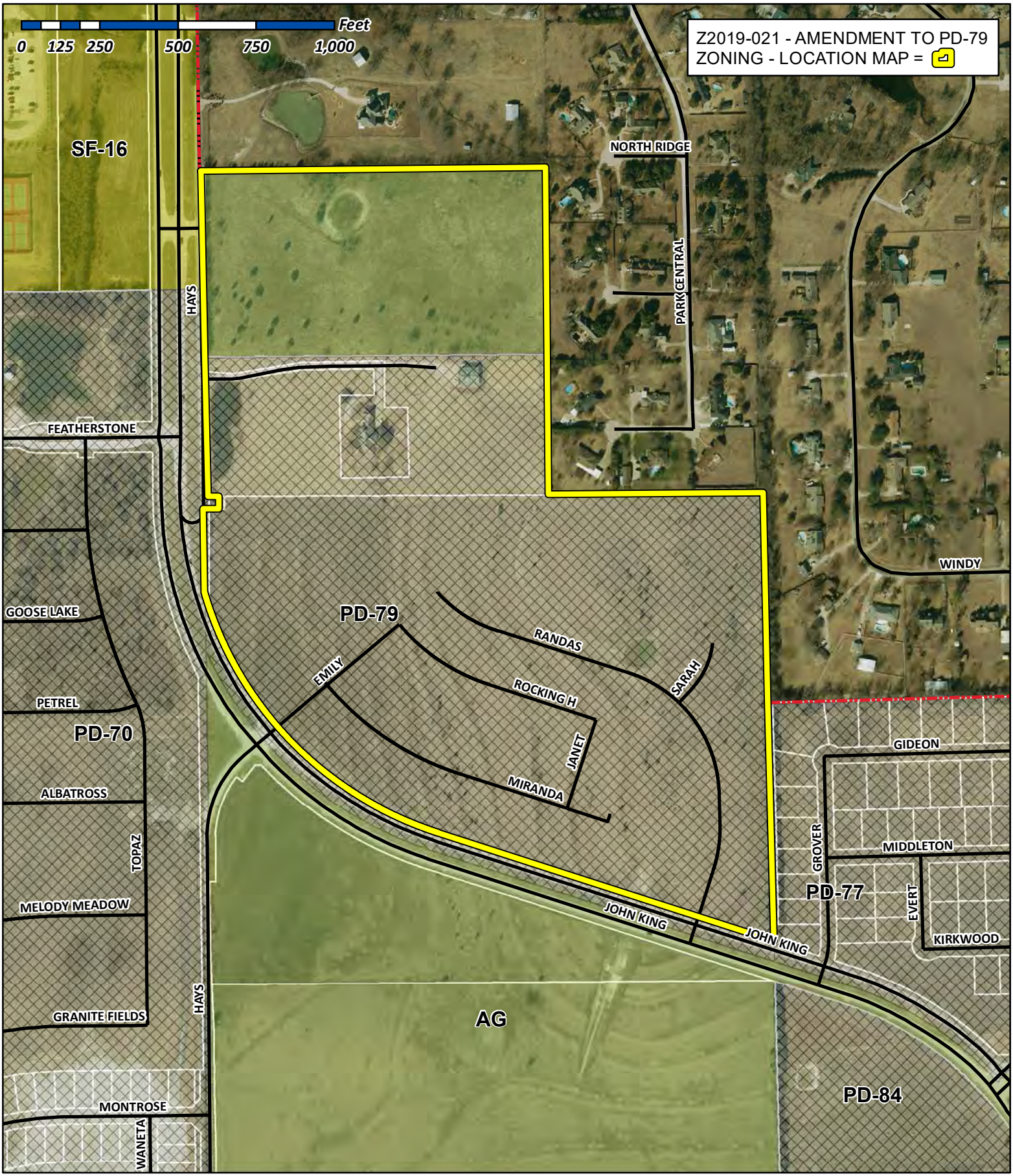
If the City Council chooses to approve the applicant's request to amend Planned Development District 79 (PD-79), then staff would propose the following conditions of approval:

(1) The applicant shall be responsible for maintaining compliance with the conditions contained within the *Planned Development District* ordinance;

(2) Any construction resulting from the approval of this zoning change shall conform to the requirements set forth by the Unified Development Code (UDC), the International Building Code (IBC), the Rockwall Municipal Code of Ordinances, city adopted engineering and fire codes and with all other applicable regulatory requirements administered and/or enforced by the state and federal government.

PLANNING AND ZONING COMMISSION

On October 8, 2019, the Planning and Zoning Commission's motion to recommend approval of the amendment to Planned Development District 79 (PD-79) with staff conditions passed by a vote of 7-0.



City of Rockwall

Planning & Zoning Department
385 S. Goliad Street
Rockwall, Texas 75032
(P): (972) 771-7745
(W): www.rockwall.com

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City of Rockwall

Planning & Zoning Department
385 S. Goliad Street
Rockwall, Texas 75087
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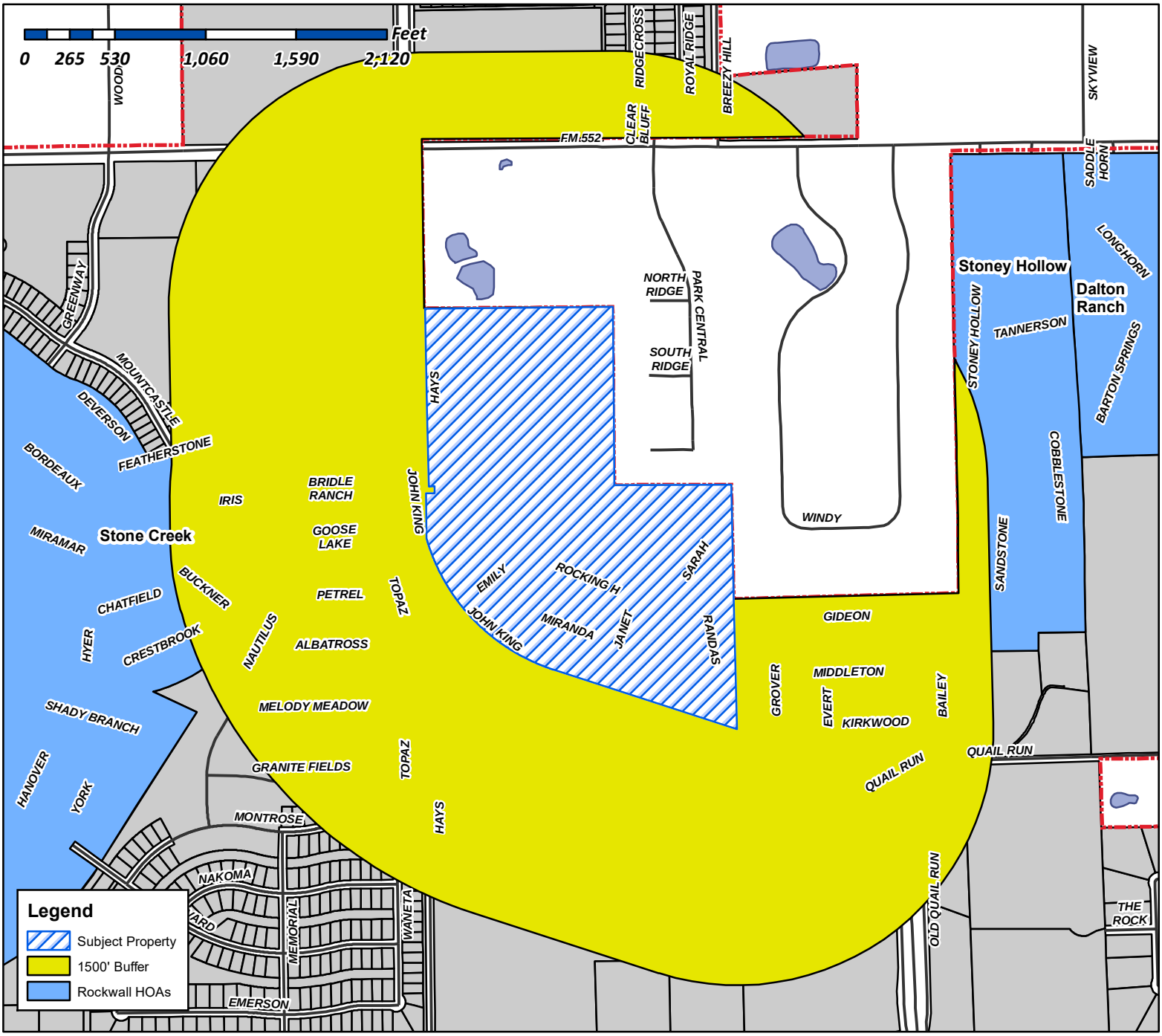
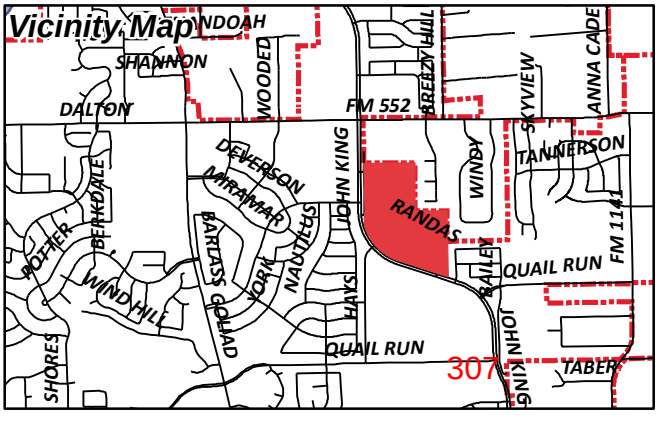


Case Number: Z2019-021
Case Name: Amendment to PD-79
Case Type: Zoning
Zoning: Planned Development District
Case Address: East of John King & South of FM 552



Date Created: ***9/13/2019***
For Questions on this Case Call (972) 771-7745

From: Morales, Laura
To: [redacted]
Cc: Miller, Ryan; Gonzales, David; Brooks, Korey
Subject: Neighborhood Notification Program: Notice of zoning request
Date: Friday, September 20, 2019 4:36:24 PM
Attachments: HOA Map.pdf
PUBLIC NOTICE.pdf

To whom it may concern:

Per your participation in the Neighborhood Notification Program, you are receiving this notification to inform your organization and residents of a request for a zoning change that lies within 1,500 feet of the boundaries of your neighborhood or subdivision. As the primary contact for the organization, you are encouraged to share this information with the residents of your subdivision. Please find attach ed a map detailing the location of the subject property requesting the zoning change in relation to your subdivision boundaries. Additionally, below is a summary of the zoning request that was published in the Rockwall Herald Banner ***September 20, 2019***. The Planning and Zoning Commission will hold a public hearing on ***Tuesday 10/8/2019 at 6:00 p.m.***, and the City Council will hold a public hearing on ***Monday 10/21/2019 at 6:00 p.m***. These hearings will be held in the City Council Chambers at City Hall, 385 S. Goliad Street. These hearings will be held in the City Council Chambers at City Hall, 385 S. Goliad Street. If you have any questions or comments regarding this request, the contact information for the Planning Department is listed below. Additional information can also be found at https://sites.google.com/site/rockwallplanning/development/development-cases

> **Z2019-021- Hold a public hearing to discuss and consider a request by Pat Atkins of KPA Consulting, Inc. on behalf of the owners Gwen Reed, Saddle Star South Holdings, LLC, and CDT Rockwall/2017, LLC for the approval of a zoning amendment to Planned Development District 79 (PD-79) [Ordinance No. 16-39] for the purpose of amending the development standards and concept plan on a 70.408-acre tract of land identified as Tracts 1, 1-03, 1-5 & 2-03 of the P. B. Harrison Survey, Abstract No. 97, City of Rockwall, Rockwall County, Texas, zoned Planned Development District 79 (PD-79) for Single-Family 8.4 (SF-8.4) District land uses, situated within the SH-205 By-Pass Overlay (SH-205 BY-OV) District, located on the north side of John King Boulevard south of Featherstone Drive, and take any action necessary.**

If this email is reaching you in error, please forward it to your HOA or neighborhood group representative and update the contact information at http://www.rockwall.com/planning/hoa.asp.

Sincerely,

Laura Morales
Planning & Zoning Coordinator
City of Rockwall Planning & Zoning Department
972-771-7745 | 972-772-6438
Lmorales@rockwall.com | http://www.rockwall.com/planning/

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City of Rockwall

Planning & Zoning Department
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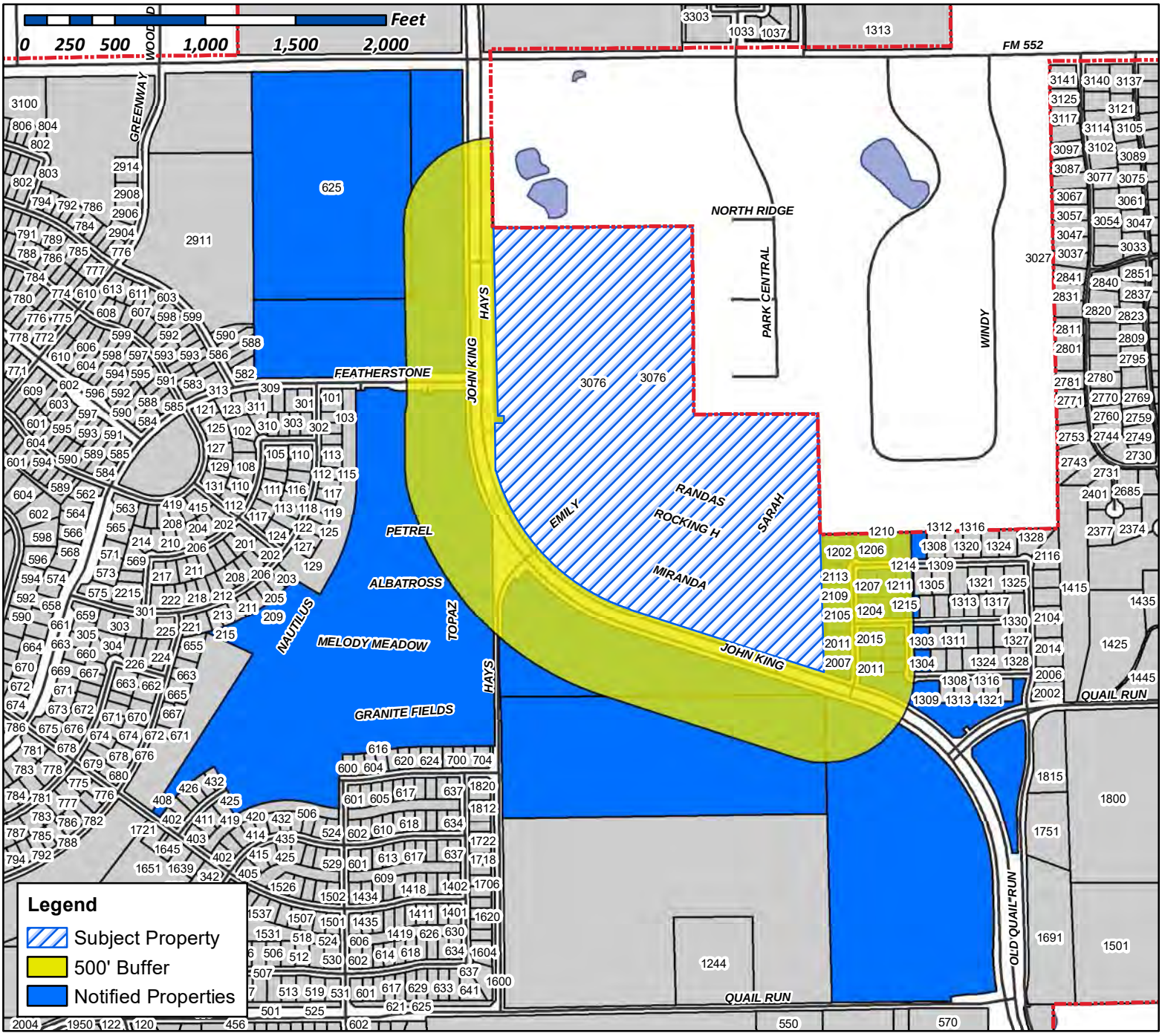

Case Number: Z2019-021
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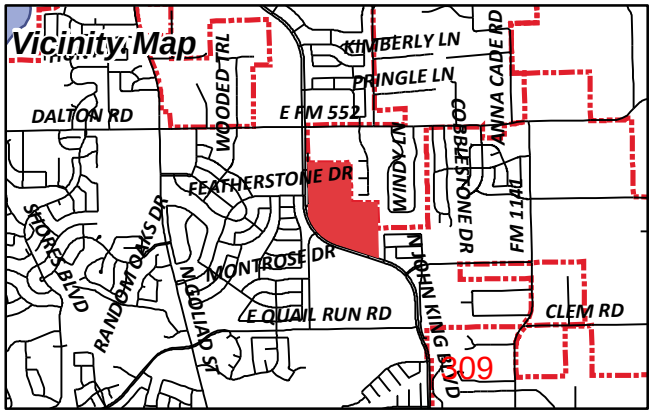

Date Created: ***9/13/2019***
For Questions on this Case Call (972) 771-7745

PACESETTER HOMES LLC
14400 THE LAKES BLVD BUILDING C, SUITE 200
AUSTIN, TX 78660

CITY OF ROCKWALL
205 W RUSK ST
ROCKWALL, TX 75087

REED GWENDOLYN
3076 HAYS RD
ROCKWALL, TX 75087

REED GWENDOLYN
3076 HAYS LN
ROCKWALL, TX 75087

ROCKWALL I S D
625 FM552
ROCKWALL, TX 75087

CDT ROCKWALL/2017 LLC
6925 FM 2515
KAUFMAN, TX 75142

SKORBURG CO.
ATTN: JOHN ARNOLD
8214 WESTCHESTER DR SUITE 710
DALLAS, TX 75225

RANDA BARTON HANCE LIVING TRUST AND
LARRY HANCE
963 W YELLOW JACKET LN APT 107
ROCKWALL, TX 75087

R & R HANCE INVESTMENTS LP
963 W YELLOW JACKET LN
ROCKWALL, TX 75087

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NOTICE OF PUBLIC HEARING
CITY OF ROCKWALL, PLANNING & ZONING DEPARTMENT

PHONE: (972) 771-7745
EMAIL: PLANNING@ROCKWALL.COM

To Whom It May Concern:

You are hereby notified that the City of Rockwall Planning and Zoning Commission and City Council will consider the following application:

Case No. Z2019-021: Saddle Star South

Hold a public hearing to discuss and consider a request by Pat Atkins of KPA Consulting, Inc. on behalf of the owners Gwen Reed, Saddle Star South Holdings, LLC, and CDT Rockwall/2017, LLC for the approval of a zoning amendment to Planned Development District 79 (PD-79) [Ordinance No. 16-39] for the purpose of amending the development standards and concept plan on a 70.408-acre tract of land identified as Tracts 1, 1-03, 1-5 & 2-03 of the P. B. Harrison Survey, Abstract No. 97, City of Rockwall, Rockwall County, Texas, zoned Planned Development District 79 (PD-79) for Single-Family 8.4 (SF-8.4) District land uses, situated within the SH-205 By-Pass Overlay (SH-205 BY-OV) District, located on the north side of John King Boulevard south of Featherstone Drive, and take any action necessary.

For the purpose of considering the effects of such a request, the Planning and Zoning Commission will hold a public hearing on **Tuesday, 10/8/2019 at 6:00 p.m.,** and the City Council will hold a public hearing on **Monday, 10/21/2019 at 6:00 p.m.** These hearings will be held in the City Council Chambers at City Hall, 385 S. Goliad Street.

As an interested property owner, you are invited to attend these meetings. If you prefer to express your thoughts in writing please return the form to:

David Gonzales
Rockwall Planning and Zoning Dept.
385 S. Goliad Street
Rockwall, TX 75087

You may also email your comments to the Planning Department at planning@rockwall.com. If you choose to email the Planning Department please include your name and address for identification purposes.

Your comments must be received by **10/21/2019** to ensure they are included in the information provided to the City Council.

Sincerely,

Ryan Miller, AICP
Director of Planning & Zoning

USE THIS QR CODE TO GO DIRECTLY TO THE WEBSITE

MORE INFORMATION ON THIS CASE CAN BE FOUND ON THE CITY'S WEBSITE:
HTTPS://SITES.GOOGLE.COM/SITE/ROCKWALLPLANNING/DEVELOPMENT-CASES

PLEASE RETURN THE BELOW FORM

Case No. Z2019-021: Saddle Star South

Please place a check mark on the appropriate line below:

☐ I am in favor of the request for the reasons listed below.

☐ I am opposed to the request for the reasons listed below.

Name:

Address:

Tex. Loc. Gov. Code, Sec. 211.006 (d) If a proposed change to a regulation or boundary is protested in accordance with this subsection, the proposed change must receive, in order to take effect, the affirmative vote of at least three-fourths of all members of the governing body. The protest must be written and signed by the owners of at least 20 percent of either: (1) the area of the lots or land covered by the proposed change; or (2) the area of the lots or land immediately adjoining the area covered by the proposed change and extending 200 feet from that area.

PLEASE SEE LOCATION MAP OF SUBJECT PROPERTY ON THE BACK OF THIS NOTICE

Zoning & Specific Use Permit Input Form

Case Number *

Please provide the Case Reference Number of the Zoning or Specific Use Permit (SUP) request that you are providing input on (Example: Z2019-001).

Z2019-024.

Please place a check mark on the appropriate line below: *

- [ ] I am in favor of the request.
- [x] I am in opposition to the request.

Please provide any additional information concerning your support or opposition to the request.

Why are you allowing a developer to increase the development site up to 70 acres without a traffic study? John King was supposed to offer a way around the traffic mess created for residents living in the north part of the county due to runaway development you allowed along Hwy. 205. Also, it appears the city's water and sewer infrastructure won't support this increase in the number of houses either. So why the push for a large, unnecessary development that will likely lower the quality of life for existing residents?

Respondent Information

Please provide your information.

First Name *

Darlene

Last Name *

Sanchez

Address *

7144 Hunt Lane

City *

Rockwall

State *

Tx

Zip Code *

75087

Email Address *

darlenesanchez@charter.net

Phone Number

_____

Please check all that apply: *

- [x] I live nearby the proposed Zoning or Specific Use Permit (SUP) request.
- [ ] I work nearby the proposed Zoning or Specific Use Permit (SUP) request.
- [ ] I own property nearby the proposed Zoning or Specific Use Permit (SUP) request.
- [ ] I own a business nearby the proposed Zoning or Specific Use Permit (SUP) request.
- [ ] Other: _____

How did you hear about this Zoning or Specific Use Permit (SUP) request? *

- ( ) I received a property owner notification in the mail.
- ( ) I read about the request on the City's website.
- ( ) I saw a zoning sign on the property.
- ( ) I read about the request in the Rockwall Herald Banner.
- ( ) My neighbors told me about the request.
- (•) Other: I saw an online discussion where people were mainly opposed to this.

SADDLE STAR LAND DEVELOPMENT L.L.C.

3076 HAYS LN.-ROCKWALL,TEXAS 75087-PAT ATKINS-DIRECTOR

9-13-19

RYAN C. MILLER AICP , DAVID GONZALES AICP

DIRECTOR OF PLANNING /CITY OF ROCKWALL

385 S. GOLIAD STREET

ROCKWALL,TEXAS 75087

LETTER OF EXPLANATION

RE: SADDLE STAR SOUTH-70.408 ACRES –OWNER - C.D.T-2017 L.L.C.-Saddle Star South Holdings, LLC And Gwendolyn Reed

ROCKWALL , ROCKWALL COUNTY , TEXAS

DEAR MR. MILLER ,GONZALES

WE ARE THE SAID AUTHORIZED REPRESENATIVES OF THE OWNERS OF THE 70.408 ACRE TRACT IN ROCKWALL, ROCKWALL COUNTY.

WE HEREBY AS AUTHORIZED AGENT, PAT ATKINS DIRECTOR OF SADDLE STAR LAND DEVELOPMENT L.L.C.,TO PURSUE APPROVAL OF OUR PLANNED DEVELOMENT REQUEST . OUR REQUEST IS ADDING THE ADDITIONAL 14.995 ACRES TO THE OVERALL SADDLE STAR SOUTH DEVELOPMENT .

THIS ADDITION WILL REPRESENT THE 80'X125' PRODUCT ALL OTHER REQUIREMENTS WITHIN THE ORIGINAL PLANNED DEVELOPMENT WILL REMAIN THE SAME.

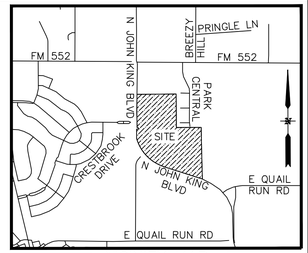
SINCERELY

Pat Atkins

PAT ATKINS-DIRECTOR-SADDLE STAR

315

LINE TABLE		
NO.	DIRECTION	DISTANCE
L1	N 89°38'44" E	50.00'
L2	N 0°38'27" W	40.00'
L3	S 89°38'05" W	34.29'



VICINITY MAP
NOT TO SCALE

0' 50' 100' 200'
Graphic scale (in feet): 1" = 100'

NOTE:
DETENTION TO BE PROVIDED PER CITY OF ROCKWALL DRAINAGE SPECIFICATIONS AND STANDARDS

FEATHERSTONE DRIVE 98' R.O.W. CABINET H, PAGE 33

CITY OF ROCKWALL
STONE CREEK PHASE VI
CABINET I, PAGE 161

STONE CREEK SF, LTD
VOLUME 5011, PAGE 9

JOHN KING BOULEVARD
(APPARENT 120' RIGHT-OF-WAY)

Monument Entry

10' Hike & Bike Trail

N 0°38'27" W 261.96'

N 1°19'17" W 442.88'

N 1°10'15" W 596.15'

L1 L2 L3

C.A. 5
(H.O.A./OPEN SPACE)

C.A. 6
(H.O.A./OPEN SPACE)

CITY OF ROCKWALL
ROCKWALL COUNTY

HAYS ROAD

RANDAS WAY
75' RIGHT-OF-WAY

MIRANDA LANE
50' RIGHT-OF-WAY

Δ=56°09'19"
L=1117.31'
R=1140.00'
CB=N 44°02'06" W
CD=1073.12'

PHASE ONE
PHASE TWO

EMILY DRIVE
50' RIGHT-OF-WAY

ROYS DRIVE
50' RIGHT-OF-WAY

PHASE TWO
PHASE THREE

C.A. 4
(H.O.A./OPEN SPACE)

AMENITY CENTER

C.A. 6
(H.O.A./OPEN SPACE)

N 89°26'56" E 1099.11'

MICHAEL & STACY
MILLER
CC #20170000011122

REMAINDER OF
R & R HANCE INVESTMENTS, L.P.
("FIRST TRACT")
VOLUME 5433, PAGE 49

10' Hike & Bike Trail

JENNIFER LANE
75' RIGHT-OF-WAY

JUDITH DRIVE
50' RIGHT-OF-WAY

MIRANDA LANE
50' RIGHT-OF-WAY

ROCKING H TRAIL
50' RIGHT-OF-WAY

C.A. 3
(H.O.A./OPEN SPACE)

RANDAS WAY
75' RIGHT-OF-WAY

JOHN KING BOULEVARD
(120' RIGHT-OF-WAY)

N 72°06'44" W 1128.56'

JANET DRIVE
50' RIGHT-OF-WAY

PHASE ONE
PHASE TWO

LAUREL DRIVE
50' RIGHT-OF-WAY

CITY OF ROCKWALL
ROCKWALL COUNTY

N 89°30'05" E 689.56'

S 0°30'07" E 446.60'

S 0°32'13" E 596.04'

CITY OF ROCKWALL
ROCKWALL COUNTY

PARK RIDGE ESTATES
CABINET A, PAGE 390

PARK RIDGE CENTRAL
60' RIGHT-OF-WAY

Monument Entry

C.A. 2
(H.O.A./OPEN SPACE)

RANDAS WAY
80' RIGHT-OF-WAY

SARAH DRIVE
50' RIGHT-OF-WAY

10' Hike & Bike Trail

C.A. 2
(H.O.A./OPEN SPACE)

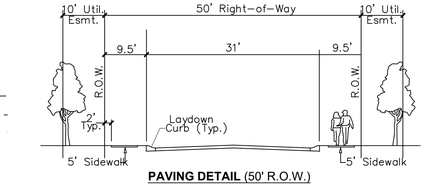
S 1°30'45" E 761.52'

S 1°17'27" E 669.75'

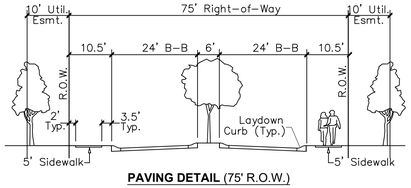
CITY OF ROCKWALL
ROCKWALL COUNTY

GIDEON GROVE LTD.
CC #20150000014609
Proposed GIDEON GROVE NORTH

BLOCK A
WINDMILL VALLEY
SUBDIVISION
CABINET A, PAGE 157



PAVING DETAIL (50' R.O.W.)
SECTION 'A - A'



PAVING DETAIL (75' R.O.W.)
SECTION 'B - B'

LAND USE DATA
TOTAL AREA ~ 70.408 ACRES / 3,066,972 SQ. FT.
TOTAL OPEN SPACE ~ 14.220 ACRE / 619,436 SQ. FT.
TYPICAL LOT SIZE ~ 70' x 125'
TOTAL LOTS ~ 176
DENSITY ~ 2.49 DWELLING UNITS / ACRE

CONCEPT PLAN

SADDLE STAR SOUTH

70.408 ACRES SITUATED IN THE
P.B. HARRISON SURVEY, ABSTRACT No. 97
CITY OF ROCKWALL
ROCKWALL COUNTY, TEXAS

ENGINEERING CONCEPTS & DESIGN L.P.
ENGINEERING / SURVEYING / PROJECT MANAGEMENT
201 WINDCO CIRCLE, SUITE 200 WYLIE, TX. 75098
(972) 941-8400

DEVELOPER
K P A CONSULTING, INC.
3076 HAYS LANE ROCKWALL, TEXAS 75087
PAT ATKINS: 972-388-6383

OWNERS

SADDLE STAR SOUTH HOLDINGS LLC.
2200 ROSS AVENUE
SUITE 4200W
DALLAS, TEXAS 75201

CDT ROCKWALL/2017 LLC
6925 F.M. 2515
KAUFMAN, TEXAS 75142

GWENDOLYN REED
3076 HAYS LANE
ROCKWALL, TEXAS 75087

CASE# Z2019-021

DATE: OCTOBER 01, 2019

SHEET 1 OF 1

EXHIBIT B
CONCEPT PLAN

TRACT ONE

BEING 44.292 acres of land situated in the P.B. Harrison Survey, Abstract No. 97, Rockwall County, Texas, and being part of two tracts of land, the "First Tract" being a called 32.5 acres and the "Second Tract" being a called 32 acres, described in a Special Warranty Deed to R & R Hance Investments, L.P., recorded as Instrument No. 2008-00396963 and in Volume 5433, Page 49 of the Deed Records of Rockwall County, Texas (DRRCT), SAVE AND EXCEPT the called "Parcel 16 (Parts 1 and 2)" conveyed to the City of Rockwall, recorded as Instrument No. 2007-00380919 and in Volume 5124, Page 210 (DRRCT), and being more particularly described as follows:

BEGINNING at a 1/2" capped iron rod stamped, "6081," found for corner in the northeasterly right-of-way line of John Kind Boulevard (variable width right-of-way) at the common north corner of said "Part 1" of Parcel 16 and called "Parcel 15" conveyed to the City of Rockwall, recorded as Instrument No. 2009-00424601 and in Volume 5951, Page 84 (DRRCT), said point also being in the common line of said "First Tract" and a called 29.185 acre tract of land conveyed to Gideon Grove Ltd., recorded as Instrument No. 20150000014609 of the Official Public Records of Rockwall County, Texas;

THENCE North 72°06'44" West along the common northeasterly line of said John Kind Boulevard and said Part 1, a distance of 1,126.56 feet to a point for corner at the beginning of a tangent curve to the right, having a radius of 1,140.00 feet and a chord which bears North 44°02'06" West, a distance of 1,073.12 feet;

THENCE in the northwesterly direction along said curve to the right, and last mentioned common line, through a central angle of 56°09'19", an arc distance of 1,117.31 feet to a 1/2" iron rod with a yellow cap stamped, "RPLS 3963," set for corner at the end of said curve and at the most northerly corner of said Part 1;

THENCE North 00°38'27" West continuing along the east right-of-way line of said John Kind Boulevard, a distance of 261.96 feet to a "PK" nail set for corner at the southwest corner of said Part 2;

THENCE North 89°38'44" East along the south line of said Part 2, a distance of 50.00 feet to a 1/2" iron rod with a yellow cap found for the southeast corner thereof;

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THENCE North 00°38'27" West along the east line of said Part 2, a distance of 40.00 feet to a 1/2" iron rod with a yellow cap found for the northeast corner thereof in the north line of said Second Tract and being in the south line of a tract of land conveyed to Randy and Gwen Reed, recorded in Volume 260, Page 1 (DRRCT);

THENCE North 89°38'05" East along the common line of last mentioned tracts, at 1,051.89 feet passing a 1/2" iron rod found for the southeast corner of said Reed tract common to the southwest corner of Park Ridge Estates, an addition to the City of Rockwall, according to the Plat thereof recorded in Cabinet A, Page 390 of the Plat Records of Rockwall County, Texas (PRRCT), and continuing along the north line of said Second Tract and the south line of said Park Ridge Estates, a total distance of 1,736.25 feet to a 3/8" iron rod found for the common east corner thereof, and being in the west line of Block A of Windmill Valley Subdivision, an addition to the City of Rockwall, according to the Plat thereof recorded in Cabinet A, Page 157 (PRRCT);

THENCE South 01°17'27" East along the common line of said Second Tract and said Block A, a distance of 669.75 feet to a 1/2" iron rod found for the southwest corner of said Block A, and being the northwest corner of said 29.185 acre tract;

THENCE South 01°30'45" East along the west line of said 29.185 acre tract and partially along the east lines of said First Tract and said Second Tract, a distance of 761.52 feet to the PLACE OF BEGINNING and Containing 44.292 acres, or 1,929,345 square feet, of land.

TRACT TWO

BEING 11.121 acres of land situated in the P.B. Harrison Survey, Abstract No. 97, Rockwall County, Texas, and being all of a called 11.126 acre tract of land described in a Warranty Deed with Vendor's Lien to Randy Reed and wife, Gwen Reed, recorded in Volume 260, Page 1 of the Deed Records of Rockwall County, Texas (DRRCT), and being more particularly described as follows:

BEGINNING at a 1/2" iron rod found for corner near the edge of an asphalt surface in the east margin of Hays Road, said point also being the common west corner of said Reed tract and a tract of land conveyed to Stephen L. Branch and Judy C. Branch, recorded in Volume 234, Page 527 (DRRCT);

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THENCE North 89°26'12" East along the common line of last mentioned tracts, a distance of 1,092.52 feet to a 1/2" iron rod found for the common east corner thereof, and being in the west line of Park Ridge Estates, an addition to the City of Rockwall, according to the Plat thereof recorded in Cabinet A, Page 390 of the Plat Records of Rockwall County, Texas (PRRCT);

THENCE South 00°30'07" East along the common line of said Reed tract and said Park Ridge Estates, a distance of 446.60 feet to a 1/2" iron rod found for the common south corner thereof, and being in the north line of a called 32 acre tract described in a Special Warranty Deed to R & R Hance Investments, L.P., as "Second Tract," recorded as Instrument No. 2008-00396963 and in Volume 5433, Page 49 (DRRCT);

THENCE South 89°38'05" West along the common line of said Second Tract and said Reed tract, a distance of 1,086.19 feet to a 1/2" iron rod found at the southwest corner of said Reed tract and being in the east margin of said Hays Road;

THENCE North 01°19'17" West along the west line of said Reed tract and the east line of said Hays Road, a distance of 442.88 feet to the PLACE OF BEGINNING and Containing 11.121 acres, or 484,450 square feet, of land.

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TRACT THREE

BEING 14.955 acres of land situated in the P.B. Harrison Survey, Abstract No. 97, Rockwall County, Texas, and all of a called 15.00 acre tract of land described in a Warranty Deed to Steve L. Branch and wife Judy C. Branch, recorded in Volume 234, Page 527 of the Deed Records of Rockwall County, Texas (DRRCT), and being more particularly described as follows:

BEGINNING at a 1/2" iron rod found for corner in the original Hays Road at the common west corner of said 15.00 acre tract and a tract of land described in a deed to Randy and Gwen Reed, recorded in Volume 260, Page 1 (DRRCT);

THENCE North 01°10'15" West, continuing along and within Hays Road and with the west line of said 15.00 acre Branch tract, a distance of 596.15 feet, to a 1/2" iron rod found for corner at the northwest corner thereof, common to the southwest corner of a called 15.00 acre tract of land described in a deed to Gerald Glen Cox and wife Rosalba Cox, recorded in Volume 3295 Page 9, (DRRCT);

THENCE North 89°26'26" East, along the common line of last mentioned tracts, a distance of 1,099.11 feet, to a point for corner at the common east corner thereof, and also being in the west line of Park Ridge Estates, an addition to the City of Rockwall, according to the Plat thereof recorded in Cabinet A, Page 390 of the Plat Records of Rockwall County, Texas (PRRCT), from which a 1/2" iron rod with a yellow cap stamped "5034" bears South 68°26'26" West, a distance of 0.18 feet;

THENCE South 00°32'13" East, along the common line of said Branch tract and said Park Ridge Estates, a distance of 596.04 feet, to a 1/2" iron rod found for corner at the southeast corner thereof, common to the northeast corner of said Reed tract;

THENCE South 89°26'12" West, along the common line of last mentioned tracts, a distance of 1,092.52 feet to PLACE OF BEGINNING and Containing 653,191 square feet, or 14.995 acres of land.

320

CITY OF ROCKWALL

ORDINANCE NO. 19-XX

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS, AMENDING THE UNIFIED DEVELOPMENT CODE [*ORDINANCE NO. 04-38*] OF THE CITY OF ROCKWALL, AS HERETOFORE AMENDED, SO AS TO FURTHER AMEND PLANNED DEVELOPMENT DISTRICT 79 (PD-79) [*ORDINANCE NO. 16-39*] FOR THE PURPOSE OF AMENDING THE DEVELOPMENT STANDARDS AND CONCEPT PLAN ON A 70.408-ACRE TRACT OF LAND, ZONED PLANNED DEVELOPMENT DISTRICT 79 (PD-79) FOR SINGLE FAMILY 8.4 (SF-8.4) DISTRICT LAND USES, BEING IDENTIFIED AS TRACTS 1, 1-03, 1-5 & 2-03 OF THE P. B. HARRISON SURVEY, ABSTRACT NO. 97, CITY OF ROCKWALL, ROCKWALL COUNTY, TEXAS AND MORE FULLY DESCRIBED HEREIN BY *EXHIBIT 'A'*; PROVIDING FOR SPECIAL CONDITIONS; PROVIDING FOR A PENALTY OF FINE NOT TO EXCEED THE SUM OF TWO THOUSAND DOLLARS ($2,000.00) FOR EACH OFFENSE; PROVIDING FOR A SEVERABILITY CLAUSE; PROVIDING FOR A REPEALER CLAUSE; PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the City has received a request by Pat Atkins of KPA Consulting, Inc. on behalf of the owners Gwen Reed, Saddle Star South Holdings, LLC, and CDT Rockwall/2017, LLC for the purpose of amending Planned Development District 79 (PD-79) [*Ordinance No. 16-39*] in order to change the development standards and concept plan for a 70.408-acre tract of land identified as Tracts 1, 1-03, 1-5 & 2-03 of the P. B. Harrison Survey, Abstract No. 97, City of Rockwall, Rockwall County, Texas, zoned Planned Development District 79 (PD-79) for Single Family 8.4 (SF-8.4) District land uses, situated within the SH-205 By-Pass Overlay (SH-205 BY OV) District, generally located east of the intersection of Featherstone Drive and John King Boulevard, and more fully described in *Exhibit 'A'* of this ordinance, which hereinafter shall be referred to as the *Subject Property* and incorporated by reference herein; and

WHEREAS, the Planning and Zoning Commission of the City of Rockwall and the governing body of the City of Rockwall in compliance with the laws of the State of Texas and the ordinances of the City of Rockwall have given the requisite notices by publication and otherwise, and have held public hearings and afforded a full and fair hearing to all property owners generally and to all persons interested in and situated in the affected area, and in the vicinity thereof, and the governing body in the exercise of its legislative discretion, has concluded that Planned Development District 79 [*Ordinance No. 16-39*] and the Unified Development Code [*Ordinance No. 04-38*] should be amended as follows:

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS:

Section 1. That the approval of this ordinance shall supersede all requirements stipulated in *Ordinance No. 16-39*;

Section 2. That the *Subject Property* shall be used only in the manner and for the purposes authorized by this Planned Development District Ordinance and the Unified Development Code [*Ordinance No. 04-38*] of the City of Rockwall as heretofore amended, as amended herein by granting this zoning change, and as maybe amended in the future;

Section 3. That development of the *Subject Property* shall generally be in accordance with the *Planned Development Concept Plan*, described in *Exhibit 'B'* of this ordinance, attached hereto and incorporated herein by reference as *Exhibit 'B'*, which is deemed hereby to be a condition of approval of the amended zoning classification for the *Subject Property*;

Section 4. That development of the *Subject Property* shall generally be in accordance with the *Development Standards*, described in *Exhibit 'C'* of this ordinance, attached hereto and incorporated herein by reference as *Exhibit 'C'*, which is deemed hereby to be a condition of approval of the amended zoning classification for the *Subject Property*;

Section 5. That development of the *Subject Property* shall be in conformance with the schedule listed below (*except as set forth below with regard to simultaneous processing and approvals*).

(a) The procedures set forth in the City's subdivision regulations on the date this ordinance is approved by the City, as amended by this ordinance (*including Subsections 5(b) through 5(g) below*), shall be the exclusive procedures applicable to the subdivision and platting of the *Subject Property*.

(b) The following plans and plats shall be required in the order listed below (*except as set forth below with regard to simultaneous processing and approvals*). The City Council shall act on an application for an *Open Space Master Plan* in accordance with the time period specified in *Section 212.009* of the *Texas Local Government Code*.

(1) Open Space Master Plan
(2) Master Plat
(3) PD Site Plan
(4) Preliminary Plat
(5) Final Plat

(c) *Open Space Master Plan.* An *Open Space Master Plan* for the *Subject Property*, prepared in accordance with this ordinance and consistent with the *Planned Development Concept Plan*, and shall be considered for approval by the City Council following recommendation of the Parks and Recreation Board.

(d) *Master Plat.* A *Master Plat* for the *Subject Property* shall be submitted and shall identify the proposed timing of each phase of the proposed development. A *Master Plat* application may be processed by the City concurrently with a *Open Space Master Plan* for the development.

(e) *PD Site Plan.* A *PD Site Plan* covering all of the *Subject Property* shall be submitted and shall identify all site/landscape/hardscape plan(s) for all open space, neighborhood parks, trail systems, street buffers and entry features. A *PD Site Plan* application may be processed by the City concurrently with a *Preliminary Plat* application for the development.

(f) *Preliminary Plat.* A *Preliminary Plat* covering all of the *Subject Property* shall be submitted and shall include a *Treescape Plan*. A *Preliminary Plat* application may be processed by the City concurrently with a *PD Site Plan* application for the development.

(g) *Final Plat.* Prior to the issuance of any building permits, a *Final Plat*, conforming to the *Preliminary Plat*, for all of the *Subject Property* shall be submitted for approval.

Section 6. That any person, firm, or corporation violating any of the provisions of this ordinance shall be deemed guilty of a misdemeanor and upon conviction shall be punished by a penalty of fine not to exceed the sum of *Two Thousand Dollars* ($2,000.00) for each offense and each and every day such offense shall continue shall be deemed to constitute a separate offense;

Section 7. That if any section, paragraph, or provision of this ordinance or the application of that section, paragraph, or provision to any person, firm, corporation or situation is for any reason judged invalid, the adjudication shall not affect any other section, paragraph, or provision of this ordinance or the application of any other section, paragraph or provision to any other person, firm, corporation or situation, nor shall adjudication affect any other section, paragraph, or provision of the Unified Development Code, and the City Council declares that it would have adopted the valid portions and applications of the ordinance without the invalid parts and to this end the provisions for this ordinance are declared to be severable;

Section 8. The standards in this ordinance shall control in the event of a conflict between this ordinance and any provision of the Unified Development Code or any provision of the City Code, ordinance, resolution, rule, regulation, or procedure that provides a specific standard that is different from and inconsistent with this ordinance. References to zoning district regulations or other standards in the Unified Development Code (including references to the *Unified Development Code*), and references to overlay districts, in this ordinance or any of the Exhibits hereto are those in effect on the date this ordinance was passed and approved by the City Council of the City of Rockwall, Texas;

Section 9. That this ordinance shall take effect immediately from and after its passage and the publication of the caption of said ordinance as the law in such cases provides;

PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS, THIS THE 4TH DAY OF NOVEMBER, 2019.

_____
Jim Pruitt, *Mayor*

ATTEST:

_____
Kristy Cole, *City Secretary*

APPROVED AS TO FORM:

_____
Frank J. Garza, *City Attorney*

1st Reading: *October 21, 2019*

2nd Reading: *November 4, 2019*

Exhibit 'A':
Legal Description and Survey

TRACT 1:

BEING 44.292 acres of land situated in the P. B. Harrison Survey, Abstract No. 97, Rockwall County, Texas, and being part of two tracts of land, the "*First Tract*" being a called 32.5 acres and the "*Second Tract*" being a called 32 acres, described in a Special Warranty Deed to R & R Hance Investments, LP., recorded as Instrument No. 2008-00396963 and in Volume 5433, Page 49 of the Deed Records of Rockwall County, Texas (DRRCT), SAVE AND EXCEPT the called "Parcel 16 (Parts 1 and 2)" conveyed to the City of Rockwall, recorded as Instrument No. 2007-00380919 and in Vol u me 5124, Page 210 (DRRCT), and being more particularly described as follows:

BEGINNING at a 1/2" capped iron rod stamped, "6081," found for corner in the northeasterly right-of-way line of John King Boulevard (120' right-of-way) at the com mon north corner of said "Part 1" of Parcel 16 and called "Parcel 15" conveyed to the City of Rockwall, recorded as Instrument No. 2009-00424601 and in Volume 5951, Page 84 (DRRCT), said point also being in the common line of said "First Tract" and a called 29.185 acre tract of land conveyed to Gideon Grove Ltd., recorded as Instrument No. 20150000014609 of the Official Public Records of Rockwall County, Texas;

THENCE North 72°06'44" West along the common northeasterly line of said John King Boulevard and said Part 1, a distance of 1,126.56 feet to a point for corner at the beginning of a tangent curve to the right, having a radius of 1,140.00 feet and a chord which bears North 44° 02' 06" West, a distance of 1,073.12-feet;

THENCE in the northwesterly direction along said curve to the right, and last mentioned common line, through a central angle of 56°09'19", an arc distance of 1,117.31-feet to a 1/2" iron rod with a yellow cap stamped, "RPLS 3963," set for corner at the end of said curve and at the most northerly corner of said Part 1;

THENCE North 00°38'27" West continuing along the east right-of-way line of said John King Boulevard, a distance of 261.96 feet to a "PK" nail set for corner at the southwest corner of said Part 2;

THENCE North 89°38'44" East along the south line of said Part 2, a distance of 50.00 feet to a 1/2" iron rod with a yellow cap found for the southeast corner thereof;

THENCE North 00°38'27" West along the east line of said Part 2, a distance of 40.00 feet to a 1/2" iron rod with a yellow cap found for the northeast corner thereof in the north line of said Second Tract and being in the south line of a tract of land conveyed to Randy and Gwen Reed, recorded in Volume 260, Page 1 (DRRCT);

THENCE North 89°38'05" East along the common line of last mentioned tracts, at 1,051.89 feet passing a 1/2" iron rod found for the southeast corner of said Reed tract com mon to the southwest corner of Park Ridge Estates, an addition to the City of Rockwall, according to the Plat thereof recorded in Cabinet A, Page 390 of the Plat Records of Rockwall County, Texas (PRRCT), and continuing along the north line of said Second Tract and the south line of said Park Ridge Estates, a total distance of 1,736.25 feet to a 3/8" iron rod found for the com mon east corner thereof, and being in the west line of Block A of Windmill Valley Subdivision, an addition to the City of Rockwall, according to the Plat thereof recorded in Cabinet A, Page 157 (PRRCT);

THENCE South 01°17'27" East along the common line of said Second Tract and said Block A, a distance of 669.75 feet to a 1/2" iron rod found for the southwest corner of said Block A, and being the northwest corner of said 29.185 acre tract;

THENCE South 01°30'45" East along the west line of said 29.185-acre tract and partially along the east lines of said First Tract and said Second Tract, a distance of 761.52 feet to the PLACE OF BEGINNING and Containing 44.292 acres, or 1,929,345 square feet, of land.

TRACT 2:

BEING 11.121 acres of land situated in the P. B. Harrison Survey, Abstract No. 97, Rockwall County, Texas, and being all of a called 11.126 acre tract of land described in a Warranty Deed with Vendor's Lien to Randy Reed and wife, Gwen Reed, recorded in Volume 260, Page 1 of the Deed Records of Rockwall County, Texas (DRRCT), and being more particularly described as follows:

BEGINNING at a 1/2" iron rod found for corner near the edge of an asphalt surface in the east margin of Hays Road, said point being the common west corner of said Reed tract and a tract of land conveyed to Stephen L. Branch and Judy C. Branch, recorded in Volume 234, Page 527 (DRRCT);

THENCE North 89°26'12" East along the common line of last mentioned tracts, a distance of 1,092.52-feet to a 1/2" iron rod found for the common east corner thereof, and being in the west line of Park Ridge Estates, an addition to the City of Rockwall, according to the Plat thereof recorded in Cabinet A, Page 390 of the Plat Records of Rockwall County, Texas (PRRCT);

THENCE South 00°30'07" East along the common line of said Reed tract and said Park Ridge Estates, a distance of 446.60 feet to a 1/2" iron rod found for the common south corner thereof, and being in the north line of a called 32 acre tract described, in a Special Warranty Deed to R & R Hance Investments, L.P., as "*Second Tract*," recorded as Instrument No. 2008-00396963 and in Volume 5433, Page 49 (DRRCT);

THENCE South 89°38'05" West along the common line of said Second Tract and said Reed tract, a distance of 1,086.19-feet to a 1/2" iron rod found at the southwest corner of said Reed tract and being in the east margin of said Hays Road;

THENCE North 01°19'17" West along the west line of said Reed tract and the east line of said Hays Road, a distance of 442.88-feet to the PLACE OF BEGINNING and Containing 11.121-acres, or 484,450 square feet, of land.

TRACT 3:

BEING 14.955 acres of land situated in the P.B. Harrison Survey, Abstract No. 97, Rockwall County, Texas, and all of a called 15.00 acre tract of land described in a Warranty Deed to Steve L. Branch and wife Judy C. Branch, recorded in Volume 234, Page 527 of the Deed Records of Rockwall County, Texas (DRRCT), and being more particularly described as follows:

BEGINNING at a 1/2" iron rod found for corner in the original Hays Road at the common west corner of said 15.00 acre tract and a tract of land described in a deed to Randy and Gwen Reed, recorded in Volume 260, Page 1 (DRRCT);

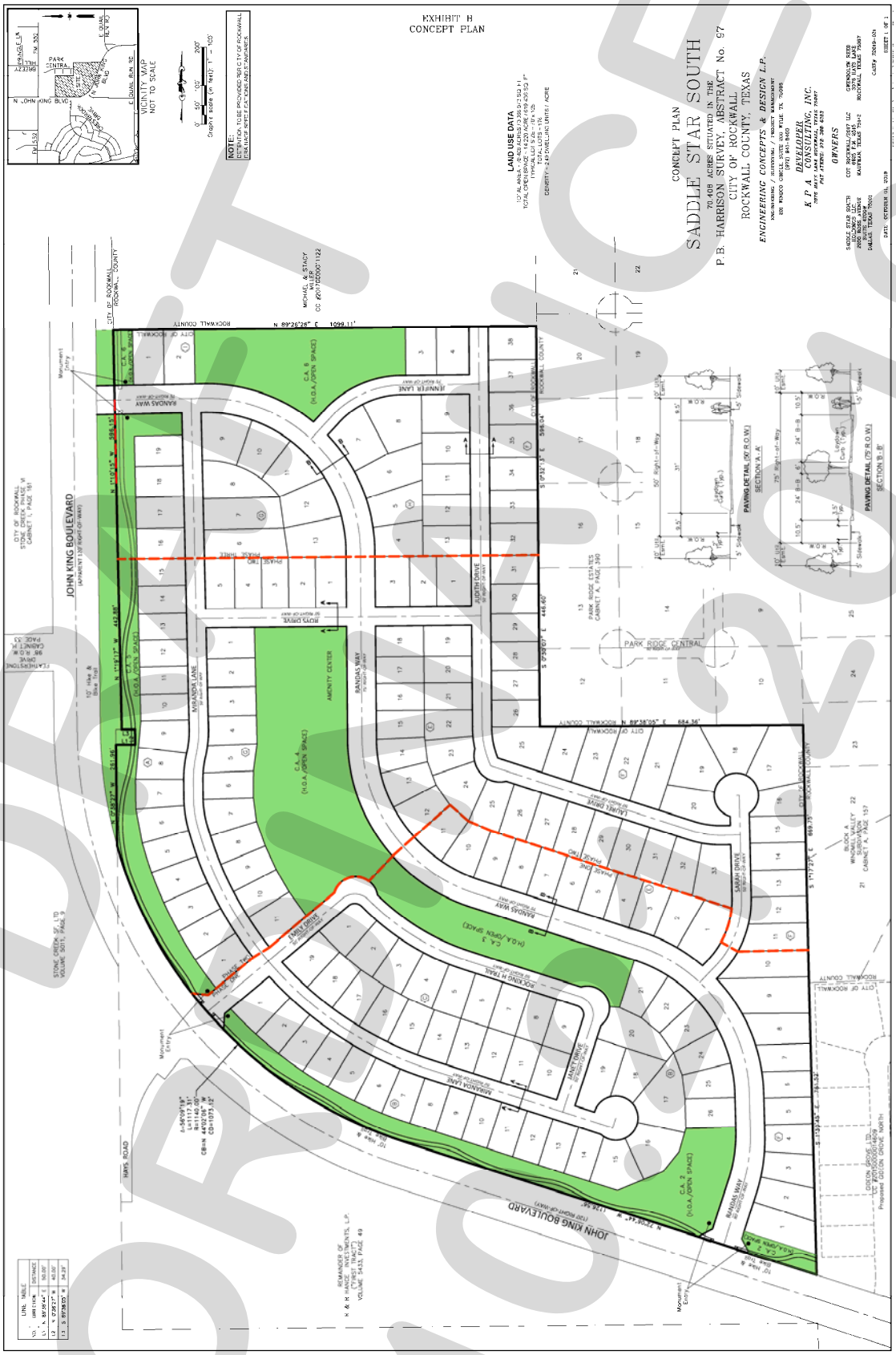
THENCE North 01°10'15" West, continuing along and within Hays Road and with the west line of said 15.00 acre Branch tract, a distance of 596.15 feet, to a 1/2" iron rod found for corner at the northwest corner thereof, common to the southwest corner of a called 15.00 acre tract of land described in a deed to Gerald Glen Cox and wife Rosalba Cox, recorded in Volume 3295 Page 9, (DRRCT);

THENCE North 89°26'26" East, along the common line of last mentioned tracts, a distance of 1,099.11 feet, to a point for corner at the common east corner thereof, and also being in the west line of Park Ridge Estates, an addition to the City of Rockwall, according to the Plat thereof recorded in Cabinet A, Page 390 of the Plat Records of Rockwall County, Texas (PRRCT), from which a 1/2" iron rod with a yellow cap stamped "5034" bears South 68°26'26" West, a distance of 0.18 feet;

THENCE South 00°32'13" East, along the common line of said Branch tract and said Park Ridge Estates, a distance of 596.04 feet, to a 1/2" iron rod found for corner at the southeast corner thereof, common to the northeast corner of said Reed tract;

THENCE South 89°26'12" West, along the common line of last mentioned tracts, a distance of 1,092.52 feet to PLACE OF BEGINNING and Containing 653,191 square feet, or 14.995 acres of land.

Exhibit 'B':
Concept Plan



Development Standards.

1. *Permitted Uses.* Unless specifically provided by this Planned Development ordinance, only those uses permitted within the Single Family 8.4 (SF-8.4) District, as stipulated by the *Permissible Use Charts* contained in Article IV, *Permissible Uses*, of the Unified Development Code (UDC), are allowed on the *Subject Property*.

2. *Lot Composition and Layout.* The lot layout and composition shall generally conform to the *Concept Plan* depicted in *Exhibit 'B'* and stated in *Table 1*, which is as follows:

Table 1: Lot Composition

Lot Type	*Minimum Lot Size (FT)*	*Minimum Lot Size (SF)*	*Dwelling Units (#)*	*Dwelling Units (%)*
A	70' x 125'	8,750 SF	143	78.41%
B	80' x 125'	10,000 SF	33	21.59%
		Maximum Permitted Units:	*176*	*100.00%*

3. *Density and Dimensional Requirements.* Unless specifically provided by this Planned Development ordinance, the development standards stipulated by the Single Family 8.4 (SF-8.4) District, as specified by Article V, *District Development Standards*, of the Unified Development Code are applicable to all development on the *Subject Property.* The maximum permissible density for the *Subject Property* shall not exceed *2.50* dwelling units per gross acre of land; however, in no case should the proposed development exceed *176* units. All lots shall conform to the standards depicted in *Table 2*, which is as follows:

Table 2: Lot Dimensional Requirements

Lot Type >	*A*	*B*
Minimum Lot Width [1]	70'	80'
Minimum Lot Depth	125'	125'
Minimum Lot Area	8,750 SF	10,000 SF
Minimum Front Yard Setback [2] & [5]	20'	20'
Minimum Side Yard Setback	5'	5'
Minimum Side Yard Setback (Adjacent to a Street) [2] & [5]	10'	10'
Minimum Length of Driveway Pavement	25'	25'
Maximum Height [3]	30'	30'
Minimum Rear Yard Setback [4]	20'	20'
Minimum Area/Dwelling Unit (SF)	2,700 SF	2,700 SF
Maximum Lot Coverage	65%	65%
Permitted Encroachment into Required Setbacks [5]	Allowed	Allowed

General Notes:

[1]: The minimum lot width shall be measured at the *Front Yard Building Setback*.

[2]: The location of the *Front Yard Building Setback* as measured from the front property line.

[3]: The *Maximum Height* shall be measured to the eave or top plate (whichever is greater) of the single-family home.

[4]: As measured from the rear yard property line.

[5]: Sunrooms, porches, stoops, bay windows, balconies, masonry clad chimneys, eaves and similar architectural features may encroach beyond the *Front Yard Building Setback* by up to ten (10) feet for any property; however, the encroachment shall not exceed five (5) feet on *Side Yard Setbacks (Adjacent to a Street)* and shall not encroach into public right-of-way [a *Sunroom* is an enclosed room no more than 15-feet in width that has glass on at least 50% of each of the encroaching faces].

4. *Building Standards.* All development shall adhere to the following building standards:

(a) *Masonry Requirement.* The minimum masonry requirement for the exterior façades of all buildings shall be 90%. For the purposes of this ordinance, the masonry requirement shall be limited to full width brick, natural stone, and cast stone. Cementaceous fiberboard horizontal lap-siding (*e.g. HardiBoard or Hardy Plank*) and, stucco (*i.e. three [3] part stucco or a comparable -- to be determined by staff*) may be used for up to 50% of the masonry requirement; however, stucco (*i.e. three [3] part stucco or a comparable -- to be determined by staff*) shall be permitted through a Specific Use Permit (SUP) only.

(b) *Roof Pitch.* A minimum of an *8:12* roof pitch is required on all structures with the exception of sunrooms and porches, which shall have a minimum of a *4:12* roof pitch.

(c) *Garage Orientation.* A minimum of 50% of the garages for the *Type A* lots and 100% of the *Type B* lots shall be oriented in a *traditional swing* (*or j-swing*) configuration. The remainder of garages maybe configured in a front entry configuration with a minimum setback of 20-feet (*i.e. allowing the garage to be flush with the front façade of the primary structure*). In this case the front façade of the primary structure does not include a permitted encroachment (*e.g. a porch, sunroom, etcetera*) allowed in *Table 2* above. All garage configurations that are not front entry shall meet the requirements of Article VI, *Parking and Loading*, of the Unified Development Code.

5. *Anti-Monotony Restrictions.* The development shall adhere to the *Anti-Monotony Matrix* depicted in *Table 3* below (*for spacing requirements see the illustration below*).

Table 3 : Anti-Monotony Matrix

Lot Type	*Minimum Lot Size*	*Elevation Features*
A	70' x 125'	(1), (2), (3), (4)
B	80' x 125'	(1), (2), (3), (4)

(1) Identical brick blends or paint colors may not occur on adjacent (*side-by-side*) properties along any block face without at least five (5) intervening homes of differing materials on the same side of the street beginning with the adjacent property and six (6) intervening homes of differing materials on the opposite side of the street.

(2) Front building elevations shall not repeat along any block face without at least five (5) intervening homes of differing appearance on the same side of the street and six (6) intervening homes of differing appearance on the opposite side of the street. The rear elevation of homes backing to open spaces or on John King Boulevard shall not repeat without at least five (5) intervening homes of differing appearance. Homes are considered to have a differing appearance if any of the following two (2) items deviate:

(a) Number of Stories
(b) Permitted Encroachment Type and Layout
(c) Roof Type and Layout
(d) Articulation of the Front Façade

(3) Permitted encroachments (*i.e. porch and sunroom*) elevations shall not repeat or be the same along any block face without at least five (5) intervening homes of sufficient

dissimilarity on the same side of the street beginning with the home adjacent to the subject property and six (6) intervening homes beginning with the home on the opposite side of the street.

(4) Each phase of the subdivision will allow for a maximum of four (4) compatible roof colors, and all roof shingles shall be an architectural or dimensional shingle (*3-Tab Roofing Shingles are prohibited*).

Illustration 1: Properties line up on the opposite side of the street. Where RED is the subject property.

Illustration 2: Properties do not line up on opposite side of the street. Where RED is the subject property.

6. *Fencing Standards.* All individual residential fencing and walls shall be architecturally compatible with the design, materials and colors of the primary structure on the same lot, and meet the following standards:

(a) Wood Fences. All wood fences shall be constructed of a standard fencing material (*minimum of ½" thickness or better; spruce fencing will not be allowed*), and use fasteners that are hot dipped galvanized or stainless steel. Wood fences facing onto a street shall be painted and/or stained and sealed with all pickets being placed on the *public side* facing the street. All wood fences shall be smooth-finished, free of burs and splinters, and be a maximum of six (6) feet in height.

(b) Wrought Iron/Tubular Steel. Lots located along the perimeter of roadways, abutting open spaces, greenbelts and parks shall be required to install a wrought iron or tubular steel fence. Wrought iron/tubular steel fences can be a maximum of six (6) feet in height.

(c) *Corner Lots*. Corner lots fences (*i.e. adjacent to the street*) shall provide masonry columns at 45-feet off center spacing that begins at the rear of the property line. A maximum of six (6) foot solid *board-on-board panel* fence constructed utilizing cedar fencing shall be allowed between the masonry columns along the side and/or rear lot adjacent to a street. In addition, the fencing shall be setback from the side property line adjacent to a street a minimum of five (5) feet. The property owner shall be required to maintain both sides of the fence.

(d) *Solid Fences (including Wood Fences)*. All solid fences shall incorporate a decorative top rail or cap detailing into the design of the fence.

7. *Landscape and Hardscape Standards.*

(1) *Landscape.* Landscaping shall be reviewed and approved with the PD Site Plan. All *Canopy/Shade Trees* planted within this development shall be a minimum of four (4) caliper inches in size and all *Accent/Ornamental/Under-Story Trees* shall be a minimum of four (4) feet in total height. The following tree species are approved for planting within this subdivision:

(a) *Canopy/Shade Trees*. Bald Cyprus, Cedar Elm, Texas Red Oak, Homestead Elm, Lace Bark Elm, Alle Elm, Chinese Pistachio, Shumard Oak, Sycamore, and Burr Oak.

(b) *Accent/Ornamental/Under-Story Trees*. Texas Redbud, Eve's Necklace, Mexican Plum, Downy Hawthorn, Crepe Myrtle, Texas Mountain Laurel, Vitex, and Desert Willow.

(2) *Landscape Buffers.* All landscape buffers and plantings located within the buffers shall be maintained by the Homeowner's Association (HOA).

(a) *Landscape Buffer and Sidewalks (John King Boulevard)*. A minimum of a 50-foot landscape buffer shall be provided along the frontage of John King Boulevard (*outside of and beyond any required right-of-way dedication*), and shall incorporate ground cover, a *built-up* berm and shrubbery along the entire length of the frontage. Berms and shrubbery shall have a minimum height of 30-inches and a maximum height of 48-inches. In addition, three (3) canopy trees and four (4) accent trees shall be planted per 100-feet of linear frontage. The developer shall also be responsible for the construction of a ten (10) foot curvilinear sidewalk situated within the 50-foot landscape buffer adjacent to John King Boulevard.

(3) *Streetscape Landscaping.* Prior to the issuance of a Certificate of Occupancy (CO), all residential, single family lots situated within the proposed subdivision shall be landscaped with canopy trees from the list stipulated by *Section 7(1)* of this ordinance in the following sizes and proportions:

(i) Two (2), three (3) inch trees measured six (6) inches above the root ball shall be planted in the front yard of an interior lot.

(ii) Two (2), three (3) inch trees measured six (6) inches above the root ball shall be planted in the front yard of a corner lot and two (2), three (3) inch caliper trees shall be planted in the side yard facing the street.

Note: For the purposes of this section only [i.e. Section 7(3)], the term "front yard" includes the area within the dedicated right-of-way for a parkway immediately adjoining the front yard of the lot.

(4) *Irrigation Requirements*. Irrigation shall be installed for all required landscaping located within common areas, landscape buffers and/or open space. Irrigation installed in these areas shall be designed by a Texas licensed irrigator or landscape architect and shall be maintained by the Homeowner's Association.

(5) *Hardscape.* Hardscape plans indicating the location of all sidewalks and trails shall be reviewed and approved with the PD Site Plan.

8. *Street.* All streets (*excluding drives, fire lanes and private parking areas*) shall be built according to City street standards.

9. *Lighting*. Light poles shall not exceed 20-feet in total height (*i.e. base and lighting standard*). All fixtures shall be directed downward and be positioned to contain all light within the development area.

10. *Sidewalks.* At a maximum, all sidewalks adjacent to a street shall begin two (2) feet behind the right-of-way line and be five (5) feet in overall width.

11. *Buried Utilities.* New distribution power-lines required to serve the *Subject Property* shall be placed underground, whether such lines are located internally or along the perimeter of the *Subject Property*, unless otherwise authorized by the City Council. Temporary power-lines constructed across undeveloped portions of the *Subject Property* to facilitate development phasing and looping may be allowed above ground, but shall not be considered *existing lines* at the time the area is developed, and if they are to become permanent facilities, such lines shall be placed underground pursuant to this paragraph. Franchise utilities shall be placed within a ten (10) foot public utility easement behind the sidewalk, between the home and the property line.

12. *Open Space.* The development shall consist of a minimum of *20%* open space (*or 14.082-acres*), and generally conform to the *Concept Plan* contained in *Exhibit 'B'* of this ordinance. All open space areas shall be maintained by the Homeowner's Association (HOA).

Continued on Next Page …

13. *Trail Rest Area.* The developer shall be responsible for the construction of a *Trail Rest Area* that generally conforms to the rest area depicted in *Figure 1* (*below*).

Figure 1: *Trail Rest Area Concept*

14. *Neighborhood Signage.* Permanent subdivision identification signage shall be permitted at all major entry points for the proposed subdivision. Final design and location of any entry features shall be reviewed and approved with the *PD Site Plan*.

15. *Homeowner's Association (HOA)*. A Homeowner's Association shall be created to enforce the restrictions established in accordance with the requirements of Section 38-15 of the Subdivision Regulations contained within the Municipal Code of Ordinances of the City of Rockwall. The HOA shall also maintain all neighborhood parks, trails, open space and common areas, irrigation, landscaping, screening fences associated with this development.

16. *Variances*. The variance procedures and standards for approval that are set forth in the Unified Development Code shall apply to any application for variances to this ordinance.

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CITY OF ROCKWALL

CITY COUNCIL MEMORANDUM

PLANNING AND ZONING DEPARTMENT
385 S. GOLIAD STREET • ROCKWALL, TX 75087
PHONE: (972) 771-7745 • EMAIL: PLANNING@ROCKWALL.COM

TO:	Mayor and City Council
CC:	Rick Crowley, *City Manager* Mary Smith, *Assistant City Manager* Joey Boyd, *Assistant City Manager*
FROM:	Ryan Miller; *Director of Planning and Zoning*
DATE:	October 21, 2019
SUBJECT:	Z2019-022; SUP for Accessory Building

On October 15, 2019, the applicant, Marty Wright submitted a letter requesting to postpone the public hearing for this case until November 4, 2019. The applicant has stated that he will be attending a business trip and will be out of town on October 21, 2019. According to Subsection 2.03(C), *Postponement, Recess, and Continuation of a Public Hearing*, of Article XI, *Development Applications and Review Procedures*, of the Unified Development Code (UDC), a public hearing may be postponed by announcing the postponement at the time and place of the notified public hearing. The public hearing shall be to a specific time and date no later than 30-days from the first or most recent public hearing. Attached to this memorandum is a copy of the applicant's letter.

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From: Marty Wright
To: Brooks, Korey
Subject: Request to Postpone Hearing
Date: Tuesday, October 15, 2019 11:52:24 AM

Mr. Brooks.

I would like to request to postpone the City Council hearing set for October 21st at 6:00pm, Due to a business trip that takes me to Austin that entire week. Please let me know.
Thanks again for your time,

Marty Wright
2340 Saddlebrook Ln
Rockwall, Texas 75087
214 717 8203

CITY OF ROCKWALL

CITY COUNCIL CASE MEMO

PLANNING AND ZONING DEPARTMENT
385 S. GOLIAD STREET • ROCKWALL, TX 75087
PHONE: (972) 771-7745 • EMAIL: PLANNING@ROCKWALL.COM

TO:	Mayor and City Council
DATE:	October 21, 2019
APPLICANT:	Marty Wright
CASE NUMBER:	Z2019-022; *Specific Use Permit (SUP) for a Detached Garage*

SUMMARY

Hold a public hearing to discuss and consider a request by Marty Wright for the approval of a Specific Use Permit (SUP) for a detached garage on a one (1) acre tract of land identified as Lot 10, Block B, Saddlebrook Estates #2 Addition, City of Rockwall, Rockwall County, Texas, zoned Single-Family 16 (SF-16) District, addressed as 2340 Saddlebrook Lane, and take any action necessary.

BACKGROUND

The subject property was annexed in 1999 [*Ordinance No. 99-33*], is zoned Single-Family 16 (SF-16) District, and is addressed as 2340 Saddlebrook Lane. On November 11, 2001, the City Council approved a change in zoning [*Case No. PZ2008-102; Ordinance No. 01-102*], from an Agricultural (AG) District to a Single-Family 16 (SF-16) District for the Saddlebrook Estates #2 Addition. On October 21, 2002, the City Council approved a replat [*Case No. PZ2002-71-01*] for the Saddlebrook Estates #2 Addition.

PURPOSE

The applicant is requesting approval of a Specific Use Permit (SUP) to allow a detached garage that exceeds the maximum allowable size for a property in a Single-Family 16 (SF-16) District.

ADJACENT LAND USES AND ACCESS

The subject property is located at 2340 Saddlebrook Lane. The land uses adjacent to the subject property are as follows:

North: Directly north of the subject property there are several single-family homes located within the Saddlebrook Estates #2 Addition, followed by the corporate limits of the City of Rockwall. These homes are zoned Single-Family 16 (SF-16) District. Beyond this is E. Quail Run Road, which is identified as a M4U (*major collector, four [4] lane, undivided roadway*) on the City's Master Thoroughfare Plan. Following this, there is a large vacant tract of land zoned Agricultural (AG) District.

South: Directly south of the subject property, are several single-family homes within the Saddlebrook Estates #2 Addition, which are zoned Single-Family 16 (SF-16) District, followed by the corporate limits of the City of Rockwall. Beyond this is FM-1141, which is identified as a M4D (*major collector, four [4] lane, divided roadway*) on the City's Master Thoroughfare Plan.

East: Directly east of the subject property there are several single-family homes within the Saddlebrook Estates #2 Addition, which are zoned Single-Family 16 (SF-16) District. Beyond this is FM-1141, which is identified as a M4D (*major collector, four [4] lane, divided roadway*) on the City's Master Thoroughfare Plan and delineates the corporate limits of the City of Rockwall.

West: Directly west of the subject property are several single-family homes within the Saddlebrook Estates #2 Addition, which are zoned Single-Family 16 (SF-16) District. Beyond this are several single-family homes zoned Agricultural (AG) District followed by John King Boulevard, which is identified as a P6D (*principle arterial, six [6] lane, divided roadway*) on the City's Master Thoroughfare Plan.

CHARACTERISTICS OF THE REQUEST

The applicant is requesting approval of a Specific Use Permit (SUP) for a detached garage that exceeds the maximum allowable size for properties located within a Single-Family 16 (SF-16) District. Currently situated on the subject property, there is a 3,397 SF brick single-family home and a 216 SF accessory building that is clad with wood. The proposed building will be situated behind the main structure, will be 13' 8" in height, and will be constructed of metal. The building will include a 24' x 40' (*i.e. 960 SF*) detached garage and a 6' x 40' (*i.e. 240 SF*) porch that will be on the front of the building. The total footprint of the building will be 1,200 SF (*i.e. 35% of the size of the home*). The porch will incorporate windows with shutters, double walk-in doors, and wooden posts. The applicant has stated that the purpose of the porch is to blend the building with the neighborhood by incorporating architectural elements that are typically seen on a single-family home. The building will have two (2) roll-up doors located on each of the side façades (*i.e. north and south façades*) and the applicant has stated that detached garage will be utilized to store several antique vehicles. The existing 12' x 18' (*i.e. 216 SF*) accessory building will be relocated and will be situated adjacent to the northern side façade of the proposed detached garage. The applicant has provided a site plan and proposed building elevations to be reviewed by the Planning and Zoning Commission and the City Council.

CONFORMANCE WITH THE CITY'S CODES

According to Subsection 7.04, *Accessory Structure Development Standards*, of Section 7, *District Development Standards*, of Article V, *District Development Standards*, of the Unified Development Code (UDC), in a Single-Family 16 (SF-16) District a detached garage is permitted provided that it is no larger than 625 SF. The detached garage shall include a minimum of one (1) garage bay door large enough to accommodate a standard size motor vehicle and shall be architecturally compatible with the primary structure. In this case, the proposed detached garage is 960 SF and the porch is 240 SF (*i.e. a total building footprint of 1,200 SF*), which exceeds the maximum allowable size of a detached garage. Although the proposed building exceeds the maximum allowable size, the applicant has provided additional architectural elements (*i.e. the front porch, windows and shutters, and the double walk-in doors*) on the building in order for the building to be consistent with the main structure. Additionally, the proposed building incorporates two (2) roll-up doors that are large enough to accommodate a standard passenger vehicle. Based on the proposed design of the building, the applicant's request appears to be in conformance with the requirements stipulated by the Unified Development Code (UDC) with regard to detached garages; however, the Planning and Zoning Commission and City Council are tasked with determining if the proposed building is architecturally compatible with the primary structure.

STAFF ANALYSIS

When looking at the applicant's request, it was observed that a large majority of property owners *(i.e. 26 of the 44 homes or roughly 60%*) currently have a detached garage and/or accessory building on their properties. Of the existing accessory buildings within the Saddlebrook Estates #2 Addition, several are roughly the same size or larger than (*i.e. 900-1,300 SF*) the proposed detached garage. It should be noted that most of the accessory buildings that are visible from the street utilize exterior materials similar to the main structure (*i.e. a combination of brick and cementitious lap siding*). Staff was able to determine that 30 building permits have been for accessory buildings within the Saddlebrook Estates #2 Addition and 27 of the permits are still active (*i.e. not expired, voided, or withdrawn*). A vast majority of the permits were issued between 2002 (*i.e. shortly after this area was annexed*) and 2009. In this case, the proposed detached garage is larger than the maximum allowable

detached garage; however, the design of the structure (*i.e. inclusion of a front entryway door, windows, shutters, and front porch*) appears to be architecturally compatible with the main house and would resemble a residential building. The building will sit more than 100-feet from the front property line and be approximately four (4)-feet higher than the street. Due to this, visibility of the garage bay doors will be limited from the front property line. Should the detached garage be visible from of the front of the property, the garage would likely resemble the existing detached garages on the surrounding properties (*i.e. the bay doors would be visible from the street*). Given that a majority of the surrounding homes have a detached garage, an accessory building, and/or a portable building approval of this request does not appear to negatively impact the subject property or surrounding properties. Staff should note, approval of a Specific Use Permit (SUP) is a discretionary decision for the City Council, pending a recommendation from the Planning and Zoning Commission. Should this request be approved, a total of two (2) accessory buildings will be located on the subject property.

NOTIFICATIONS

On September 20, 2019, staff sent 30 notices to all residents/property owners within 500-feet of the subject property. There are no Homeowner's Associations (HOA's)/Neighborhood Associations located within 1,500-feet of the subject property and are participating in the Neighborhood Notification Program. At the time this report was written, staff had received four (4) emails and one (1) notice in favor and one (1) email in opposition of this request.

CONDITIONS OF APPROVAL

If the City Council chooses to approve the applicant's request then staff would propose the following conditions of approval:

(1) The following conditions pertain to the operation of a *detached garage* on the *Subject Property* and conformance to these conditions are required for continued operations:

(a) The detached garage shall generally conform to the concept plan and the conceptual building elevations depicted in *Exhibits 'B'* & *'C'* of the attached ordinance;

(b) The detached garage shall not exceed a maximum size of 1,200 SF;

(c) The detached garage shall not exceed an overall height of 15-feet;

(d) The subject property shall not have more than two (2) accessory buildings;

(2) Any construction resulting from the approval of this zoning change shall conform to the requirements set forth by the Unified Development Code (UDC), the International Building Code (IBC), the Rockwall Municipal Code of Ordinances, city adopted engineering and fire codes and with all other applicable regulatory requirements administered and/or enforced by the state and federal government.

PLANNING AND ZONING COMMISSION

On October 8, 2019, the Planning and Zoning Commission's motion to recommend denial of the applicant's request was approved by a vote of 7-0. According to Section 2.03(G), *Protest of a Zoning Change*, of Article XI, *Development Applications and Review Procedures*, of the Unified Development Code (UDC), "(i)f such change [*zoning change or Specific Use Permit (SUP)*] is recommended for denial by the Planning and Zoning Commission, such zoning change or Specific Use Permit (SUP) shall require a supermajority vote (*i.e. a three-forths vote of those members present*), with a minimum of four (4) votes in the affirmative required for approval."

City of Rockwall
Planning & Zoning Department
385 S. Goliad Street
Rockwall, Texas 75032
(P): (972) 771-7745
(W): www.rockwall.com

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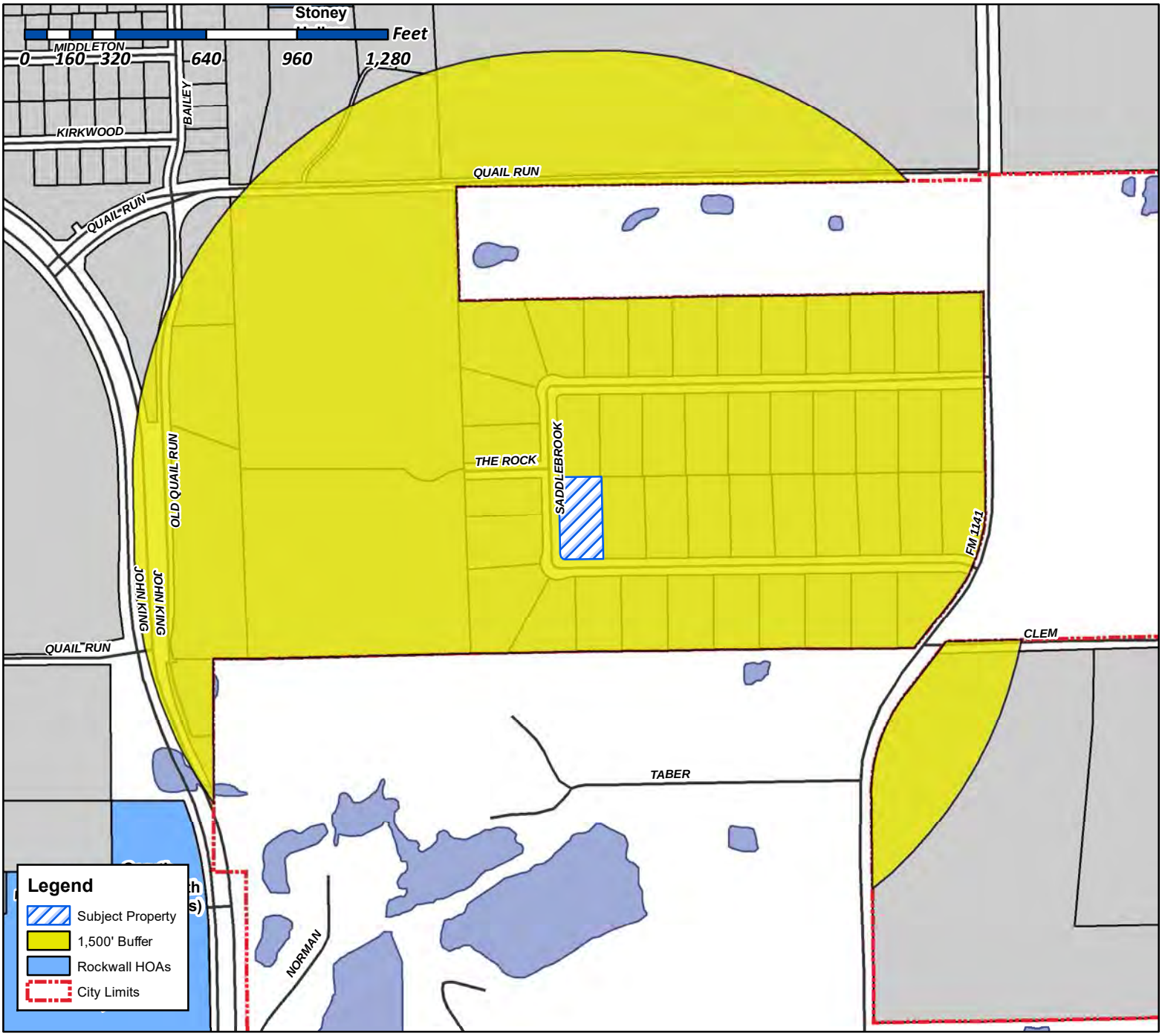
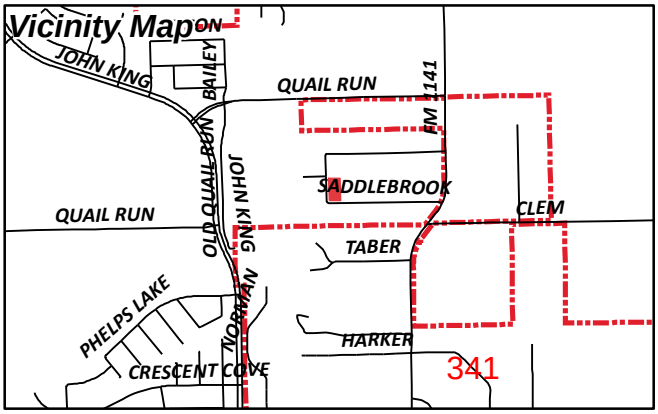
City of Rockwall

Planning & Zoning Department
385 S. Goliad Street
Rockwall, Texas 75087
(P): (972) 771-7745
(W): www.rockwall.com



Case Number: Z2019-022
Case Name: SUP for an Accessory Building
Case Type: Zoning
Zoning: Single Family 16 (SF-16) District
Case Address: 2340 Saddlebrook Lane



Date Created: ***9/17/2019***

For Questions on this Case Call (972) 771-7745

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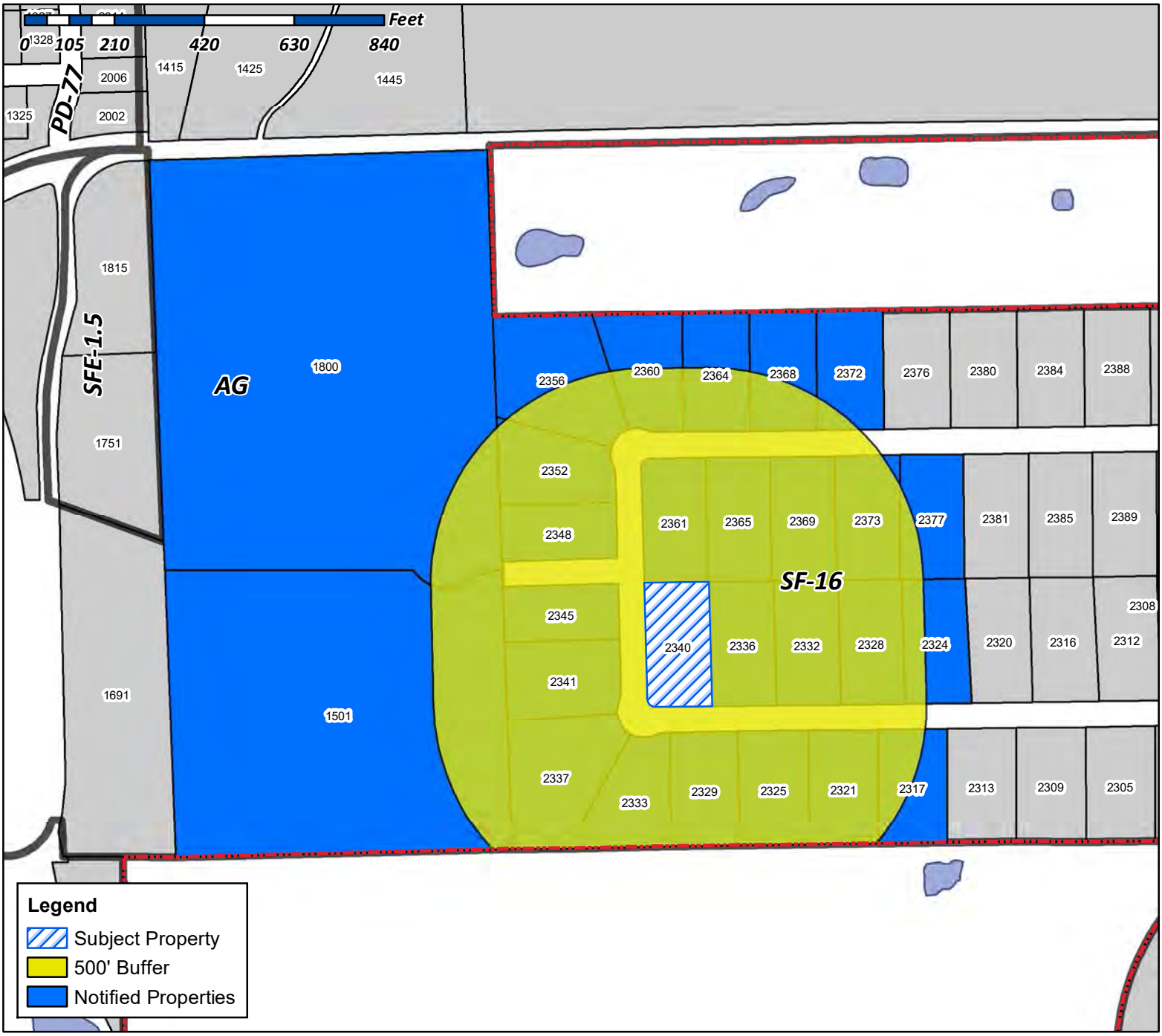
City of Rockwall

Planning & Zoning Department
385 S. Goliad Street
Rockwall, Texas 75087
(P): (972) 771-7745
(W): www.rockwall.com



Case Number: Z2019-022
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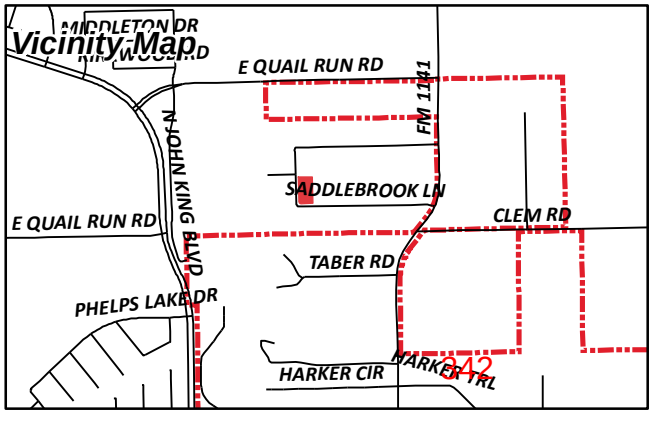

Date Created: *9/17/2019*
For Questions on this Case Call (972) 771-7745

CURRENT RESIDENT
1501 THE ROCK
ROCKWALL, TX 75087

TYLER WILLIAM L AND VANITA RAE
1501 THE ROCK
ROCKWALL, TX 75087

CURRENT RESIDENT
1800 E QUAIL RUN RD
ROCKWALL, TX 75087

MUGGEO THOMAS & PATRICIA M
2317 SADDLEBROOK LN
ROCKWALL, TX 75087

ROBINSON RONNIE D & VERONICA A
2321 SADDLEBROOK LANE
ROCKWALL, TX 75087

BARON JEFFREY MICHAEL & JEANNE MARIE
2324 SADDLEBROK LANE
ROCKWALL, TX 75087

CONFIDENTIAL
2325 SADDLEBROOK LN
ROCKWALL, TX 75087

AMUNDSON DAVID O & ALICIA K
2328 SADDLEBROOK LN
ROCKWALL, TX 75087

BROWN CHRISTOPHER & SHELLEY
2329 SADDLEBROOK LN
ROCKWALL, TX 75087

WHITE JOHN C & PAMELA E
2332 SADDLEBROOK LN
ROCKWALL, TX 75087

YODER DEBRA AND BYRON M GILLORY JR
2333 SADDLEBROOK LANE
ROCKWALL, TX 75087

SHACK RANDY & JAMIE
2336 SADDLEBROOK LANE
ROCKWALL, TX 75087

THOMAS WILLARD L AND PEGGY J
2337 SADDLEBROOK LANE
ROCKWALL, TX 75087

WRIGHT MARTY ALLEN & DEBRA MAY
2340 SADDLEBROOK LN
ROCKWALL, TX 75087

TROISE GUTHRIE CHASE
2341 SADDLEBROOK LN
ROCKWALL, TX 75087

SCHALE WILLIAM AND CORTNEY
2345 SADDLEBROOK LN
ROCKWALL, TX 75087

GRIFFIN STEPHEN J
2348 SADDLEBROOK LN
ROCKWALL, TX 75087

HARVEY GARY G & KENETA L REVOCABLE LIVING TRUST
2352 SADDLEBROOK LN
ROCKWALL, TX 75087

COX ROBERT & BEVERLY
2356 SADDLEBROOK LN
ROCKWALL, TX 75087

OROZCO ARTHUR & SANDRA
2360 SADDLEBROOK LANE
ROCKWALL, TX 75087

HARVEY LEE L AND
MARIA J PEREIRA
2361 SADDLEBROOK LANE
ROCKWALL, TX 75087

BERGER KEVIN M & DEBBIE R
2364 SADDLEBROOK LN
ROCKWALL, TX 75087

PROCTOR CAROLYN
2365 SADDLEBROOK LN
ROCKWALL, TX 75087

STELZER WADE L & MISTY M
2368 SADDLEBROOK LN
ROCKWALL, TX 75087

CURRENT RESIDENT
2369 SADDLEBROOK LN
ROCKWALL, TX 75087

ELLIS MELISSA A AND CHIMA O
2372 SADDLEBROOK LN
ROCKWALL, TX 75087

CALDERON ALEJANDRO & ROSARIO
2373 SADDLEBROOK LN
ROCKWALL, TX 75087

ARENAS SEVERIANO & KRISTI L
2377 SADDLEBROOK LN
ROCKWALL, TX 75087

COX GERALD GLEN AND ROSALBA CARRASCO
3150 HAYS LN
ROCKWALL, TX 75087

GILKINSON DOYLE D & LORA A
PO BOX 8432
GREENVILLE, TX 75404

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NOTICE OF PUBLIC HEARING
CITY OF ROCKWALL, PLANNING & ZONING DEPARTMENT

PHONE: (972) 771-7745
EMAIL: PLANNING@ROCKWALL.COM

To Whom It May Concern:

You are hereby notified that the City of Rockwall Planning and Zoning Commission and City Council will consider the following application:

Case No. Z2019-022: SUP for Accessory Building

Hold a public hearing to discuss and consider a request by Marty Wright for the approval of a Specific Use Permit (SUP) for an accessory building on a one (1) acre tract of land identified as Lot 10, Block B, Saddlebrook Estates #2 Addition, City of Rockwall, Rockwall County, Texas, zoned Single-Family 16 (SF-16) District, addressed as 2340 Saddlebrook Lane, and take any action necessary.

For the purpose of considering the effects of such a request, the Planning and Zoning Commission will hold a public hearing on **Tuesday, 10/8/2019 at 6:00 p.m.,** and the City Council will hold a public hearing on **Monday, 10/21/2019 at 6:00 p.m.** These hearings will be held in the City Council Chambers at City Hall, 385 S. Goliad Street.

As an interested property owner, you are invited to attend these meetings. If you prefer to express your thoughts in writing please return the form to:

Korey Brooks
Rockwall Planning and Zoning Dept.
385 S. Goliad Street
Rockwall, TX 75087

You may also email your comments to the Planning Department at planning@rockwall.com. If you choose to email the Planning Department please include your name and address for identification purposes.

Your comments must be received by **10/21/2019** to ensure they are included in the information provided to the City Council.

Sincerely,

Ryan Miller, AICP
Director of Planning & Zoning

USE THIS QR CODE TO GO DIRECTLY TO THE WEBSITE

MORE INFORMATION ON THIS CASE CAN BE FOUND ON THE CITY'S WEBSITE:
HTTPS://SITES.GOOGLE.COM/SITE/ROCKWALLPLANNING/DEVELOPMENT-CASES

PLEASE RETURN THE BELOW FORM

Case No. Z2019-022: SUP for Accessory Building

Please place a check mark on the appropriate line below:

☐ I am in favor of the request for the reasons listed below.

☐ I am opposed to the request for the reasons listed below.

Name:

Address:

Tex. Loc. Gov. Code, Sec. 211.006 (d) If a proposed change to a regulation or boundary is protested in accordance with this subsection, the proposed change must receive, in order to take effect, the affirmative vote of at least three-fourths of all members of the governing body. The protest must be written and signed by the owners of at least 20 percent of either: (1) the area of the lots or land covered by the proposed change; or (2) the area of the lots or land immediately adjoining the area covered by the proposed change and extending 200 feet from that area.

PLEASE SEE LOCATION MAP OF SUBJECT PROPERTY ON THE BACK OF THIS NOTICE

From:	Planning
To:	Brooks, Korey
Subject:	FW: Case No. Z2019-022
Date:	Tuesday, October 01, 2019 4:11:53 PM

From: Berger, Kevin [redacted]
Sent: Thursday, September 26, 2019 7:36 AM
To: Planning <planning@rockwall.com>
Subject: Case No. Z2019-022

This is in regards to the above SUP request for 2340 Saddlebrook Lane.

First of all, we are 100% in favor of the request to build an accessory building in excess of 900 square feet which we assume is the reason for the SUP.

We know from building our own workshop in 2006 that at that time, the city required that the exterior cladding contains the same materials, excluding glass, as found on the main structure which in our case meant that we needed to brick the accessory building. I can think of at least 7 accessory buildings in Saddlebrook Estates that have been built and all of them comply with this requirement. From looking at the request and viewing the renderings, it appears that this structure is a 100% steel building.

Is this SUP just for the structure being greater than 900 square feet?

Is there an additional variance being applied for not using the same cladding material as the main residence?

Has the Rockwall UDC changed since 2006 that allows for a metal accessory building not allowed previously?

We know that bricking an accessory building is more expensive than not, but up to this point everyone in our neighborhood has had to comply. And honestly it has kept the neighborhood looking much better than if we had all built metal buildings.

Thanks for any clarification you can provide,

Kevin & Debbie Berger
2364 Saddlebrook Lane
Rockwall, TX 75087
214-534-6594

From: Planning
To: Brooks, Korey
Subject: FW: Case number Z2019022:SUP for accessory building
Date: Tuesday, October 01, 2019 4:10:08 PM

-----Original Message-----
From: Peggy Thomas [redacted]
Sent: Monday, September 30, 2019 2:08 PM
To: Planning <planning@rockwall.com>
Subject: Case number Z2019022:SUP for accessory building

Our names are Willard and Peggy Thomas and we are in favor of the request for the zoning change. It is our belief that the inhabitants of the home will build an appropriate structure for our neighborhood, as their home is one of the nicest ones in the neighborhood and so very well-kept thank you very much.

Willard and Peggy Thomas
2337Saddlebrook Ln., Rockwall, TX 75087

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From:	Planning
To:	Brooks, Korey
Subject:	FW: Case No. Z2019-022. Marty Wright
Date:	Tuesday, October 01, 2019 4:10:47 PM

From: [redacted]
Sent: Friday, September 27, 2019 2:12 PM
To: Planning <planning@rockwall.com>
Subject: Case No. Z2019-022. Marty Wright

In reference to Case number Z2019-022 I am in favor of the request to build the new building on the property. I am Marty's neighbor and I have looked at his plans for the new building. I think its going to be a very nice building as proposed. If there are any questions just let me know.

Chris Brown
2329 Saddlebrook Ln.
Rockwall, TX 75087
214-926-6969
[redacted]

From:	Planning
To:	Brooks, Korey
Subject:	FW: Case No. Z2019-022
Date:	Thursday, October 10, 2019 9:45:51 AM

From: David Amundson [redacted]
Sent: Thursday, October 10, 2019 9:44 AM
To: Planning <planning@rockwall.com>
Subject: Case No. Z2019-022

David Amundson
2328 Saddlebrook Lane Rockwall, TX 75087

Case No. Z2019-022
I am in favor of the request for SUP for Accessory Building to 2340 Saddlebrook Lane.

I also request that the Council consider the advantages of a Steel Building over conventional construction of wood and brick.
I have attached 2 sites that I have found listing the advantages.

Eco-friendly
Lower Cost
More efficient
Durability - Little to no maintenance
Noncombustible material - **lower risk of fire**
Insurance discounts
Increased resale value

http://armstrongsteel.com/network/future-first-time-builders/pros-and-cons-of-steel-buildings-and-traditional-timber-buildings/#.XZ86UUZKiUk

https://www.rhinobldg.com/10-reasons-metal-buildings-rule/

Thanks,

David Amundson

PLEASE RETURN THE BELOW FORM

Case No. Z2019-022: SUP for Accessory Building

Please place a check mark on the appropriate line below:

☑ I am in favor of the request for the reasons listed below.

☐ I am opposed to the request for the reasons listed below.

While I recognize the fact that no one wants their neighborhood to become a warehouse district, I think Mr. Wright's request should be approved. If anyone will keep it looking nice, he will. He and his wife and son are always out doing yard work & landscaping. Best yard in the neighborhood! I'm sure it will be done tastefully to fit in and maintained to look great.

Name: Stephen Griffin

Address: 2348 Saddlebrook Ln Rockwall 75087

Tex. Loc. Gov. Code, Sec. 211.006 (d) If a proposed change to a regulation or boundary is protested in accordance with this subsection, the proposed change must receive, in order to take effect, the affirmative vote of at least three-fourths of all members of the governing body. The protest must be written and signed by the owners of at least 20 percent of either: (1) the area of the lots or land covered by the proposed change; or (2) the area of the lots or land immediately adjoining the area covered by the proposed change and extending 200 feet from that area.

PLEASE SEE LOCATION MAP OF SUBJECT PROPERTY ON THE BACK OF THIS NOTICE

From: Planning
To: Brooks, Korey
Subject: FW: Case No. Z2019-022 Comment
Date: Monday, October 07, 2019 8:14:20 AM

-----Original Message-----
From: Bradley Jones [redacted]
Sent: Sunday, October 6, 2019 6:42 PM
To: Planning <planning@rockwall.com>
Subject: Case No. Z2019-022 Comment

Bradley and Susan Jones
2352 Saddlebrook Lane
Rockwall, TX 75087

We are opposed to the request for the reasons listed below:

The size and construction type are not compatible with the neighborhood. We are considering building a detached garage and research indicates that the structure needs to be built with the same materials as the house…not a metal building. Also, the addition of a building that size would start to crowd the lot and not be consistent with the rest of the neighborhood. For these two reasons, I believe the construction of this structure would decrease home values in the future and lead potentially lead to other requests of this nature.

Regards, Brad Jones

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Planning and zoning:

The situs address is 2340 Saddlebrook Ln. Rockwall, Texas 75087. We hope to build a storage building on our property. The property is 1 acre and currently has our home, pool, cabana, accessory building and all fence is wrought iron and a 8 foot wood fence on the east side that belongs to my neighbor.

What we plan to do is move our current accessory building to the north end of the property and add a storage building just of south of that structure. The proposed storage building will have a slab 30x40. The structure will include 24x40 of storage and a 6x40 porch on the west side. All windows and walk-in doors will be on the porch side and it will include overhead roll up door on the north and south end of the building. Maximun height will be 13 foot 8 inches. Colors will be Sandstone, Brown and wainscot trim on the bottom. No plumbing will be added and electricity will be added at a later time. A 90 foot driveway will be added to meet up with the proposed building at a later time.

We have a building quote from Eversafe Buildings for a total of $14,245.52 not including the slab. Eversafe has also included the concrete slab recommendations, which I have included in this packet. The slab cost is estimated to be approx. $9600.00, for a total project cost of approx. $23,850.00.

In our neighborhood we have other projects that also went past the maximum square footage and one having a second floor and going well above the 15-foot maximum height requirement.

Our use of this building to store several antique cars. The reason for the porch was my wife's idea.

I have included:

Site map of my property indicating proposed building site and feet between borders

Building quote

Recommendation of concrete slab

3D models of proposed storage building

Two photos of current accessory building to be moved

Two photos of proposed site of building

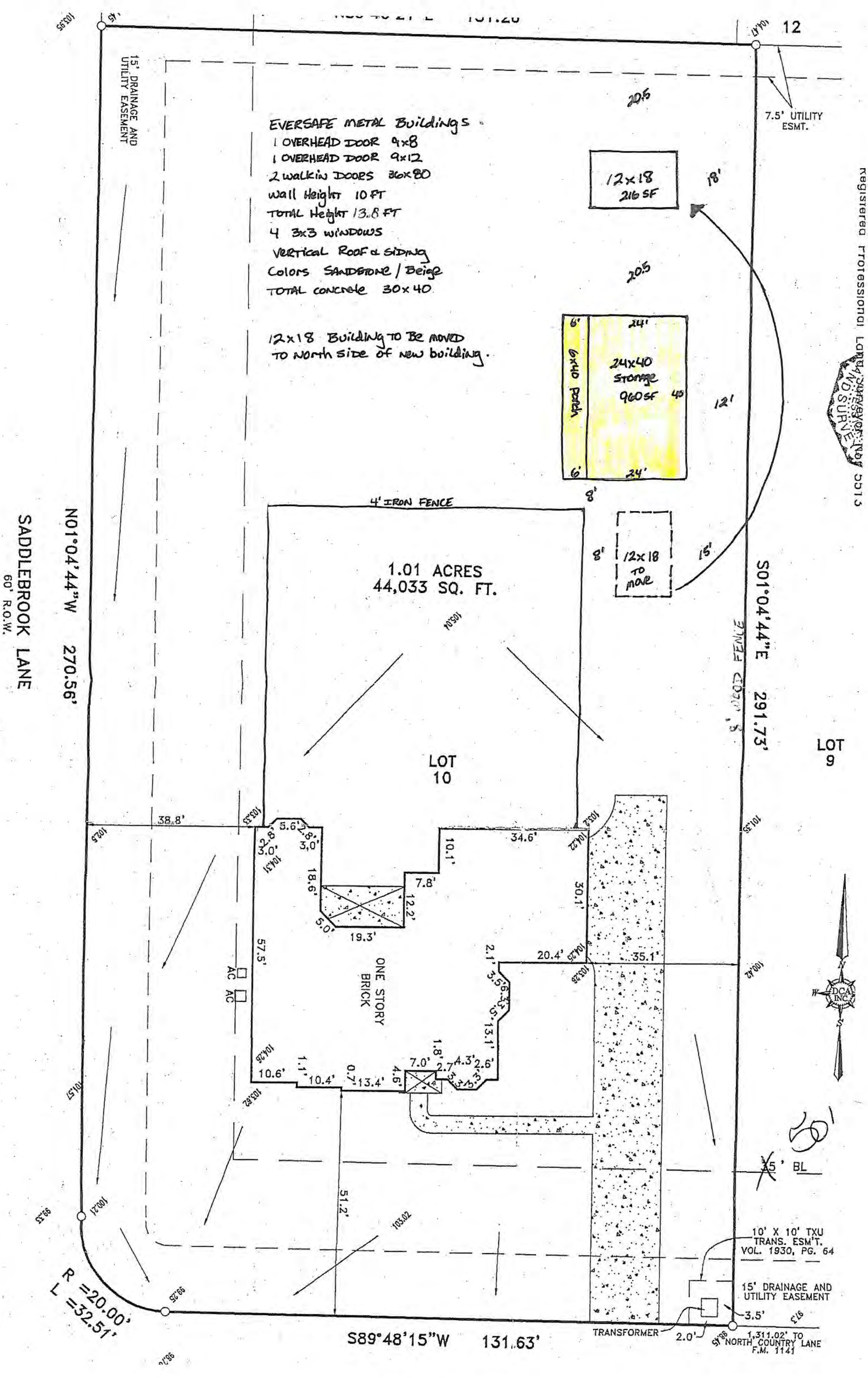
If you need any other information, please call me or email anytime.

Thanks for your time,

Marty and Debra Wright

(214) 717-8203

mwright-1@att.net


EVERSAFE METAL BUILDINGS
1 OVERHEAD DOOR 9x8
1 OVERHEAD DOOR 9x12
2 walkin DOORS 36x80
wall Height 10 FT
TOTAL Height 13.8 FT
4 3x3 windows
Vertical Roof & Siding
Colors SANDSTONE / Beige
TOTAL concrete 30x40
12x18 Building to be moved to north side of new building.
12x18
216 SF
18'
20.5
24x40
Storage
960 SF
6x40 Porch
24'
40
12'
8'
15'
12x18 to move
4' IRON FENCE
1.01 ACRES
44,033 SQ. FT.
LOT 10
LOT 9
12
ONE STORY BRICK
AC
15' DRAINAGE AND UTILITY EASEMENT
7.5' UTILITY ESMT.
N01°04'44"W 270.56'
S01°04'44"E 291.73'
SADDLEBROOK LANE
60' R.O.W.
S89°48'15"W 131.63'
R =20.00'
L =32.51'
35' BL
10' X 10' TXU TRANS. ESM'T. VOL. 1930, PG. 64
15' DRAINAGE AND UTILITY EASEMENT
TRANSFORMER
1,311.02' TO NORTH COUNTRY LANE F.M. 1141
38.8'
34.6'
35.1'
20.4'
57.5'
51.2'
19.3'
10.6'
10.4'
13.4'
7.0'
30.1'
13.1'
12.2'
18.6'
7.8'
10.1'

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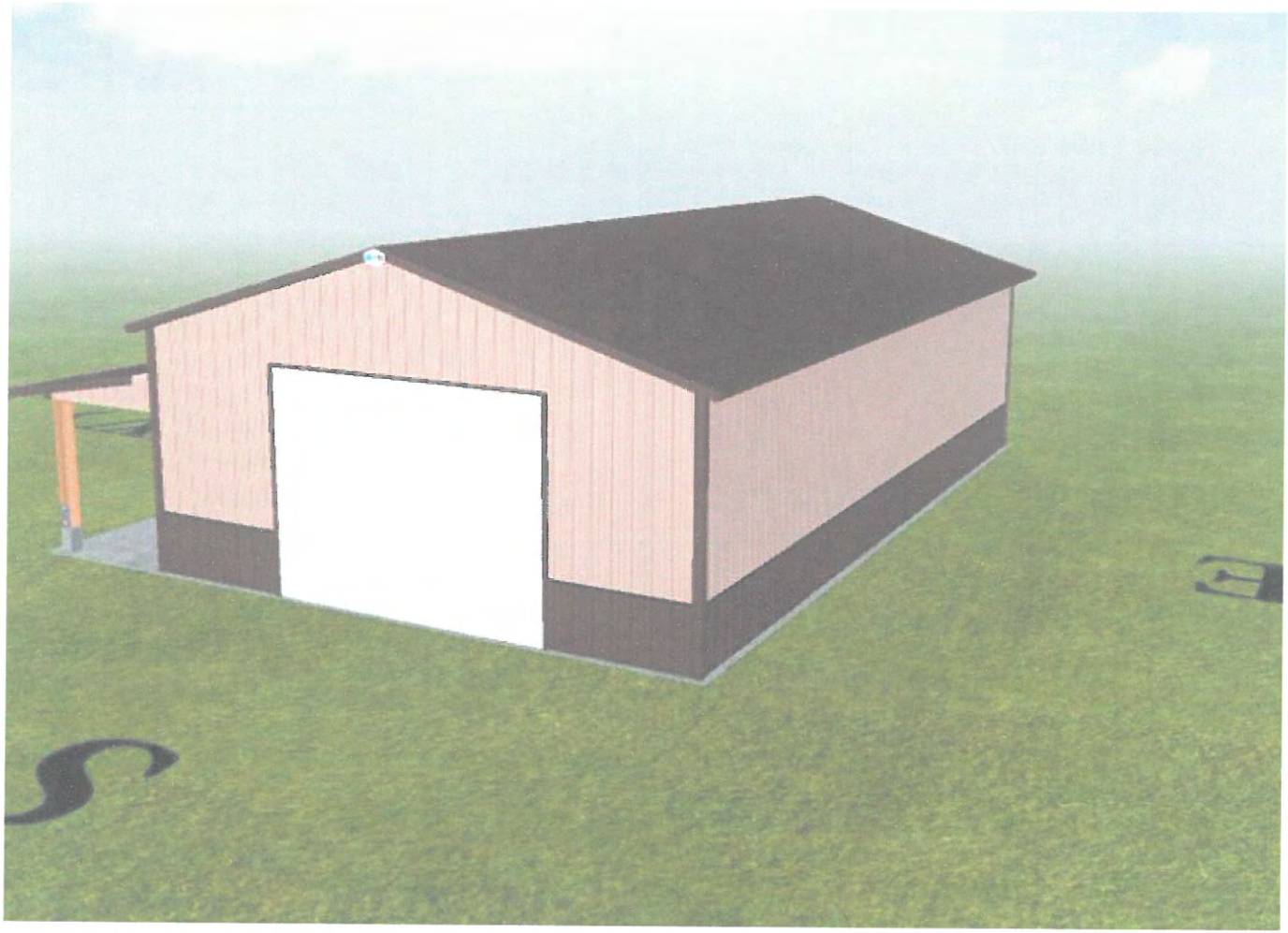

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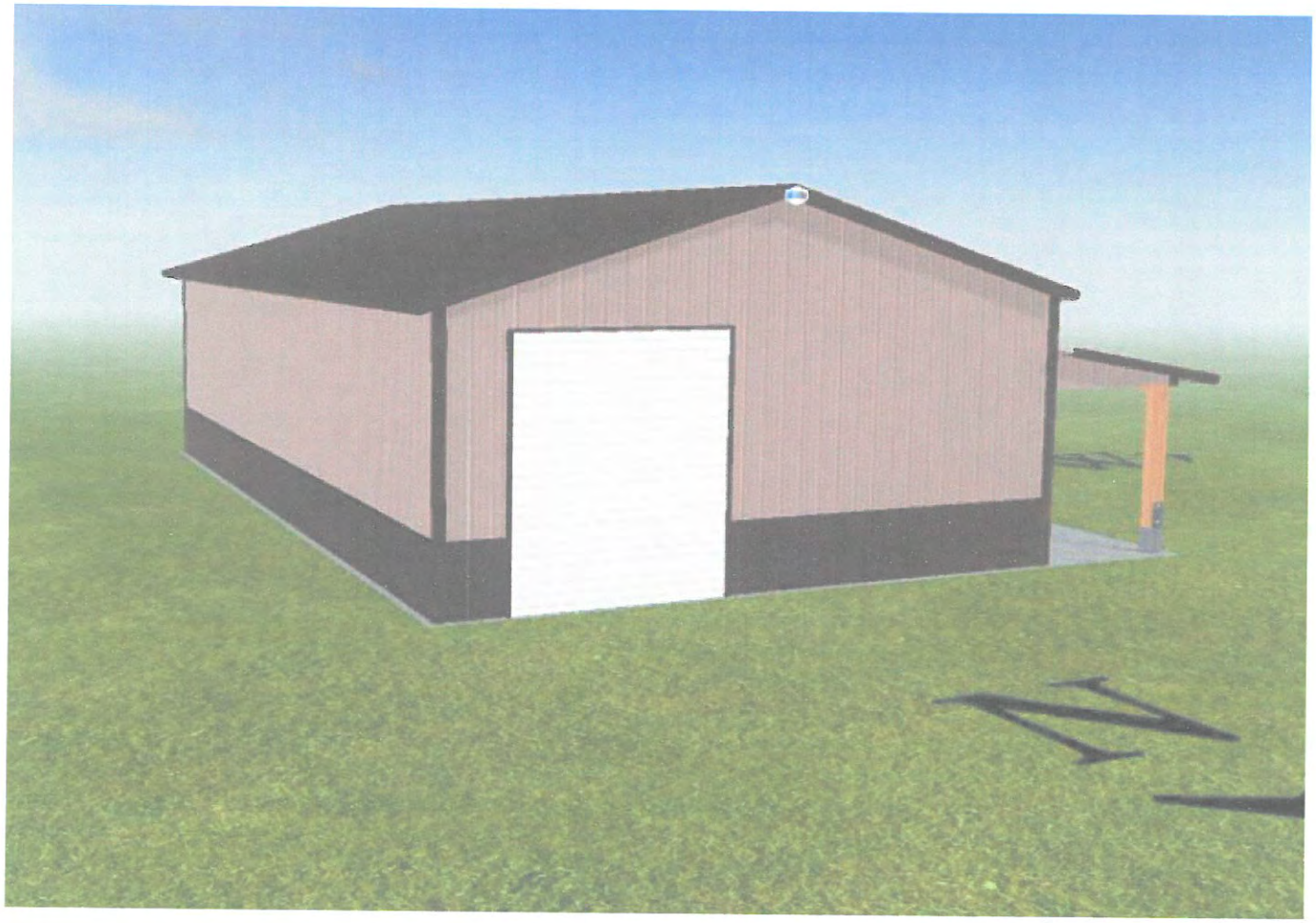

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Building Colors

Eversafe Steel Buildings offers a variety of standard colors for your steel building. You can select from 13 different colors for the roof, the sides and the trim. Make your choices from the selections below:

*Colors shown represent finish colors as accurately as possible, however color may vary slightly on actual building. Due to monitor and screen variations on different devices, digital depictions of colors may vary. Not all colors are available in every state and colors may vary by state. Non-standard colors, color matching and two-tone wall color wainscoting available in certain states. Please ask your representative for details.

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Eversafe steel building quote

From: Bob Fuerstenau (bfuerstenau@eversafebuildings.com)

To: mwright-1@att.net

Date: Thursday, September 12, 2019, 9:44 AM CDT

Hi Marty,

Here is the updated quote for the new building size we spoke about. Let me know if you need anything else.

Thanks,

Bob Fuerstenau
Regional Account Manager

EVERSAFE

Eversafe Buildings
A Longlife Steel Buildings company
Phone 1-800-374-7106 x387
Fax 1-866-609-5390
bfuerstenau@eversafebuildings.com
http://www.eversafebuildings.com/

Eversafe Steel Building Proposal (Marty Wright 24x40x10 with 6x40 lean to).pdf
167.9kB

image011.png
487.3kB

EVERSAFE
BUILT SAFE BUILT STRONG BUILT TO LAST
A Longlife Steel Buildings company

STEEL BUILDING PROPOSAL

EVERSAFE BUILDINGS | 3415 CUSTER RD. SUITE 101 | PLANO, TX 75023
PH: 1-800-374-7106 | FAX: 1-800-374-4694 | WWW.EVERSAFEBUILDINGS.COM

CUSTOMER:
Marty Wright

DATE:
9/12/2019

ADDRESS:
TBD

CITY/STATE:
Rockwall, TX

ZIP:
75087

COUNTY:
Rockwall

PHONE:
(214) 717-8203

E-MAIL:
mwright-1@att.net

BUILDING TYPE:
Garage

ROOF SIZE:
24' x 41'

BUILDING SIZE:
24' x 40'

WALL HEIGHT:
10'

ROOF PITCH:
3/12

ROOF TYPE:
Upgraded Vertical Roof With 6" Overhang

FRAME TYPE:
Heavy Duty 14 Gauge Galvanized Steel

FRAME SPACING:
5' On Center

SHEETING TYPE:
Heavy Duty 29 Gauge Galvanized Steel

CERTIFICATION:
140 mph/30 psf

QUANTITY	DESCRIPTION
	BUILDING DETAILS
	24' x 40' x 10' Garage
2	Upgraded Vertical Sidewalls
1	Full End - Upgraded Vertical Sheeting
1	Full End - Upgraded Vertical Sheeting
	Upgraded Vertical Roof With 6" Overhang (Vertical Roof Includes Hat Channels & Ridge Cap)
	LEAN-TO BUILDING DETAILS
1	6' x 40' x 8' Roof Only Lean-To (2/12 Pitch Roof)
1	Sidewall (No Sheeting) - Includes Sidewall Hat Channels
	Upgraded Vertical Roof With 6" Overhang
	ACCESSORIES
1	9' x 8' Heavy Duty Lockable Roll Up Door
1	12' x 9' Heavy Duty Lockable Roll Up Doors (With Chain Hoist)
2	Header Seal for Roll Up Door
2	Heavy Duty Walk Doors With Keyed Lock - 36" x 80" (Solid)
4	30" x 30" Single Hung Windows
	Concrete Anchors
Roof Only	1/4 Inch Double Bubble Insulation (R10.1) - $1,040.00 (Option-Not included in price below)
1	Fee to Connect Lean-To To Main Building
	Foam Enclosures - Ridge and Eaves
	MISCELLANEOUS
	Certified Building
	Generic Stamped Drawings
	FREE DELIVERY TO JOBSITE
	FREE INSTALLATION ON YOUR PAD

12 MONTH WORKMANSHIP WARRANTY ON BUILDING INSTALLATION
20 YEAR RUST THROUGH WARRANTY ON FRAMING MATERIALS
10 YEAR WARRANTY ON SHEETING

Note: Discount Good Until:
9/19/2019

Building Price (Before Discount)	$14,827.50
Discount	-$1,482.75
Miscellaneous	$0.00
BUILDING PRICE (AFTER DISCOUNT)	**$13,344.75**
Sales Tax (6.75%)	$900.77
Drawings	$0.00
Total	$14,245.52
Due Now**	$2,135.16
Remaining Balance after "Due Now" paid (COD)	$12,110.36

PREPARED BY:
Bob Fuerstenau

*Note: Roll up doors installed on the eave side of the building will require a header for an additional fee.

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Concrete Specifications

From: Bob Fuerstenau (bfuerstenau@eversafebuildings.com)

To: mwright-1@att.net

Date: Friday, September 6, 2019, 10:41 AM CDT

Marty,

The concrete slab that we recommend should be/have:

- 4" thick ***(minimum)*** w/ a 12"x12" continuous footer
- same exact dimensions as your building frame (e.g. 24'x35')**
- 2,500 PSI concrete ***(minimum)***
- two #5 rebar continuous
- NO wet-set anchors (anchors will be provided at installation)

**If pulling a permit using our generic engineer-stamped drawings, foundation should be 5 5/8" wider than the building frame with a ¾" step down all around.

This e-mail is strictly for the purposes of budgeting and obtaining estimates. Please do not use the information herein as sole guidelines for pouring concrete slab.

Let me know if you have any questions or concerns.

Sincerely,

Bob Fuerstenau

Regional Account Manager

EVERSAFE

Eversafe Buildings

A Longlife Steel Buildings company

Phone 1-800-374-7106 x387

CITY OF ROCKWALL

ORDINANCE NO. 19-XX

SPECIFIC USE PERMIT NO. S-XXX

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS, AMENDING THE UNIFIED DEVELOPMENT CODE (UDC) [*ORDINANCE NO. 04-38*] OF THE CITY OF ROCKWALL, ROCKWALL COUNTY TEXAS, AS PREVIOUSLY AMENDED, SO AS TO GRANT A SPECIFIC USE PERMIT (SUP) TO ALLOW A *DETACHED GARAGE BUILDING* THAT EXCEEDS THE MAXIMUM ALLOWABLE SIZE ON A ONE (1)-ACRE PARCEL OF LAND, IDENTIFIED AS LOT 10, BLOCK B, SADDLEBROOK ESTATES #2 ADDITION, CITY OF ROCKWALL, ROCKWALL COUNTY, TEXAS; AND MORE SPECIFICALLY DESCRIBED IN *EXHIBIT 'A'* OF THIS ORDINANCE; PROVIDING FOR SPECIAL CONDITIONS; PROVIDING FOR A PENALTY OF FINE NOT TO EXCEED THE SUM OF TWO THOUSAND DOLLARS ($2,000.00) FOR EACH OFFENSE; PROVIDING FOR A SEVERABILITY CLAUSE; PROVIDING FOR A REPEALER CLAUSE; PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the City has received a request from Marty Wright for the approval of a Specific Use Permit (SUP) to allow a *detached garage* that exceeds the maximum allowable size on a one (1)-acre parcel of land being described as Lot 10, Block B, Saddlebrook Estates #2 Addition, City of Rockwall, Rockwall County, Texas, zoned Single-Family 16 (SF-16) District, addressed as 2340 Saddlebrook Lane, and being more specifically depicted in *Exhibit 'A'* of this ordinance, which herein after shall be referred to as the *Subject Property* and incorporated by reference herein; and

WHEREAS, the Planning and Zoning Commission of the City of Rockwall and the governing body of the City of Rockwall, in compliance with the laws of the State of Texas and the ordinances of the City of Rockwall, have given the requisite notices by publication and otherwise, and have held public hearings and afforded a full and fair hearing to all property owners generally, and to all persons interested in and situated in the affected area and in the vicinity thereof, the governing body in the exercise of its legislative discretion has concluded that the Unified Development Code (UDC) [*Ordinance No. 04-38*] of the City of Rockwall should be amended as follows:

NOW, THEREFORE, **BE IT ORDAINED** by the City Council of the City of Rockwall, Texas;

SECTION 1. That the Unified Development Code (UDC) [*Ordinance No. 04-38*] of the City of Rockwall, as heretofore amended, be and the same is hereby amended so as to grant a Specific Use Permit (SUP) allowing a *detached garage* as stipulated by Subsection 7.04, *Accessory Structure Development Standards,* of Section 7, *District Development Standards*, of Article V, *District Development Standards*, the Unified Development Code (UDC) [*Ordinance No. 04-38*] on the *Subject Property*; and,

SECTION 2. That the Specific Use Permit (SUP) shall be subject to the requirements set forth in Subsection 7.04, *Accessory Structure Development Standards*, of Section 7, *District Development Standards,* of Article V, *District Development Standards*, of the Unified

Development Code (UDC) [*Ordinance No. 04-38*] as heretofore amended and as may be amended in the future, and shall be subject to the following:

2.1 OPERATIONAL CONDITIONS

The following conditions pertain to the operation of a *detached garage* on the *Subject Property* and conformance to these conditions are required for continued operations:

1) The detached garage shall generally conform to the concept plan and the conceptual building elevations depicted in *Exhibits 'B'* & *'C'* of this ordinance;

2) The detached garage shall not exceed a maximum size of 1,200 SF;

3) The detached garage shall not exceed an overall height of 15-feet;

4) The subject property shall not have more than two (2) accessory buildings;

2.2 COMPLIANCE

Approval of this ordinance in accordance with Subsection 2.05, City *Council Action*, of Article XI, *Zoning Related Applications,* of the Unified Development Code (UDC) will require compliance to the following:

1) Upon obtaining a building permit, should the homeowner fail to meet the minimum operational requirements set forth herein and outline in the Unified Development Code (UDC), the City Council may (*after proper notice*) initiate proceedings to revoke the Specific Use Permit (SUP) in accordance with Section 2.02.D(3) of Article XI, *Zoning Related Applications*, of the Unified Development Code (UDC).

SECTION 3. That the official zoning map of the City be corrected to reflect the changes in zoning described herein.

SECTION 4. That all ordinances of the City of Rockwall in conflict with the provisions of this ordinance be, and the same are hereby repealed to the extent of that conflict.

SECTION 5. Any person, firm, or corporation violating any of the provisions of this ordinance shall be deemed guilty of a misdemeanor and upon conviction shall be punished by a penalty of fine not to exceed the sum of *TWO THOUSAND DOLLARS ($2,000.00)* for each offence and each and every day such offense shall continue shall be deemed to constitute a separate offense.

SECTION 6. If any section or provision of this ordinance or the application of that section or provision to any person, firm, corporation, situation or circumstance is for any reason judged invalid, the adjudication shall not affect any other section or provision of this ordinance or the application of any other section or provision to any other person, firm, corporation, situation or circumstance, and the City Council declares that it would have adopted the valid portions and applications of the ordinance without the invalid parts and to this end the provisions of this ordinance shall remain in full force and effect.

SECTION 7. That this ordinance shall take effect immediately from and after its passage.

PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS, THIS THE 4TH DAY OF NOVEMBER, 2019.

369

Jim Pruitt, *Mayor*

ATTEST:

Kristy Cole, *City Secretary*

APPROVED AS TO FORM:

Frank J. Garza, *City Attorney*

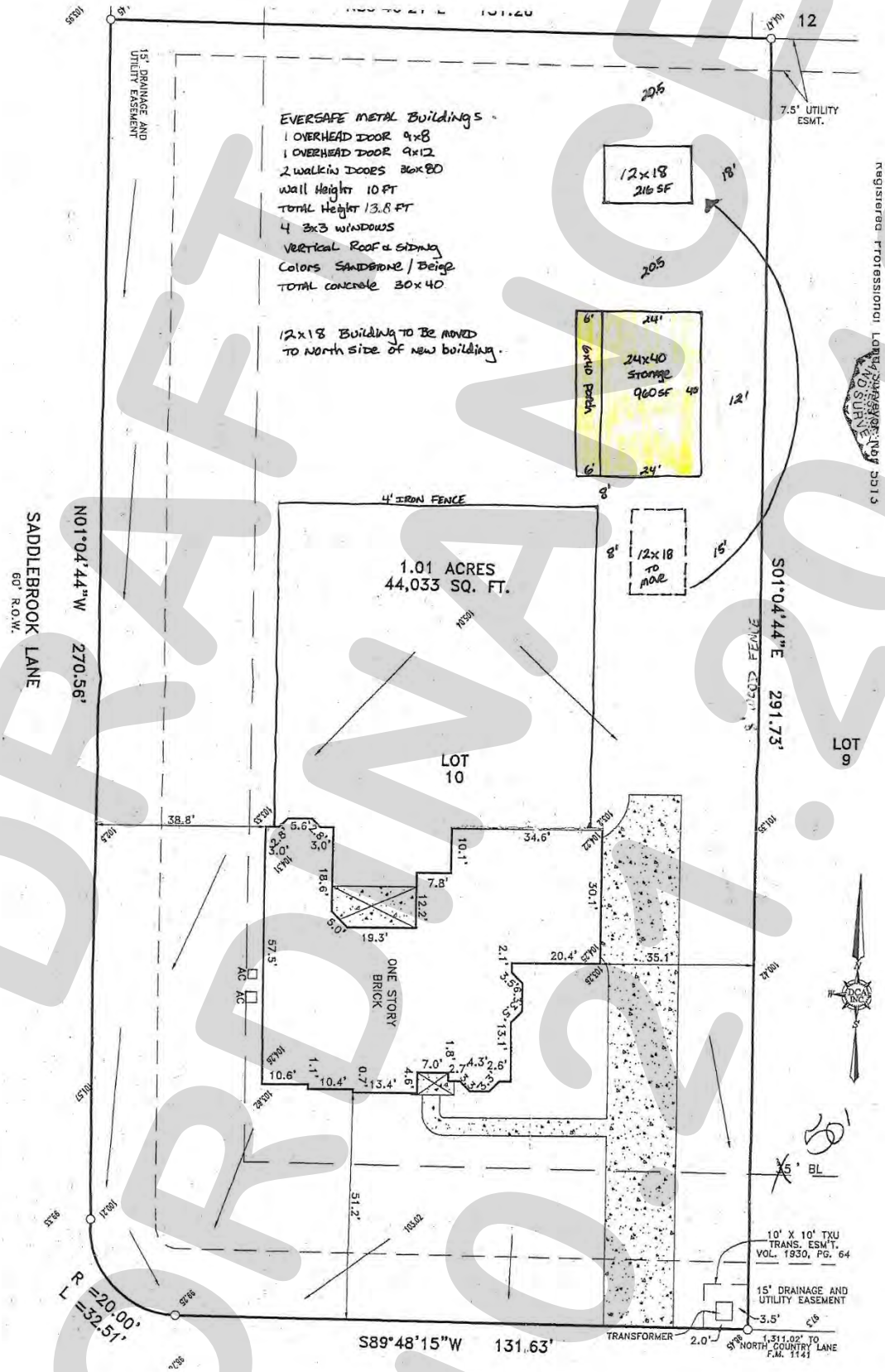
1st Reading: *October 24, 2019*

2nd Reading: *November 4, 2019*

370

Address: *2340 Saddlebrook Lane*
Legal Description: *Lot 10, Block B, Saddlebrook Estates #2 Addition*

371



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CITY OF ROCKWALL

CITY COUNCIL CASE MEMO

PLANNING AND ZONING DEPARTMENT
385 S. GOLIAD STREET • ROCKWALL, TX 75087
PHONE: (972) 771-7745 • EMAIL: PLANNING@ROCKWALL.COM

TO:	Mayor and City Council
DATE:	10/21/2019
APPLICANT:	Adam Buczek; *Stone Creek Balance, LTD*
CASE NUMBER:	Z2019-024; *Amendment to Planned Development District 70 (PD-70)*

SUMMARY

Hold a public hearing to discuss and consider a request by Adam Buczek of Stone Creek Balance, LTD for the approval of a zoning amendment to Planned Development District 70 (PD-70) for the purpose of changing the number of hard-edged retention ponds required for the residential subdivision being a ~336.00-acre tract of land identified as the Stone Creek Subdivision and being situated within the W. T. Deweese Survey, Abstract No. 71 and the S. King Survey, Abstract No 131, City of Rockwall, Rockwall County, Texas, zoned Planned Development District 70 (PD-70) for Single-Family 10 (SF-10) District land uses, situated within the North SH-205 Overlay (N. SH-205 OV) and SH-205 By-Pass Overlay (SH-205 BY-OV) Districts, generally located at the southeast corner of the intersection of FM-552 and SH-205 [*N. Goliad Street*], and take any action necessary.

BACKGROUND

The subject property was annexed into the City by four (4) different ordinances: [*1*] *Ordinance No. 61-01* on February 6, 1961, [*2*] *Ordinance No. 61-02* on February 6, 1961, [*3*] *Ordinance No. 86-37* on May 19, 1986, and [*4*] *Ordinance No. 98-10* on March 16, 1998. On October 18, 2004, the City Council denied a preliminary plat [*Case No. P2004-046*] that proposed establishing 1,519 single-family lots on a 405.29-acre property situated within the City's extraterritorial jurisdiction, and that would later become the Breezy Hill Subdivision. After three (3) years of litigation over this case, Richard Skorburg of the Skorburg Company submitted two (2) development agreements covering both the subject property and the 405.29-acre property covered by the 2004 preliminary plat request. In addition, a request to rezone the subject property from an Agricultural (AG) District to a Planned Development District for General Retail (GR) District and Single Family 10 (SF-10) District land uses was submitted. This request [*i.e. Z2007-006 and the development agreements*] was approved by the City Council on April 2, 2007 by *Ordinance No. 07-13*, which established Planned Development District 70 (PD-70) in accordance with the approved development agreement. Planned Development District 70 (PD-70) would later be amended twice [*i.e. Ordinance No.'s 09-44 & 11-35*] both times to increase the amount of land zoned for General Retail (GR) District land uses at the southwestern corner of the Planned Development (PD) District (*i.e. adjacent to the Walgreens Pharmacy*).

At the time of establishment Planned Development District 70 (PD-70) permitted 918 single-family homes that had lot sizes that ranged from 50' x 120' to 100' x 200'. As of today, the Skorburg Co. has established 768 of the permitted 918 single-family lots, and has submitted a final plat (*i.e. P2019-035 -- which was withdrawn by the applicant with the intent of resubmitting the case at the conclusion of this zoning case*) proposing an additional 118 single-family lots. This means that the total development will include 886 single-family lots, or 32 lots less than the maximum permitted by Planned Development District 70 (PD-70). In addition, the original site plan included a location for a fire station (*i.e. presently Fire Station #7*), a school site (*i.e. Rockwall Elementary No. 15 -- currently under construction*), and private open space areas. In 2014, the Skorburg Co. and the City agreed to the establishment of a 11.35-acre public park at the northwest corner of Featherstone Drive and John King Boulevard.

PURPOSE

On September 13, 2019, the applicant submitted an application requesting to amend Planned Development District 70 (PD-70) [*Ordinance No.'s 09-44 & 11-35*] for the purpose of reducing the number of required hard edged retention ponds from four (4) ponds to three (3) ponds. Additionally, the applicant has submitted a letter stating an intent to provide an additional fountain feature for the existing retention pond located adjacent to York Street.

ADJACENT LAND USES AND ACCESS

The subject property is located at the southeast corner of the intersection of FM-552 and SH-205 [*N. Goliad Street*]. The land uses adjacent to the subject property are as follows:

North: Directly north of the subject property is FM-552, which is identified as TXDOT4D (*i.e. TXDOT, four [4] lane, divided roadway*) on the City's Master Thoroughfare Plan. Beyond this is the corporate boundaries for the City of Rockwall.

South: Directly south of the *subject property* is E. Quail Run Road, which is identified as a M4D (*i.e. major collector, four [4] lane, divided roadway*) on the City's Master Thoroughfare Plan. Beyond this is Planned Development District 5 (PD-5), which is zoned for Single Family 7 (SF-7) District land uses and consists of ~539.00-acres.

East: Directly east of the *subject property* is J. W. Williams Middle School, which is situated on a 25.569-acre tract of land zoned Single-Family 16 (SF-16) District. Continuing along the eastern boundary of PD-70 are several parcels of land zoned Agricultural (AG) District, and Planned Development District 79 (PD-79) for Single-Family 10 (SF-10) District land uses. Beyond this is John King Boulevard, which is identified as a M4D (*i.e. major collector, four [4] lane, divided roadway*) on the City's Master Thoroughfare Plan.

West: Directly west of the *subject property* is N. Goliad Street, which is identified as a M4D (*i.e. major collector, four [4] lane, divided roadway*) on the City's Master Thoroughfare Plan. Beyond this are several properties that are zoned Single-Family 16 (SF-16) District, Planned Development District 37 (PD-37), Agricultural (AG) District, Single-Family Estate (SFE-1.5) District, and Planned Development District 3 (PD-3). These areas include a mix of land uses, but are primarily residential.

CHARACTERISTICS OF THE REQUEST

Planned Development District 70 (PD-70) [*Ordinance No. 09-44*] -- *in accordance with the original development agreement* -- requires the developer to provide a minimum of four (4) retention ponds with hard edges and fountain features. According to the ordinance, the location and configuration of the proposed ponds is to be determined at the time of development. Currently, the developer has constructed three (3) of the four (4) ponds required by Planned Development District 70 (PD-70): [*1*] the first pond is located at the northeast corner of the intersection of N. Goliad Street [*SH-205*] and Featherstone Drive (*i.e. at the entry to the subdivision*), [*2*] the second pond located south of and adjacent to homes along Crestbrook Drive, and [*3*] the third pond located within the public park located at the northwest corner of Featherstone Drive and John King Boulevard. The pond at the entryway to the subdivision is the only pond that incorporates both a hardedge and a fountain feature. The pond located south of and adjacent to Crestbrook Drive only incorporates a hardedge, and the pond in the public park does not incorporate either a hardedge or a fountain; however, this pond was exempted by the City to make the park eligible for matching grants through the State of Texas, which were applied to increase the amenity of the park. The applicant has requested to change the language in the Planned Development District 70 (PD-70) to reduce the number of ponds from three (3) to four (4) ponds, and has agreed to incorporate a fountain feature in the pond adjacent to Crestbrook Drive and another in a secondary pond along York Street. This means that the only thing the applicant is lacking to meet the

current requirements would be a hardedge along the pond located adjacent to York Street; however, staff should point out that this pond is located within the 100-year floodplain and is not highly visible from the street. The applicant has stated the reason for the request is tied to the lengthy and indefinite permitting process required by the Texas Commission on Environmental Quality (TCEQ), and a desire to *not* put an additional cost burden on the Stone Creek Homeowner's Association (HOA).

As has been done with past requests to amend Planned Development (PD) District ordinances, staff has consolidated the two (2) regulating ordinances into one (1) regulating ordinances; however, the only change made in the attached draft ordinance is to the verbiage relating to the number of retention ponds permitted within the development.

INFRASTRUCTURE

There are no infrastructure requirements associated with the proposed amendment. In addition, staff should point out that the additional retention pond is not needed to meet the stormwater detention requirements, as the retention ponds were not accounted for in the required detention for the subdivision (*i.e. the development was required to provide detention in other areas of the subdivision to meet the City's engineering requirements*).

CONFORMANCE WITH THE CITY'S CODES

Since the request is only tied to a requirement of Planned Development District 70 (PD-70), the request remains in compliance with all of the requirements of the City's codes.

CONFORMANCE WITH OURHOMETOWN VISION 2040 COMPREHENSIVE PLAN

The proposed request does not change any of the land uses permitted within Planned Development District 70 (PD-70), and as a result does not have an impact on the City's Future Land Use Map. In addition, the request does not relate to any of the specific goals, policies, or strategies contained within the OURHometown Vision 2040 Comprehensive Plan.

NOTIFICATIONS

On September 20, 2019, staff mailed 928 notices to property owners and residents within 500-feet of Planned Development District 70 (PD-70). Staff also emailed notices to the Quail Run Valley, Lakeview Summit, Random Oaks, and Rockwall Shores Homeowner's Associations (HOA's), which are the only HOA's located within 1,500-feet of Planned Development District 70 (PD-70) participating in the *Neighborhood Notification Program*. Additionally, staff posted a sign adjacent to the subject property along N. Goliad Street [*SH-205*], and advertised the public hearings in the Rockwall Herald Banner as required by the Unified Development Code (UDC). At the time this case memo was drafted, staff had received four (4) notices, three (3) online forms, & twelve (12) emails in favor of the request, and four (4) notices, one (1) online form, & five (5) emails opposed to the request.

CONDITIONS OF APPROVAL

If the City Council chooses to approve the applicant's request to amend Planned Development District 70 (PD-70), then staff would propose the following conditions of approval:

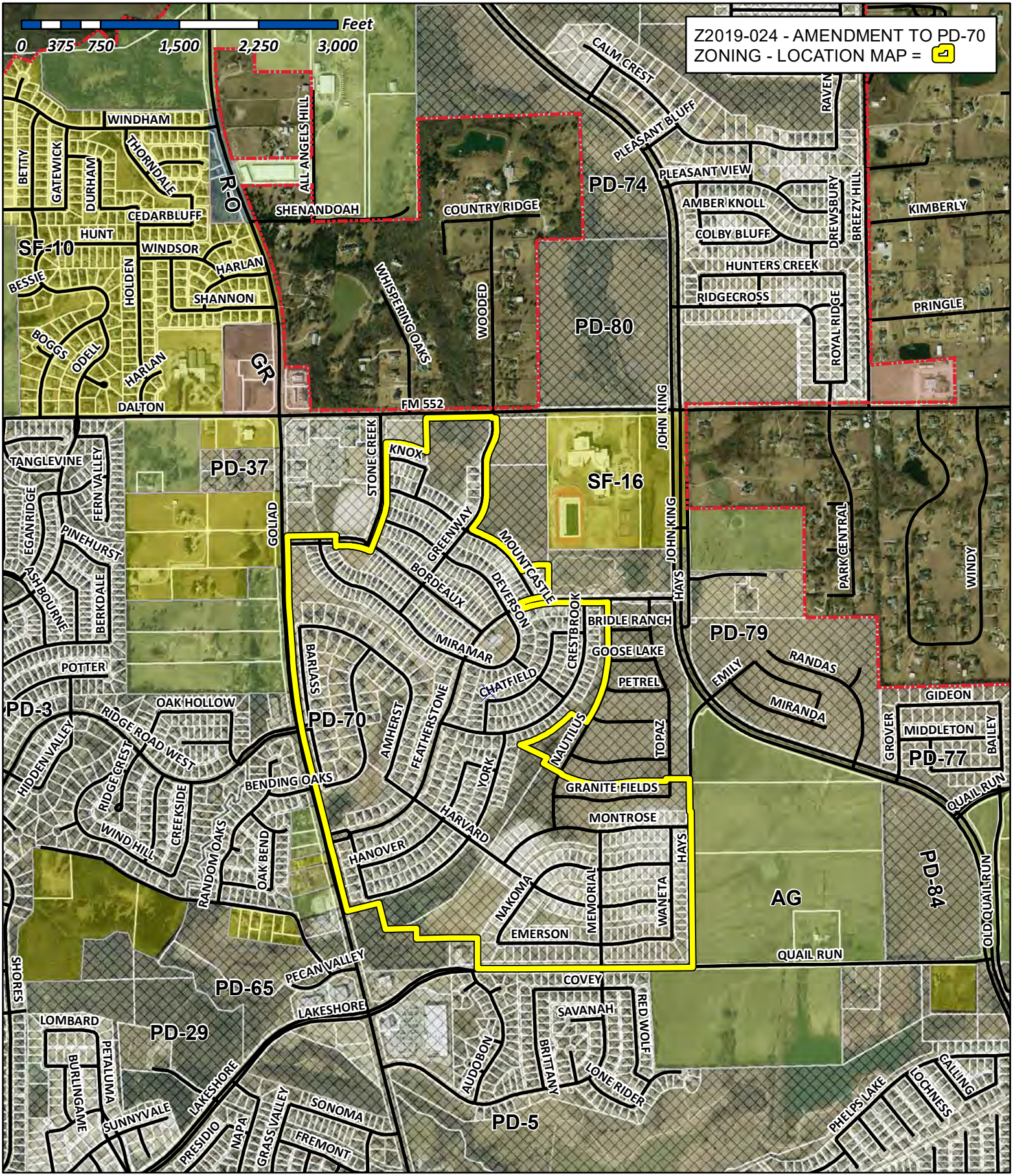
(1) The applicant shall be responsible for maintaining compliance with the conditions contained within the Planned Development District ordinance;

(2) Any construction resulting from the approval of this zoning amendment shall conform to the requirements set forth by the Unified Development Code (UDC), the International Building Code (IBC), the Rockwall Municipal Code of Ordinances, city adopted engineering and fire codes and

with all other applicable regulatory requirements administered and/or enforced by the state and federal government.

PLANNING AND ZONING COMMISSION

On October 8, 2019, the Planning and Zoning Commission's motion to recommend approval of the amendment to Planned Development District 70 (PD-70) with staff conditions passed by a vote of 5 to 2, with Commissioners Welch and Thomas dissenting.



City of Rockwall

Planning & Zoning Department
385 S. Goliad Street
Rockwall, Texas 75032
(P): (972) 771-7745
(W): www.rockwall.com

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City of Rockwall

Planning & Zoning Department
385 S. Goliad Street
Rockwall, Texas 75087
(P): (972) 771-7745
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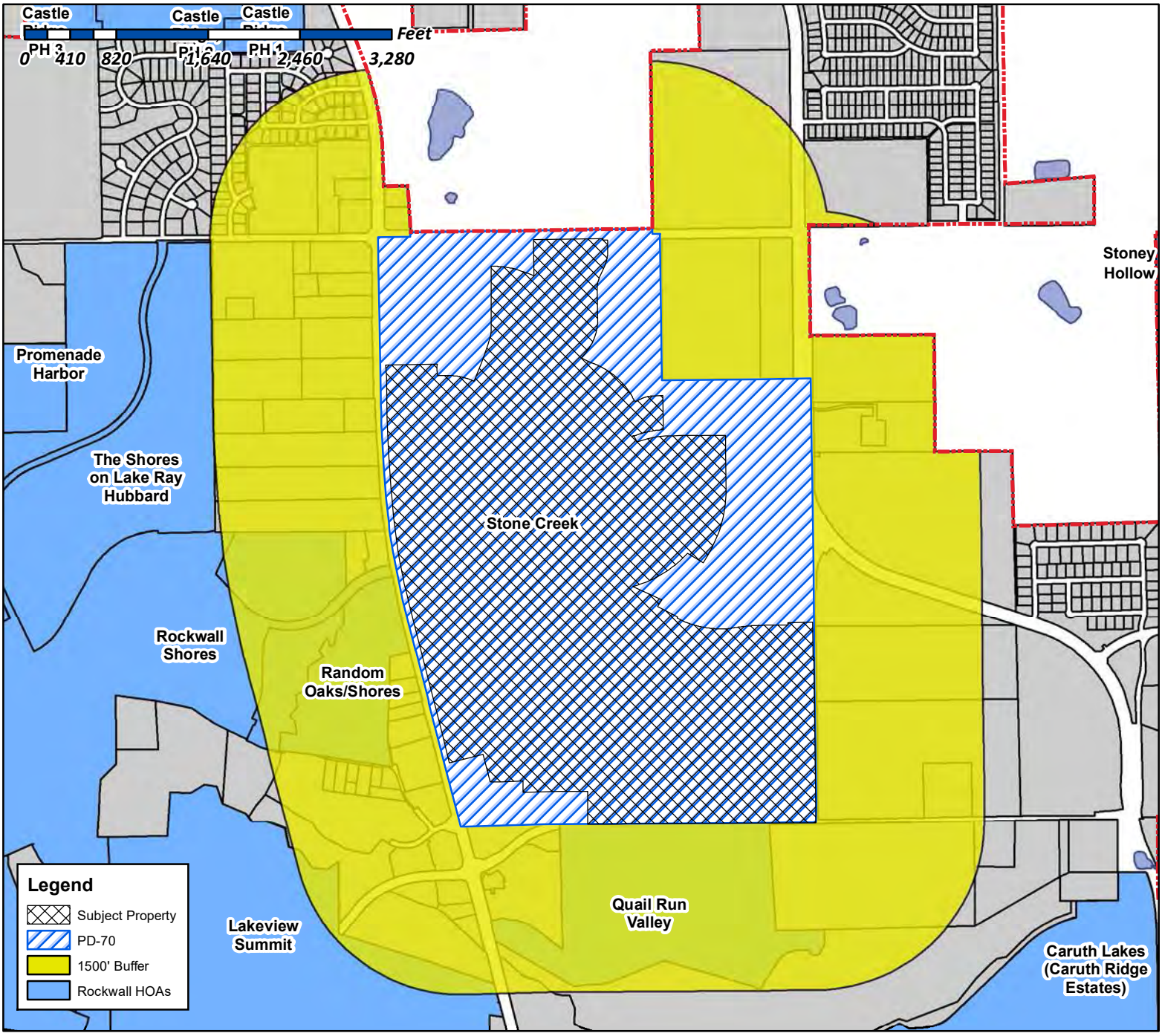
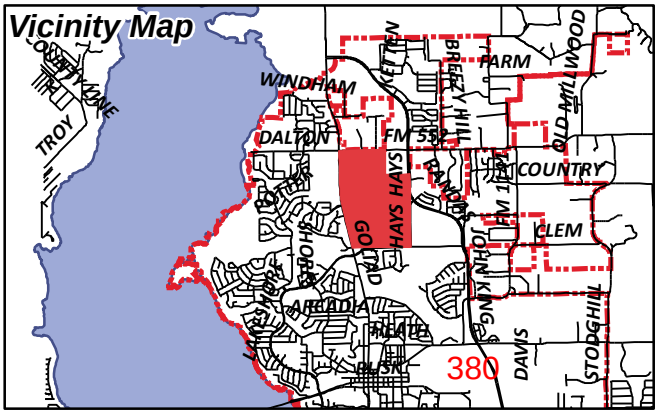


Case Number: Z2019-024
Case Name: Amendment to PD-70
Case Type: Zoning
Zoning: Amendment to PD-70
Case Address: S/E Corner of FM 552 & SH 205

Date Created: ***9/16/2019***
For Questions on this Case Call (972) 771-7745



Gonzales, David

From: Morales, Laura
Sent: Friday, September 20, 2019 4:47 PM
To: [redacted]
Cc: Miller, Ryan; Gonzales, David; Brooks, Korey
Subject: Neighborhood Notification Program: Notice of zoning request
Attachments: Z2019-024 HOA Map.pdf; PUBLIC NOTICE.pdf

To whom it may concern:

Per your participation in the Neighborhood Notification Program, you are receiving this notification to inform your organization and residents of a request for a zoning change that lies within 1,500 feet of the boundaries of your neighborhood or subdivision. As the primary contact for the organization, you are encouraged to share this information with the residents of your subdivision. Please find attach ed a map detailing the location of the subject property requesting the zoning change in relation to your subdivision boundaries. Additionally, below is a summary of the zoning request that was published in the Rockwall Herald Banner ***September 20, 2019***. The Planning and Zoning Commission will hold a public hearing on ***Tuesday 10/8/2019 at 6:00 p.m.***, and the City Council will hold a public hearing on ***Monday 10/21/2019 at 6:00 p.m***. These hearings will be held in the City Council Chambers at City Hall, 385 S. Goliad Street. These hearings will be held in the City Council Chambers at City Hall, 385 S. Goliad Street. If you have any questions or comments regarding this request, the contact information for the Planning Department is listed below. Additional information can also be found at https://sites.google.com/site/rockwallplanning/development/development-cases

> **Z2019-024- Hold a public hearing to discuss and consider a request by Adam Buczek of Stone Creek Balance, LTD for the approval of a zoning amendment to Planned Development District 70 (PD-70) for the purpose of changing the number of hard-edged retention ponds required for the residential subdivision being a ~336-acre tract of land identified as the Stone Creek Subdivision and being situated within the W. T. Deweese Survey, Abstract No. 71 and the S. King Survey, Abstract No 131, City of Rockwall, Rockwall County, Texas, zoned Planned Development District 70 (PD-70) for Single-Family 10 (SF-10) District land uses, situated within the North SH-205 Overlay (N. SH-205 OV) and SH-205 By-Pass Overlay (SH-205 BY-OV) Districts, generally located at the southeast corner of the intersection of FM-552 and SH-205 [N. Goliad Street], and take any action necessary.**

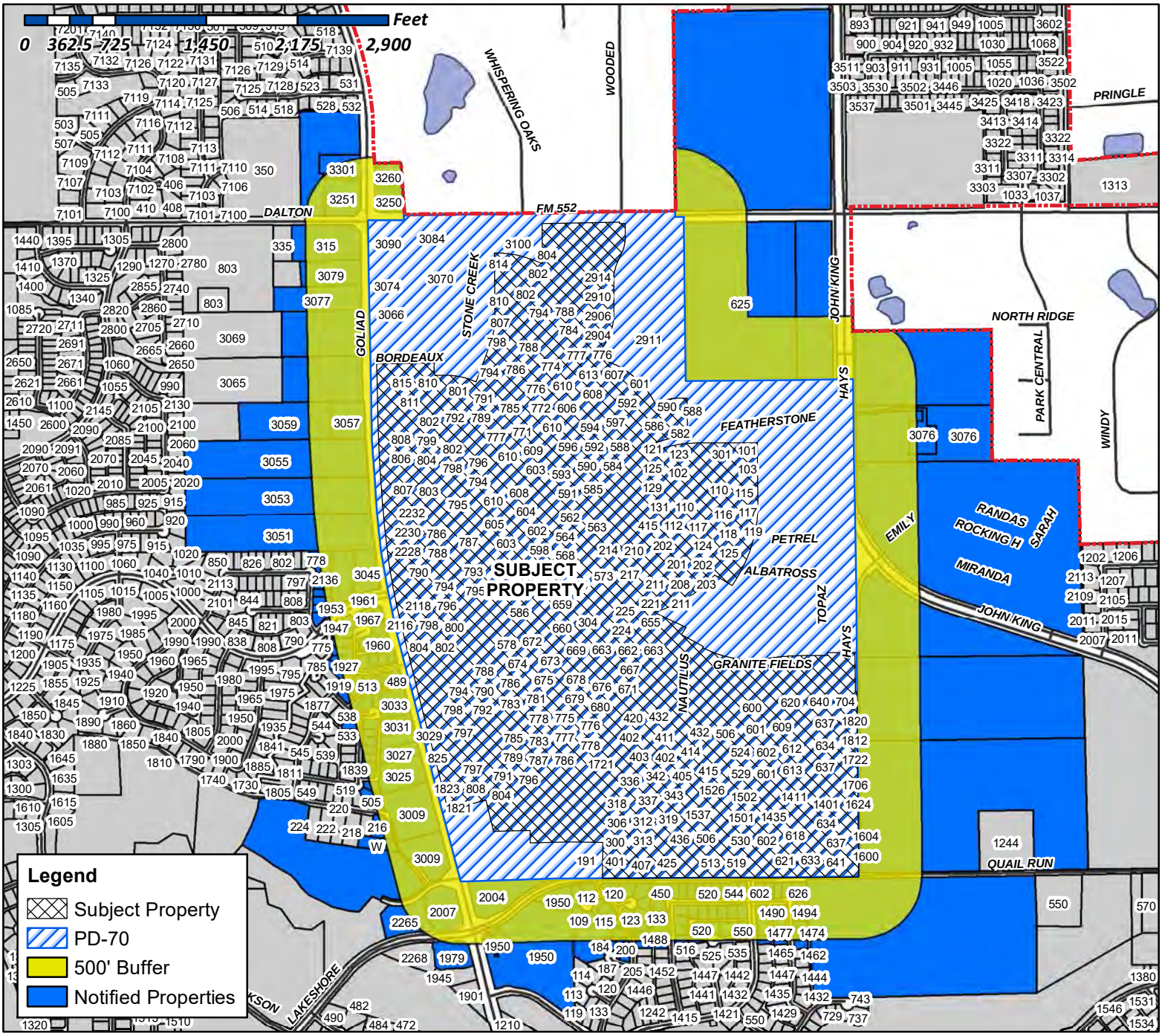
If this email is reaching you in error, please forward it to your HOA or neighborhood group representative and update the contact information at http://www.rockwall.com/planning/hoa.asp.

Sincerely,

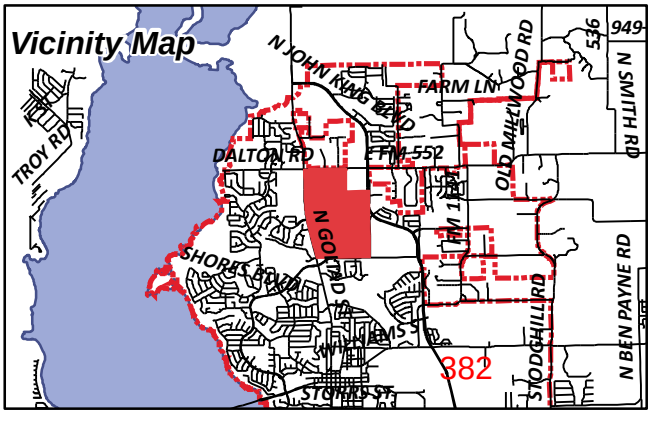
Laura Morales
Planning & Zoning Coordinator
City of Rockwall Planning & Zoning Department
972-771-7745 | 972-772-6438
Lmorales@rockwall.com | http://www.rockwall.com/planning/

City of Rockwall

Planning & Zoning Department
385 S. Goliad Street
Rockwall, Texas 75087
(P): (972) 771-7745
(W): www.rockwall.com



Case Number: Z2019-024
Case Name: Amendment to PD-70
Case Type: Zoning
Zoning: Amendment to PD-70
Case Address: Near S/E Corner of FM 552 & SH 205



Date Created: ***9/16/2019***
For Questions on this Case Call (972) 771-7745

CHIZZONITE CAROL AND RALPH
101 CRESTBROOK DR
ROCKWALL, TX 75087

KROGER TEXAS LP
1014 VINE STREET
CINCINNATI, OH 45202

PARKS ROBERT
102 CHATFIELD
ROCKWALL, TX 75087

ROCKWALL STONE CREEK ESTATES
HOMEOWNERS ASSOCIATION INC
C/O NEIGHBORHOOD MANAGEMENT INC
1024 S GREENVILLE AVE SUITE 230
ALLEN, TX 75002

SENSOY CENK AND MARNI
103 CRESTBROOK DR
ROCKWALL, TX 75087

CECIL CHARLES R & ASHLEY M
104 CHATFIELD DRIVE
ROCKWALL, TX 75087

SHAW KIM A & BETH ANN
105 CHATFIELD DRIVE
ROCKWALL, TX 75087

HERRON HOLLY AND JORDAN
105 CRESTBROOK DR
ROCKWALL, TX 75087

ROCKWALL INDEPENDENT SCHOOL DISTRICT
1050 WILLIAMS ST
ROCKWALL, TX 75087

GIDEON CHRISTOPHER M & KIM
106 CHATFIELD DR
ROCKWALL, TX 75087

WATTS KEVIN C & MELODIE
106 PECAN DRIVE
ROCKWALL, TX 75087

MOHOTTIGE SHAMANI CHAMPIKA
106 SUNBIRD LN
SUNNYVALE, TX 75182

CARRAZCO JUAN B & MIRIAN
107 CHATFIELD DRIVE
ROCKWALL, TX 75087

SATLER GARY THOMAS AND MICHELLE LYNN
107 CRESTBROOK DR
ROCKWALL, TX 75087

CAMPION THOMAS R
108 CHATFIELD DR
ROCKWALL, TX 75087

REEG STEPHEN A & AMY N
109 CHATFIELD DR
ROCKWALL, TX 75087

VO KIMBERLY TRAN AND ADAM
109 CRESTBROOK DR
ROCKWALL, TX 75087

TRAN KHANH-LINH
109 CRESTBROOK DRIVE
ROCKWALL, TX 75087

HAMPTON GEORGE T & BRENDA J
109 REGAL BLF
ROCKWALL, TX 75087

ZUBIK JASON FOSTER
110 CHATFIELD DRIVE
ROCKWALL, TX 75087

WANLESS ERIC & EILEEN
110 CRESTBROOK DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
111 CRESTBROOK DR
ROCKWALL, TX 75087

LEUGERS CHESTER THOMAS & DANI LYNN
111 CHATFIELD DRIVE
ROCKWALL, TX 75087

MACKEY EVA M
112 CHATFIELD DR
ROCKWALL, TX 75087

BOLES STEVEN LEE JR AND TINA R
112 CRESTBROOK DR
ROCKWALL, TX 75087

RHODES KYLE W AND REBECCA
112 REGAL BLUFF
ROCKWALL, TX 75087

STEPHENSON ROSS J
113 CHATFIELD DR
ROCKWALL, TX 75087

FREEMAN BENJAMIN AND DESIREE
113 CRESTBROOK DR
ROCKWALL, TX 75087

ZAHARA MARK WAYNE AND JENNIFER M
114 CRESTBROOK DR
ROCKWALL, TX 75087

NORWOOD BRYAN CLARK AND JENNIFER ANN
115 CHATFIELD DR
ROCKWALL, TX 75087

383

HAYNES ANTHONY
115 CRESTBROOK DR
ROCKWALL, TX 75087

HOWLETT NEVA RAE
115 REGAL BLUFF
ROCKWALL, TX 75087

THOMAS SAMSON N & LINDA R
1150 POTTER AVE
ROCKWALL, TX 75087

ERVIN RICHARD L
1155 W WALL ST STE 101
GRAPEVINE, TX 76051

KUMAR MINU & NITEN
116 CRESTBROOK DRIVE
ROCKWALL, TX 75087

REED RICHARD R AND LINDA S
117 CHATFIELD DR
ROCKWALL, TX 75087

WAGNER PHILLIP AND ALLISON
117 CRESTBROOK DR
ROCKWALL, TX 75087

REINHARDT JASON AND AMBER
118 CRESTBROOK DR
ROCKWALL, TX 75087

VASQUEZ FRANK EDWARD AND
JAMIE LEEANN LYNCH
119 CRESTBROOK DR
ROCKWALL, TX 75087

CONFIDENTIAL
120 CRESTBROOK DR
ROCKWALL, TX 75087

RAMOS RAMON A & DELMA P
120 IRELAND CT
ROCKWALL, TX 75087

HOEFER RUSSELL M & DIANE
121 CRESTBROOK DRIVE
ROCKWALL, TX 75087

JOHNS RUSSELL AND AMY
121 DEVERSON DR
ROCKWALL, TX 75087

MILLER MAX EDWARD AND KRISTINA R
122 CRESTBROOK DR
ROCKWALL, TX 75087

CULPEPPER DANNA JOHNSON
122 REGAL BLUFF
ROCKWALL, TX 75087

CURRENT RESIDENT
123 CRESTBROOK DR
ROCKWALL, TX 75087

REID DOUGLAS CHARLES AND ELIZABETH
123 DEVERSON DR
ROCKWALL, TX 75087

HEIDENREICH ERIN K AND ADAM
123 IRELAND COURT
ROCKWALL, TX 75087

M REA PROPERTIES 2 LLC
1234 TRALEE LN
GARLAND, TX 75044

MILLER TIMOTHY L AND DONNA K
124 CRESTBROOK DRIVE
ROCKWALL, TX 75087

BACHMAN GREGORY D AND DIANA L
125 CRESTBROOK DR
ROCKWALL, TX 75087

CORLEY SHARRON J
125 DEVERSON DRIVE
ROCKWALL, TX 75087

KNEE DANIEL AND SARAH
127 CRESTBROOK DR
ROCKWALL, TX 75087

2018 D ESTRADA & P GRAHAM-ESTRADA
REVOCABLE TRUST
DANIEL ESTRADA & PENELOPE CATHERINE
GRAHAM-ESTRADA- TRUSTEES
127 DEVERSON DRIVE
ROCKWALL, TX 75087

ADAMS JOHN R & DONNA M
129 CRESTBROOK DRIVE
ROCKWALL, TX 75087

WILKE LORETTA AND DAVID
129 DEVERSON DR
ROCKWALL, TX 75087

SCOTT MARK ALAN SR &
DOREEN
130 IRELAND CT
ROCKWALL, TX 75087

LAVALLEE EDWARD J
131 DEVERSON DR
ROCKWALL, TX 75087

CASTRICONE RICHARD & LEANNE
133 IRELAND CT
ROCKWALL, TX 75087

ARMET TED
136 IRELAND COURT
ROCKWALL, TX 75087

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HARTMANN HOLDINGS LLC
1375 PEBBLE HILLS DRIVE
ROCKWALL, TX 75087

BURNETT CATHY J
139 IRELAND COURT
ROCKWALL, TX 75087

CURRENT RESIDENT
1401 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1402 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1405 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1406 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1408 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1409 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1410 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1411 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1414 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1415 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1418 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1419 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1422 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1423 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1426 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1427 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1430 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1431 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1434 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1435 HARVARD DR
ROCKWALL, TX 75087

PACESETTER HOMES LLC
14400 THE LAKES BLVD BUILDING C, SUITE 200
AUSTIN, TX 78660

HAYWORTH AMY AND
LYNN ROBINSON
1468 RED WOLF DR
ROCKWALL, TX 75087

FREEMAN TODD MICHAEL
1471 RED WOLF DR
ROCKWALL, TX 75087

STOLL ROBERT AND ANN
1472 MEMORIAL DR
ROCKWALL, TX 75087

BENSON LINWOOD AND NANCY
1474 RED WOLF DRIVE
ROCKWALL, TX 75087

REDMOND BRIAN AND NICOLE
1475 PLUMMER DR
ROCKWALL, TX 75087

ELLER DIANE ELIZABETH
1476 AUDOBON LN
ROCKWALL, TX 75087

LANNOYE RACHEL M & MARK C
1477 BRITTANY WAY
ROCKWALL, TX 75087

385

LOPEZ AURELIO A
1477 RED WOLF DR
ROCKWALL, TX 75087

WATTS KENNETH A & LISA
1478 MEMORIAL DR
ROCKWALL, TX 75087

CASTLEBERRY DANNY LEE & RUTH E
1480 BRITTANY WAY
ROCKWALL, TX 75087

TROUSDALE JOHN R
1480 RED WOLF DR
ROCKWALL, TX 75087

ROCKWALL 205-552 LLC
14801 QUORUM DR SUITE 160
DALLAS, TX 75254

CURRENT RESIDENT
1482 AUDOBON LN
ROCKWALL, TX 75087

VIEDA & GONZALEZ
1483 RED WOLF DR
ROCKWALL, TX 75087

BOTTOMS DEBRA E & CHARLES G
1484 MEMORIAL DR
ROCKWALL, TX 75087

MILLIGAN FAMILY TRUST
CHARLES E MILLIGAN AND CARLA A MILLIGAN
TRUSTEES
1485 BRITTANY WAY
ROCKWALL, TX 75087

BEYER ALFRED B & JANET M
1486 RED WOLF DR
ROCKWALL, TX 75087

VOLPE JOANN
1488 AUDOBON LN
ROCKWALL, TX 75087

ELLIS BRIAN & LAUREN
1488 BRITTANY WAY
ROCKWALL, TX 75087

TUTTLE DAVID & CAROLYN
1490 MEMORIAL DR
ROCKWALL, TX 75087

HAYNES GEORGE J & CAROLYN J
1491 AUDOBON LN
ROCKWALL, TX 75087

MAYO GARY M & LILIAN URBINA-MAYO
1491 RED WOLF DR
ROCKWALL, TX 75087

PADILLA OSCAR & MELISSA
1493 BRITTANY WAY
ROCKWALL, TX 75087

CURRENT RESIDENT
1494 RED WOLF DR
ROCKWALL, TX 75087

CASAZZA ALBERT AND ALEXIS K
1496 BRITTANY WAY
ROCKWALL, TX 75087

CURRENT RESIDENT
1501 HARVARD DR
ROCKWALL, TX 75087

HELMER KALENA AND BRIAN
1501 AUDOBON LN
ROCKWALL, TX 75087

CURRENT RESIDENT
1502 HARVARD DR
ROCKWALL, TX 75087

BOYLES GLYN E & MARY F
1503 BRITTANY WAY
ROCKWALL, TX 75087

WILLIAMS THOMAS MICHAEL AND
PANSY ANITA WILLIAMS
1504 BRITTANY WAY
ROCKWALL, TX 75087

CURRENT RESIDENT
1507 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1508 HARVARD DR
ROCKWALL, TX 75087

INGRAM AUDRA JOY
1509 AUDOBON LN
ROCKWALL, TX 75087

SCARBOROUGH AUDREY M
1511 BRITTANY WAY
ROCKWALL, TX 75087

CURRENT RESIDENT
1513 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1514 HARVARD DR
ROCKWALL, TX 75087

HARRIS PATRICIA A
1517 AUDOBON LN
ROCKWALL, TX 75087

386

CURRENT RESIDENT
1519 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1520 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1525 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1526 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1531 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1537 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1600 WANETA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1604 WANETA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1608 WANETA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1612 WANETA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1616 WANETA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1620 WANETA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1624 WANETA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1639 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1645 HARVARD DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1651 HARVARD DR
ROCKWALL, TX 75087

HUDGENS GERALD FRANK & ROCHELLE
EAVONNE
1675 AVONLEA DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
1702 WANETA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1706 WANETA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1710 WANETA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1714 WANETA DR
ROCKWALL, TX 75087

METROPLEX ACQUISITION FUND, LP
1717 WOODSTEAD CT STE 207
THE WOODLANDS, TX 77380

CURRENT RESIDENT
1718 WANETA DR
ROCKWALL, TX 75087

NOWELL PHILLIP RUSSELL AND
CASEY ELIZABETH O'HEARN
1721 HARVARD DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
1722 WANETA DR
ROCKWALL, TX 75087

HPA TEXAS SUB 2018-1 ML LLC
180 N STETSON AVE SUITE 3650
CHICAGO, IL 60601

HP TEXAS I LLC DBA HPA TX LLC
180 NORTH STETSON AVENUE SUITE 3650
CHICAGO, IL 60601

MEGATEL HOMES LLC
1800 VALLEY VIEW LANE SUITE 400
FARMERS BRANCH, TX 75234

CURRENT RESIDENT
1804 WANETA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1808 WANETA DR
ROCKWALL, TX 75087

387

CURRENT RESIDENT
1812 WANETA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1816 WANETA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1820 WANETA DR
ROCKWALL, TX 75087

CHAPMAN BOBBY E II AND AMY L CHAMPMAN
1821 HAINSWORTH DRIVE
ROCKWALL, TX 75087

MOORE MICHAEL RAY JR & STEPHANIE
1823 HAINSWORTH DRIVE
ROCKWALL, TX 75087

MORGAN RAYMOND L JR AND STEPHANIE L
1825 HAINSWORTH DR
ROCKWALL, TX 75087

ESCOBEDO OMAR & MARIA C
1827 HAINSWORTH DRIVE
ROCKWALL, TX 75087

HUA ALEXANDER AND THU THUY
1829 HAINESWORTH DR
ROCKWALL, TX 75087

SLOAN CHRISTOPHER A & MISTI D
1830 OAK BEND DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
1831 HAINSWORTH DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1833 HAINSWORTH DR
ROCKWALL, TX 75087

MONTGOMERY BARRY A AND MARY R
1838 OAK BEND DR
ROCKWALL, TX 75087

ESCOBEDO CARLOS DAVID
184 RAINTREE CT
ROCKWALL, TX 75087

MULLET STEPHEN PAUL
1844 OAK BEND DR
ROCKWALL, TX 75087

BELL JEFFREY A & LARISSA
1850 OAK BEND DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
1856 OAK BEND DR
ROCKWALL, TX 75087

LEE THERESE M & GREGORY H
1862 OAK BEND DR
ROCKWALL, TX 75087

MAPENGO DERECK B AND TERI
1868 OAK BEND DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
1875 OAK BEND DR
ROCKWALL, TX 75087

MYERS CHARLES & SHERRY
1876 OAK BEND DRIVE
ROCKWALL, TX 75087

NEDELCU MIHAI & AMY
190 RAINTREE CT
ROCKWALL, TX 75087

CURRENT RESIDENT
191 E QUAIL RUN RD
ROCKWALL, TX 75087

SCHULTZ JENNIFER S & ERIC
1910 RANDOM OAKS DRIVE
ROCKWALL, TX 75087

WEYGANDT DEBORA ANN
1918 RANDOM OAKS DRIVE
ROCKWALL, TX 75087

LAPP CALVIN MICHAEL AND REBECCA JEAN
1919 RANDOM OAKS DR
ROCKWALL, TX 75087

MURPHY ANYA ELLEN
1927 RANDOM OAKS DR
ROCKWALL, TX 75087

MENDENHALL SCOTT H & KENDRA W
1935 RANDOM OAKS DR
ROCKWALL, TX 75087

KELLEY ROBERT E & ERIN B
1941 RANDOM OAKS DR
ROCKWALL, TX 75087

MARSH JAMES C & JOANN
1947 RANDOM OAKS DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1950 N GOLIAD
ROCKWALL, TX 75087

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MICHAELS RICHARD A & AUDREY
1953 RANDOM OAKS DR
ROCKWALL, TX 75087

BROWN LARRY W & DIANE
1954 RANDOM OAKS DR
ROCKWALL, TX 75087

STORMER CLAYTON A
1960 RANDOM OAKS DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1961 RANDOM OAKS DR
ROCKWALL, TX 75087

PEREZ JOHN & BRITANIE
1966 RANDOM OAKS DR
ROCKWALL, TX 75087

MANASCO KURT & COURTNEY C
1967 RANDOM OAKS DR
ROCKWALL, TX 75087

CURRENT RESIDENT
1979 N GOLIAD ST
ROCKWALL, TX 75087

KENNET TYLER D AND DONELLE M
200 RAINTREE COURT
ROCKWALL, TX 75087

CURRENT RESIDENT
2004 N GOLIAD
ROCKWALL, TX 75087

CURRENT RESIDENT
2007 N GOLIAD
ROCKWALL, TX 75087

CLARK KEVIN & MARY
201 CHATFIELD DRIVE
ROCKWALL, TX 75087

BARRICK JONATHAN T
202 CHATFIELD DR
ROCKWALL, TX 75087

CUMMINGS JIMMIE SCOTT & TRACI R
202 CRESTBROOK DRIVE
ROCKWALL, TX 75087

SIMEK JENNIFER L AND DOUGLAS R
203 CHATFIELD DR
ROCKWALL, TX 75087

MAGNESS PATRICK A & MELODY I
203 CRESTBROOK DRIVE
ROCKWALL, TX 75087

ARKOMA DEVELOPMENT LLC
203 E INTERSTATE 30
ROCKWALL, TX 75087

BROCK MARK E AND CARIN
204 CHATFIELD DRIVE
ROCKWALL, TX 75087

VAN HORN ANDREW J & ANDREA L
204 CRESTBROOK DRIVE
ROCKWALL, TX 75087

WALLER DAVID M & SORAYA E
205 CHATFIELD DRIVE
ROCKWALL, TX 75087

MUNDHENK CRAIG AND AYA
205 CRESTBROOK DR
ROCKWALL, TX 75087

LOVETT TERESA
206 CHATFIELD DRIVE
ROCKWALL, TX 75087

PARK KYOUNG WON
206 CRESTBROOK DRIVE
ROCKWALL, TX 75087

JANSSEN DENNIS R AND HOLLY E
20607 ORCHARD CT
FRANKFORT, IL 60423

BRYANT THOMAS HENRY AND LEA ANN
207 CHATFIELD DR
ROCKWALL, TX 75087

WHANNELL TAMMY AND DANIEL J
207 CRESTBROOK DR
ROCKWALL, TX 75087

CURRENT RESIDENT
208 CRESTBROOK DR
ROCKWALL, TX 75087

OCONNOR MICHAEL TYLER & ASHLEY ELISA
208 CHATFIELD DRIVE
ROCKWALL, TX 75087

WREN TIMOTHY J AND JENNIFER N
209 CHATFIELD DR
ROCKWALL, TX 75087

SMITH KYMBERLY D
209 CRESTBROOK DRIVE
ROCKWALL, TX 75087

SPEIGHT REBECCA L
210 CHATFIELD DRIVE
ROCKWALL, TX 75087

389

DODD TIMM & JAMIE C
210 CRESTBROOK DRIVE
ROCKWALL, TX 75087

MAZZUCA MICHAEL JR AND JULIE
2100 TWIN CREEK LN
ROCKWALL, TX 75087

WETMORE BRENT & CHELSEA
2106 TWIN CREEK LANE
ROCKWALL, TX 75087

CURRENT RESIDENT
211 CRESTBROOK DR
ROCKWALL, TX 75087

PAULSEN GORGAS R & SHERRY C
211 CHATFIELD DR
ROCKWALL, TX 75087

WALLACE JONATHAN M & KAREN J
2112 TWIN CREEK LN
ROCKWALL, TX 75087

HARGIS JOHN EDWARD AND JESSICA
2114 BARLASS DRIVE
ROCKWALL, TX 75087

MILLER DANIEL J & CARLA M
2116 BARLASS DRIVE
ROCKWALL, TX 75087

BRAUN LISA AND BRIAN
2118 BARLASS DR
ROCKWALL, TX 75087

LAPARE DENNIS E & RENEE E
2118 TWIN CREEK LN
ROCKWALL, TX 75087

FISKNESS MICHAEL EDWARD AND TARAH CHRISTINE
212 CHATFIELD DR
ROCKWALL, TX 75087

FLOREZ CINDY ANN
212 CRESTBROOK DRIVE
ROCKWALL, TX 75087

CAVAZOS BRUNO
2120 BARLASS DRIVE
ROCKWALL, TX 75032

CURRENT RESIDENT
2124 TWIN CREEK LN
ROCKWALL, TX 75087

WHITEHOUSE TIMOTHY B & HEIKE I
213 CHATFIELD DRIVE
ROCKWALL, TX 75087

JOHANNESEN TRACE AND AMY
213 CRESTBROOK DR
ROCKWALL, TX 75087

COLLINS KIT J
2130 TWIN CREEK LN
ROCKWALL, TX 75087

CURRENT RESIDENT
2136 TWIN CREEK LN
ROCKWALL, TX 75087

CURRENT RESIDENT
214 CRESTBROOK DR
ROCKWALL, TX 75087

PANG JOHN J & SUE W
214 CHATFIELD DR
ROCKWALL, TX 75087

VILLARREAL JOHN E AND KIMBERLY A
215 CHATFIELD DR
ROCKWALL, TX 75087

WALKER KEVIN W & CHRISTY D
215 CRESTBROOK DRIVE
ROCKWALL, TX 75087

HEWITT DEREK THOMAS & CAMERON ELISE
216 CRESTBROOK DR
ROCKWALL, TX 75087

DEAN LANTY W & MARY F
216 W QUAIL RUN RD
ROCKWALL, TX 75087

DEAN LANTY W & MARY F
216 W QUAIL RUN RD
ROCKWALL, TX 75087

HARPER ROBERT AND TARA
217 CHATFIELD DRIVE
ROCKWALL, TX 75087

EVANS RICHARD THOMAS AND TIFFANY DAWN
217 CRESTBROOK DR
ROCKWALL, TX 75087

CLIFTON JEROME
218 CRESTBROOK DRIVE
ROCKWALL, TX 75087

MCCOLLUM JACK F & JOAN R
219 CRESTBROOK DRIVE
ROCKWALL, TX 75087

BURROWS REBECCA
220 CRESTBROOK DRIVE
ROCKWALL, TX 75087

390

GLEASON JAMES AND ANGELA
221 CRESTBROOK DR
ROCKWALL, TX 75087

JONES BRADLEY K & SUSAN M
2215 HYER DRIVE
ROCKWALL, TX 75087

TYREE JEFF & AMBER
2217 HYER DR
ROCKWALL, TX 75087

SHOWS STEPHEN
2219 HYER DR
ROCKWALL, TX 75087

DUMAS DARRELL AND
JOHN CERVI
222 CRESTBROOK DRIVE
ROCKWALL, TX 75087

MULLEN SCOTT & KELSEY
2220 BARLASS DR
ROCKWALL, TX 75087

KIM DANIEL TAE HYUN AND WOOJUNG LEE
2221 HYER DR
ROCKWALL, TX 75087

CLARK BRADLEY EUGENE & TRACI DEANN
2223 HYER DRIVE
ROCKWALL, TX 75087

MYRICK CHASE AND CHRISTINA
2224 BARLASS DR
ROCKWALL, TX 75087

LARSON MELISSA AND
ROBERT BRYANT
2226 BARLASS DR
ROCKWALL, TX 75087

BOWMAN JOHN D AND BARBARA
2228 BARLASS DR
ROCKWALL, TX 75087

SARTAIN ROBBIE R AND KIM M
2230 BARLASS DR
ROCKWALL, TX 75087

BALLARD LINDA A
2232 BARLASS DRIVE
ROCKWALL, TX 75087

REBEL FRANCIS JOSEPH IV AND REGINA
224 SHADY BRANCH DRIVE
ROCKWALL, TX 75087

WALKER RODGER L AND DEBORAH D
225 CRESTBROOK DRIVE
ROCKWALL, TX 75087

FODGE MATTHEW AND KAILEE
226 SHADY BRANCH DR
ROCKWALL, TX 75087

CURRENT RESIDENT
2265 NORTH LAKESHORE DR
ROCKWALL, TX 75087

PORTOFINO DRIVE LLC
2266 LAFAYETTE LANDING
HEATH, TX 75032

CURRENT RESIDENT
227 CRESTBROOK DR
ROCKWALL, TX 75087

MOOMJIAN ASHLEY L AND CHAD A
228 SHADY BRANCH DR
ROCKWALL, TX 75087

KYLE JOHN K & MARGARET E
2320 FAIRWAY CIRCLE
HEATH, TX 75032

KAMAND INVESTMENTS OF TEXAS
2380 DESERT FALLS LANE
ROCKWALL, TX 75087

QUAIL RUN VALLEY OWNERS ASSOC
C/O ASSURED MGT INC
2500 LEGACY DR STE 220
FRISCO, TX 75034

ALDI TEXAS LLC
2500 WESTCOURT ROAD
DENTON, TX 76207

COSLEY STEVEN M
25129 THE OLD ROAD STE 105
STEVENSON RANCH, CA 91381

YU YAOYANG AND ZHUE LU
2529 SCENIC DR
PLANO, TX 75025

SHORES ON LAKE RAY HUBBARD
HOME OWNERS ASSOCIATION
2650 CHAMPIONS
ROCKWALL, TX 75087

HUGHES CLIFTON A III & LADONNA F
2904 GREEN WAY DR
ROCKWALL, TX 75087

BUFF PAUL CHRISTOPHER AND STACEY
2906 GREENWAY DR
ROCKWALL, TX 75087

RUIZ JOHN R III & PATRICIA GREENE
2908 GREEN WAY DRIVE
ROCKWALL, TX 75087

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BALLARD JUSTIN R AND MELODY K
2910 GREEN WAY DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
2911 GREENWAY DR
ROCKWALL, TX 75087

DEAN KIMBERLEE AND LARRY
2912 GREEN WAY DR
ROCKWALL, TX 75087

SHERMAN CHRISTOPHER ALLEN
2914 GREEN WAY DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
300 NAKOMA DR
ROCKWALL, TX 75087

KHAN ABDUL AND MAIMOONA REVOCABLE
LIVING TRUST
ABDUL RAHMAN KHAN AND MAIMOONA
RAHMAN KHAN CO TRUSTEES
3008 DOVE CREEK LN
RICHARDSON, TX 75082

CURRENT RESIDENT
3009 N GOLIAD ST
ROCKWALL, TX 75087

CHIU THOMAS C
301 CRESTBROOK DR
ROCKWALL, TX 75087

HARKRIDER MICHAEL & KELLI
301 FEATHERSONE DRIVE
ROCKWALL, TX 75087

DONALDSON MICHAEL J AND TARALYN K
302 IRIS DR
ROCKWALL, TX 75087

FREE METHODIST CHURCH
OF NORTH AMERICA
302 N GOLIAD ST
ROCKWALL, TX 75087

LEWIS THERESA GAYLE AND KEVIN RAY
302 SHADY BRANCH DR
ROCKWALL, TX 75087

CLARK TROY & JANICE
3025 N GOLIAD ST
ROCKWALL, TX 75087

ROSS JODY ALAN & KAREY
3027 N GOLIAD ST
ROCKWALL, TX 75087

CURRENT RESIDENT
3029 N GOLIAD ST
ROCKWALL, TX 75087

GUSSIE JEFFREY S AND JESSICA R
303 CRESTBROOK DRIVE
ROCKWALL, TX 75087

WHEELER KEITH AND TINA
303 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

GREER PATRICIA L
3031 N GOLIAD ST
ROCKWALL, TX 75087

CURRENT RESIDENT
3031 N GOLIAD ST
ROCKWALL, TX 75087

GREER TIMOTHY K
3033 N GOLIAD
ROCKWALL, TX 75087

STERN RANDY AND LISA
304 IRIS DRIVE
ROCKWALL, TX 75087

FORD RICHARD DAVID AND CLAUDIA
304 SHADY BRANCH DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
3045 N GOLIAD RD
ROCKWALL, TX 75087

CURRENT RESIDENT
305 FEATHERSTONE DR
ROCKWALL, TX 75087

THOMPSON BENJAMIN K AND JESSICA S
305 CRESTBROOK DR
ROCKWALL, TX 75087

LAM PROPERTY
3051 N GOLIAD ST
ROCKWALL, TX 75087

STONE DAVID
3053 N GOLIAD ST
ROCKWALL, TX 75087

FERGUSON DAVEY L & SHIRLEY C
DAVID W FERGUSON AS JOINT TENANTS
3055 N GOLIAD ST
ROCKWALL, TX 75087

WEST JEFFREY A & CHANTEL M
3059 N GOLIAD STREET
ROCKWALL, TX 75087

CURRENT RESIDENT
306 NAKOMA DR
ROCKWALL, TX 75087

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DRISCOLL SEAN T & SARAH E
306 IRIS DR
ROCKWALL, TX 75087

STEED JASON & NATALIE MARIE
3065 N GOLIAD STREET
ROCKWALL, TX 75087

CURRENT RESIDENT
3066 N GOLIAD
ROCKWALL, TX 75087

LIU JOHN AND CONNIE Q
3069 N GOLIAD
ROCKWALL, TX 75087

YEH ALEX CHEN-CHU AND CATHERINE LIEW
307 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
3070 N GOLIAD ST
ROCKWALL, TX 75087

CURRENT RESIDENT
3074 N GOLIAD
ROCKWALL, TX 75087

REED GWENDOLYN
3076 HAYS LN
ROCKWALL, TX 75087

DIRKSE RICHARD & TAMERA
3077 N GOLIAD ST
ROCKWALL, TX 75087

FRENCH DONALD
3079 N GOLIAD ST
ROCKWALL, TX 75087

SWANK ANTHONY K & KELLI J
308 IRIS DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
3084 N GOLIAD
ROCKWALL, TX 75087

WACKER ROBERT W & KATHRYN
WACKER JOINT REVOCABLE LIV TRUST
309 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
3090 N GOLIAD
ROCKWALL, TX 75087

BAKER CHRISTOPHER D
310 IRIS DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
3100 STONECREEK DR
ROCKWALL, TX 75087

CRAWFORD SHAFEN AND KATY
311 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

HUFF ELLIOTT AND TOBIE
312 NAKOMA DRIVE
ROCKWALL, TX 75087

CARRILLO FRANCISCO JR & MELODY APRIL
313 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

CLARK ALLAN JR
313 NAKOMA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
315 DALTON RD
ROCKWALL, TX 75087

COLE HC ROCKWALL TX LLC
C/O ROCKWALL REGIONAL HOSPITAL, LLC; ATTN
LEGAL DEPT.
3150 HORIZON RD
ROCKWALL, TX 75032

CARLSON CURT AND MARIA
318 NAKOMA DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
319 NAKOMA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
324 NAKOMA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
325 NAKOMA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
3250 N GOLIAD
ROCKWALL, TX 75087

CURRENT RESIDENT
3251 N GOLIAD
ROCKWALL, TX 75087

CURRENT RESIDENT
3260 N GOLIAD
ROCKWALL, TX 75087

WILLIAMS VICKI LYNN
330 NAKOMA DRIVE
ROCKWALL, TX 75087

393

CURRENT RESIDENT
3301 N GOLIAD
ROCKWALL, TX 75087

CURRENT RESIDENT
331 NAKOMA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
336 NAKOMA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
337 NAKOMA DR
ROCKWALL, TX 75087

LACOUR JENNIFFER AND RICHARD
342 NAKOMA DRIVE
ROCKWALL, TX 75087

TRAMMELL LANCE AND JENNIFER
343 NAKOMA DR
ROCKWALL, TX 75087

METROPLEX ACQUISITION FUND LP
C/O RONALD DRIBBEN
357 MARIAH BAY DRIVE
HEATH, TX 75032

GEISENDORFF ALBERT G AND ANN M
3O57 N GOLIAD ST
ROCKWALL, TX 75087

TYSON STEPHANIE AND CARY
401 EMERSON DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
402 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
402 NAKOMA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
403 MONTROSE DR
ROCKWALL, TX 75087

HENRY KIMI LINN
405 NAKOMA DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
407 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
408 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
408 NAKOMA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
411 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
413 EMERSON DR
ROCKWALL, TX 75087

LIU BIN AND
XIAORUI WEI
4132 NORMANDY AVENUE
DALLAS, TX 75087

LIU BIN AND XIAO QUN WEI AND
XIAORUI WEI
4132 NORMANDY AVENUE
DALLAS, TX 75205

CURRENT RESIDENT
414 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
414 NAKOMA DR
ROCKWALL, TX 75087

TAYLOR MATTHEW A & MELINDA M
415 MIRAMAR DRIVE
ROCKWALL, TX 75087

FUGLER SHANE L
415 NAKOMA DRIVE
ROCKWALL, TX 75087

ZIEGLER RENEE A
417 MIRAMAR DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
419 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
419 MONTROSE DR
ROCKWALL, TX 75087

DEFORD JAMES M & MICAELA
419 MIRAMAR DRIVE
ROCKWALL, TX 75087

JAVKER REALTY CORP
42 BOND ST
NEW YORK, NY 10012

CURRENT RESIDENT
420 MONTROSE DR
ROCKWALL, TX 75087

394

CURRENT RESIDENT
420 NAKOMA DR
ROCKWALL, TX 75087

CLARK MOLLYE N
421 MIRAMAR DRIVE
ROCKWALL, TX 75087

NEWTON KEEGAN B AND DIANA T
423 MIRAMAR DR
ROCKWALL, TX 75087

CURRENT RESIDENT
425 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
425 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
425 NAKOMA DR
ROCKWALL, TX 75087

MITCHELL JONATHAN & AMY
425 MIRAMAR DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
426 NAKOMA DR
ROCKWALL, TX 75087

BOLDING MARK AND JULIE
426 MONTROSE DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
430 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
431 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
432 MONTROSE DR
ROCKWALL, TX 75087

HUTTON WILLIAM
432 NAKOMA DRIVE
ROCKWALL, TX 75087

ASONGWE DANIEL
435 NAKOMA DRIVE
ROCKWALL, TX 75087

JOBE BRYAN AND KAREN
436 EMERSON DRIVE
ROCKWALL, TX 75087

LITTLE GENIUS OF TEXAS LLC
436 QUAIL CREEK DR
MURPHY, TX 75094

BRINKMAN DANIEL
437 EMERSON DRIVE
ROCKWALL, TX 75087

SOLER JOSEPH
4462 VISTA MEADOW CT
MOORPARK, CA 93021

WILLIAMS HAROLD B & SHARON R
450 COVEY TRL
ROCKWALL, TX 75087

MAXWELL TRACY AND KASSIE
456 COVEY TR
ROCKWALL, TX 75087

CURRENT RESIDENT
489 BENDING OAKS TRL
ROCKWALL, TX 75087

NEIGHBORS LEONARD V AND LINDA L
490 BENDING OAKS
ROCKWALL, TX 75087

CONFIDENTIAL
495 BENDING OAKS TRL
ROCKWALL, TX 75087

TOWELL KEITH R AND MARTHA M
496 BENDING OAKS TRAIL
ROCKWALL, TX 75087

599 MIRAMAR LLC
4N650 HIGH MEADOW RD
ST CHARLES, IL 60175

CURRENT RESIDENT
500 EMERSON DR
ROCKWALL, TX 75087

CONFIDENTIAL
500 NAKOMA DRIVE
ROCKWALL, TX 75087

CURTIS JOSEPH & THERESA
500 SHADOW OAKS CT
ROCKWALL, TX 75087

CURRENT RESIDENT
501 BENDING OAKS TR
ROCKWALL, TX 75087

CURRENT RESIDENT
501 EMERSON DR
ROCKWALL, TX 75087

395

ZOPP THOMAS M & MITZI ANN
502 BENDING OAKS TRL
ROCKWALL, TX 75087

KOLESNYK OKSANA
502 COVEY TRAIL
ROCKWALL, TX 75087

CURRENT RESIDENT
505 COVEY TRL
ROCKWALL, TX 75087

ARRIAGA HENRY
505 HIDDEN OAK LN
ROCKWALL, TX 75087

CURRENT RESIDENT
506 NAKOMA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
506 SHADOW OAKS CT
ROCKWALL, TX 75087

MUSTAPHA AHMAD
506 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
507 EMERSON DR
ROCKWALL, TX 75087

BORN MARK I & SHELLEY L
507 BENDING OAKS TRL
ROCKWALL, TX 75087

CURRENT RESIDENT
508 COVEY TR
ROCKWALL, TX 75087

ADAMSON KEVIN AND BECKY
509 NAKOMA DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
510 BENDING OAKS TR
ROCKWALL, TX 75087

LEE KEKE AND
BAITING WU
5101 SETTLEMENT WAY
MCKINNEY, TX 75070

YERKS SHAWN AND LISA
512 EMERSON DRIVE
ROCKWALL, TX 75032

COLL JORGE GUTIERREZ AND LARA CUCURULL RUBIO
512 NAKOMA DRIVE
ROCKWALL, TX 75087

CAMPBELL ROBERT & PATRICIA
512 SANDPIPER LN
MESQUITE, TX 75149

CURRENT RESIDENT
513 COVEY TRL
ROCKWALL, TX 75087

CURRENT RESIDENT
513 EMERSON DR
ROCKWALL, TX 75087

SARMIENTO FAMILY LIV REV TRUST
ALICIA SARMIENT TRUSTEE
513 BENDING OAKS TRL
ROCKWALL, TX 75087

MCMILLAN ROBERT
514 COVEY TRL
ROCKWALL, TX 75087

JOHNSON NATALIE K
514 SHADOW OAKS COURT
ROCKWALL, TX 75087

HARTSFIELD MELINDA ANN & BRADLEY GENE
516 SAVANAH CT
ROCKWALL, TX 75087

JAMES EDWARD PROBYN IV AND KERSTIN MARIE
517 NAKOMA DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
518 NAKOMA DR
ROCKWALL, TX 75087

BODINO LORI ANN
518 EMERSON DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
519 EMERSON DR
ROCKWALL, TX 75087

DUPRE EMILY JOY
520 COVEY TRAIL
ROCKWALL, TX 75087

HULTQUIST JON J & BETH L
520 SAVANAH COURT
ROCKWALL, TX 75087

CURRENT RESIDENT
521 COVEY TRL
ROCKWALL, TX 75087

BENNETT CANDACE N AND LIONEL
523 NAKOMA DRIVE
ROCKWALL, TX 75087

396

CURRENT RESIDENT
524 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
524 NAKOMA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
525 EMERSON DR
ROCKWALL, TX 75087

HUNT JUNE
526 COVEY TRL
ROCKWALL, TX 75087

FELKNER GEORGE K AND CAROLYN
526 SAVANAH COURT
ROCKWALL, TX 75087

HAMILTON LYNDSE K
529 COVEY TR
ROCKWALL, TX 75087

ANDERSON JERRY AND LEANNE
529 NAKOMA DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
530 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
531 EMERSON DR
ROCKWALL, TX 75087

SEATON JOSHUA A AND BETTY I EMELIANTSEV
532 COVEY TR
ROCKWALL, TX 75087

TAYLOR WILLIAM C & JENNIFER L
532 SAVANAH CT
ROCKWALL, TX 75087

GIBRALTER JEFFREY H & LACIE L
537 COVEY TRL
ROCKWALL, TX 75087

BOWEN JAMES R & CENIA
538 COVEY TRL
ROCKWALL, TX 75087

BURKART RICHARD G & DONNA D
540 SAVANAH CT
ROCKWALL, TX 75087

PAWLIK ROBERT
544 COVEY TR
ROCKWALL, TX 75087

MACK RYAN M SR & ROBIN L
545 COVEY TRL
ROCKWALL, TX 75087

BAKER JUSTIN T AND MORGAN CHAIVRE
550 SAVANAH CT
ROCKWALL, TX 75087

PATRICK JAIME A
562 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

WELLS RENEE LAMBERT & KEVIN M
563 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

DAVIS DEREK LINN & AMIE LYNN
564 FEATHERSTONE DR
ROCKWALL, TX 75087

HOPSON THOMAS WADE & JUDY ELAINE
565 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

BERENS TYLER JOSEPH AND SAMANTHA J
566 FEATHERSTONE DR
ROCKWALL, TX 75087

INGRAM CULLEN AND JERI
567 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

STEIGER CHRISTOPHER M & ALISHA N MOTL
568 FEATHERSTON DR
ROCKWALL, TX 75087

REED SHANNON AND HEATHER
569 FEATHERSTONE DR
ROCKWALL, TX 75087

KIEHL CHRISTINE MARIE
570 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

KIEHL CHRISTINE MARIE
570 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

MARTINEZ RAMIRO AND MARIA M
571 FEATHERSTONE DR
ROCKWALL, TX 75087

HEFNER ERICH J AND AMANDA F
572 FEATHERSTONE DR
ROCKWALL, TX 75087

MERFELD BRIAN R & MEGAN J
573 FEATHERSTONE DR
ROCKWALL, TX 75087

397

GILMORE PATRICK L AND TINA D
574 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

WARRINGTON JASON
575 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

PARKER BRADLEY J & JANA C SIMARD
576 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

PATTERSON RICHARD
578 AMHERST DR
ROCKWALL, TX 75087

JORDAN JAY A AND COURTNEY L
580 AMHERST DRIVE
ROCKWALL, TX 75087

ASHLEY MARGARET P
5805 YACHT CLUB
ROCKWALL, TX 75032

NGUYEN THIEN AN NGOC AND
VAN THUY DANG
582 AMHERST DRIVE
ROCKWALL, TX 75087

FINNEY JEFFERY SCOTT AND MARY KIM
ROBERTS
582 DEVERSON DR
ROCKWALL, TX 75087

MUSTAFA MUSTAFA & DIANA AQRABAWI AND
MOHAMMAD AQRABAWI
582 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

STEPHENSON KEVIN AND DIANA E HAYNES
583 MOUNTCASTLE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
584 MOUNTCASTLE DR
ROCKWALL, TX 75087

MITCHELL TERRY AND KRISTINE
584 AMHERST DRIVE
ROCKWALL, TX 75087

RIZKALLA MAGDY I AND ANGIE N
584 BORDEAUX DR
ROCKWALL, TX 75087

INGLE BRADY AND LAUREN
584 DEVERSON DR
ROCKWALL, TX 75087

PINTO ERIC & JENNIFER BUARD
584 MIRAMAR DR
ROCKWALL, TX 75087

WARREN JEREMY J AND ALYSE M
585 BORDEAUX DR
ROCKWALL, TX 75087

ALLEN JOHN D & AMY C
585 DEVERSON DR
ROCKWALL, TX 75087

SATERY JAMES RUSSELL
585 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

GOLD STAR PROS LLC
5853 FM 36 S
QUINLAN, TX 75474

ESPARZA EZEQUIEL JR AND ANGELA MARIE
586 AMHERST DR
ROCKWALL, TX 75087

AYERSMAN JAMES L AND WANDA E
586 BORDEAUX DR
ROCKWALL, TX 75087

ESCANDOR ROMMEL A
586 DEVERSON DRIVE
ROCKWALL, TX 75087

MCBROOM NICHOLAS & ANDREA
586 MIRAMAR DR
ROCKWALL, TX 75087

COOK STEPHEN & JO-ANN
586 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

SOUZA LEVY AND LILI
587 BORDEAUX DR
ROCKWALL, TX 75087

EVANS NATHAN EDWARD & ASHLEY TAYLOR
587 DEVERSON DR
ROCKWALL, TX 75087

RIDDLE DANNY R AND CAREN M
587 MOUNTCASTLE DR
ROCKWALL, TX 75087

MILLER STEVEN & AINE
588 AMHERST DR
ROCKWALL, TX 75087

VALLADARES ELIA AND YAN
588 BORDEAUX DR
ROCKWALL, TX 75087

SARTAIN BRANDON
588 DEVERSON DRIVE
ROCKWALL, TX 75087

398

CULLEN KEVIN M & SHARON T
588 MIRAMAR DR
ROCKWALL, TX 75087

HALE WILLIE & AMY
588 MOUNTCASTLE DR
ROCKWALL, TX 75087

CONNELLY ROBERT AND RACQUEL
589 BORDEAUX DRIVE
ROCKWALL, TX 75087

MCCURDY ALEXANDER AUSTIN AND ASHLEY CRAIG
589 DEVERSON DRIVE
ROCKWALL, TX 75087

BANKHEAD JAMES II & WENDY
589 MIRAMAR DRIVE
ROCKWALL, TX 75087

VONGUNDEN ERIC AND XIOMARA
589 MOUNTCASTLE DR
ROCKWALL, TX 75087

YOUSFI SHARIQ AND SHAZIA BASIT
590 AMHERST DR
ROCKWALL, TX 75087

MATTHEWS KRISTI LEIGH AND ROSS DANIEL III
590 BORDEAUX DR
ROCKWALL, TX 75087

JONES MURRAY A & TERRI L
590 DEVERSON DRIVE
ROCKWALL, TX 75087

NOEL MARY YVONNE
590 MIRAMAR DRIVE
ROCKWALL, TX 75087

SKAGGS JUSTIN & KELLY
590 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

WARREN ANDREW JAMES AND CHRISTINE
591 BORDEAUX DR
ROCKWALL, TX 75087

GRATES CHRISTOPHER J JR AND NICOLE
591 DEVERSON DRIVE
ROCKWALL, TX 75087

KEYS BRANDON E AND JENNIFER
591 MIRAMAR DRIVE
ROCKWALL, TX 75087

STALSBERG RANDY L & SHEILA R
591 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

PURCELL CLOYCE CHAD & RACHEL LYNNE
592 AMHERST DRIVE
ROCKWALL, TX 75087

VANPELT RAYMOND J AND PAMELA J
592 BORDEAUX DR
ROCKWALL, TX 75087

CRADY KEVIN & APRIL
592 DEVERSON DR
ROCKWALL, TX 75087

SCHERER PAMELA RINAY
592 MIRAMAR DRIVE
ROCKWALL, TX 75087

DENT VICKIE L
593 BORDEAUX DR
ROCKWALL, TX 75087

BRINKLEY RICKY L & LIANE M
593 DEVERSON DR
ROCKWALL, TX 75087

MCKINNEY KAREN DIANN
593 MIRAMAR DRIVE
ROCKWALL, TX 75087

GOODEN EDWARD EARL & ALEXA JO
593 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
594 AMHERST DR
ROCKWALL, TX 75087

ROBY GREGSON CARL AND KELLIE NICHOLE
594 BORDEAUX DR
ROCKWALL, TX 75087

HUPP RUSSELL A JR AND RACHELLE L
594 DEVERSON DR
ROCKWALL, TX 75087

ROWE PETER JAMES & SARAH ELISABETH WATSON
594 MIRAMAR DR
ROCKWALL, TX 75087

WHEELER BRADLEY Q AND BARBARA D
595 BORDEAUX DRIVE
ROCKWALL, TX 75087

DYER WILLIAM A AND MARIE E
595 DEVERSON DRIVE
ROCKWALL, TX 75087

LESSARD ANNA
595 MIRAMAR DR
ROCKWALL, TX 75087

399

CONFIDENTIAL
595 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

JOHNSON CHRISTOPHER P AND KELLI RENEE
596 AMHERST DR
ROCKWALL, TX 75087

FERGERSON SHIRLEY A AND JOE H
596 BORDEAUX DR
ROCKWALL, TX 75087

ZHANG QIAO
596 DEVERSON DR
ROCKWALL, TX 75087

GRADY ANJELA S
596 MIRAMAR DR
ROCKWALL, TX 75087

BRADFORD TODD D AND KARA R
597 BORDEAUX DR
ROCKWALL, TX 75087

WARD MATTHEW DAVID
597 DEVERSON DRIVE
ROCKWALL, TX 75087

HARDING ERIK LEE & KRISTINA
597 MIRAMAR DR
ROCKWALL, TX 75087

ANNOR ABIGAIL OSEI AND MICHAEL A ADJETEY
597 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

DELONG ERIC AND JENNIFER
598 AMHERST DR
ROCKWALL, TX 75087

BOBBITT CHARLES P III AND CHERYL J
598 BORDEAUX DR
ROCKWALL, TX 75087

TAYLOR MELISSA SUMMER & JOHN
598 DEVERSON DRVIE
ROCKWALL, TX 75087

SAGER DONALD W & MELISSA M
598 MIRAMAR DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
599 MIRAMAR DR
ROCKWALL, TX 75087

MIGLIACCIO JOSEPH AND KIMBERLY
599 BORDEAUX DR
ROCKWALL, TX 75087

ASH KRISTIN
599 DEVERSON DRIVE
ROCKWALL, TX 75087

WALTERS BART A AND TIKKA M
599 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
600 MONTROSE DR
ROCKWALL, TX 75087

REBAC OF ROCKWALL, LLC
6000 UNIVERSITY AVE STE 350
WEST DES MOINES, IA 50266

CURRENT RESIDENT
601 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
601 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
601 NAKOMA DR
ROCKWALL, TX 75087

ARAIZA RODOLFO A MARES AND KRISTA
KAYLEEN MARES
601 BORDEAUX DR
ROCKWALL, TX 75087

CLAUSSEN BRIAN L
601 DEVERSON DR
ROCKWALL, TX 75087

GERMER JOHN
601 MIRAMAR DR
ROCKWALL, TX 75087

DESAI PRANAV MAHESHBHAI AND MEGHANA
601 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
602 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
602 NAKOMA DR
ROCKWALL, TX 75087

BORTZ BRIAN R AND TIFFANY A
602 AMHERST DR
ROCKWALL, TX 75087

DAHAL PUSKAR AND ANJU DHITAL
602 BORDEAUX DR
ROCKWALL, TX 75087

400

GREAVES LARRY
602 COVEY TRL
ROCKWALL, TX 75087

KIGER GEORGE WESLEY ESTATE
GEORGE KIGER JR INDEPENDENT EXECUTOR
602 DEVERSON DR
ROCKWALL, TX 75087

TOUGAW RONALD LYNN JR & LAURA JEAN
602 MIRAMAR DRIVE
ROCKWALL, TX 75087

AYLOTT JASON M & SHERI L MAXWELL-AYLOTT
603 AMHERST DR
ROCKWALL, TX 75087

WELLS MICHAEL JR AND DAWN
603 BORDEAUX DR
ROCKWALL, TX 75087

VO KEVIN & GIANG KIEU PHAM
603 DEVERSON DR
ROCKWALL, TX 75087

SOLDATOVIC DRAGANA & CEDOMIR
603 MIRAMAR LN
ROCKWALL, TX 75087

TANG MINH AND HANG NGUYEN
603 MOUNTCASTLE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
604 MONTROSE DR
ROCKWALL, TX 75087

SAUER WAYNE & CARMEN MONIQUE
604 AMHERST DRIVE
ROCKWALL, TX 75087

BUCK ROBERT E AND HALEIGH V
604 BORDEAUX DR
ROCKWALL, TX 75087

GUNDERSON RICHARD M AND ROBYN R
604 DEVERSON DR
ROCKWALL, TX 75087

BERNHARDT KATHY K
604 MIRAMAR DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
605 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
605 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
605 NAKOMA DR
ROCKWALL, TX 75087

NGUYEN TRACY
605 AMHERST DRIVE
ROCKWALL, TX 75087

NEECE DAVID JR
605 BORDEAUX DR
ROCKWALL, TX 75087

FINNEY BYRON & ELIZABETH
605 DEVERSON DR
ROCKWALL, TX 75087

ASHMORE CHRIS AND JANELLE
605 MIRAMAR DR
ROCKWALL, TX 75087

PATTERSON MICHAEL AND ABBY
605 MOUNTCASTLE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
606 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
606 NAKOMA DR
ROCKWALL, TX 75087

WEIDEMAN RANDY L & DIANNE M
606 AMHERST DRIVE
ROCKWALL, TX 75087

KING BRYAN J AND SHELLY
606 BORDEAUX DR
ROCKWALL, TX 75087

BEASLEY COREY BRYAN AND ALICIA DIANE
606 DEVERSON DR
ROCKWALL, TX 75087

SAGRAVES TODD ANDREW & HEATHER AND
VIRGINIA CHERYL TALKINGTON
606 MIRAMAR DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
607 DEVERSON DR
ROCKWALL, TX 75087

KISTLER DANIEL & STACY
607 AMHERST DRIVE
ROCKWALL, TX 75087

CARVAJAL CARLOS H & CYNTHIA H
607 BORDEAUX DRIVE
ROCKWALL, TX 75087

401

MONTGOMERY ANDREW J & MAGDALENE G
607 MIRAMAR DRIVE
ROCKWALL, TX 75087

HENSON TIA & WILLIAM KENDALL
607 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
608 MONTROSE DR
ROCKWALL, TX 75087

HUNT ROBERT PRESTON
608 AMHERST DRIVE
ROCKWALL, TX 75087

DUDLEY DANIEL R AND SHELLEY L
608 BORDEAUX DR
ROCKWALL, TX 75087

OBIOMA CHIBO & BLOSSOM
608 COVEY TRL
ROCKWALL, TX 75087

KAUR KAMALJEET AND
AJEET SINGH
608 DEVERSON DR
ROCKWALL, TX 75087

MCMAHAN THOMAS H & SHANNON J
608 MIRAMAR DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
609 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
609 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
609 NAKOMA DR
ROCKWALL, TX 75087

SMITH JAMES M & SHIRLEY LYNN
609 AMHERST DRIVE
ROCKWALL, TX 75087

MCGUIRE DANIEL R AND JENNIFER
609 BORDEAUX DR
ROCKWALL, TX 75087

YAKEL DEREC AND KATARZYNA
609 DEVERSON DR
ROCKWALL, TX 75087

SUTER ANTHONY AND MELISSA
609 MIRAMAR DRIVE
ROCKWALL, TX 75087

LOYA MARK A AND SHIVON P
609 MOUNTCASTLE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
610 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
610 NAKOMA DR
ROCKWALL, TX 75087

WILCOX GRANTLEY & KELLY
610 AMHERST DRIVE
ROCKWALL, TX 75087

PRINCE ERVIN F AND PAMELA
610 BORDEAUX DRIVE
ROCKWALL, TX 75087

LACEY GARY & KIMBERLY ENGLE
610 DEVERSON DRIVE
ROCKWALL, TX 75087

BURGIEL BROOKE
610 MIRAMAR DR
ROCKWALL, TX 75087

CUNNINGHAM ELISA
611 MOUNTCASTLE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
612 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
612 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
612 NAKOMA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
613 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
613 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
613 NAKOMA DR
ROCKWALL, TX 75087

CONFIDENTIAL
613 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

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CURRENT RESIDENT
614 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
614 NAKOMA DR
ROCKWALL, TX 75087

PEOPLES BILLY W JR
614 COVEY TRL
ROCKWALL, TX 75087

CURRENT RESIDENT
616 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
617 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
617 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
617 NAKOMA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
618 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
618 NAKOMA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
620 COVEY TRL
ROCKWALL, TX 75087

CURRENT RESIDENT
620 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
621 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
621 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
621 NAKOMA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
622 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
622 NAKOMA DR
ROCKWALL, TX 75087

DREES CUSTOM HOMES LP
6225 N ST HWY 161 #150
IRVING, TX 75038

CURRENT RESIDENT
624 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
625 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
625 FM552
ROCKWALL, TX 75087

CURRENT RESIDENT
625 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
625 NAKOMA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
626 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
626 NAKOMA DR
ROCKWALL, TX 75087

HASEGAWA TETSUYA & PATRICIA EMY AOKI
626 COVEY TRL
ROCKWALL, TX 75087

CURRENT RESIDENT
628 MONTROSE DR
ROCKWALL, TX 75087

PUGH WILLIAM C AND DIANA L
628 PIPPIN LANE
KINGSVILLE, TX 78363

CURRENT RESIDENT
629 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
629 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
629 NAKOMA DR
ROCKWALL, TX 75087

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CURRENT RESIDENT
630 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
630 NAKOMA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
632 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
633 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
633 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
633 NAKOMA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
634 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
634 NAKOMA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
636 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
637 EMERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
637 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
637 NAKOMA DR
ROCKWALL, TX 75087

CURRENT RESIDENT
640 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
641 EMERSON DR
ROCKWALL, TX 75087

CAMPBELL KEN AND ROSE M
655 YORK DR
ROCKWALL, TX 75087

PICHA KEVIN KENNETH AND NANCY LYNN
657 YORK DR
ROCKWALL, TX 75087

CONFIDENTIAL
658 FEATHERSTONE DR
ROCKWALL, TX 75087

DANG TIET DINH & THANH THI VU DANG
659 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

WLODARCZAK MARCUS ANTHONY AND
DANIEL GRANT SHIRLEY
659 YORK DR
ROCKWALL, TX 75087

HALL ROBERT E AND PATRICIA A
660 FEATHERSTONE DR
ROCKWALL, TX 75087

BENNETT DANIELLE ACCARDO AND SEAN M
660 HANOVER DR
ROCKWALL, TX 75087

TEAGUE GREGORY CHARLES
661 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

CARTER FAMILY TRUST
RICHARD CARTER AND MARY CARTER TRUSTEES
661 YORK DR
ROCKWALL, TX 75087

LLOYD MARK S AND ANGIE L
662 FEATHERSTONE DR
ROCKWALL, TX 75087

BRITT MATTHEW THOMAS AND SARAH
REBECCA
662 HANOVER DR
ROCKWALL, TX 75087

GARCIA SANTIAGO DIAZ
662 YORK DR
ROCKWALL, TX 75087

BINDER TIMOTHY J AND LISSA A
663 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

BLAIR BRYNN FORBRICH AND CHRISTON
MICHAEL
663 HANOVER DR
ROCKWALL, TX 75087

OPITZ JEFF AND CAROL
663 YORK DR
ROCKWALL, TX 75087

JETER JAMES D AND CAROL L
664 FEATHERSTONE DR
ROCKWALL, TX 75087

404

MOSS MICHAEL ANDREW AND BETH ANN
664 HANOVER DR
ROCKWALL, TX 75087

RADICIONI WADE AND LISA R
664 YORK DR
ROCKWALL, TX 75087

BRAKSTAD BENGT AND THERESA KATHLEEN
665 FEATHERSTONE DR
ROCKWALL, TX 75087

HALL BRYAN PATRICK
665 HANOVER DR
ROCKWALL, TX 75087

IONITA MIHAI AND LAURA
665 YORK DR
ROCKWALL, TX 75087

GASTON DAVID LEE AND CARRIE ANN
667 FEATHERSTONE DR
ROCKWALL, TX 75087

OGLE JONATHAN A AND TONI L
667 HANOVER DR
ROCKWALL, TX 75087

MARKHAM BRUCE D AND DONNETTA P
667 YORK DR
ROCKWALL, TX 75087

CORL KIMBERLY BETH & JON DEREK
668 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

GLYNN JAMES T AND SALLY A
668 HANOVER DR
ROCKWALL, TX 75087

WEISS DANIEL HERMAN
668 YORK DR
ROCKWALL, TX 75087

CURRENT RESIDENT
669 YORK DR
ROCKWALL, TX 75087

WINCHEL TANYA M
669 FEATHERSTONE DR
ROCKWALL, TX 75087

POLEY JOHN R AND KATHRYNE L
669 HANOVER DR
ROCKWALL, TX 75087

CURLEE BRET A AND SUSAN L
670 FEATHERSTONE DR
ROCKWALL, TX 75087

RICKETTS GREGORY B & DANIELLE E
670 HANOVER DRIVE
ROCKWALL, TX 75087

MCLAUGHLIN PATRICK PARKER
670 YORK DR
ROCKWALL, TX 75087

BOWERS DON
671 FEATHERSTONE DR
ROCKWALL, TX 75087

LOFLAND WILLIAM CHRISTOPHER AND LYNDSEY NICOLE
671 HANOVER
ROCKWALL, TX 75087

ERICKSON JULIA A AND DAVID
671 YORK DR
ROCKWALL, TX 75087

WILLIAMS DONALD AND TAMMY
672 FEATHERSTONE DR
ROCKWALL, TX 75087

SPRADLING JOHN RYAN AND SARAH KIM
672 HANOVER DR
ROCKWALL, TX 75087

DRAKE VERNON EUGENE & TOYA YVETTE
672 YORK DRIVE
ROCKWALL, TX 75087

HUYNH TAN KHAH AND THUY THU
673 FEATHERSTONE DR
ROCKWALL, TX 75087

VILLARREAL CRAIG ALAN AND CHARLYN ROBIN HANNA
673 HANOVER DR
ROCKWALL, TX 75087

WRIGHT BOBBY PAUL AND MARY L
674 FEATHERSTONE DR
ROCKWALL, TX 75087

MILLER JAMES RYAN
674 HANOVER DRIVE
ROCKWALL, TX 75087

ECKROTE KENNETH R & LESLIE A
674 YORK DRIVE
ROCKWALL, TX 75087

ALBARELLI REBECCA & GEORGE
675 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

MARTINEZ CARLOS FERNANDO RODRIGUEZ
675 HANOVER DR
ROCKWALL, TX 75087

405

MUELLER BRYAN SCOTT
676 HANOVER DRIVE
ROCKWALL, TX 75087

DORTCH TOMMY C & ELLEN D
676 YORK DRIVE
ROCKWALL, TX 75087

WEBER ANDREW JOSEPH AND DANIELLE MARIE WEBER
677 HANOVER DRIVE
ROCKWALL, TX 75087

ENGLISH ERIC S AND TEREON DENISE MCCLARIN
678 HANOVER DR
ROCKWALL, TX 75087

TRAN VINCENT VINH & KATHERINE NGOC TU
678 YORK DR
ROCKWALL, TX 75087

HOPPER MICHAEL ERIC AND TINA CHERIEE
679 HANOVER DR
ROCKWALL, TX 75087

KANG MINCHUL AND MIYOUNG CHEONG
680 YORK DR
ROCKWALL, TX 75087

CDGT ROCKWALL/2016 LLC
6925 FM 2515
KAUFMAN, TX 75142

CDT ROCKWALL/2017 LLC
6925 FM 2515
KAUFMAN, TX 75142

CURRENT RESIDENT
700 MONTROSE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
704 MONTROSE DR
ROCKWALL, TX 75087

GREER PATRICIA L
710 BROOKFIELD DR
GARLAND, TX 75040

GOLIAD REAL ESTATE LLC
7700 EASTERN AVENUE SUITE 705
DALLAS, TX 75209

BOGERT WILLIAM PAUL AND RENEE
771 BORDEAUX DRIVE
ROCKWALL, TX 75087

LUPER JUSTIN GARRET
7718 VISTA RIDGE LANE
SACHSE, TX 75048

ERICKSON BRENT D AND JENNIFER
772 BORDEAUX DRIVE
ROCKWALL, TX 75087

HUNTER JEFFREY KYLE & RENEE MARIE
774 DEVERSON DRIVE
ROCKWALL, TX 75087

PURSELL NATHANIEL S AND NILAFE R
775 BORDEAUX DRIVE
ROCKWALL, TX 75087

ATINC MAHMUT GUCLU AND MURUVVET YASEMIN OCAL-
775 DEVERSON DR
ROCKWALL, TX 75087

SUN WEI AND
BAO AN LI
775 HANOVER DRIVE
ROCKWALL, TX 75087

MCDONALD SONDRA S
776 BORDEAUX DR
ROCKWALL, TX 75087

KERLEY KATHRYN LEE AND CHARLES VANCE
776 DEVERSON DR
ROCKWALL, TX 75087

ILLIG ANTHONY A & KRISTIN D
776 MIRAMAR DRIVE
ROCKWALL, TX 75087

COBB ARTHUR AND DEIDRA
776 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

CHEEK ASHLEY DAVID & CHRISTIN
776 YORK DRIVE
ROCKWALL, TX 75087

REED TREVOR LANCE & ADRIENNE
777 BORDEAUX DR
ROCKWALL, TX 75087

HACKNEY JAMES M AND KATHY Y
777 DEVERSON DR
ROCKWALL, TX 75087

PANAK DAVID LEO & LISA RENE
777 HANOVER DRIVE
ROCKWALL, TX 75087

CLEVENGER WANDA
777 MIRAMAR DR
ROCKWALL, TX 75087

BRYANT DENNIS A & ROBYN E
777 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

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CURRENT RESIDENT
778 DEVERSON DR
ROCKWALL, TX 75087

GOTTLEABER STEVEN AND TERRI
778 BORDEAUX DR
ROCKWALL, TX 75087

CRUZ SANTIAGO & NINFA E
778 HANOVER DRIVE
ROCKWALL, TX 75087

BAILEY LANCE & KALI
778 MIRAMAR DRIVE
ROCKWALL, TX 75087

VELASQUEZ KRISTEN F AND
DAYAN I VELASQUEZ ESCUDERO
778 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

TAYLOR LAURA
778 OAK HOLLOW
ROCKWALL, TX 75087

YATES TERRY WILLIAM & CYNTHIA
778 YORK DRIVE
ROCKWALL, TX 75087

FREEMAN COLBY C AND NEISHA E
779 BORDEAUX DR
ROCKWALL, TX 75087

BUCKNER JUSTIN S AND ELAINE THOAI-ANH
NGUYEN
779 DEVERSON DR
ROCKWALL, TX 75087

BOYD STEPHEN & SUSAN
779 MIRAMAR
ROCKWALL, TX 75087

HASSAN AKRAM A AND AMAL
779 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

LEE NICHOLAS Q AND SABRINA BH PHUNG
780 BORDEAUX DR
ROCKWALL, TX 75087

CONFIDENTIAL
780 DEVERSON DRIVE
ROCKWALL, TX 75087

HAMPTON CHRISTOPHER T AND HEATHER M
780 HANOVER DR
ROCKWALL, TX 75087

COULMAN MICHAEL SCOTT & ANASTASIA V
780 MIRAMAR DRIVE
ROCKWALL, TX 75087

SOUTHAM MARK J AND LINDA D
780 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

BIESEL TROY H
780 YORK DRIVE
ROCKWALL, TX 75087

WILLIAMSON BRENNAN AND SARAH
781 BORDEAUX DR
ROCKWALL, TX 75087

DOBSON JASON M AND KIMBERLY
781 DEVERSON DR
ROCKWALL, TX 75087

JACKSON SHANNON D
781 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

HIESTER DAVID LIFE ESTATE AND
MADELEINE N HIESTER
781 HANOVER DRIVE
ROCKWALL, TX 75087

SAUNDERS RICHARD & STACI
781 MIRAMAR DRIVE
ROCKWALL, TX 75087

HOLLOWAY SHERYLL
781 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

PHELAN RYAN PATRICK
782 BORDEAUX DR
ROCKWALL, TX 75087

WING ABIGAIL E
782 DEVERSON DR
ROCKWALL, TX 75087

PATTERSON WILLIAM L JR AND DWAYLA L
REVOCABLE LIVING TRUST
782 HANOVER DR
ROCKWALL, TX 75087

GENTILE JOSEPH C
782 MIRAMAR DRIVE
ROCKWALL, TX 75087

SIMPSON CODY M & LESLIE
782 MOUNTCASTLE DR
ROCKWALL, TX 75087

MABRY AMY PEARCE & RUSSELL KYLE
782 YORK DRIVE
ROCKWALL, TX 75087

OLSON JAMES A AND JEAN V
783 BORDEAUX DR
ROCKWALL, TX 75087

407

BASSETT-FITTOS DENISE A
783 DEVERSON DR
ROCKWALL, TX 75087

DANG TANYA AND
BRYANT TRAN
783 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

MYERS SHELLI
783 HANOVER DRIVE
ROCKWALL, TX 75087

RENNER KEVIN AND CECILIA
783 MIRAMAR DR
ROCKWALL, TX 75087

GRISWOLD ADAM & ASHLEY
783 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

CONFIDENTIAL
HEATHER A CAMUNE
784 BARRYMORE DR
ROCKWALL, TX 75087

STANDEN DARREN JOSEPH AND KAREN BONNIE
784 BORDEAUX DR
ROCKWALL, TX 75087

HOLDEN CHRISTOPHER & SANDRA
784 DEVERSON DR
ROCKWALL, TX 75087

SLOAN JAMES R AND JUDY A GARZA
784 HANOVER DR
ROCKWALL, TX 75087

JOHNSON EMMA G
784 MIRAMAR DRIVE
ROCKWALL, TX 75087

BREYTSPRAAK DONALD JR & NONNIE
784 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

HALE B CALVIN & PHYLLIS A
784 YORK DR
ROCKWALL, TX 75087

WALSH DEREK AND MICHELLE
785 BORDEAUX DR
ROCKWALL, TX 75087

CALDWELL ERIC AND DEBBIE
785 DEVERSON DR
ROCKWALL, TX 75087

CUTLER CLAUDE K & VIVIAN M
785 FEATHERSTONE DR
ROCKWALL, TX 75087

WATTS WILLIAM MARK & LORI LYNN
785 HANOVER DRIVE
ROCKWALL, TX 75087

EMERSON JAIME
785 MIRAMAR DRIVE
ROCKWALL, TX 75087

MUELLER MICHAEL RAY AND MERRITT
785 MOUNTCASTLE DR
ROCKWALL, TX 75087

TBC FAMILY TRUST
TONY AND BRENDA CAMPAGNA TRUSTEES
786 BARRYMORE DRIVE
ROCKWALL, TX 75087

JOHNSON BART JACOB AND AMANDA DAWN
786 BORDEAUX DR
ROCKWALL, TX 75087

HARDWICK GLENDA
786 DEVERSON DR
ROCKWALL, TX 75087

VAUGHN JESSE & CARLA MICHELLE
786 FEATHERSTONE DR
ROCKWALL, TX 75087

BAILEY ALAN W & SHIRLEY Y
786 HANOVER DR
ROCKWALL, TX 75087

WENDEL PAUL AND TERRI
786 MIRAMAR DRIVE
ROCKWALL, TX 75087

PATTERSON MICHAEL WAYNE AND MICHELLE
KEHOE
786 MOUNTCASTLE DR
ROCKWALL, TX 75087

RUSSELL WILLIAM
786 YORK DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
787 BARRYMORE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
787 DEVERSON DR
ROCKWALL, TX 75087

CURRENT RESIDENT
787 FEATHERSTONE DR
ROCKWALL, TX 75087

ROBERTSON RYAN LYNDLE AND LYNETTE MARIE
787 BORDEAUX DRIVE
ROCKWALL, TX 75087

408

LAND GEOFFREY ALLISON & ERNANI MAXINE
787 HANOVER DR
ROCKWALL, TX 75087

COLLIER MELODEE
787 MIRAMAR DRIVE
ROCKWALL, TX 75087

OWUSU JOSEPH AND
FLAVIA FRIMPONG
787 MOUNTCASTLE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
788 DEVERSON DR
ROCKWALL, TX 75087

MCDONALD BRADLEY NEAL AND JULIE LYNN
788 BARRYMORE DR
ROCKWALL, TX 75087

PODINA STEVEN L
788 BORDEAUX DR
ROCKWALL, TX 75087

LAKIN RICHARD J & SUSAN C
788 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

CONFIDENTIAL
788 HANOVER DR
ROCKWALL, TX 75087

BURGIEL KEVIN THOMAS
788 MIRAMAR DR
ROCKWALL, TX 75087

THOMAS JOHN EARL & ADRIENNE CAPRI
788 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

BLACKETER LARRY M AND GWENDOLYN HILL
788 YORK DR
ROCKWALL, TX 75087

CURRENT RESIDENT
789 FEATHERSTONE DR
ROCKWALL, TX 75087

EVERHART RYAN M AND KARA M GILLILAND
789 BORDEAUX DR
ROCKWALL, TX 75087

CRUMP GUY AND MELISSA
789 DEVERSON DR
ROCKWALL, TX 75087

LORTS NANCY J
789 HANOVER DRIVE
ROCKWALL, TX 75087

MURRAY BRYAN A & SHANNON
789 MIRAMAR DR
ROCKWALL, TX 75087

DEAN SHELLY & ROBERT
789 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
790 HANOVER DR
ROCKWALL, TX 75087

MAGUIRE LINDSAY T & CHRISTOPHER M
790 BARRYMORE DRIVE
ROCKWALL, TX 75087

HAWKINSON JEFFREY S AND MADELINE N
790 BORDEAUX DR
ROCKWALL, TX 75087

GREEN MATTHEW DWAYNE AND TWILA
790 DEVERSON DRIVE
ROCKWALL, TX 75087

FOWLER DOUGLAS LYNN & ROBIN
790 FEATHERSTONE DR
ROCKWALL, TX 75087

HAVENS WILLIAM
790 MIRAMAR DRIVE
ROCKWALL, TX 75087

KARKHOFF MICHAEL AND JUDY
790 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

KELLY TIMOTHY
790 YORK DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
791 FEATHERSTONE DR
ROCKWALL, TX 75087

BAWCUM ROSS AND TIFFANY
791 BARRYMORE DR
ROCKWALL, TX 75087

HUGHES JACOB AUSTIN AND CANDICE
791 BORDEAUX DR
ROCKWALL, TX 75087

KINSEY SHEARON KAY
791 DEVERSON DR
ROCKWALL, TX 75087

ALBRITTON MICHAEL H & ELAINE W LIVING
TRUST
MICHAEL H & ELAINE W ALBRITTON TRUSTEES
791 HANOVER DRIVE
ROCKWALL, TX 75087

409

SCHWISTER TODD J AND APRIL D
791 MIRAMAR DR
ROCKWALL, TX 75087

TAYLOR SCOTTY LEE AND MEAGAN
791 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

PATEL BHAVIK & ASMINI
792 BARRYMORE DRIVE
ROCKWALL, TX 75087

MURPHY MICHAEL & VICKI
792 DEVERSON DR
ROCKWALL, TX 75087

MOMSEN KIMBERLY MICHELE
792 FEATHERSTONE DR
ROCKWALL, TX 75087

DAVISON CHARLES DAVID AND NANCY JOAN
792 HANOVER DR
ROCKWALL, TX 75087

KIESCHNICK ROGER
792 MIRAMAR DR
ROCKWALL, TX 75087

WOODLIFF JACK AND EMMA
792 MOUNTCASTLE DR
ROCKWALL, TX 75087

WILSON BRANDON CRAIG AND EMILY MARIE
792 YORK DR
ROCKWALL, TX 75087

CURRENT RESIDENT
793 MOUNTCASTLE DR
ROCKWALL, TX 75087

REEVES ERIC
793 BARRYMORE DR
ROCKWALL, TX 75087

WEBB CAROLYN K
793 DEVERSON DRIVE
ROCKWALL, TX 75087

SCHLADWEILER DEREK AND SARAH RENAE
793 FEATHERSTONE DRIVE
ROCKWALL, TX 75087

HARP CHRISTOPHER J AND PENNY
793 HANOVER DR
ROCKWALL, TX 75087

COSTELLO NICHOLAS D & MELISSA L
793 MIRAMAR DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
794 BORDEAUX DR
ROCKWALL, TX 75087

HALE ALAN LEE AND RITA M
794 AMHERST DR
ROCKWALL, TX 75087

LAMB CHANCE DUKE
794 BARRYMORE DR
ROCKWALL, TX 75087

SCHROEDER DAVID J & MARGARET D
794 DEVERSON DR
ROCKWALL, TX 75087

MULLIS RHETT DANIEL AND SUSAN
794 FEATHERSTONE DR
ROCKWALL, TX 75087

EVANS MARCUS EUGENE AND DEANN
794 HANOVER DR
ROCKWALL, TX 75087

VALK CATHLEEN A
794 MIRAMAR DRIVE
ROCKWALL, TX 75087

GORDON SCOTT AND MIRANDA
794 MOUNTCASTLE DR
ROCKWALL, TX 75087

THERRIEN MICHAEL AND VICTORIA
794 YORK DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
795 FEATHERSTONE DR
ROCKWALL, TX 75087

CHINN MARK & ELENA
795 AMHERST DR
ROCKWALL, TX 75087

DOPKINS DANIEL AND JENNIFER
795 BARRYMORE
ROCKWALL, TX 75087

LOTHSCHUTZ PAMELA
795 DEVERSON DR
ROCKWALL, TX 75087

NURMI DOUGLAS B & LISA R
795 HANOVER DRIVE
ROCKWALL, TX 75087

DAVIS BOYCE W & MISTY C
795 MIRAMAR DRIVE
ROCKWALL, TX 75087

410

DJUKIC-LUJAN NATALIE A AND
FEDERICO I FERREYRA
795 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

DACUS BRIAN & STACIE
796 AMHERST DRIVE
ROCKWALL, TX 75087

JAMES LANIER BALLARD & ELIZABETH SUTTER
BALLARD REVOCABLE LIVING TRUST
JAMES LANIER BALLARD & ELIZABETH SUTTER
BALLARD TRUSTEES
796 BARRYMORE DRIVE
ROCKWALL, TX 75087

MULLINS KEITH AND ROBIN
796 DEVERSON DR
ROCKWALL, TX 75087

TURNER JIMMIE L
796 FEATHERSTONE DR
ROCKWALL, TX 75087

CHAMBLESS WILLIAM AND HELEN GOMEZ-
SALVADOR
796 HANOVER DR
ROCKWALL, TX 75087

VOLL ANDREW W AND JOANNA
796 MIRAMAR DR
ROCKWALL, TX 75087

WEMPE MARK STEVEN AND SUSAN SPENCER
796 YORK DR
ROCKWALL, TX 75087

CURRENT RESIDENT
797 AMHERST DR
ROCKWALL, TX 75087

CURRENT RESIDENT
797 FEATHERSTONE DR
ROCKWALL, TX 75087

LIVINGSTON ERIKA S & JACK E
797 DEVERSON DRIVE
ROCKWALL, TX 75087

TUMULTY TIMOTHY M & KIM A
797 HANOVER DRIVE
ROCKWALL, TX 75087

ARMSTRONG JOHN N AND LAURA L
797 MIRAMAR DR
ROCKWALL, TX 75087

CURRENT RESIDENT
798 BARRYMORE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
798 FEATHERSTONE DR
ROCKWALL, TX 75087

LOGWOOD CLINTON G II & DANA C
798 AMHERST DR
ROCKWALL, TX 75087

GINGRAS BRIDGET KANDICE & ETHAN WILLIAM
798 DEVERSON DR
ROCKWALL, TX 75087

TINDALL JACOB
798 MIRAMAR DR
ROCKWALL, TX 75087

DAVIS JAN ANNETTE AND DARRYL WAYNE
798 YORK DR
ROCKWALL, TX 75087

MCCORMICK KEVIN & JULIA
799 MIRAMAR DRIVE
ROCKWALL, TX 75087

ROCHE CHRISTOPHER & MELANIE
800 BARRYMORE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
801 BORDEAUX DR
ROCKWALL, TX 75087

CAMUNE CHRISTOPHER
801 AMHERST DRIVE
ROCKWALL, TX 75087

SHULTZ ZACHARY
801 MIRAMAR DRIVE
ROCKWALL, TX 75032

HIGGINS SCOTT AND KERRIANNA KNIGHT
801 MOUNTCASTLE DR
ROCKWALL, TX 75087

LOFTIS JAMES D & CHRISTINE C
802 AMHERST DRIVE
ROCKWALL, TX 75087

JONES BRYAN M AND MERICHELLE E
802 BARRYMORE DR
ROCKWALL, TX 75087

COSS MARCUS H & KRISTIN N
802 KNOX DRIVE
ROCKWALL, TX 75087

CURRY CHRISTOPHER DALE & MICHELLE RENE
802 MIRAMAR DR
ROCKWALL, TX 75087

DURAN MARCO AND KATIE
802 MOUNTCASTLE DR
ROCKWALL, TX 75087

411

PODINA LAUREN ADRIA & MICHAEL
802 YORK DRIVE
ROCKWALL, TX 75087

CURRENT RESIDENT
803 MIRAMAR DR
ROCKWALL, TX 75087

MURPHY MARK R AND BRANDI L
803 AMHERST DR
ROCKWALL, TX 75087

JOHNSON CHANDLER JASON AND AMBER DAWN
803 KNOX DR
ROCKWALL, TX 75087

SICILIANO LAURA EDITH
803 MOUNTCASTLE DR
ROCKWALL, TX 75087

SLAMONS JOSEPH LAWRENCE
804 AMHERST DR
ROCKWALL, TX 75087

KHAN MASROOR
804 BARRYMORE DRIVE
ROCKWALL, TX 75087

ANDERSON JEANETTE
804 KNOX DRIVE
ROCKWALL, TX 75087

KIM YUN HYUN & JIN HEE JUNG
804 MIRAMAR DRIVE
ROCKWALL, TX 75087

ZHAO WEIDONG AND
XIAOLEI WANG
804 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

FLORES JORGE & NAOMI SHALIT
804 YORK DRIVE
ROCKWALL, TX 75087

ABOUCHEDID CHARLES A
805 KNOX DRIVE
ROCKWALL, TX 75087

GODINEZ DAVID R AND KAREN W
805 MIRAMAR DR
ROCKWALL, TX 75087

PENTON RYAN THOMAS AND JENNIFER ANN
805 MOUNTCASTLE DR
ROCKWALL, TX 75087

CURRENT RESIDENT
806 MOUNTCASTLE DR
ROCKWALL, TX 75087

EVANS DOUGLAS E
806 AMHERST DRIVE
ROCKWALL, TX 75087

HENDERSON ERIC S & MEGAN A
806 KNOX DRIVE
ROCKWALL, TX 75087

CYPERT LYNDOL & JERE
806 MIRAMAR DRIVE
ROCKWALL, TX 75087

REY LUIS SR AND JUDY L
806 YORK DR
ROCKWALL, TX 75087

MOBLEY JANET
807 AMHERST DR
ROCKWALL, TX 75087

STEWART CHRISTOPHER & PRISCILLA
807 KNOX DRIVE
ROCKWALL, TX 75087

AGEE DANIEL B AND LEAH D KING AND
STEPHEN C BEUCHAW AND KAREN L BEUCHAW
807 MIRAMAR DRIVE
ROCKWALL, TX 75087

RANKIN CARLA S
807 MOUNTCASTLE DR
ROCKWALL, TX 75087

2018 M J WIEBEL REVOCABLE TRUST
MICHAEL JUSTIN WIEBEL AND JAIME LAUREN
WIEBEL- TRUSTEES
808 AMHERST DRIVE
ROCKWALL, TX 75087

FERNANDEZ TERESA SUAREZ AND LUIS
OSVALDO
808 KNOX DRIVE
ROCKWALL, TX 75087

BAILEY JERRY SCOTT & KAREN RENEE
808 MIRAMAR DRIVE
ROCKWALL, TX 75087

CHEW CHRISTINA
808 MOUNTCASTLE DR
ROCKWALL, TX 75087

ODEYEMI ADETUNJI
808 YORK DR
ROCKWALL, TX 75087

CURRENT RESIDENT
809 KNOX DR
ROCKWALL, TX 75087

GREER KRISTEN N
809 MIRAMAR DR
ROCKWALL, TX 75087

412

WRIGHT EMILY ELIZABETH AND KEVIN MATTHEW
810 KNOX DR
ROCKWALL, TX 75087

SHING RICHARD L & IVEY D
810 MIRAMAR DR
ROCKWALL, TX 75087

MALONE VICKI MARLA
810 MOUNTCASTLE DRIVE
ROCKWALL, TX 75087

MOY BING
811 KNOX DRIVE
ROCKWALL, TX 75087

HASSAN ALAA E & PATRICIA ANN HASSAN IBRAHIM
811 MIRAMAR DRIVE
ROCKWALL, TX 75087

HERGERT KODY AND ADRIENNE MICHELLE
812 KNOX DRIVE
ROCKWALL, TX 75087

WRIGHT EMILY ELIZABETH AND KEVIN MATTHEW
810 KNOX DRIVE
ROCKWALL, TX 75087

413

NOTICE OF PUBLIC HEARING
CITY OF ROCKWALL, PLANNING & ZONING DEPARTMENT

PHONE: (972) 771-7745
EMAIL: PLANNING@ROCKWALL.COM

To Whom It May Concern:

You are hereby notified that the City of Rockwall Planning and Zoning Commission and City Council will consider the following application:

Case No. Z2019-024: PD Amendment to PD-70

Hold a public hearing to discuss and consider a request by Adam Buczek of Stone Creek Balance, LTD for the approval of a zoning amendment to Planned Development District 70 (PD-70) for the purpose of changing the number of hard-edged retention ponds required for the residential subdivision being a ~336-acre tract of land identified as the Stone Creek Subdivision and being situated within the W. T. Deweese Survey, Abstract No. 71 and the S. King Survey, Abstract No 131, City of Rockwall, Rockwall County, Texas, zoned Planned Development District 70 (PD-70) for Single-Family 10 (SF-10) District land uses, situated within the North SH-205 Overlay (N. SH-205 OV) and SH-205 By-Pass Overlay (SH-205 BY-OV) Districts, generally located at the southeast corner of the intersection of FM-552 and SH-205 [N. Goliad Street], and take any action necessary.

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As an interested property owner, you are invited to attend these meetings. If you prefer to express your thoughts in writing please return the form to:

David Gonzales
Rockwall Planning and Zoning Dept.
385 S. Goliad Street
Rockwall, TX 75087

You may also email your comments to the Planning Department at planning@rockwall.com. If you choose to email the Planning Department please include your name and address for identification purposes.

Your comments must be received by **10/21/2019** to ensure they are included in the information provided to the City Council.

Sincerely,

Ryan Miller, AICP
Director of Planning & Zoning

USE THIS QR CODE TO GO DIRECTLY TO THE WEBSITE

MORE INFORMATION ON THIS CASE CAN BE FOUND ON THE CITY'S WEBSITE:
HTTPS://SITES.GOOGLE.COM/SITE/ROCKWALLPLANNING/DEVELOPMENT-CASES

PLEASE RETURN THE BELOW FORM

Case No. Z2019-024: PD Amendment to PD-70

Please place a check mark on the appropriate line below:

☐ I am in favor of the request for the reasons listed below.

☐ I am opposed to the request for the reasons listed below.

Name:

Address:

Tex. Loc. Gov. Code, Sec. 211.006 (d) If a proposed change to a regulation or boundary is protested in accordance with this subsection, the proposed change must receive, in order to take effect, the affirmative vote of at least three-fourths of all members of the governing body. The protest must be written and signed by the owners of at least 20 percent of either: (1) the area of the lots or land covered by the proposed change; or (2) the area of the lots or land immediately adjoining the area covered by the proposed change and extending 200 feet from that area.

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Case No. Z2019-024: PD Amendment to PD-70

Please place a check mark on the appropriate line below:

☐ I am in favor of the request for the reasons listed below.

☒ I am opposed to the request for the reasons listed below.

We need at lest three pond for this size of DeLopement for water Run off. (Leave The Pond)

Name: Bruce A. MacLeod

Address: 111 Crest Brook Dr. Rockwall Texas.

Tex. Loc. Gov. Code, Sec. 211.006 (d) If a proposed change to a regulation or boundary is protested in accordance with this subsection, the proposed change must receive, in order to take effect, the affirmative vote of at least three-fourths of all members of the governing body. The protest must be written and signed by the owners of at least 20 percent of either: (1) the area of the lots or land covered by the proposed change; or (2) the area of the lots or land immediately adjoining the area covered by the proposed change and extending 200 feet from that area.

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☑ I am opposed to the request for the reasons listed below.

I request the developer, Dick Scorburg, take care of the common areas consistent with Appendix "C" of PD-070 prior to any amendment to reduce anything. I now and have before questioned Mr. Scorburg's integrity towards us!

Name: Michael H. Albritton

Address: 791 Hanover Drive, Rockwall TX, 75087-7150

Tex. Loc. Gov. Code, Sec. 211.006 (d) **If a proposed change to a regulation or boundary is protested in accordance with this subsection, the proposed change must receive, in order to take effect, the affirmative vote of at least three-fourths of all members of the governing body. The protest must be written and signed by the owners of at least 20 percent of either: (1) the area of the lots or land covered by the proposed change; or (2) the area of the lots or land immediately adjoining the area covered by the proposed change and extending 200 feet from that area.**

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Case No. Z2019-024: PD Amendment to PD-70

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☒ I am opposed to the request for the reasons listed below.

MAKE THE DEVELOPER MEET THE REQUIREMENTS AGREED TO ON THE APPROVED PD-70, PAGE #81. THE DEVELOPER HAS NOT COMPLIED WITH OTHER CRITERIA AND THIS IS THE LAST SECTION AVAILIABLE WITH APPROVED DEVELOPMENT PLAN. TO COMPLY

Name: RALPH CHIZZONITE

Address: 101 CRESTBROOK DRIVE, ROCKWALL, TX. 75087

Tex. Loc. Gov. Code, Sec. 211.006 (d) If a proposed change to a regulation or boundary is protested in accordance with this subsection, the proposed change must receive, in order to take effect, the affirmative vote of at least three-fourths of all members of the governing body. The protest must be written and signed by the owners of at least 20 percent of either: (1) the area of the lots or land covered by the proposed change; or (2) the area of the lots or land immediately adjoining the area covered by the proposed change and extending 200 feet from that area.

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KEEP PD REQUIREMENTS FOR HARD EDGE PONDS, MODIFY EXISTING POND TO HARD EDGE, RETAIN SOME TREES AROUND THE POND TO PROVIDE A PLEASING & NATURAL DRAINAGE AREA.

NOTICE OF PUBLIC HEARING
CITY OF ROCKWALL, PLANNING & ZONING DEPARTMENT

PHONE: (972) 771-7745
EMAIL: PLANNING@ROCKWALL.COM

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David Gonzales
Rockwall Planning and Zoning Dept.
385 S. Goliad Street
Rockwall, TX 75087

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Sincerely,

Ryan Miller, AICP
Director of Planning & Zoning

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Case No. Z2019-024: PD Amendment to PD-70

Please place a check mark on the appropriate line below:

☒ I am in favor of the request for the reasons listed below.

☐ I am opposed to the request for the reasons listed below.

WE DON'T NEED A SMALL POND ACROSS THE STREET (FEATHERSTONE) FROM THE LARGE, NATURAL POND.

Name: Bob Wacker, Kathy Wacker

Address: 309 FEATHERSTONE DRIVE

Tex. Loc. Gov. Code, Sec. 211.006 (d) **If a proposed change to a regulation or boundary is protested in accordance with this subsection, the proposed change must receive, in order to take effect, the affirmative vote of at least three-fourths of all members of the governing body. The protest must be written and signed by the owners of at least 20 percent of either: (1) the area of the lots or land covered by the proposed change; or (2) the area of the lots or land immediately adjoining the area covered by the proposed change and extending 200 feet from that area.**

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Case No. Z2019-024: PD Amendment to PD-70

Please place a check mark on the appropriate line below:

[X] I am in favor of the request for the reasons listed below.

[ ] I am opposed to the request for the reasons listed below.

Name: Carolyn K Webb

Address: 193 Devereson Dr, Rockwall, Tx 75087

Tex. Loc. Gov. Code, Sec. 211.006 (d) **If a proposed change to a regulation or boundary is protested in accordance with this subsection, the proposed change must receive, in order to take effect, the affirmative vote of at least three-fourths of all members of the governing body. The protest must be written and signed by the owners of at least 20 percent of either: (1) the area of the lots or land covered by the proposed change; or (2) the area of the lots or land immediately adjoining the area covered by the proposed change and extending 200 feet from that area.**

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Zoning & Specific Use Permit Input Form

Case Number *

Please provide the Case Reference Number of the Zoning or Specific Use Permit (SUP) request that you are providing input on (Example: Z2019-001).

Z2019-024

Please place a check mark on the appropriate line below: *

- [x] I am in favor of the request.
- [ ] I am in opposition to the request.

Please provide any additional information concerning your support or opposition to the request.

Respondent Information

Please provide your information.

First Name *

Bryant

Last Name *

Tran

Address *

783 Featherstone Drive

City *

Rockwall

State *

TX

Zip Code *

75087

Email Address *

bryant.tran@outlook.com

Phone Number

Please check all that apply: *

- [x] I live nearby the proposed Zoning or Specific Use Permit (SUP) request.
- [ ] I work nearby the proposed Zoning or Specific Use Permit (SUP) request.
- [x] I own property nearby the proposed Zoning or Specific Use Permit (SUP) request.
- [ ] I own a business nearby the proposed Zoning or Specific Use Permit (SUP) request.
- [ ] Other: _____

How did you hear about this Zoning or Specific Use Permit (SUP) request? *

- (●) I received a property owner notification in the mail.
- ( ) I read about the request on the City's website.
- ( ) I saw a zoning sign on the property.
- ( ) I read about the request in the Rockwall Herald Banner.
- ( ) My neighbors told me about the request.
- ( ) Other: _____

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Case Number *

Please provide the Case Reference Number of the Zoning or Specific Use Permit (SUP) request that you are providing input on (Example: Z2019-001).

Z2019-024

Please place a check mark on the appropriate line below: *

- [ ] I am in favor of the request.
- [x] I am in opposition to the request.

Please provide any additional information concerning your support or opposition to the request.

Respondent Information

Please provide your information.

First Name *

Elliott

Last Name *

Huff

Address *

312 nakoma dr

City *

Rockwall

State *

Texas

Zip Code *

75087

Email Address *

elliotthuff2001@yahoo.com

Phone Number

Please check all that apply: *

- [x] I live nearby the proposed Zoning or Specific Use Permit (SUP) request.
- [ ] I work nearby the proposed Zoning or Specific Use Permit (SUP) request.
- [x] I own property nearby the proposed Zoning or Specific Use Permit (SUP) request.
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Z2019-024

Please place a check mark on the appropriate line below: *

- [x] I am in favor of the request.
- [ ] I am in opposition to the request.

Please provide any additional information concerning your support or opposition to the request.

I have read the request and find it to be reasonable.

Respondent Information

Please provide your information.

First Name *

Richard

Last Name *

LaCour

Address *

342 Nakoma Dr

City *

Rockwall

State *

TX

Zip Code *

75087

Email Address *

rlacour2010@gmail.com

Phone Number

512-300-9357

Please check all that apply: *

- [x] I live nearby the proposed Zoning or Specific Use Permit (SUP) request.
- [ ] I work nearby the proposed Zoning or Specific Use Permit (SUP) request.
- [ ] I own property nearby the proposed Zoning or Specific Use Permit (SUP) request.
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- ( ) My neighbors told me about the request.
- ( ) Other: _____

Miller, Ryan

From: Planning
Sent: Friday, October 4, 2019 9:14 AM
To: Miller, Ryan; Gonzales, David
Subject: FW: Case Z2019-024 PD Amendment to PD-70

From: SWANK, TONY [mailto:AS5191@att.com]
Sent: Friday, October 4, 2019 8:41 AM
To: Planning
Subject: Case Z2019-024 PD Amendment to PD-70

Good morning

I received a notice for this change in the mail. I will be out of town and will not be able to attend the hearing. I would like to express my opposition to the change. I feel that the developer needs to stick with the original plans for the neighborhood.

NOTICE OF PUBLIC HEARING
CITY OF ROCKWALL, PLANNING & ZONING DEPARTMENT

PHONE: (972) 771-7745
EMAIL: PLANNING@ROCKWALL.COM

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David Gonzales
Rockwall Planning and Zoning Dept.
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Rockwall, TX 75087

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Sincerely,

Ryan Miller, AICP
Director of Planning & Zoning

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PLEASE RETURN THE BELOW FORM

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Please place a check mark on the appropriate line below:

☒ I am in favor of the request for the reasons listed below.

☐ I am opposed to the request for the reasons listed below.

Reduces HOA costs

Name: GREGSON ROBY

Address: 574 BORDEAUX DR, ROCKWALL, TX 75087

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Director of Planning & Zoning

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☐ I am in favor of the request for the reasons listed below.

☒ I am opposed to the request for the reasons listed below.

I AM NOT IN FAVOR OF REDUCING THE NUMBER OF PONDS FROM FOUR (4) TO TWO (2) PONDS. I THINK THAT TWO PONDS IS INADEQUATE FOR AN AREA OF THIS SIZE AND WILL NOT COPE WITH FLOODING

Name: WILLIAM R. HUTTON

Address: 432 NAKOMA DR., ROCKWALL, TEXAS 75032.

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Gonzales, David

From: [redacted]
[redacted]
Tuesday, October 8, 2019 2:31 PM
To: Planning
Cc: Miller, Ryan; Gonzales, David
Subject: Case No. Z2019-024 PD Amendment to PD-70

Importance: High

Although we are not opposed to the Developer not installing an additional pond, we are **opposed** to the existing amendment as we interpret it.

We have communicated with the Corp. of Engineers (CoE) and we have an email from the CoE stating that no permit is required to clean the banks of a waterway if the roots within the waterway are not disturbed.

Stone Creek already has four (4) ponds: Featherstone at Goliad, Crestbrook, York, and at the City Park. So, the number of ponds seems to have been met.

The main outstanding issue within the PD-070 is the number of "hard-edges" and the "fountain features" for the existing ponds.

Cleaning out the area around on both sides of the creek and pond along York Drive to the water's edge and installing a fountain feature to cut down on algae would go a long way to enhance the appearance of that area.

We would like for the Developer to consider having the PD amendment written to require four (4) ponds with a fountain feature, and omitting the "hard-edge" requirement. Additionally, to accomplish the goal of making the neighborhood aesthetically pleasing, which was the original purpose of this (PD-070) requirement, the Developer would commit to cleaning out the underbrush on our creeks and around both sides of the ponds on York Drive, at his expense. No one is expecting any additional plant material, irrigation, or anything else. Just a clean-up so that the areas may be mowed to the water's edge like in the picture in the PD. Actually, the areas remaining to be cleaned are not that large, but very visible!

The City Park pond has been exempted from the water feature, so our recommendation should result in a fountain feature on Featherstone-Goliad entrance (already provided), on Crestbrook, and on the York pond.

We could end up with a beautiful neighborhood and a plan that is cost effective for the Developer and our HOA.

I am hopeful that the result of this discussion is a "win-win". The Developer wins by not having to install another hard edge pond somewhere within the neighborhood, and the citizens win a community that both the homeowners and the Developer can be proud of.

James & Shirley Smith
609 Amherst Drive, Rockwall, TX 75087

Gonzales, David

From: Planning
Sent: Wednesday, October 9, 2019 8:46 AM
To: Gonzales, David
Subject: FW: Case No. Z2019-024: PD Amendment to PD70

From: Judy Rey [redacted]
Sent: Tuesday, October 8, 2019 5:44 PM
To: Planning <planning@rockwall.com>
Subject: Case No. Z2019-024: PD Amendment to PD70

My name is Luis Rey. I live at 806 York Dr. in Stone Creek Estates. I am opposed to the request for the change in Case No. Z2019-024. I want this plan to be followed as it was originally presented. This developer has a bad habit of not doing the things he was supposed to do in Stone Creek. Now he's ready to move on, and does not want to mess with us anymore. We will never again buy a home in any neighborhood that is developed by Skorburg. He is helping ruin the beauty of Rockwall, while whoever is in charge of Rockwall, allows him to do it.
Thank you.

Luis Rey
806 York Dr.

Gonzales, David

From: Dann [redacted]
Sent: Sunday, October 6, 2019 10:17 PM
To: Gonzales, David
Subject: Z2019-024

This serves as my vote to allow Z2019-024 to pass, allowing the developer of Stone Creek Estates to reduce the number of hard-edges ponds from 4 to 3 IF the developer is held to his promise to add a fountain to the pond on York Drive. I live on York and the pond and creek in their current state are an eyesore and dangerous.

Dann Shirley
659 York Dr., Rockwall, TX 75087

•|||||||•

Gonzales, David

From: Kevin Picha [redacted]
Sent: Monday, October 7, 2019 12:08 PM
To: Gonzales, David
Subject: Zoning Change proposal Z2019-024

I live in Stone Creek at 657 York Drive. Regarding the Zoning Change proposal Z2019-024, I would be in favor of the proposal, removing the hard-edge requirement, adding fountain features to existing ponds that don't have a fountain, and cleaning the areas around the York pond so that maintenance can be done.

--
Kevin Picha
[redacted]

Gonzales, David

From: Ralph Chizzonite [redacted]
Sent: Saturday, September 28, 2019 3:27 PM
To: Gonzales, David
Subject: Case No. Z2019-024: Amendment to PD-70

Follow Up Flag: Follow up
Flag Status: Flagged

Good afternoon David, I hope all is well with you.
I have completed the the public hearing response form and returned it to you.

I want to reiterate a previous conversation between the Planning Department and the Stone Creek Landscape Committee is as follows:

Of the 4 hard edge ponds referenced by PD-70, the only hard edged pond in existence is the pond located of of Featherstone Drive and Goliad (SH205). In a separate agreement, the pond that was dedicated with the public park land has been counted as the second of 4 hard edge ponds, even though that pond was not configured with a hard edge. The remaining 2 ponds are still a requirement and will be required to be provided; however the development still has future phases that these ponds could be provided.

Section 10 is the last phase available to the developer to provide the remaining hard edge pond. Therefore I request that the requirement for the hard edge not be waived.
I further suggest that the existing pond be modified to a hard edge and to retain some of the existing trees around the pond. This will provide a pleasing entry and a natural retention area.

Please fill free to contact me at 614-312-9192 with any questions or comments.
Thank you,
Ralph Chizzonite

Sent from my iPad

Gonzales, David

From: Jack Woodliff [redacted]
Sent: Saturday, October 12, 2019 12:55 PM
To: Gonzales, David
Subject: FW: Stone Creek Estates - Please Vote
Attachments: Ponds city.jpg

Sent from Mail for Windows 10

From: Bob Wacker
Sent: Friday, October 11, 2019 10:00 PM
To: Stone Creek Estate Homeowners
Subject: Stone Creek Estates - Please Vote

The City has Planned Development (PD) 0rdinances that define the requirements for specific areas.

On October 21 the City Council will vote on a proposed change to ours (PD-70).
It involves the requirement for 4 ponds with hard-edges (not natural) and fountains.

The developer will comply with the current PD-70, but is requesting one waiver of the hard-edge
for pond #4. Here are the 4 ponds, with upgrades if PD-70 change is approved.:

#1 at main entrance, already has hard-edge and fountain
#2 at park, hard-edge and fountain were waived by city & parks
#3 behind Crestbrook, he will add fountain and it already has hard edge
#4 along York, he will add fountain, but wants the hard-edge waived.

If you are in favor or not in favor of the change, please forward the message below to

DGonzales@rockwall.com

Regards,
Bob Wacker
309 Featherstone Drive
Rockwall, TX 75089

To: David Gonzales (DGonzales@rockwall.com)
Rockwall Planning Engineer

Ref: Z2019-024 Change to PD-70

____ I am in favor of the proposed change.
_Yes___ I am not in favor of the proposed change.

Regards,

Name _Jack
Woodliff_____

Address __792 Mountcastle Dr._____

Gonzales, David

From: Abby Patterson [redacted]
Sent: Saturday, October 12, 2019 8:42 AM
To: Gonzales, David

To: David Gonzales

Rockwall Planning Engineer

Ref: Z2019-024 Change to PD-70

___x_ I am in favor of the proposed change.

____ I am not in favor of the proposed change.

Regards,

Name _____abby Patterson _____

Address _____605 Mountcastle dr_____

Gonzales, David

From: David Hiester [redacted] >
Sent: Friday, October 11, 2019 11:09 PM
To: Gonzales, David
Cc: bobwacker@att.net
Subject: Fw: Stone Creek Estates - Please Vote YES
Attachments: Ponds city.jpg

We vote "In Favor."

David and Madeleine Hiester
781 Hanover Dr

----- Forwarded Message -----
From: Bob Wacker [redacted] >
To: Neighbors [redacted]
Sent: Friday, October 11, 2019, 10:10:46 PM CDT
Subject: Stone Creek Estates - Please Vote YES

I am in favor of the proposed change.

It will benefit our neighborhood and HOA.

I hope you will vote “in favor”

Bob Wacker

From: Bob Wacker [m[redacted]
Sent: Friday, October 11, 2019 10:00 PM
To: Stone Creek Estate Homeowners
Subject: Stone Creek Estates - Please Vote

The City has Planned Development (PD) 0rdinances that define the requirements for specific areas.

On October 21 the City Council will vote on a proposed change to ours (PD-70).

It involves the requirement for 4 ponds with hard-edges (not natural) and fountains.

The developer will comply with the current PD-70, but is requesting one waiver of the hard-edge for pond #4. Here are the 4 ponds, with upgrades if PD-70 change is approved.:

#1 at main entrance, already has hard-edge and fountain

#2 at park, hard-edge and fountain were waived by city & parks

#3 behind Crestbrook, he will add fountain and it already has hard edge

#4 along York, he will add fountain, but wants the hard-edge waived.

If you are in favor or not in favor of the change, please forward the message below to

DGonzales@rockwall.com

Regards,

Bob Wacker

309 Featherstone Drive

Rockwall, TX 75089

To: David Gonzales (DGonzales@rockwall.com)

Rockwall Planning Engineer

Ref: Z2019-024 Change to PD-70

____ I am in favor of the proposed change.

____ I am not in favor of the proposed change.

Regards,

Name _____

Address _____

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Gonzales, David

From: [redacted]
Sent: Sunday, October 13, 2019 1:34 PM
To: Gonzales, David
Subject: FW: Stone Creek Estates - Please Vote YES
Attachments: Ponds city.jpg

To: David Gonzales (DGonzales@rockwall.com)
Rockwall Planning Engineer

Ref: Z2019-024 Change to PD-70

_X___ I am in favor of the proposed change.
____ I am not in favor of the proposed change.

Regards,

Name Jack McCollum_____

Address _219 Crestbrook Drive, Rockwall 75087_____

Gonzales, David

From: Shelley Dudley [redacted]
Sent: Saturday, October 12, 2019 6:33 PM
To: Gonzales, David
Subject: Fwd: Stone Creek Estates - Please Vote

To: David Gonzales (DGonzales@rockwall.com)

Rockwall Planning Engineer

Ref: Z2019-024 Change to PD-70

_x___ I am in favor of the proposed change.

____ I am not in favor of the proposed change.

Regards,

Name _Shelley Dudley
__

Address _608 Bordeaux Dr Rockwall, Tx 75087

Shelley Dudley- Realtor
Sent from Mobil Via voice text
"**D**" Magazine Top Residential Realtors
Keller Williams Realty

Cell # 214-734-8850
[redacted]

Gonzales, David

From: Shirley Fergerson [redacted]
Sent: Sunday, October 13, 2019 9:44 AM
To: Gonzales, David
Subject: FW: Stone Creek Estates - I Vote YES

Sent: Sunday, October 13, 2019 9:08 AM

Subject: Fwd: Stone Creek Estates - I Vote YES

David Gonzales
(DGonzales@rockwall.com)
Rockwall Planning Engineer

Ref: Z2019-024 Change to PD-70

YES, I am in favor of the proposed change.

Regards,
Joe & Shirley Fergerson
596 Bordeaux Drive
Rockwall TX 75087

Gonzales, David

From: Tom Dortch [redacted]
Sent: Sunday, October 13, 2019 5:07 PM
To: Gonzales, David
Subject: Z2019-024 Change to PD70

To: David Gonzales (DGonzales@rockwall.com)
Rockwall Planning Engineer

Ref: Z2019-024 Change to PD-70

__X__ I am in favor of the proposed change.
____ I am not in favor of the proposed change.

Regards,

Name: Tommy
Dortch

Address: 676 York Dr, Rockwall, 75087

Sent from my iPad

Gonzales, David

From: Vicki Williams [redacted]
Sent: Saturday, October 12, 2019 11:03 AM
To: Gonzales, David
Subject: Stone Creek Estates - I Vote YES

David Gonzales
(DGonzales@rockwall.com)
Rockwall Planning Engineer

Ref: Z2019-024 Change to PD-70

YES, I am in favor of the proposed change.

Regards,
Vicki Williams
330 Nakoma Drive
Rockwall TX 75087

Changed to 'In Favor Of' rather than 'Opposed'

Gonzales, David

From: Judy Rey [redacted]
Sent: Wednesday, October 16, 2019 3:55 AM
To: Gonzales, David
Subject: Z2019-024 Change

Mr. Gonzales,
I now approve of the change in Z2019-024. Having a fountain in the York Street pond would greatly enhance our neighborhood.
Thank you,
Luis Rey
806 York Dr.
Stone Creek Estates

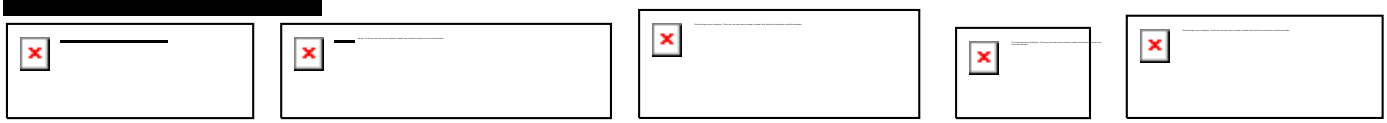
Gonzales, David

From: Michael Podina [redacted]
Sent: Wednesday, October 16, 2019 9:24 AM
To: Gonzales, David
Subject: Fountain

David, I approve of this change in adding a fountain to The York pond. My address is 802 York Dr.

Thank you,

Michael Podina | Luxury Travel Curator
972-974-8661
Lifetime Getaways an Affiliate of Travel Experts a "Virtuoso Agency"
[redacted]



Zoning & Specific Use Permit Input Form

Case Number *

Please provide the Case Reference Number of the Zoning or Specific Use Permit (SUP) request that you are providing input on (Example: Z2019-001).

Z2019-024: PD Amendment to PD-70

Please place a check mark on the appropriate line below: *

- [x] I am in favor of the request.
- [ ] I am in opposition to the request.

Please provide any additional information concerning your support or opposition to the request.

Respondent Information

Please provide your information.

First Name *

Luis

Last Name *

Fernandez

Address *

808 Knox Drive

City *

Rockwall

State *

Tx

Zip Code *

75087

Email Address *

fernandez.luis@sbcglobal.net

Phone Number

Please check all that apply: *

- [x] I live nearby the proposed Zoning or Specific Use Permit (SUP) request.
- [ ] I work nearby the proposed Zoning or Specific Use Permit (SUP) request.
- [x] I own property nearby the proposed Zoning or Specific Use Permit (SUP) request.
- [ ] I own a business nearby the proposed Zoning or Specific Use Permit (SUP) request.
- [ ] Other: _____

How did you hear about this Zoning or Specific Use Permit (SUP) request? *

- (●) I received a property owner notification in the mail.
- ( ) I read about the request on the City's website.
- ( ) I saw a zoning sign on the property.
- ( ) I read about the request in the Rockwall Herald Banner.
- ( ) My neighbors told me about the request.
- ( ) Other: _____

PLEASE RETURN THE BELOW FORM

Case No. Z2019-024: PD Amendment to PD-70

Please place a check mark on the appropriate line below:

☒ I am in favor of the request for the reasons listed below.

☐ I am opposed to the request for the reasons listed below.

Name: Leah + Daniel Agee

Address: 9007 Miramar Drive, Rockwall, TX 75087

Tex. Loc. Gov. Code, Sec. 211.006 (d) **If a proposed change to a regulation or boundary is protested in accordance with this subsection, the proposed change must receive, in order to take effect, the affirmative vote of at least three-fourths of all members of the governing body. The protest must be written and signed by the owners of at least 20 percent of either: (1) the area of the lots or land covered by the proposed change; or (2) the area of the lots or land immediately adjoining the area covered by the proposed change and extending 200 feet from that area.**

PLEASE SEE LOCATION MAP OF SUBJECT PROPERTY ON THE BACK OF THIS NOTICE

Gonzales, David

From: Jan Davis [redacted]
Sent: Wednesday, October 16, 2019 1:38 PM
To: Gonzales, David
Cc: Gonzales, David
Subject: Z2019-024Fountain in York pond, Stone Creek

Mr. Gonzales
Rockwall City Planner
Z2019-024,

I would most definitely approve the change to add a fountain on the York pond directly in front of my house. This would help tremendously with the algae and growth that has greatly increased since the bridge being installed.

PS if they would clean out the dead trees and debris that would be greatly appreciated as well.

Our address
Darryl and Jan Davis
798 York Dr.
Rockwall, TX

214-934-3801 Cell

Jan Davis

Gonzales, David

From: me [redacted]
Sent: Wednesday, October 16, 2019 6:16 PM
To: Gonzales, David
Subject: Case No Z2019-024 PD Amendment to PD-70

I would to like to make known I oppose the request to amend PD-70. The developer knew the requirements going into to this development and he needs to stick to them. He has cut as many corners as possible. Hard edged retention ponds are needed to replace the natural areas that are no longer natural but have streets, sidewalks and roofs.

If I need to mail in the notice to be heard please let me know asap.

Thank you,

Alexis Casazza
1496 Brittany Way
Rockwall, TX 75087

Sent from Mail for Windows 10

Gonzales, David

From: Lori Bodino [redacted]>
Sent: Thursday, October 17, 2019 2:12 PM
To: Gonzales, David
Subject: Ref: Z2019-024 Change to PD-70

To: David Gonzales (DGonzales@rockwall.com) Rockwall Planning Engineer Ref: Z2019-024 Change to PD-70

____ I am in favor of the proposed change.
_X_ I am not in favor of the proposed change.

Regards,

Name__Lori Ann Bodino_
Address__518 Emerson Drive, Rockwall, TX 75087__

Please do not hesitate to contact me if additional information is needed.

Regards,
Lori Ann

Lori Ann Bodino
Dallas County District Courts Administrator
600 Commerce Street, Suite 681
Dallas, Texas 75202
(214)653-6105 Office
(214)653-7202 Fax

SKORBURG
COMPANY

8214 Westchester Drive, Suite 710
Dallas, Texas 75225

Mr. Ryan Miller
Director of Planning & Zoning
385 S. Goliad Street
Rockwall, Texas 75087

September 12, 2019

Dear Mr. Miller:

Please accept this request for a zoning change to reduce the required number of hard edge retention ponds from four (4) to three (3) as described in Exhibit "C" (Planned Development District No. 70) to PD Ordinance No. 07-13 (as amended by Ordinance No. 09-44), more specifically contained in the last paragraph of Section C ("Standards for District Design and Connectivity"), Paragraph 6(d) (under "Parks and Open Space"). No other changes to the PD are being requested.

The original Stone Creek PD was approved in 2007 that included a requirement to have four (4) hard edge ponds built throughout Stone Creek Estates. The exact location and configuration of the ponds was to be determined at the time of development.

To date, three (3) ponds have been fulfilled: two (2) hard edge retention ponds were constructed with Phase I, and the third pond is located within the 11.3 acre City park that was dedicated to the City of Rockwall in January 2014. An exhibit showing the location of these three (3) existing ponds is included on the attached **Exhibit "A"**. While the pond located in the City park does not have a hard edge, it has been counted towards the PD requirement as it was the City's decision to not install a hard edge to be eligible for a State matching grant for the park. Hence, three (3) of the four (4) hard edge ponds as required by the existing PD have been satisfied.

For additional background on this request, Phase I was constructed in 2007-08, which included two (2) hard edge retention ponds. In 2012, we received notice from the City that the City's process for obtaining a Texas Commission on Environmental Quality ("TCEQ") permit for retention ponds had changed, which lengthened the permitting time period to up to a year, and due to water rights, there would be no guarantee if the permit would be approved after that time period.

To avoid the potential need for another TCEQ permit (that may or may not be approved) and adding more long-term maintenance cost burden on the HOA, we believe it is in the best interests of Stone Creek Estates not to construct an additional hard edge pond.

As such, we respectfully request the PD be modified per the attached **Exhibit "B"** to reduce the number of hard edge ponds from four (4) to three (3).

In lieu of installing a hard edge around the City park pond and a fourth hard edge pond somewhere that could pose potential future TCEQ issues in the future, we redirected value to Stone Creek residents and the City by enlarging the park dedication area (resulting in fewer lots), and will be finishing the build out of Stone Creek Estates with 32 fewer lots than allowed under the PD (the PD allows a maximum of 918 total SF lots, but the final phase of Stone Creek will result in the build out being only 886 SF lots based on the City approved preliminary plat for the final phase).

We look forward to visiting with the Planning and Zoning Commission and City Council on this proposed amendment to our master planned community.

Sincerely,

Adam J. Buczek
Skorburg Company, Development Partner
On behalf of Stone Creek Balance, Ltd, a Texas limited partnership (Owner and Applicant)

459

EXHIBIT "A"

Three (3) Existing Pond Locations

The single-family zoned land of Stone Creek Estates is outlined in yellow below.

The two (2) existing hard edge retention ponds are outlined in **BLUE.**

The one (1) existing City park pond (no hard edge, but counted toward PD hard edge pond requirement) is outlined in **ORANGE**.

460

EXHIBIT "B"

Requested Stone Creek PD Language Modification

With respect to Exhibit "C" (Planned Development District No. 70) to PD Ordinance No. 07-13 (as amended by Ordinance No. 09-44), this zoning application requests that the last paragraph of Section C ("Standards for District Design and Connectivity"), Paragraph 6(d) (under "Parks and Open Space") be modified to read as follows:

"The Developer shall provide retention ponds in the locations depicted on the Concept Plan in Exhibit "B" of this ordinance. Hardedges and fountain features shall be incorporated into Ponds 1 & 2, Pond 3 shall incorporate a natural edge, and Pond 4 shall incorporate a fountain feature and a natural edge. All retention pond hard edges shall be similar to the hard edge shown in Figure 5 below."

Figure 5: Retention Pond with Hardedge.

In addition to the above change, the Concept Plan included on Exhibit "B" of the ordinance would be updated accordingly.

Gonzales, David

From: Adam Buczek <abuczek@skorburgcompany.com>
Sent: Wednesday, October 2, 2019 10:03 AM
To: Miller, Ryan; Gonzales, David
Cc: Audrey Beard; Bryan Holland; John Arnold; Beverly
Subject: FW: Stone Creek Q&A / information on requested PD change

Follow Up Flag: Follow up
Flag Status: Flagged

Good morning, Ryan and David.

I am forwarding you this e-mail exchange with Bob Wacker (Stone Creek resident) in which he has helped compile feedback from Stone Creek residents (on the HOA NextDoor website) about the zoning change request. I have provided responses to each on in red font below, and I want you to have this on record as we're going to install a fountain in the Crestbrook pond regardless of the outcome of this case so that pond is fully compliant with the existing PD (giving us 3 fully compliant ponds including the main entry pond (which has a fountain already) and the City Park pond – which counts even though it does not but that's with City direction.

Insofar as the 4th pond…….if this PD request gets approved, based on resident input below, we (developer) will also install an additional fountain in the pond along York (which does not have a hard edge). If not, then we'll just build the 4th pond and include a fountain in a TBD location within Stone Creek Estates while we develop the last phase of Stone Creek.

This will hopefully provide clarity and additional context for how 3 of the 4 ponds under the current PD conditions will be fully satisfied "as is", and if the PD is approved as requested – then we'll also install a fountain in the York pond (even though no hard edge) to help address the "aesthetics" comments below.

Best Regards,

Adam J. Buczek
Development Partner
Skorburg Company
8214 Westchester Drive, Suite 710
Dallas, Texas 75225
Ph: (214) 888-8843
Cell: (817) 657-5548
Fax: (214) 888-8861

From: Adam Buczek
Sent: Wednesday, October 02, 2019 9:52 AM
To: Bob Wacker <bobwacker@att.net>
Subject: Stone Creek Q&A / information on requested PD change

Good morning, Bob. Thanks for keeping me in the loop and helping me get resident feedback. I have typed responses to each comment below under "Against PD-70 Change" in **red font**. I also added some commentary / clarifying notes to your original email to make sure there's no confusion on certain facts. Feel free to share as you wish with homeowners as we want to be 100% transparent. The main things here are that we are going to install a fountain in the Crestbrook pond regardless to fulfill the PD requirement on that pond.

Also – if the PD amendment is approved, we will also install a fountain in the pond off York (which does not have a hard edge), but we'll do it anyway. If the PD amendment is not approved, then we will NOT install a fountain in the York pond – but instead, will plan to install a fountain in the 4th hard edge pond that we end up building to fulfill the existing requirements of the PD.

I will be sharing this correspondence with NMI and city staff so we are all in the loop. Questions let me know. Thanks.

Best Regards,

Adam J. Buczek
Development Partner
Skorburg Company
8214 Westchester Drive, Suite 710
Dallas, Texas 75225
Ph: (214) 888-8843
Cell: (817) 657-5548
Fax: (214) 888-8861

From: Bob Wacker <bobwacker@att.net>
Sent: Wednesday, October 02, 2019 3:25 AM
To: Adam Buczek <abuczek@skorburgcompany.com>
Subject: Status

I've summarized the key posts (Nextdoor and emails).

AGAINST PD-70 CHANGE

The City should hold the Developer accountable for the requirements (shall provide) stated in the PD?
It's the "aesthetic purpose" that we are concerned about that has not been met.

1. Why not consider a natural edge pond, with a water feature, in a different area within the neighborhood? If the City (and Stone Creek residents) prefer to leave the PD unchanged and have us install a 4th hard edge pond, we will do so. For reasons cited in our summary letter with the zoning application, the developer does not think it's the best use of HOA funds long-term – but we are happy to proceed either way.

2. Isn't the actual reason for finishing out the PD with fewer lots due to the fact that the PD requires an
average lot size of 8,000 s.f., and the Developer has to put in larger lots in Phase X to maintain that average? No. Our average lot size is voluntarily larger than what was required in the PD. For instance, we opted for a larger lot mix, dedicated a City park that is 45% larger than required by the PD, and sold additional land to the Rockwall ISD – all of which contributed to the planned build out of Stone Creek being 32 lots less than allowed by the PD.

3. Why should this pond (the one behind Crestbrook) be acceptable to the City or our neighborhood? Other than the fact that it does not currently have a fountain in it, the

pond meets the requirements of the PD. The developer will install a fountain in the Crestbrook pond in conjunction with the development of the last phase of Stone Creek to fully satisfy the PD with respect to the pond behind Crestbrook. A fountain was not previously installed due to it being a low visibility area, and therefore, we did not think it would be the best use of HOA funds in terms of directing maintenance dollars, but unless residents object, we're going to install a fountain in this pond to complete this PD element.

4. if the Developer were to agree to go back and clean-up some of these under-developed Common
Areas, perhaps the City/Developer (and residents of Stone Creek) might then be able to come to
a reasonable compromise. First and foremost, we want our residents to be happy. Open spaces in prior phases have been dedicated to the City of Rockwall and are to be maintained by the HOA pursuant to the PD and their respective recorded plats. If there are some specific areas or items that residents would like the developer to consider assisting with, they should send such items to NMI and ask them to pass on and share / discuss with the developer. One of the functions an HOA management company serves is to provide a path of communication between residents and the developer. The developer is happy to privately and in good faith review items that residents would like to be taken into consideration. Notwithstanding the foregoing, we respectfully ask residents and the City to take into account the following items in context with this zoning request:

A. Reducing the required number of hard edge ponds from 4 to 3 would help keep homeowners dues down via lower maintenance costs. A 4th pond for the HOA to maintain is not going to add value to the community, as this is an amenity that already exists in other locations. Ponds are not cheap to maintain – particularly long-term. In our view, HOA dues could be better spent / directed towards adding other types of assets in open space areas, if residents desire down the road. In turn, we have redirected value for the residents in Items B through D below.

B. With our current approved preliminary plat for the last phase of Stone Creek, we plan to finish the build out of Stone Creek with 32 fewer lots than allowed under the PD, which is significantly lower density than allowed under the PD. As stated in #2 above, we opted for a larger lot mix, dedicated a City park that is 45% larger than required, and sold additional land to the Rockwall ISD – all of which contributed to the planned build out of Stone Creek being 32 lots less than allowed by the PD.

C. Part of our plan in lieu of not doing a 4th pond was that we donated a 45% larger City park than required by the PD (and did so in a manner which got matching grant dollars to the City from the Texas Parks & Wildlife Foundation to help expedite and enhance the park improvements). The required City Park area per the PD was 7.8 acres of contiguous land. Our City Park dedication area was 11.3 acres – an increase of 3.5 acres.

D. The long-term value that is being enjoyed by the City and residents of Stone Creek is reflected in the fact that the price points of the homes throughout the community have far exceeded expectations from original projections / requirements of the original 212 agreement with the City.

5. Why not require that all the creeks and ponds be consistent with the picture that the Developer
submitted as Appendix “C” in the original PD? The existing ponds are constructed in a manner consistent with the intent of the PD. The picture attached to the PD is conceptual, and as stated in the PD, the exact size/shape/configuration of ponds were to be determined at the time of development.

6. A reasonable solution would be for the Developer to clean all the Common Areas to be consistent
with the picture in Appendix “C” (without a hard edge) so that all Common Areas could be mowed
to the water line. Each pond has its own natural configuration, design, and maintenance needs. All common areas that have been completed to date have been timely turned over to the HOA in good condition as required. Once a common area is turned over to the HOA, the maintenance becomes the responsibility of the HOA.

7. A fountain feature needs to be added to the ponds on York Drive and maybe to the one on
Crestbrook Drive to decrease algae and inhibit mosquito growth. As stated in #3 above, the developer will add a fountain to the Crestbrook pond so this pond will be 100% in compliant with the existing PD. The pond along York Drive is not one of the existing 3 ponds that have been counted towards the PD requirements; however, if this PD request gets approved, the developer will happily install an additional fountain in the pond along York Drive as well. If the zoning change request is not approved, then the 4th pond requirement will be satisfied with the construction of a separate 4th pond and fountain located elsewhere within Stone Creek Estates.

The City-owned land across from the new elementary school needs to be cleaned out for easy
mowing. Then the Developer could proceed to finish out Phase X as he has initially presented
with no additional pond. The City controls and maintains City-owned property.

If many of the features required by the city were not done by the developer, then this would
be something he needs to complete. I feel there are many areas that are wasted and not taken advantage of due to the developer and if this is our chance to hold his feet to the fire,
this is our last chance to do so. For purposes of this zoning request, the definition of “Many features…not done by the developer” means just 1 more pond and adding 2 more fountains to said ponds. All other requirements of the PD have been fulfilled to

date. On the flip, additional value has been added for the benefit of the community as described in #4 above.

I happen to view the existing pond in Phase X from my back yard, but that does afford me the
ability to see the pond in active use by neighbors, and the wildlife that it facilitates. I would love
to see it remain and to help future neighbors avoid future foundation issues. This pond is a stock tank pond – non-jurisdictional, and will be filled in with the development of the last phase of Stone Creek.

FOR PD-70 CHANGE

My initial posting on Nextdoor

When Stone Creek was started, the City's PD (Planned Development-70) ordinance required
4 hard-edge (stone, brick, concrete, etc) ponds. Two were built … #1 and #2. The HOA has
to maintain them. The annual cost is typically $7k-$10k. Pond #3 was planned for the park,
but the city waived that requirement. Its a natural area and they wanted it to stay that way.

The developer submitted the last plot of land (Phase 10) to the city for approval. The developer
wants to finish Stone Creek ASAP and doesn't want to build the pond. The reason we don't want to build the pond is because we don't see it adding any value as an additional amenity to the HOA, and since we've redirected value via other avenues as stated above. Adding another pond will only add ongoing maintenance cost to the HOA, and while the location of a 4th pond is not yet determined – if we build it along the floodplain – it could require us to obtain another TCEQ permit, which we don't want to deal with. The only remaining location
would be the 'pond' across from the park. Not true. We have a few options for the 4th pond location, so regardless – this stock tank pond is going to be filled in and go away with the development of the last phase of Stone Creek (Phase X). It is not a natural pond, nor a necessary retention or
detention pond. It is a very old shallow stock pond. Correct. It's maintenance would be very expensive.
The park already has a large enough pond immediately across Featherstone Drive for adequate
recreation. Agreed – no need for pond overkill. The HOA can accumulate $7K-$10K per year in funds and save up to add much more complimentary and other value-added amenities if it so chooses down the road rather than continually sink money into another pond.

If the PD change request is denied and a hard-edge pond must be built, it would take several

months of planning and approvals. Not true. This would only be true in the event we opted to pick a location that would require a TCEQ permit to construct the last pond. If the PD modification request is denied, we would then look for options to construct a 4th pond somewhere that would not require a TCEQ permit. And then be an extra annual maintenance cost to the HOA.

If the PD change is approved, then Phase 10 can be started quickly. Phase 10 can and is planned to start this fall regardless of the outcome of this zoning request, and the 4th pond can be built (if the PD change is not approved) anywhere within Stone Creek Estates. That will allow the homeowners
to continue to take control of their HOA Board of Directors. We already have one on the Board,
and the sale of the Phase 10 lots would let us replace the other two BOD members (i.e., the
developer's officers) right away. Bob – the Developer will remain in control of the HOA until the last lot is sold to builders (so the homeowners will not take control of the HOA until that time – which will likely take a few more years).

I support the change and recommend that those who also agree, should read the notice we
just received, check the appropriate box, sign it, and then mail it back to the City.

Another reply of mine….

1. The existing ponds have been resolved with TCEQ and the City.
2. The differences in green spaces were approved at each Phase
   by the City. We should have raised any concerns then.
   WE SHOULD BE DOING THAT FOR PHASE 10 NOW.
3. The HOA is responsible for the existing ponds.
   We decide and pay for maintenance and whatever
   improvements we want to make.

And another of mine …

The push to force Skorburg into building a 4th pond is also to try to get leverage on him for
alternative actions ... clean up the main pond, help fix the Amenity Center, etc. If he does
build a 4th pond, his costs will be passed on to the new lot owners, but the HOA will have the
cost of maintaining another pond. It likely would delay (TCEQ plans, approvals, construction)
the homeowners takeover of the HOA BOD. The outcome of this zoning request will have no impact on the timing at which the homeowners take over the HOA BOD, as the timing of the last phase of Stone Creek will not be delayed over this item.

Approving the PD-70 amendment expedites build-out of Stone Creek Estates and our take-over..
That's why I'm in favor of it.

Bob Wacker

NEED PICTURE PROOF IF THERE IS A HARD EDGE AROUND THIS ENTIRE POND AREA.

Adam Buczek

From: Brandon Davidson <Bdavidson@corwinengineering.com>
Sent: Friday, September 06, 2019 2:01 PM
To: Adam Buczek
Subject: Stone Creek Phase 10
Attachments: Thumbs55.PDF

NEED 360° PICTURES SO WE SEE ALL EDGES.

Aerial of Phase 1 pond with hard edge. As-built is attached.

Brandon Davidson, P.E.

CITY OF ROCKWALL

ORDINANCE NO. 19-XX

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS, AMENDING PLANNED DEVELOPMENT DISTRICT 70 (PD-70) AND THE UNIFIED DEVELOPMENT CODE [*ORDINANCE NO. 04-38*] OF THE CITY OF ROCKWALL, AS HERETOFORE AMENDED, BY AMENDING THE DEVELOPMENT STANDARDS APPROVED WITH ORDINANCE NO. 09-44, BEING A 395.075-ACRE TRACT OF LAND SITUATED IN THE W. T. DEWEESE SURVEY, ABSTRACT NO. 71 AND THE S. KING SURVEY, ABSTRACT NO. 131, CITY OF ROCKWALL, ROCKWALL COUNTY, TEXAS AND MORE FULLY DESCRIBED HEREIN BY *EXHIBIT 'A'*; PROVIDING FOR SPECIAL CONDITIONS; PROVIDING FOR A PENALTY OF FINE NOT TO EXCEED THE SUM OF TWO THOUSAND DOLLARS ($2,000.00) FOR EACH OFFENSE; PROVIDING FOR A SEVERABILITY CLAUSE; PROVIDING FOR A REPEALER CLAUSE; PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the City has received a request by Adam Buczek of Stone Creek Balance, LTD for the approval of a zoning amendment to Planned Development District 70 (PD-70) for the purpose of changing the number of hard-edged retention ponds required for the Stone Creek Subdivision being a 395.075-acre tract of land situated in the W. T. DeWeese Survey, Abstract No. 71 and the S. King Survey, Abstract No. 131, City of Rockwall, Rockwall County, Texas, zoned Planned Development District 70 (PD-70) for General Retail (GR) District and Single Family 10 (SF-10) District land uses, located at the southwest corner of FM-552 and N. Goliad Street (*SH-205*), and more fully described in *Exhibit 'A'* of this ordinance, which hereinafter shall be referred to as the *Subject Property* and incorporated by reference herein; and

WHEREAS, the Planning and Zoning Commission of the City of Rockwall and the governing body of the City of Rockwall in compliance with the laws of the State of Texas and the ordinances of the City of Rockwall have given the requisite notices by publication and otherwise, and have held public hearings and afforded a full and fair hearing to all property owners generally and to all persons interested in and situated in the affected area, and in the vicinity thereof, and the governing body in the exercise of its legislative discretion, has concluded that Planned Development District 70 [*Ordinance No.'s 07-13, 09-44 & 11-35*] and the Unified Development Code [*Ordinance No. 04-38*] should be amended as follows:

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS:

Section 1. That the approval of this ordinance shall supersede all requirements stipulated in *Ordinance No.'s 07-13, 09-44 & 11-35*;

Section 2. That the *Subject Property* shall be used only in the manner and for the purposes authorized by this Planned Development District Ordinance and the Unified Development Code [*Ordinance No. 04-38*] of the City of Rockwall as heretofore amended, as amended herein by granting this zoning change, and as maybe amended in the future;

Section 3. That development of the *Subject Property* shall generally be in accordance with the *Planned Development Concept Plan*, contained in *Exhibit 'B'* of this ordinance, attached hereto and incorporated herein by reference as *Exhibit 'B'*, which is deemed hereby to be a

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condition of approval of the amended zoning classification for the *Subject Property*;

Section 4. That development of the *Subject Property* shall generally be in accordance with the *Development Standards*, contained in *Exhibit 'C'* of this ordinance, attached hereto and incorporated herein by reference as *Exhibit 'C'*, which is deemed hereby to be a condition of approval of the amended zoning classification for the *Subject Property*;

Section 5. A PD Development Plan must be approved for the areas designated as *Retail* on the *Concept Plan* contained in *Exhibit 'B'*; however, the *PD Development Plan* application may be processed by the City of Rockwall concurrently with a preliminary plat application and *PD Site Plan* application.

Section 6. That the official zoning map of the City of Rockwall shall be corrected to reflect the changes in zoning as described herein.

Section 7. That any person, firm, or corporation violating any of the provisions of this ordinance shall be deemed guilty of a misdemeanor and upon conviction shall be punished by a penalty of fine not to exceed the sum of *Two Thousand Dollars* (*$2,000.00*) for each offense and each and every day such offense shall continue shall be deemed to constitute a separate offense;

Section 8. That if any section, paragraph, or provision of this ordinance or the application of that section, paragraph, or provision to any person, firm, corporation or situation is for any reason judged invalid, the adjudication shall not affect any other section, paragraph, or provision of this ordinance or the application of any other section, paragraph or provision to any other person, firm, corporation or situation, nor shall adjudication affect any other section, paragraph, or provision of the Unified Development Code, and the City Council declares that it would have adopted the valid portions and applications of the ordinance without the invalid parts and to this end the provisions for this ordinance are declared to be severable;

Section 9. The standards in this ordinance shall control in the event of a conflict between this ordinance and any provision of the Unified Development Code or any provision of the City Code, ordinance, resolution, rule, regulation, or procedure that provides a specific standard that is different from and inconsistent with this ordinance. References to zoning district regulations or other standards in the Unified Development Code (including references to the *Unified Development Code*), and references to overlay districts, in this ordinance or any of the Exhibits hereto are those in effect on the date this ordinance was passed and approved by the City Council of the City of Rockwall, Texas;

Section 10. That this ordinance shall take effect immediately from and after its passage.

PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS, THIS THE 4TH DAY OF NOVEMBER, 2019.

_____
Jim Pruitt, *Mayor*

ATTEST:

_____
Kristy Cole, *City Secretary*

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APPROVED AS TO FORM:

_____

Frank J. Garza, *City Attorney*

1st Reading: *October 21, 2019*

2nd Reading: *November 4, 2019*

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LEGAL DESCRIPTION

Being a 395.075-Acre tract of land situated in the W. T. DeWeese Survey, Abstract No. 71 and the S. King Survey, Abstract No. 131, City of Rockwall, Rockwall County, Texas and being all of a called 385.075-acre tract of land conveyed to W. W. Caruth Jr. by Deed recorded in *Volume 54, Page 22* Deed Records, Rockwall County, Texas (DRRCT) and also being all of a called 2.25-acre tract of land conveyed to Soden H. Harris and wife Adrine V. Harris by deed recorded in *Volume 50, Page 375* (DRRCT) being more particularly described by metes and bounds as follows:

BEGINNING at a ½-inch iron pipe found for a northeast corner of aforesaid 392.938-acre tract and being the northwest corner of Rockwall Middle School No. 4 Addition to the County of Rockwall by plat recorded in *Cabinet F, Page 67*, Plat Records, Rockwall County, Texas and being on the south right-of-way line of FM-552 (a variable width right-of-way).

THENCE South 00 Degrees 35 Minutes 35 Seconds East along a east line of aforesaid 392.938-acre tract and the common west line of aforesaid Rockwall Middle School No. 4 Addition a distance of 1,270.02-feet to a ½-inch capped iron rod found for the inside corner of said 382-938-acre tract and the southwest corner of said Rockwall Middle School No. 4 Addition.

THENCE North 69 Degrees 25 Minutes 13 Seconds East along a north line of aforesaid 392.938-acre tract and the common south line of aforesaid Rockwall Middle School No. 4 Addition a distance of 1,331.00-feet to a PK Nail set for a northeast corner of said 392.938-acre tract in the approximate centerline of Hayes Road (a variable width prescriptive right-of-way) and being on the west line of a called 15.00-acre tract of land conveyed to Steve L. Branch and wife Judy C. Branch by deed recorded in *Volume 234, Page 527 D*eed Records, Rockwall County, Texas a ½-inch capped iron rod found bears North 87 Degrees 58 Minutes 03 Seconds a distance of 22.82-feet.

THENCE South 00 Degrees 35 Minutes 35 Seconds East along the east line of aforesaid 392.938-acre tract and the approximate centerline of aforesaid Hayes Road and the west line of aforesaid 15.00-acre tract and the west line of a called 11.126-acre tract of land conveyed to Leon A. Smith by deed recorded in *Volume 160, Page 1,* Deed Records, Rockwall County, Texas and the west line of a called 32.00-acre and 35.5-acre tracts of land conveyed to Roy Lee Hance by deed recorded in *Volume 68, Page 73*, Deed Records, Rockwall County, Texas, a distance of 3,980.56-feet to a PK Nail set for the southeast corner of said 392.938-acre tract and being on the north line of a called 38.639-acre tract of land conveyed to Roy L. Hance and wife, Randa B. Hance by deed recorded in *Volume 91, Page 107* Deed Records, Rockwall County, Texas.

THENCE along the south line of aforesaid 392.938-acre tract and the common north line of aforesaid 30.033-acre tract and the north line of Quail Run Valley No. 2 an addition to the City of Rockwall by plat recorded in *Cabinet E, Page 185*, Plat Records, Rockwall County, Texas and the north line of Quail Run Valley, No. 1 an addition to the City of Rockwall by Plat Recorded in *Cabinet E, Page 57,* Plat Records, Rockwall County, Texas the following courses and distances:

South 89 Degrees 34 Minutes 36 Seconds West a distance of 2,364.65-Feet to a 5/8-inch iron rod with a yellow plastic cap stamped *Carter Burgress* set for corner.

South 88 Degrees 24 Minutes 39 Seconds West a distance of 650.72-feet to a 5/8 inch iron rod with a yellow plastic cap stamped *Carter Burgress* set for a southwest corner of aforesaid 392.938-acre tract.

THENCE North 54 Degrees 44 Minutes 21 Seconds West a distance of 165.14-feet to a ½-inch iron pipe found for corner on the east right-of-way of State Highway 205 (a 100-foot right-of-way).

THENCE along the west line of aforesaid 392.938-acre tract and the common east right-of-way of aforesaid State Highway 205 the following courses and distances:

North 14 Degrees 18 Minutes 45 Seconds West a distance of 1,942.08-feet to a 5/8 inch iron rod with a

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yellow plastic cap stamped *Carter Burgess* set for corner and the beginning of a tangent curve to the right having a central angle of 10 Degrees 15 Minutes 35 Seconds a radius of 5,380.00-feet. A chord bearing of North 69 Degrees 11 Minutes 27 Seconds West and a chord length of 1,015.74-feet.

Along said tangent curve to the right an arc length of 1,017.09-feet to a concrete right-of-way monument found for corner.

North 04 Degrees 03 Minutes 51 Seconds West a distance of 379.29-feet to a 5/8 inch iron rod with a yellow plastic cap stamped *Carter Burgess* set for corner, a concrete right-of-way monument found bears South 00 Degrees 29 Minutes 25 Seconds West a distance of 4.10-feet and being the beginning of a tangent curve to the right having a central angle of 03 Degrees 07 Minutes 00 Seconds a radius of 5,580.00-feet a cord bearing of North 02 Degrees 30 Minutes 27 Seconds West and a chord length of 305.93-feet.

Along said tangent curve to the right an arc length of 305.97-feet, to a 5/8 inch iron rod with a yellow plastic cap stamped *Carter Burgess* set for corner a concrete right-of-way monument found bears South 02 Degrees 45 Minutes 01 Seconds East a distance of 3.95-feet.

North 00 Degrees 56 Minutes 57 Seconds West a Distance of 1,499.13-feet to a 5/8 inch iron rod with a yellow plastic cap stamped *Carter Burgess* set for corner a concrete right-of-way monument found bears South 10 Degrees 54 Minutes 38 Seconds East, a distance of 5.48-feet.

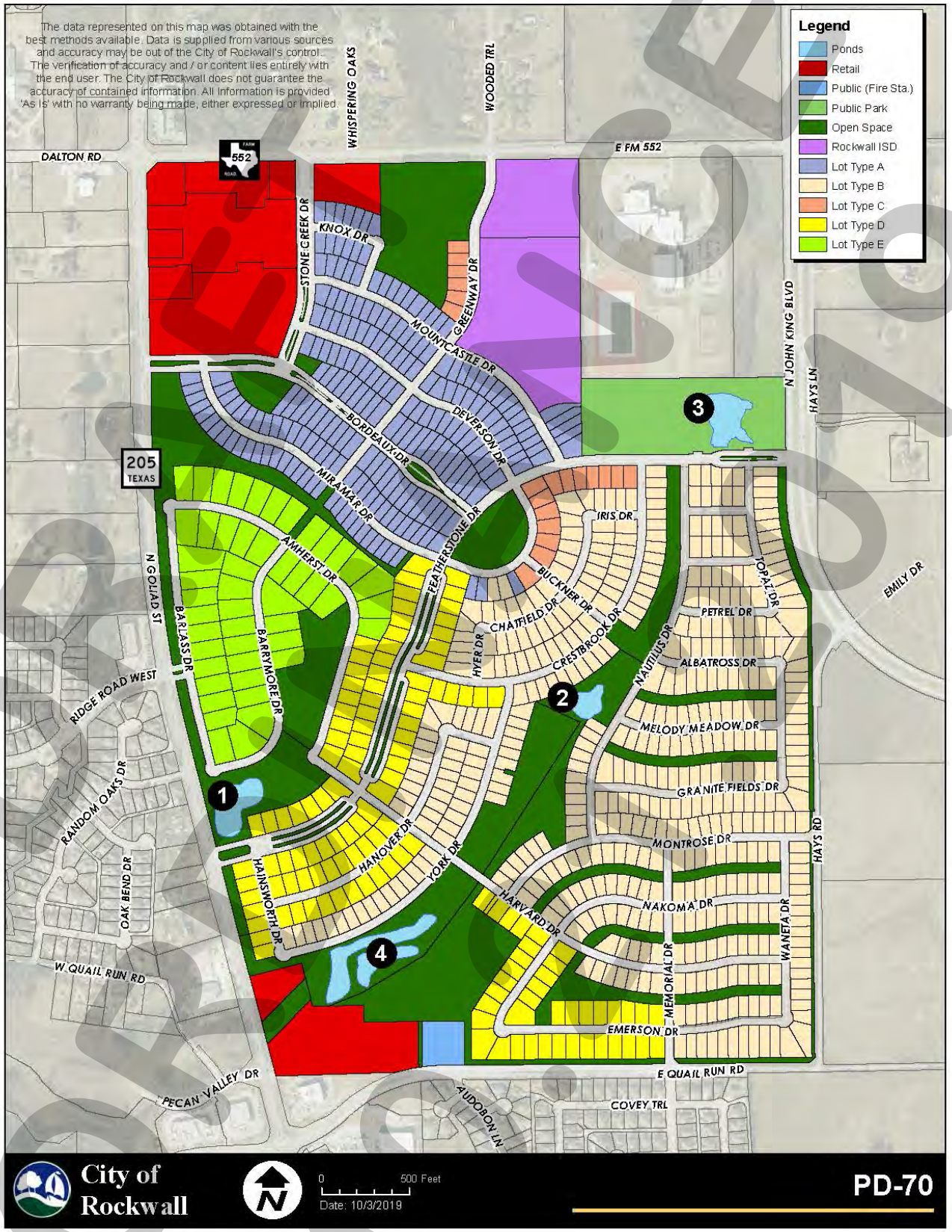
North 44 Degrees 58 Minutes 31 Seconds East a distance of 85.41-feet to a 5/8 inch iron rod with a yellow plastic cap stamped *Carter Burgess* set for corner at the intersection of the east right-of-way of aforesaid State Highway 205 and the south right-of-way of aforesaid FM-552 a concrete right-of-way monument found bears South 83 Degrees 49 Minutes 06 Seconds West a distance of 16.86-feet.

THENCE along the north line of aforesaid 392.938-acre tract and the common south right-of-way of aforesaid FM-552 the following courses and distances:

North 89 Degrees 09 Minutes 25 Seconds East a distance of 1,890.00-feet to a 5/8 inch iron rod with a yellow plastic cap stamped *Carter Burgess* set for corner.

South 00 Degrees 50 Minutes 35 Seconds East, a distance of 10.00-feet to a 5/8 inch iron rod with a yellow plastic cap stamped *Carter Burgess* set for corner.

North 89 Degrees 09 Minutes 25 Seconds East a distance of 521.43-feet to the *Point of Beginning* and containing 395.075-acres of land, more or less.



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A. GENERAL REQUIREMENTS

1. *Uses Allowed.* The following uses are permitted for the *Subject Property*.

   a. *Residential Uses*. Uses permitted of right or by Specific Use Permit (SUP) for the Single Family 10 (SF-10) District, as set forth in Article IV, *Permissible Uses*, of the Unified Development Code (UDC) [*Ordinance 04-38*], shall be allowed for areas designated for single-family (*i.e. labeled as 50's, 60's, 70's, 80's & 100's*) on the *Concept Plan*, subject to approval of a Specific Use Permit (SUP) if required by the Single Family 10 (SF-10) District regulations.

   b. *Non-residential uses*. Non-residential uses shall be allowed only within the area designated as retail on the approved *Concept Plan* for the district, and are limited to those uses permitted of right or by special use permit for the General Retail (GR) District subject to approval of a *PD Development Plan* and *PD Site Plan* in accordance with the Planned Development District regulations contained in Section 2 of Article X, *Planned Development Regulations*. of the Unified Development Code [*Ordinance No. 04-38*], and subject to approval of a Specific Use Permit (SUP) if required by the General Retail (GR) District regulations; provided, however, that the following uses are expressly prohibited:

   - ☑ Animal Hospital/Clinic
   - ☑ Animal Boarding/Kennel without Outside Pens
   - ☑ Convent or Monastery
   - ☑ Hotel or Motel
   - ☑ Hotel, Residence
   - ☑ Cemetery/Mausoleum
   - ☑ Mortuary of Funeral Chapel
   - ☑ Social Service Provider
   - ☑ Billiard Parlor or Pool Hall
   - ☑ Carnival, Circus, or Amusement Ride
   - ☑ Commercial Amusement/Recreation (*Outside*)
   - ☑ Gun Club, Skeet or Target Range (*Indoor*)
   - ☑ Astrologer, Hypnotist, or Psychic Art and Science
   - ☑ Garden Supply/Plant Nursery
   - ☑ Night Club, Discotheque, or Dance Hall
   - ☑ Secondhand Dealer
   - ☑ Auto Repair Garage (*Minor*)
   - ☑ Car Wash, Self Service*
   - ☑ Service Station*
   - ☑ Mining and Extraction (*Sand, Gravel, Oil & Other*)
   - ☑ Helipad
   - ☑ Railroad Yard or Shop
   - ☑ Transit Passenger Facility

   ** Not including a convenience store with an accessory car wash use or more than two (2) gas pumps, which accessory uses are permitted by SUP.*

   The following additional use shall be permitted of right in the PD District:

   - ☑ Grocery Store with a maximum building area of eighty thousand (80,000) square feet.

   c. *Design of Non-Residential Uses.* The retail areas shall be designed to be pedestrian-oriented and easily accessible to adjacent residential neighborhoods. Additionally, the retail area shall be designed and constructed to be integrated with adjacent uses, not separated from them by screening walls or other physical barriers. This will be

accomplished by creating paths from adjacent development into the retail area and through the use of landscaping buffers, building design and other urban design elements to create compatibility with the surrounding residential neighborhood.

d. *Density and Lot Composition*. No more than 918 single-family residential dwelling units may be constructed within the *Subject Property*. Except as provided in subsection (e), single-family residential units shall be allocated by product type in accordance with the following table:

Table 1: Lot Composition

Lot Type	Lot Size Minimum	Lot SF Minimum	Driveway Access	Total Units	Total Dwelling Units (%)
A	50' x 120'	6,000	Front	180	19.6%
B	60' x 120'	7,200	Front	521	56.8%
C	70' x 120'	8,400	Front	36	03.9%
D	80' x 125'	10,000	Front	134	14.6%
E	100' x 200'	20,000	Front	47	05.1%
AVERAGE LOT SIZE:		8,000 SF			
			MAXIMUM ALLOWED TOTAL UNITS:	918	100%

e. *Variation in lot composition.* The allocation of single-family dwellings among lot types may deviate from that in subsection (d), provided that the maximum allowed total dwelling units does not exceed 918 units, the average lot size for the development is not less than 8,000 square feet, and the following rules are met:

(1) Lot types 'A', 'B', & 'C' may increase not more than 5% in aggregate number.

(2) Lot type 'D' shall not be decreased below 124 lots of the total lots developed on the *Subject Property*.

(3) Lot type 'E' shall not be decreased below 47 lots of the total lots developed on the *Subject Property*.

2. *Development Standards Applicable.*

(1) *Residential uses*. Except as may be modified by these *PD Development Standards*, areas designated for single-family (*i.e. labeled as 50's, 60's, 70's, 80's & 100's*) shall be subject to the development standards for the Single Family 10 (SF-10) District, as set forth in Subsection 3.07 of Article V, *District Development Standards*, of the Unified Development Code (UDC), to the development standards stipulated for the North SH-205 Overlay (N SH-205 OV) and the SH-205 Bypass Overlay (205 BY-OV) Districts, and to all supplemental standards contained in the Unified Development Code in effect on the effective date of this ordinance.

(2) *Non-residential uses.* Except as may be modified by these *PD Development Standards*, areas designed for *Retail* land uses shall be subject to the development standards for the General Retail (GR) District, as set forth in Subsection 4.04 of Article V, *District Development Standards*, of the Unified Development Code (UDC), to the development standards stipulated for the North SH-205 Overlay (N SH-205

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OV) and the SH-205 Bypass Overlay (205 BY-OV) Districts, and to all supplemental standards contained in the Unified Development Code in effect on the effective date of this ordinance.

3. *Homeowner's Association (HOA).* A *Homeowner's Association* (*HOA*) shall be formed and duly incorporated in the State of Texas for the *Subject Property*. Membership shall be mandatory for the owner of each residential lot within these areas of the *Subject Property*. This HOA shall be established to ensure the proper maintenance of all common areas for which the HOA is either the owner or is the party designated as responsible for maintenance. The bylaws of this HOA shall establish a system of payment of dues, a system of enforcement of its rules and regulations; and an explanation of the responsibility of each member with regard to the common areas. The bylaws shall be submitted to the Director of Planning for review and approval, not to be unreasonably withheld, for conformity with this paragraph prior to the initial transfer to the HOA of ownership of any real property.

4. *Architectural Review.* All developments within the PD District shall be reviewed by an Architectural Review Committee (ARC) for the *Subject Property*, which will be composed of *Developer* representatives, throughout the completion of development. The ARC shall remain in effect until all new construction has concluded. City of Rockwall building permits shall not be issued prior to ARC approval. Certification of ARC approval shall be submitted with each building permit application, which shall comply with all anti-monotony standards as described in *Section B.4.*, *Anti-Monotony Features* of this document.

B. SPECIAL DEVELOPMENT STANDARDS

1. Dimensional Standards for Residential Uses.

Table 2: Lot Type Matrix

Lot Types	A	B	C	D	E
Maximum Building Height	36'	36'	36'	36'	36'
Minimum Air Conditioned Square Footage	1,800	2,200	2,400	2,600 [2]	3,000
Minimum Front Yard Building Setback	15'	20'	20'	20'	25'
Minimum Rear Yard Building Setback	10'	10'	15'	15'	15'
Minimum Side Yard (*Interior*)	5'	5'	5'	6'	7'
Minimum Side Yard Adjacent to a Street	15'	15'	15'	15'	15'
Minimum Distance of Driveway (*from Property Line*)	*N/A*	20'	20'	20'	25'
Minimum Lot Area (*Square Feet*)	6,000	7,200	8,400	10,000	20,000
Minimum Lot Frontage [1]	50'	60'	70'	80'	100'

Notes:

[1]: Lots fronting onto curvilinear streets, cul-de-sacs and eyebrows may be reduced by twenty percent (20%) in lot width measured at the front property line provided that the lot width will be met at the front building line. Additionally, the lot depth on lots fronting onto curvilinear streets, cul-de-sacs and eyebrows may be reduced by up to 10 percent (10%) but shall meet the minimum lot size for each lot type as referenced within Table 1.

[2]: A maximum of 20% of the lots may have homes not less than 2,500 sq. ft.

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2. *Development Standards for Residential Uses by Lot Product/Type*

a. *Detached Single Family Lot Type A*

Development Standards	
Minimum Lot Size	6,000 SF
Minimum Lot Width (@ Front Building Line)	50’
Minimum Lot Depth	110’
Minimum Lot Width (Corner Lot)	55’
Minimum Side Yard Setback	5’
Minimum Front Yard Building Setback	15’
Minimum Rear Yard Building Setback	10’
Minimum Air Conditioned Square Footage	1,800 SF
Minimum Roof Pitch	8:12 Except for 4:12 on Porch Roofs
Minimum Masonry Requirement [*Brick, Stone, Cultured Stone, 3-Part Stucco, cementitious siding with color palette*]	80%
Garage Orientation	Garages will be allowed to be accessed from the street; however, a minimum driveway length of 20-foot must be provided.
Maximum Lot Coverage	75%

b. *Detached Single Family Lot Type B*

Development Standards	
Minimum Lot Size	7,200 SF
Minimum Lot Width (@ Front Building Line)	60’
Minimum Lot Depth	110’
Minimum Lot Width (Corner Lot)	65’
Minimum Side Yard Setback	5’
Minimum Front Yard Building Setback	20’
Minimum Rear Yard Building Setback	10’
Minimum Air Conditioned Square Footage	2,200 SF
Minimum Roof Pitch	8:12 Except for 4:12 on Porch Roofs
Minimum Masonry Requirement [*Brick, Stone, Cultured Stone, 3-Part Stucco*]	80%
Garage Orientation	Garages will be allowed to have the garage accessed from the street using traditional “swing” or “J” drives. A second single garage door facing street is permitted behind (width) of double garage door in “swing” or “J” configuration only. A minimum of 33% of Type ‘B’ lots shall have 3 car garages.
Maximum Lot Coverage	65%

c. *Detached Single Family Lot Type C*

Development Standards	
Minimum Lot Size	8,400 SF
Minimum Lot Width (@ Front Building Line)	70’
Minimum Lot Depth	120’
Minimum Lot Width (Corner Lot)	75’
Minimum Side Yard Setback	6’
Minimum Front Yard Building Setback	20’
Minimum Rear Yard Building Setback	10’
Minimum Air Conditioned Square Footage	2,400 SF

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Minimum Roof Pitch	8:12 Except for 4:12 on Porch Roofs
Minimum Masonry Requirement [*Brick, Stone, Cultured Stone, 3-Part Stucco*]	80%
Garage Orientation	Garages will be allowed to have the garage accessed from the street using traditional "swing" or "J" drives. A second single garage door facing street is permitted behind (width) of double garage door in "swing" or "J" configuration only. A minimum of 33% of Type 'C' lots shall have 3 car garages.
Maximum Lot Coverage	65%

d. *Detached Single Family Lot Type D*

Development Standards	
Minimum Lot Size	10,000 SF
Minimum Lot Width (@ Front Building Line)	80'
Minimum Lot Depth	125'
Minimum Lot Width (Corner Lot)	85'
Minimum Side Yard Setback	6'
Minimum Front Yard Building Setback	20'
Minimum Rear Yard Building Setback	15'
Minimum Air Conditioned Square Footage	2,600 SF [1]
Minimum Roof Pitch	8:12 Except for 4:12 on Porch Roofs
Minimum Masonry Requirement [*Brick, Stone, Cultured Stone, 3-Part Stucco*]	80%
Garage Orientation	Traditional "swing" or "J" drive required. A second single garage door facing street is permitted behind (width) of double garage door in "swing" or "J" configuration only. A minimum of 80% of Type 'D' lots shall have 3 car garages.
Maximum Lot Coverage	65%

Notes:

[1]: *A maximum of 20% of the lots may have homes not less than 2,500 SF.*

e. Detached Single Family Lot Type E

Development Standards	
Minimum Lot Size	20,000 SF
Minimum Lot Width (@ Front Building Line)	100'
Minimum Lot Depth	175'
Minimum Lot Width (Corner Lot)	100'
Minimum Side Yard Setback	7'
Minimum Front Yard Building Setback	25'
Minimum Rear Yard Building Setback	15'
Minimum Air Conditioned Square Footage	3,000 SF
Minimum Roof Pitch	8:12 Except for 4:12 on Porch Roofs
Minimum Masonry Requirement [*Brick, Stone, Cultured Stone, 3-Part Stucco*]	80%
Garage Orientation	Traditional "swing" or "J" drive required. A second single garage door facing street is permitted behind (width) of double garage door in "swing" or "J" configuration only. A minimum of 80% of Type 'E' lots shall have 3 car garages.
Maximum Lot Coverage	70%

3. *Fencing.*

   a. *Residential uses.* All individual residential fencing shall be cedar standard fencing material (minimum ½" thickness) or better (spruce fencing will not be allowed). All cedar pickets shall be placed on the "public side" facing the street, alley or neighboring property. Tubular steel fencing is also acceptable for individual residential fencing, and shall be *required* on lots located along perimeter roadways, and/or abutting open spaces, greenbelts and parks. Corner lot fencing (adjacent to the street) shall provide masonry columns at 45-feet off center spacing that begins at the rear property line corner and terminates ten (10') feet behind the front yard building setback line. A maximum six (6') foot solid board on board "panel" cedar fencing shall be allowed between the masonry columns along the side and/or rear yard lot adjacent to a street. In addition, the fencing shall be setback from the side property line adjacent to a street a minimum of five (5') feet. The property owner shall maintain that portion of the property outside the fence. Fencing shall be consistent with the language described above and *Figure 1* below.

Figure 1: *Fence Example.*

4. *Anti-Monotony Features.* Lot types shall incorporate the following elevation features.

Table 3 : Anti-Monotony Matrix

Lot Type	Lot Size (Approx.)	Elevation Features
A	50' x 120'	i, iii, iv
B	60' x 120'	ii, iii, iv

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C	70’ x 120’	ii, iii, iv
D	80’ x 125’	ii, iii, iv
E	100’ x 200’	ii, iii, iv

i. Exterior facade must be composed of eighty percent (80%) masonry (brick, stone, cultured stone, three-part stucco, cementitious siding). Identical brick blends may not occur to adjacent (side-by-side) properties. Elevations shall not repeat along the fronting or siding streetscape without at least three (3) intervening homes of sufficient dissimilarity (to be determined by the ARC) on the same side of the street or two (2) intervening homes on the opposite side of the street. All chimneys shall be constructed of masonry materials, excluding cementitious siding.

ii. Exterior facade must be composed of eighty percent (80%) masonry (brick, stone, cultured stone, three-part stucco). Identical brick blends may not occur to adjacent (side-by-side) properties. Elevations shall not repeat along the fronting or siding streetscape without at least four (4) intervening homes of sufficient dissimilarity (to be determined by the ARC) on the same side of the street and (2) intervening homes on the opposite side of the street). The rear elevation of homes backing to open spaces or thoroughfares shall not repeat without at least two (2) intervening homes of sufficient dissimilarity (to be determined by the ARC). All chimneys shall be constructed of masonry materials, excluding cementitious siding.

iii. Minimum of 8:12 roof pitch, except for 4:12 roof pitches on porches. For each phase, a maximum of four compatible roof colors may be used. Dimensional shingles shall be used. Crown molding will be installed in all living and family rooms, unless vaulted or pop-up ceilings are utilized. No Formica counters in kitchens and bathrooms, no blown acoustic ceilings. No vinyl flooring will be used in kitchens and bathrooms.

iv. If the garage is accessed from the street a traditional “swing” or “J” drive will be used. Second single garage door facing street is permitted behind (width) of double garage door in “swing” or “J” configuration only.

5. *Streetscape Landscape.* Prior to issuance of a Certificate of Occupancy, yards for all single-family lots on the *Subject Property* shall be landscaped with large canopy trees.

(1) Two minimum three (3) inch trees measured six (6) inches above the root ball shall be planted in the front yard of an interior lot.

(2) Two minimum three (3) inch trees measured six (6) inches above the root ball shall be planted in the front yard of a corner lot and two additional trees of same caliper shall be planted in the side yard facing the street.

(3) For purposes of this section only, the term “front yard” includes the area within the dedicated right-of-way for a parkway immediately adjoining the front yard of the lot for properties in the areas identified as *Residential* on the *Concept Plan* in *Exhibit B* of this ordinance.

6. *Master Design Guidelines.* Additional design guidelines specific to each phase of development that shall apply to all single-family dwellings units within that phase of development, shall be submitted to the City prior to issuance of any building permits for that portion of the development.

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C. STANDARDS FOR DISTRICT DESIGN AND CONNECTIVITY

1. *Streetscape Standards for Collectors & Non-Fronting Thoroughfares.* All streets, excluding drives, fire lanes and private parking areas, shall be built according to City of Rockwall street standards as modified by *Street Buffer Strip Elevation and Street Cross-Section Elevations* below in *Figure 2*.

Figure 2: Illustration on next page

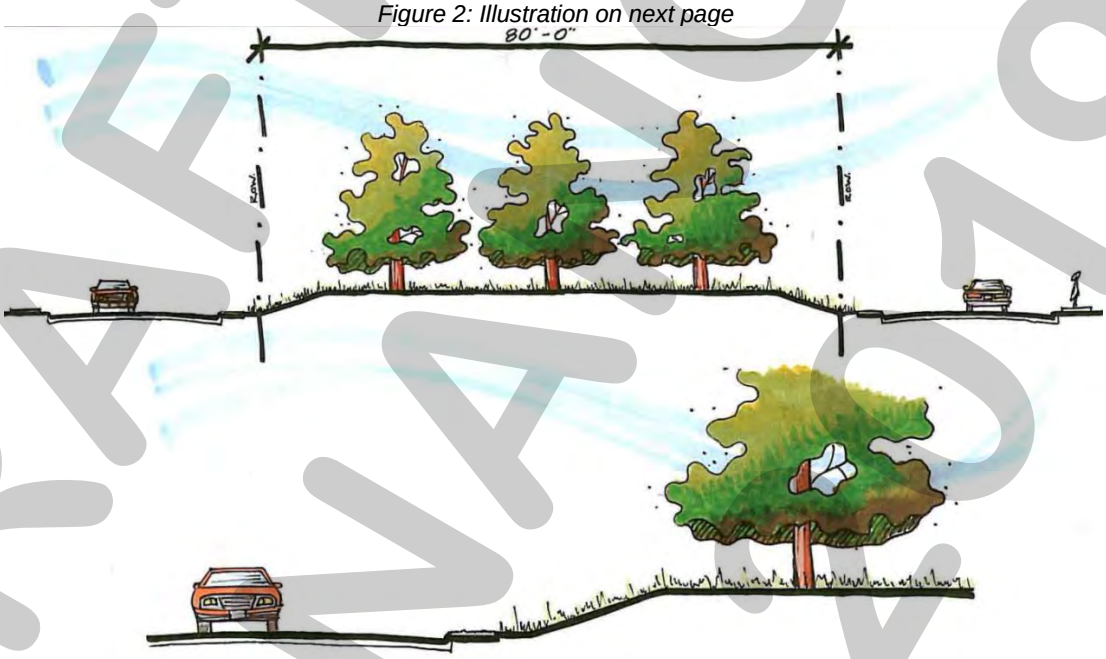

Figure 2: *Street Buffer Strip Elevation and Street Cross-Section Elevations.*

a. *Buffer-Strip for the North SH-205 Overlay (N. SH-205 OV) District.* The landscape buffer strip shall be as described in Section E, *Landscape Standards*, of Article V, *District Development Standards*, of the Unified Development Code (UDC), and be a minimum width of 60-feet as illustrated below in *Figures 3 & 4* and as indicated on the PD Concept Plan. Sidewalks and Hike & Bike Trails are to be placed according to city requirements and as set forth in the *Open Space Master Plan* for the District.

b. *Buffer-Strip for the SH-205 By-Pass Overlay (SH-205 BY-OV) District.* The landscape buffer strip shall be as described in Section E, *Landscape Standards*, of Article V, *District Development Standards*, of the Unified Development Code (UDC), and be a minimum width of 50-feet as illustrated below in *Figures 3 & 4* and as indicated on the PD Concept Plan. Sidewalks and Hike & Bike Trails are to be placed according to city requirements and as set forth in the *Open Space Master Plan* for the District.

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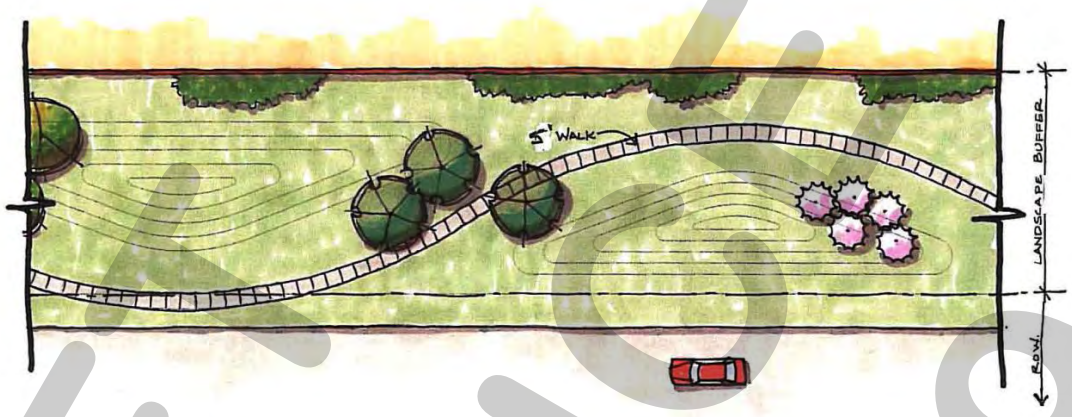

Figure 3: *Landscape Buffer Plan*

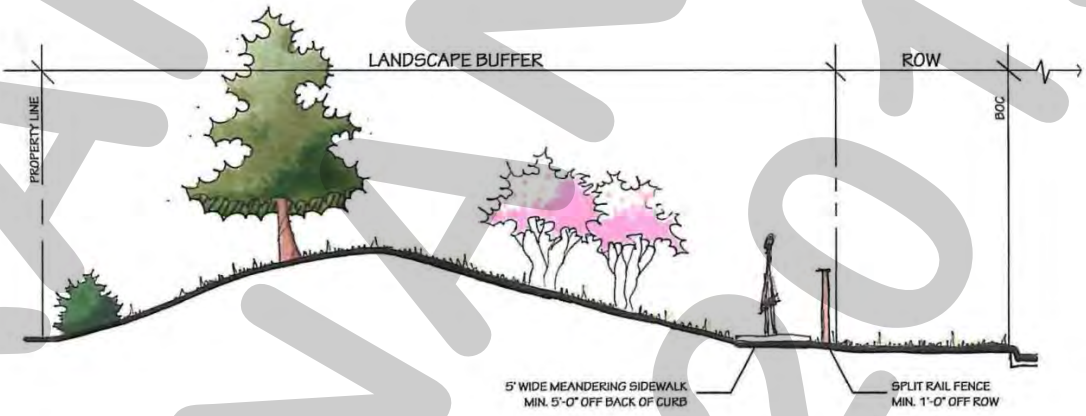

Figure 4: *Landscape Buffer Cross Section*

c. *Buffer-Strip (Outside of Overlay Districts).* The landscape buffer strip shall be a minimum of ten (10) feet on Hays Road and Quail Run Road. Sidewalks and Hike & Bike Trails are to be placed according to city requirements and as set forth in the *Open Space Master Plan* for the District.

d. *Irrigation.* Any irrigation installed in landscape areas and public parks must be designed by a Texas licensed irrigator or landscape architect.

e. *HOA Maintained Fencing.* The Homeowner's Association (HOA) will maintain all common area and perimeter fencing surrounding the *Subject Property*. Such perimeter fencing shall be composed of a six (6) foot tall tubular steel fencing with masonry entry features or such other fencing as may be approved by the City at the time of platting. Perimeter screening may also be accomplished by earthen berms landscaped with living screening. Property owners will maintain all fences constructed on private property.

f. *Curvilinear Walks. Curvilinear Walks* are to be a minimum of five (5) feet in width and a maximum of six (6) feet in width (*i.e. Hike & Bike Trails*) consistent with the approved *Open Space Master Plan*. *Collector Streets*, with or without center medians, may incorporate sidewalks six (6) feet in width adjacent to or within the *front yard* landscape easements. *Curvilinear Walks* may meander within the

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parkway and common areas; however, the edge of the walk shall be no closer than four (4) feet from the back-of-curb.

g. *Medians.* Any proposed median openings shall meet the City standards at the time of *PD Site Plan* approval.

2. *Lighting.* Light poles shall not exceed 20-feet in height, and all light fixtures shall direct light downward and be contained within the *Subject Property*.

3. *Sidewalks.* At a minimum, sidewalks located on streets shall begin four (4) feet behind the back of curb and shall be five (5) feet in overall width.

4. *Curbing.* Within *Lot Types A & B*, *roll-up-curbing* may be incorporated in an effort to minimize frequent curb cuts and maximize streetscape continuity. These *roll-up-curbs* shall be approved by the City of Rockwall Engineering Department with the approval of the final plat application.

5. *Buried Utilities.* New distribution power-lines required to serve the *Subject Property* shall be placed underground, whether such lines are located internally or along the perimeter of the *Subject Property*, unless otherwise authorized by the City Council. New transmission power-lines, or distribution lines of a size not typically or cost effectively placed underground (*i.e. 3-phase lines*), or additional lines that are added to existing poles, may be above ground, if located along the perimeter of the *Subject Property*, except along the SH-205 By-Pass (*i.e. John King Boulevard*). Additionally, if such above ground lines are installed along the perimeter of the *Subject Property* and adjacent to non-residential uses, then the lines shall be installed behind the non-residential buildings where the installation is possible. The *Developer* shall not be required to re-locate existing overhead power-lines along the perimeter of the *Subject Property*. Temporary power-lines constructed across undeveloped portions of the *Subject Property* to facilitate development phasing and looping may be allowed above ground, but shall not be considered *existing lines* at the time the area is developed, and if they are to become permanent facilities, such lines shall be placed underground pursuant to this paragraph.

6. *Parks and Open Space.* Allowing inclusion of approximately 50% of the school sites and floodplain shown on the *Concept Plan* and approximately 20.0% of the land on the *Subject Property* shall constitute open space, which is hereby deemed sufficient if supported by the following standards and conditions.

a. The *Subject Property* shall contain not less than 79-acres of open space including approximately 26.6-acres of floodplain as shown on *Exhibit B* of this ordinance.

b. Allowable open space may include but is not limited to public or private parks, trails, natural areas, buffers, traffic circle medians, entry features, common areas (*including any HOA recreation center or similar facilities*) and other features depicted on the *Concept Plan*, as set forth in the *Open Space Master Plan* prepared in accordance with subparagraph (c) below. Street right-of-way will not be included as open space. At least 80% of the single-family dwellings within the development shall be located within 800-feet of a public or private open space. In

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order to qualify, such open space must be at least one (1) continuous acre in area, not including roadway buffers less than 50-feet in width.

c. The *Developer* shall prepare the *Open Space Master Plan* to be consistent with the approved *Concept Plan*. The purpose of an *Open Space Master Plan* is to supplement the *Concept Plan* by providing an additional level of detail for public and private open space areas. The *Open Space Master Plan* shall identify the locations of and improvements to public parks, school sites and other public and private open space or common areas, taking into consideration the proximity of single-family dwellings, as required by subparagraph (a), and shall illustrate an integral system of trail improvements that, together with intervening land held by other property owners or the City, is designed to connect residential areas, schools and retail areas within the *Subject Property* to parks and open space within the *Subject Property* and that provides for continuation and connection of the trail system to off-site parks and open space, in accordance with the City's *Master Park and Recreation Plan*. The *Open Space Master Plan* shall clearly differentiate public parks from private facilities and common lands to be maintained by the HOA. The locations of public parks, school sites and other public and private open space or common areas shown on the *Open Space Master Plan* shall be in conformance with the *Concept Plan*, except as otherwise provided in Section 7 of Article II of the *Capital Facilities Agreement* pertaining to school sites. The *Open Space Master Plan* shall include a phasing plan for construction of all trails and parks, and common open space and facilities. The *Open Space Master Plan* shall be considered for approval if it complies with this section, the applicable City regulations, the *Concept Plan*, and generally accepted park-planning practices.

d. The District shall contain not less than 7.8 acres of land to be used as public or private parkland. A minimum of 7.8 contiguous acres shall be dedicated to the City in accordance with the City's *Neighborhood Parkland Dedication Ordinance* on approval of the final plat for the first phase of the development. This dedication shall include the dedication of a five (5) foot wide parcel to connect the *City Park* within the *Subject Property* to the existing City property to the east of the middle school. The remaining area will be retained as a private park within the *District*. Park improvements shall be constructed in accordance with the approved *Open Space Master Plan*. The site plan incorporating the design of park improvements and hike /bike trail improvements shall be considered for approval with the final plat for the phase of the development containing such improvements. Performance of the obligations in this subparagraph shall be deemed to fully satisfy the City's *Neighborhood Parkland Dedication Ordinance* regarding land dedication. At the time of recordation of final plats for each phase, *Developer* shall pay park improvement fees to the City. These fees shall be held in an escrow account until the commencement of *Phase 3*, at which time the *Developer* shall inform the City if the *Developer* wishes to use the escrowed fees as well as future fees to construct park improvements. Said improvements shall be approved by *Parks Director*, approval not to be unreasonably withheld, and invoices for improvements shall be submitted to *Parks Director* for approval. Performance of the obligations in this subparagraph shall be deemed to fully satisfy the City's *Neighborhood Parkland Dedication Ordinance* regarding park development fees, provided that park improvements are installed at a value equal or exceeding the value of park improvement fees for the entire *District*

applicable at that time, or improvement fees are paid. Thereafter, the *Developer* shall not be responsible for additional parkland dedication or park development fees associated with the *Subject Property*, except as otherwise may be provided in a *Capital Facilities Agreement* approved by the City.

The *Developer* shall provide retention ponds in the locations depicted on the *Concept Plan* in *Exhibit 'B'* of this ordinance. Hardedges and fountain features shall be incorporated into *Ponds 1 & 2*, *Pond 3* shall incorporate a natural edge, and *Pond 4* shall incorporate a fountain feature and a natural edge. All retention pond hardedges shall be similar to the hardedge shown in *Figure 5* below.

Figure 5: *Retention Pond with Hardedge.*

7. *Signage.* Permanent subdivision identification signage shall be permitted at all major entry points, in general conformance to the signage elevations and plan shown below in *Figures 6 & 7*. Final design of entry features to be determined with the Planned Development Site Plan.

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Figure 6: *Main Entry Subdivision Signage Elevations*

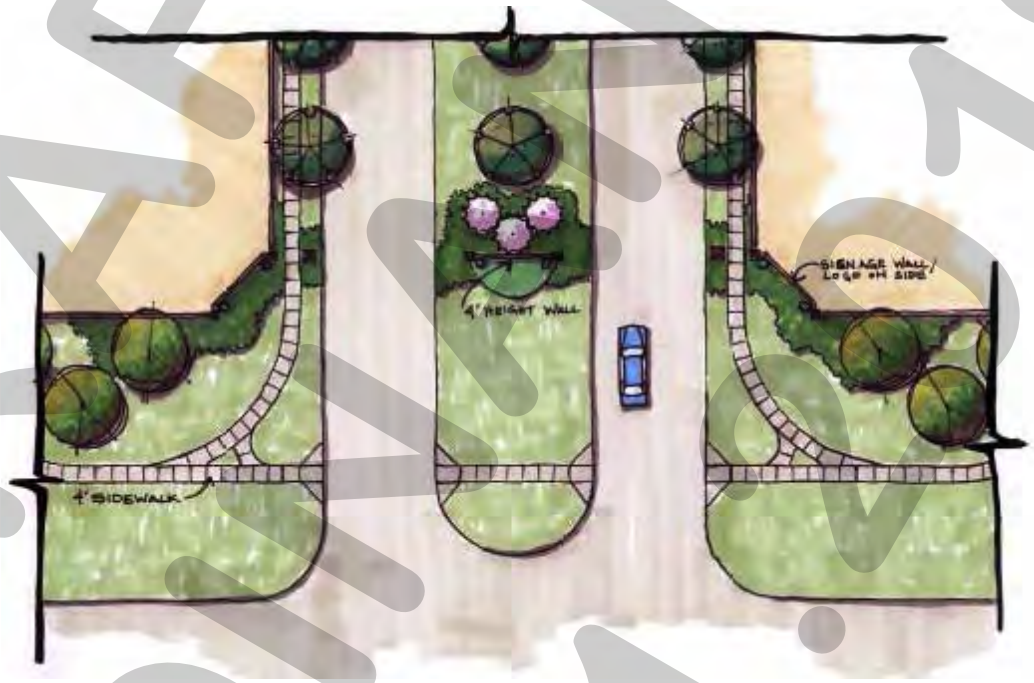

Figure 7: *Main Entry Subdivision Signage Plan*

8. *Variances.* The variance procedures and standards for approval set forth in the Unified Development Code (UDC) shall apply to any application for variance(s) to this ordinance.

9. *Amenity Center.* Developer shall construct an amenity center in approximate size and detail as shown below in *Figure 8*.

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Figure 8: *Amenity Center*

10. *Trees.* All trees planted within the District shall be a minimum three (3) inch caliper in size as measured six (6) inches above the root ball.

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City of Rockwall
The New Horizon

MEMORANDUM

TO: **Honorable Mayor and Council**

FROM: **Jeffrey Widmer, Building Official**

DATE: **October 21, 2019**

SUBJECT: **Variance request to reduce the required sign separation distance**

Doctor Michael Fisher and Doctor Marisa Zitterich of Fisher & Zitterich Dentistry located at 1306 Summer Lee Drive have requested to appear before the City Council to seek a variance from the required sign separation requirements for a new monument sign.

Our sign ordinance requires a minimum separation distance of 60' between free standing signs. The Applicants are currently constructing their new office building and desire to build a new monument sign with a separation distance of 44' from the nearest sign, due to very limited options for their sign placement.

The proposed monument sign complies with all other provisions within the sign code.

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SIGN VARIANCE APPLICATION

Date: 10.17.19

Property Address of Subject: 1306 Summer Lee Dr.

Applicant Name: Zeke Bullock / Barnett Signs Day Phone #: (972) 362-8779

Address: 4250 Action Dr. Mesquite, TX 75150

Owner of Property: 1306 Summer Lee LLC Michael & Carla Fisher Day Phone #: (972) 771-4000

Address: 244 Harvest Ridge Dr. Rockwall, TX 75032

Legal Description of Property (Description may be attached):

Lot 6, Block A Temunovic Addition

Total Acreage: 1.082 Number of Lots: 1

Current Use of Property: New Construction

Proposed Use of Property: Medical Office

Requirement or Regulation for which a Variance is Requested:

We are requesting a variance to the sign ordinance for monument signs requiring 60' of separation between signs.

Reason For Variance Request: (Attach any necessary documents)

In addition to reasons stated on attached letter, there is only one other possible location in which this sign could be installed and that location also poses several hardships as well. The first being that the location would be confusing to the public as it would appear to be intended for the drive into the property to the east of this location. In addition, after meeting the required 20' adjoining property line setback, There would only be 5' of space in which to install this sign, resulting in customers unable to open their car doors without hitting their door on the sign.

Digitally signed by Zeke Bullock
Date: 2019.10.17 07:22:54 -05'00'

Signature of Applicant

500

FISHER & ZITTERICH
FAMILY | COSMETIC | IMPLANT
DENTISTRY

DR. MICHAEL FISHER DR. MARISA ZITTERICH

October 16, 2019

City of Rockwall, To Whom Concerned:

I am requesting a variance to the sign ordinance specifying 60' of separation between monument signs on adjoining properties for our new dental office currently under construction at 1306 Summer Lee Drive. Our proposed sign meets all requirements of the City sign code including size, height, masonry, electrical, front setback, and adjoining property line setback. However, due to site layout and easements on the property, the only location in which a monument sign can be constructed allows for 44' of separation between our proposed sign and the current Lakeside Allergy monument sign.

This is due to the fact that Lakeside Allergy only had to maintain a 20' adjoining property line setback as well. During the site planning phase and development of our project the City required us to use the shared access from the road with Lakeside Allergy. So we could not position our entrance farther away from that of Lakeside Allergy, and thus we cannot now position our sign farther away.

In order to meet the 60' of separation and stay out of all easements, our monument sign would have to be located far away from the entrance, and directly within several parking spaces that are now established in City-inspected and approved concrete. During the design, approval and permitting process with the City our sign position was never seen or presented as a concern, and all of our submitted site plans showed our currently requested position for our monument sign.

Please grant this request for the sign variance described above so our monument sign may have the same favorable position relative to our entrance as that of our neighbors, Lakeside Allergy and Lowrance Dental.

Gratefully,

Michael Fisher

Michael Fisher, DDS

1020 W. RALPH HALL PARKWAY SUITE 101 ROCKWALL, TEXAS 75032
PHONE: 972-771-4000 FAX: 972-771-4700

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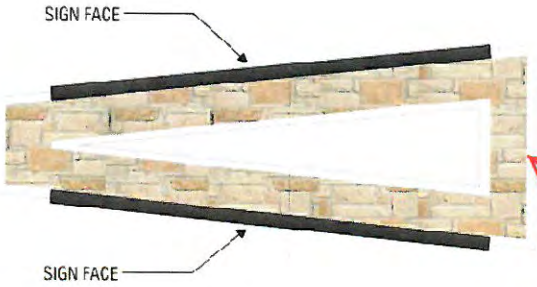
Brick: Silver Creek Brick
- Stone: Leuders - 70% Smoke, 30% Buff
- Stucco: 66 Bright White with Semi-Textured finish
- Cast Stone: There is no actual color name for this, it's just #3 (See attached)
- Mortar: White

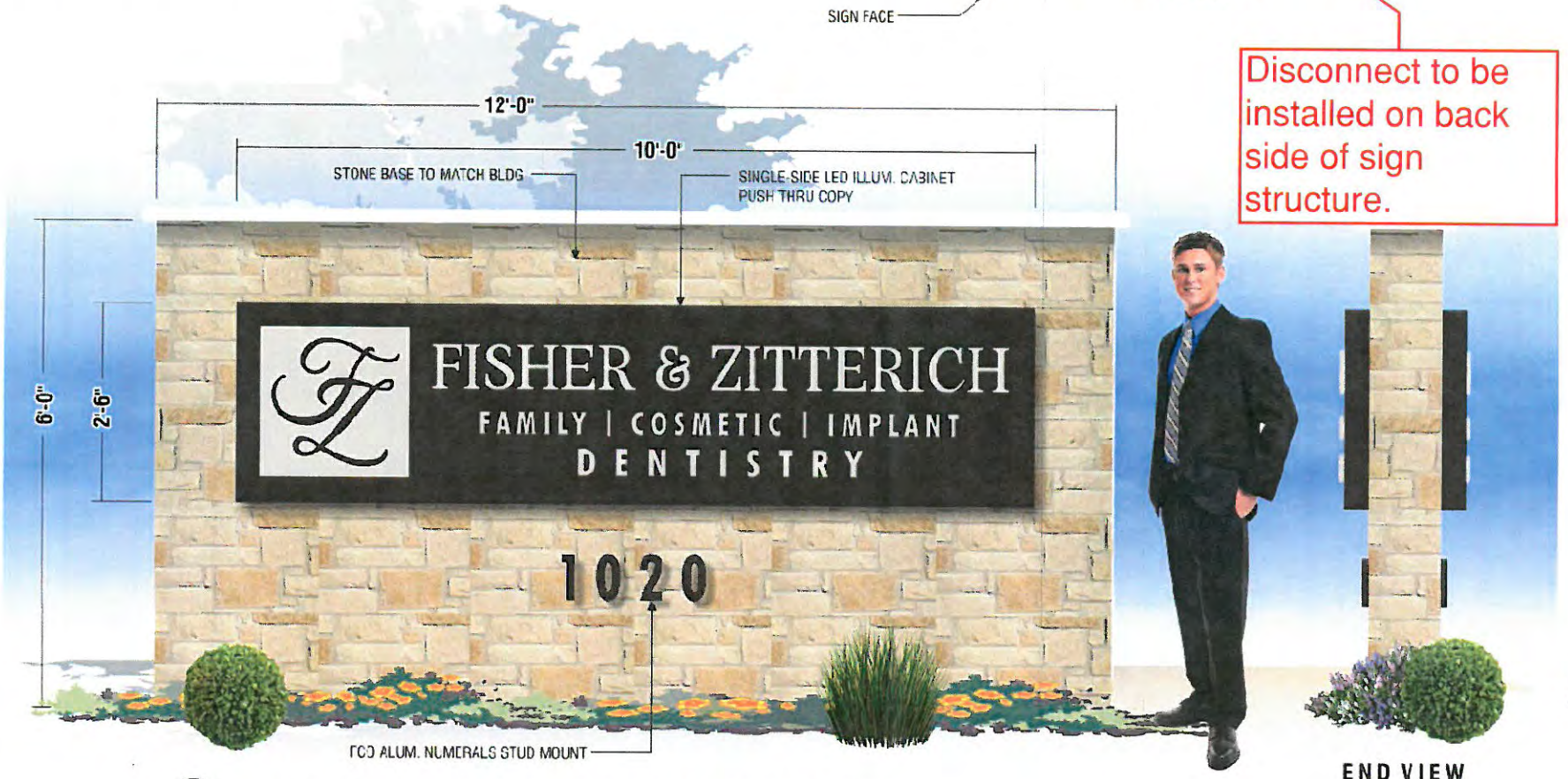
FABRICATED BOXED ALUMINUM CABINET PAINTED AS SHOWN
LOGO BACKGROUND AS SHOWN
LOGO LETTERS PAINTED AS SHOWN
PUSH THRU ACRYLIC COPY W/ OPAQUE VINYL OVERLAY
WHITE LED ILLUMINATION, FLUSH MOUNT TO SIGN FACE AS REQUIRED.

EXACT COLORS TO BE SPECIFIED PRIOR TO PRODUCTION.



PLAN VIEW
V-SHAPED SIGN
NTS

Disconnect to be installed on back side of sign structure.



END VIEW

SIGN C **FACE VIEW: V-SHAPED INT. ILLUM. MONUMENT SIGN**
SCALE: 3/4" = 1'-0"

Project Name:
Mike Fisher Dentist
1020 Summer Lee Drive
Rockwall, TX
75032

09.25.2019

Project Manager:
Zeke Bullock

Drawn By:
Robert Contreras

Design No.
S8

Proud Member of the following Associations

Print Verification:
PROOF
PROOF 2

48 Years BARNETT

Signs
Installation
Maintenance

BARNETT SIGNS

Barnett Signs, Inc.
4256 Action Drive
Mesquite, Texas 75150
972.681.8600 Phone
972.681.8824 Fax
barnettsigns.com

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Approximate location of proposed sign

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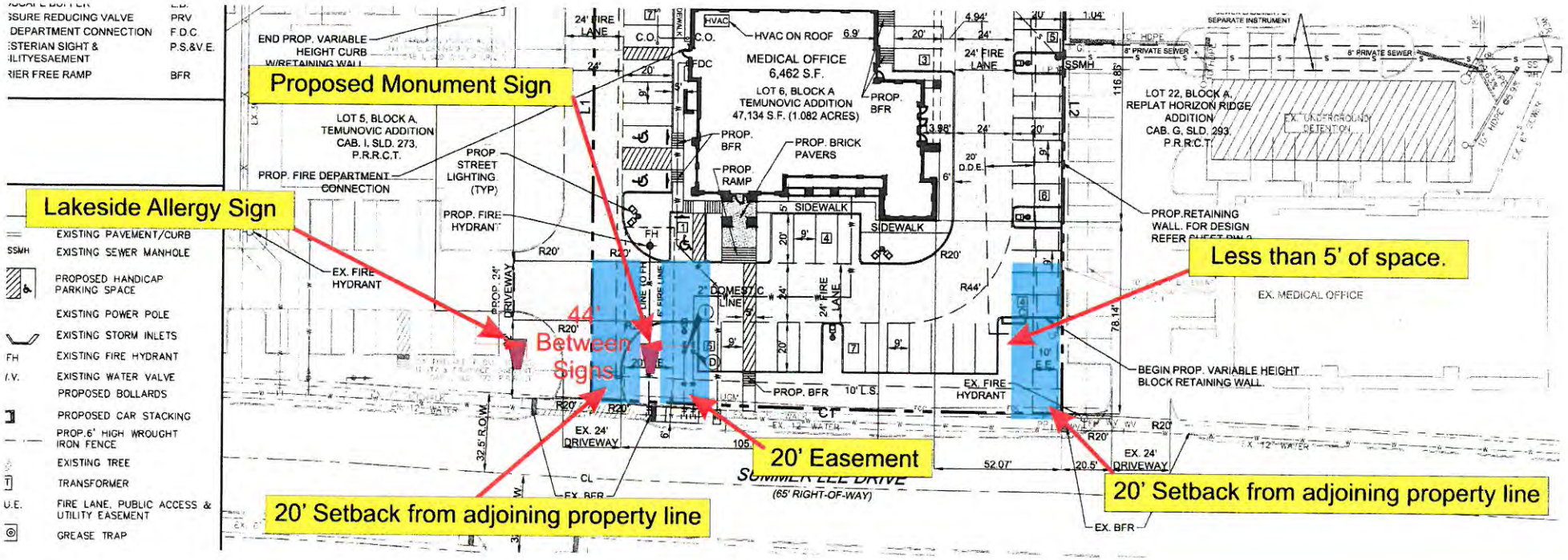
503


Approximate location of proposed sign
© 2018 Google
Google Earth

504


Proposed Monument Sign
Lakeside Allergy Sign
Less than 5' of space.
44' Between Signs
20' Easement
20' Setback from adjoining property line
20' Setback from adjoining property line
MEDICAL OFFICE 6,462 S.F.
LOT 6, BLOCK A TEMUNOVIC ADDITION 47,134 S.F. (1.082 ACRES)
LOT 5, BLOCK A, TEMUNOVIC ADDITION CAB. I, SLD. 273, P.R.R.C.T.
LOT 22, BLOCK A, REPLAT HORIZON RIDGE ADDITION CAB. G, SLD. 293, P.R.R.C.T.
END PROP. VARIABLE HEIGHT CURB W/RETAINING WALL
PROP. FIRE DEPARTMENT CONNECTION
PROP. STREET LIGHTING (TYP)
PROP. FIRE HYDRANT
EX. FIRE HYDRANT
PROP. BRICK PAVERS
PROP. RAMP
PROP. BFR
SIDEWALK
PROP.RETAINING WALL. FOR DESIGN REFER
EX. MEDICAL OFFICE
BEGIN PROP. VARIABLE HEIGHT BLOCK RETAINING WALL
EX. FIRE HYDRANT
EX. 24' DRIVEWAY
PROP. 24' DRIVEWAY
SUMMER LEE DRIVE
(65' RIGHT-OF-WAY)
EX. BFR
EXISTING PAVEMENT/CURB
EXISTING SEWER MANHOLE
PROPOSED HANDICAP PARKING SPACE
EXISTING POWER POLE
EXISTING STORM INLETS
EXISTING FIRE HYDRANT
EXISTING WATER VALVE
PROPOSED BOLLARDS
PROPOSED CAR STACKING
PROP.6' HIGH WROUGHT IRON FENCE
EXISTING TREE
TRANSFORMER
FIRE LANE, PUBLIC ACCESS & UTILITY EASEMENT
GREASE TRAP

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City of Rockwall
The New Horizon

MEMORANDUM

TO: **Honorable Mayor and City Council Members**

FROM: **Kristy Cole, City Secretary / Assistant to the City Manager**

DATE: **October 15, 2019**

SUBJECT: **Boards & Commissions (re)Appointments**

Council is asked to consider the following reappointments and vacancies, terms of which expired back in August. The Council liaison(s) assigned to each board is listed next to the board title. Unless otherwise noted, each person listed below who is eligible for reappointment has given staff indication that he or she wishes to be reappointed.

Airport Advisory Board (Pruitt, Fowler and Macalik)

- Kellie Roby resigned - *VACANCY TO BE FILLED*

Board of Adjustments (full Council)

- David Lowrey
- Stuart Smith
- Shannon Bennett
- Peter Flores does NOT wish to be reappointed – *VACANCY TO BE FILLED*
- Todd White is termed out – *VACANCY TO BE FILLED*

Historic Preservation Advisory Board (Trowbridge)

- Carolyn Francisco
- Jay Odom
- Daniel Nichols does not wish to be reappointed - *VACANCY TO BE FILLED*
- Mike Mishler is termed out - *VACANCY TO BE FILLED*

Park Board (Johannesen)

- Fran Webb does NOT wish to be reappointed – *VACANCY TO BE FILLED*

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Cole, Kristy

Subject: Next Meeting Agenda Item

-----Original Message-----
From: Crowley, Rick <RCrowley@rockwall.com>
Sent: Tuesday, October 15, 2019 2:58 PM
To: Trowbridge, Patrick <PatrickTrowbridge@rockwall.com>
Cc: Council Group <CouncilGroup@rockwall.com>; Smith, Mary <MSmith@rockwall.com>; Boyd, Joey <JBoyd@rockwall.com>; Cole, Kristy <KCole@rockwall.com>
Subject: Re: Next Meeting Agenda Item

Sent from my iPhone

> On Oct 15, 2019, at 2:37 PM, Trowbridge, Patrick <PatrickTrowbridge@rockwall.com> wrote:
>
> I would like to talk about Water Billing at the next meeting if okay?
>
> Sent from my iPhone

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CITY OF ROCKWALL

CITY COUNCIL MEMORANDUM

PLANNING AND ZONING DEPARTMENT
385 S. GOLIAD STREET • ROCKWALL, TX 75087
PHONE: (972) 771-7745 • EMAIL: PLANNING@ROCKWALL.COM

TO:	Mayor and City Council
CC:	Rick Crowley, *City Manager* Mary Smith, *Assistant City Manager* Joey Boyd, *Assistant City Manager*
FROM:	Ryan Miller, *Director of Planning and Zoning*
DATE:	October 21, 2019
SUBJECT:	Comprehensive Plan Advisory Committee (CPAC)

At the October 7, 2019 City Council meeting, the City Council requested that staff contact the previous Comprehensive Plan Advisory Committee (CPAC) members to see if they would like to continue their service on the committee. Staff has contacted all members of the previous committee, and all seven (7) members have indicated that they would like to continue to serve on the new committee. Attached to this memorandum is a resolution that would reinstate the CPAC as a standing committee; however, the City Council may choose, at their discretion, to increase the size of the committee by appointing additional members. Should this be the case, staff will make any corrections to the resolution and bring it back before the City Council at the *November 4, 2019* City Council meeting. For general reference, staff has included the memorandum and supporting documents from the October 7, 2019 City Council meeting for the City Council's review. Should the City Council have any questions staff will be available at the October 21, 2019 City Council meeting.

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CITY OF ROCKWALL

RESOLUTION NO. 19-23

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS, ESTABLISHING THE COMPREHENSIVE PLAN ADVISORY COMMITTEE AND PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, a City's Comprehensive Plan -- *also known as a general plan or master plan* -- is a document intended to layout a 20-year vision for a city and guide a City Council's actions on policy decisions relating to land use and development regulations, and expenditures for capital improvements; and,

WHEREAS, the City Charter for the City of Rockwall states that "(t)he existing master plan [*Comprehensive Plan*] for the physical development of the City contains recommendations for the growth, development and beautification of the City and its extraterritorial jurisdiction … "; and,

WHEREAS, the City of Rockwall's Comprehensive Plan was originally drafted in 1966 with major updates being approved in 1986, 1995, and 2001; and,

WHEREAS, the City Council of the City of Rockwall adopted the OURHometown Vision 2040 Comprehensive Plan on December 3, 2018 by *Ordinance No. 18-48*; and,

WHEREAS, the OURHometown Vision 2040 Comprehensive Plan calls for the establishment of a standing Comprehensive Plan Advisory Committee (CPAC) that can review the Comprehensive Plan on an annual basis to account for changes to the physical development of the City, provide accountability for the progress of the plan, and to provide a clear vision for the future growth of the community; and,

WHEREAS, in an effort to ensure transparency and to further citizen involvement in the planning process, the City Council hereby establishes an appointed board of Rockwall citizens to serve as the Comprehensive Plan Advisory Committee (CPAC); and,

WHEREAS, the Comprehensive Plan Advisory Committee (CPAC) shall serve as an advisory and recommending body to ensure that the findings, recommendations and strategies identified by City staff are in alignment with the goals and vision of the community and the City Council;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS:

SECTION 1. *Purpose.* The Comprehensive Plan Advisory Committee (CPAC) serves in an advisory role overseeing the preparation and annual review of the OURHometown Vision 2040 Comprehensive Plan for the purpose of achieve the following:

1) To provide advisory recommendations to City Staff, the City Council Development Review Committee (CCDC), and the City Council; and,

2) To ensure that all findings, recommendations and strategies prepared for the Comprehensive Plan are in alignment with the goals and vision of the Community and the City Council.

SECTION 2. *Members.* The Comprehensive Plan Advisory Committee (CPAC) shall consist of seven (7) members that are appointed by the City Council. These members should be

representative of the community and may consist of members of the City's other boards and commissions, community leaders, stakeholder groups and development experts; however, all appointees shall be citizens of the City of Rockwall.

SECTION 3. *Term of Membership.* The members of the Comprehensive Plan Advisory Committee (CPAC) shall be appointed for a term of five (5) years with the ability to serve two (2) consecutive terms. Any member of the Comprehensive Plan Advisory Committee (CPAC) may be removed from office for any cause deemed by the City Council to be sufficient for removal. If a vacancy should exist on the committee due to removal from office, resignation, death, refusal or inability to serve, the City Council shall appoint a new member to fill the vacancy for a new term.

SECTION 4. *Attendance.* If a member of the Comprehensive Plan Advisory Committee (CPAC) has three (3) consecutive absences that are not excused by the Comprehensive Plan Advisory Committee (CPAC), or is absent from more than 25% of the meetings, that member may be removed from the committee; however, if absent from 50% of the meetings in any calendar year, the member will automatically be removed from the Comprehensive Plan Advisory Committee (CPAC).

SECTION 3. *Officers.* At the first Comprehensive Plan Advisory Committee (CPAC) meeting, the committee shall elect a Chairman and Vice-Chairman. These positions will serve for a term of three (3) years. The Vice-Chairman is to preside in the absence of the chair.

SECTION 4. *Voting.* All recommendations and decisions of the Comprehensive Plan Advisory Committee (CPAC) shall be decided by a simple majority vote.

SECTION 5. *Meetings.* The Comprehensive Plan Advisory Committee (CPAC) shall meet on an as needed basis. Since the Comprehensive Plan Advisory Committee (CPAC) is an advisory board and not a regulatory board, its meetings shall not be subject to the requirements of the Texas Open Meetings Act as stipulated by Chapter 551 of the *Texas Local Government Code*; however, the agenda for each meeting shall be posted on the City's bulletin board, in front of City Hall, a minimum of 24-hours prior to the meeting. The agenda shall indicate the time and place of each meeting. All Comprehensive Plan Advisory Committee (CPAC) meetings shall be open to the general public.

SECTION 6. *Dissolution Date [Sunset Clause].* The Comprehensive Plan Advisory Committee (CPAC) shall serve at the discretion of the City Council and may be dissolved by the City Council at any time. Upon the dissolution of the committee the members shall be released from any further obligations with respect to the Comprehensive Plan Advisory Committee (CPAC).

SECTION 7. *Effective Date.* This resolution shall take effect immediately from and after its adoption and it is so resolved.

PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS, ON THIS THE 21ST DAY OF OCTOBER, 2019.

APPROVED:

_____
Jim Pruitt, *Mayor*

ATTEST:

_____
Kristy Cole, *City Secretary*

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CITY OF ROCKWALL

CITY COUNCIL MEMORANDUM

PLANNING AND ZONING DEPARTMENT
385 S. GOLIAD STREET • ROCKWALL, TX 75087
PHONE: (972) 771-7745 • EMAIL: PLANNING@ROCKWALL.COM

TO:	Mayor and City Council
CC:	Rick Crowley, *City Manager* Mary Smith, *Assistant City Manager* Joey Boyd, *Assistant City Manager*
FROM:	Ryan Miller, *Director of Planning and Zoning*
DATE:	October 7, 2019
SUBJECT:	Comprehensive Plan Advisory Committee (CPAC)

On December 3, 2018, the City Council approved *Ordinance No. 18-48*, which adopted the OURHometown Vision 2040 Comprehensive Plan. This document was the result of a two (2) year collaboration between the Comprehensive Plan Advisory Committee (CPAC), the City's boards and commissions, City staff, and the general public. The original resolution that established the CPAC in 2016 (*i.e. Resolution No. 16-17*) contained a sunset clause dissolving the committee upon the adoption of the Comprehensive Plan; however, one of the adopted implementation strategies approved with the plan calls for a standing CPAC committee that can assist staff with the required annual updates.

In response to this implementation strategy staff is requesting that the City Council appoint a standing CPAC that will function similar to the City's other advisory boards. To assist the City Council, staff has included the memorandum and guidelines presented to the City Council in 2016, and a list of the previous members of the CPAC. Staff should point out that while the previous CPAC consisted of seven (7) members, the City Council may establish a larger committee at their discretion. Staff anticipates that this committee will only meet two (2) to three (3) times a year during the annual update process, and potentially more during the five (5) and ten (10) year update process. Once the City Council has provided staff with direction concerning the committee and the number of members, staff will prepare a resolution outlining the responsibilities of the committee. Staff is currently preparing the annual update to the OURHometown Vision 2040 Comprehensive Plan for the committee's review. Should the City Council have any questions concerning this request, staff will be available at the *October 7, 2019* City Council meeting.

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2016 CPAC Members:

1) Donna Dorman
   Personal: *Unknown*
   Boards/Committees: Rockwall Summer Musicals Member, Keep John King a Boulevard, Friends of Raymond Cameron Lake
   Address: 1093 Shady Lane Drive (Caruth Lakes, Phase 6)
   Phone: (972) 571-9855
   Email:donnadorman@swbell.net

2) Johnny Lyons
   Personal: Lyons Heating and Air (108 Interruban Street)
   Boards/Committees: Planning and Zoning Commission
   Address: 101 Becky Lane
   Phone: (214) 808-9029
   Email: jlyons@lyonsairandheat.com

3) Jerry Welch
   Personal: Ebby Halliday Realtors
   Boards/Committees: Architectural Review Board (ARB)
   Address: 1509 S. Lakeshore Drive
   Phone: (972) 800-3915
   Email: jerry@thewelchteam.com

4) Bob Wacker
   Personal: Retired
   Boards/Committees: N/A
   Address: 806 Miramar Drive (Stone Creek)
   Phone: (214) 801-9377
   Email: bobwacker@att.net

5) Shannon Nerren
   Personal: Civil Engineer
   Boards/Committees: N/A
   Address: 401 Forest Trace (599 Trout Street -- LRE)
   Phone: (409) 504-8769
   Email: swn@azb-engrs.com

6) Mike Larriviere
   Personal: Keystone Insurance & Bonds
   Volunteer: YMCA, Carter BloodCare, RISD, Lake Pointe Church
   Address: 1425 E. Quail Run Road
   Phone: (214) 649-3699
   Email: mike@kswins.com

7) Dale Cherry
   Personal: Civil Engineer
   Boards/Committees: REDC
   Address: 508 Highview Lane
   Phone: 972-978-3650
   Email: jdalecherry@gmail.com

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CITY OF ROCKWALL, TEXAS
MEMORANDUM

TO: Mayor and City Council

CC: Rick Crowley, *City Manager*
Brad Griggs, *Assistant City Manager*

FROM: Ryan Miller, *Director of Planning and Zoning*

DATE: October 3, 2016

SUBJECT: Comprehensive Plan Advisory Committee (CPAC) Resolution

As will be discussed in the work session on October 3, 2016, the City Council will need to appoint a citizen steering committee to assist staff through the proposed Comprehensive Plan update. In order to give the City Council the option of approving the resolution and/or appointing members at the October 3, 2016 meeting staff has placed this as an action item on the agenda; however, this item can be postponed to a future meeting date and does not require the Council to take action. Staff has attached the proposed resolution and a list of suggested criteria for selecting members that was provided to the City Council during the 2010 Comprehensive Plan update (*see Exhibits 'A'*). Should the City Council have any questions staff will be available at the meeting to discuss.

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Suggestions for Comprehensive Plan Advisory Committee

- ☑ Former Planning and Zoning Commissioners;
- ☑ Current or past REDC Board Members;
- ☑ Former or Current County Commissioners;
- ☑ Independent local businessmen with interest in community;
- ☑ Representatives from the R.I.S.D. (could be a teacher);
- ☑ Real Estate individual involved in residential and commercial development;
- ☑ Local Corporate Business owner or CEO;
- ☑ Local Builder/Developer;
- ☑ Banking/Financial Investment representative involved in local development and business investment;
- ☑ Individuals that represent large neighborhoods/subdivisions or H.O.A. within the city;
- ☑ Local Civil Engineers involved in land use and development;
- ☑ Citizens that are large land owners or representatives of large land owners within the City; and,
- ☑ Representatives from non-profit organizations that affect large areas of the City.

The potential participants on the Committee should generally be individuals that:

- ☑ are interested in the growth of the City
- ☑ may have been involved in land use planning
- ☑ may have been involved in a land use conflict
- ☑ may have a considerable influence on land use planning
- ☑ may be affected by the outcome of land use planning

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CITY OF ROCKWALL

RESOLUTION NO. 16-17

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS, ESTABLISHING THE COMPREHENSIVE PLAN ADVISORY COMMITTEE AND PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, a City's Comprehensive Plan -- *also known as a general plan or master plan* -- is a document intended to layout a 20-year vision for a city and guide a City Council's actions on policy decisions relating to land use and development regulations, and expenditures for capital improvements; and,

WHEREAS, the City Charter for the City of Rockwall states that "(t)he existing master plan [*Comprehensive Plan*] for the physical development of the City contains recommendations for the growth, development and beautification of the City and its extraterritorial jurisdiction ... "; and,

WHEREAS, the City of Rockwall's Comprehensive Plan was originally drafted in 1966 with major updates being approved in 1986, 1995, and 2001; and,

WHEREAS, the City of Rockwall's last Comprehensive Plan update was adopted on March 5, 2012 by *Resolution No. 12-07*; and,

WHEREAS, the City Council of the City of Rockwall acknowledges that the Comprehensive Plan needs to be updated from *time-to-time* to account for changes to the physical development of the City and to provide a clear vision for the future growth of the community; and,

WHEREAS, in an effort to ensure transparency and to further citizen involvement in the planning process, the City Council hereby establishes an appointed board of Rockwall citizens to serve as the Comprehensive Plan Advisory Committee (CPAC); and,

WHEREAS, the Comprehensive Plan Advisory Committee (CPAC) shall serve as an advisory and recommending body to ensure that the findings, recommendations and strategies identified by City staff are in alignment with the goals and vision of the community and the City Council;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS:

SECTION 1. *Purpose.* The Comprehensive Plan Advisory Committee (CPAC) serves in an advisory role overseeing the preparation of the Comprehensive Plan update to achieve the following:

1) To provide advisory recommendations to City Staff, the City Council Development Review Committee (CCDC), and the City Council; and,

2) To ensure that all findings, recommendations and strategies prepared for the Comprehensive Plan update are in alignment with the goals and vision of the Community and the City Council.

SECTION 2. *Members.* The Comprehensive Plan Advisory Committee (CPAC) shall consist of seven (7) members that are appointed by the City Council. These members should be representative of the community and may consist of members of the City's other boards and commissions, community leaders, stakeholder groups and development experts; however, all

appointees shall be citizens of the City of Rockwall.

SECTION 3. *Officers.* At the first Comprehensive Plan Advisory Committee (CPAC) meeting, the committee shall elect a Chairman and Vice-Chairman. These positions will serve for the duration of the committee [*i.e. until the dissolution date*].

SECTION 4. *Voting.* All recommendations and decisions of the Comprehensive Plan Advisory Committee (CPAC) shall be decided by a simple majority vote.

SECTION 5. *Meetings.* The Comprehensive Plan Advisory Committee (CPAC) shall meet on an as needed basis. Since the CPAC is an advisory board and not a regulatory board, its meetings shall not be subject to the requirements of the Texas Open Meetings Act as stipulated by Chapter 551 of the *Texas Local Government Code*; however, the agenda for each meeting shall be posted on the City's bulletin board, in front of City Hall, a minimum of 24-hours prior to the meeting. The agenda shall indicate the time and place of each meeting. All CPAC meetings shall be open to the general public.

SECTION 6. *Dissolution Date [Sunset Clause].* Upon the completion and adoption of the 2017 Comprehensive Plan Update, the Comprehensive Plan Advisory Committee (CPAC) shall be dissolved and its members shall be released from any further obligations with respect to the Committee.

SECTION 7. *Effective Date.* This resolution shall take effect immediately from and after its adoption and it is so resolved.

PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS, ON THIS THE 3RD DAY OF OCTOBER, 2016.

APPROVED:

Jim Pruitt, Mayor

ATTEST:

Kristy Cole, City Secretary

CITY OF ROCKWALL TEXAS
SEAL

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City of Rockwall
The New Horizon

MEMORANDUM

TO: **Rick Crowley, City Manager**

FROM: **Amy Williams, P.E., Director of Public Works/City Engineer**

DATE: **October 14, 2019**

SUBJECT: **2019 Update of the Standards of Design and Construction**

Over the course of the last year and half staff has updated the City's Standards of Design and Construction. The current Standards of Design and Construction were approved by City Council on November 7, 2016. Staff conducted several internal reviews of the Standards to address current gaps and additions.

Staff has attached a list of major changes to these standards that were made and the Updated 2019 Standards of Design and Construction. For reference the portions of the standards that have been changed are in "red". There are two of the major items that staff would like to discuss with City Council in detail. They are:

- Section 3.4: Detention
  - The addition of requiring storm water detention in the Buffalo Creek Watershed for all developments. A map has been attached for your reference as far as the extents of the Buffalo Creek Watershed within the City Limits along with a letter of recommendation from the Cities hydrologic and hydraulics engineering consultant.
- Section 6.2: Grading, Fill, Excavation and Earthwork Permit
  - The addition of the following language: *"An early fill, excavation and earthwork permit will not be issued to any development or re-development projects that are in actively being reviewed by the Engineering Division. Grading for the parcels/development will only be released after final construction plan release by the Engineering Division."*

Staff request consideration to proceed with the City Council adoption of the October 2019 update to the Standards of Design and Construction.

If you have any questions, please advise.

AJW

Attachment

Cc: Joey Boyd, Assistant City Manager
Mary Smith, Assistant City Manager
Jeremy White, P.E., CFM, Civil Engineer
Rick Sherer, Water/Wastewater Manager
Billy Chaffin, Superintendent of Streets & Drainage
File

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Major Changes to the Standards of Design and Construction

1. **General Requirements**
   - Standard Specifications: Adoption of the 5th Edition, November 2017, NCTCOG Standard Specifications for Public Works Construction.
   - Clarification of right-of-way and easement requirements
2. **Streets**
   - Addition of procedures for driveway construction and replacement on TxDOT Facilities.
   - Addition of sidewalk requirements for roadway reconstruction project. Result of the 2018 roadway bond project sidewalk policy decision from the September 3, 2019 Council Meeting.
   - Clarification of decorative sign poles and fixtures.
   - Clarification of requirements for Temporary Traffic Control.
   - Addition of Traffic Impact Analysis and Mitigation Requirements.
3. **Storm Drainage Facilities**
   - Clarification of requirements, definitions and procedures pertaining to the Unit Hydrograph Method.
   - Addition of requiring storm water detention for all developments within the Buffalo Creek Watershed.
   - Addition of requirements for determining local 100-year flood zones.
   - Clarifications and expansion of the Flood Studies, Reclamation and Modifications section to work to reduce problems staff has dealt with in past reviews.
4. **Vegetation**
   - Expanded definition of how close trees can be planted next to public utilities based on the size of the utility.
5. **Water System and Wastewater System**
   - Combined Water and Wastewater in to one section.
   - Addition of requirements for when a Infrastructure Capacity Study shall be performed.
   - Addition of procedures for water and wastewater line installation within TxDOT Right-of-Way
   - Clarification of requirements for Crossings (Culvert, Creek, TxDOT Highway, and Railroad)
   - Addition of requirements for sizing water and wastewater mains.
   - Clarification of requirements for design flow of wastewater system.
   - Addition of requirements for dead end water mains.
   - Addition of requirements on manholes for internal drop connections, corrosion protection and inflow prevention.
   - Addition of structural requirements for wastewater aerial creek crossings.
   - Addition of new sub-section for wastewater lift stations and force mains.
6. **Miscellaneous Requirements**
   - Addition of requirements allowing when grading permits are issued.
7. **Special Provisions to the NCTCOG's Standard Specifications for Public Works Construction Standards**
   - Updated to conform to the NCTCOG's 5th Edition, November 2017 and integrate City amendments.
8. **Special Provisions to the NCTCOG's Standard Drawings for Public Works Construction Standards**
   - Updated to conform to the NCTCOG's 5th Edition, November 2017 and integrate City amendments.
   - Addition of several new and updated standard details.

Amy Williams, P.E.
City Engineer
City of Rockwall
385 S. Goliad
Rockwall, Texas 75087

September 27, 2019

Re: Detention Considerations for Buffalo Creek Watershed

Dear Ms. Williams:

Two of the largest watershed areas within the City of Rockwall are the Buffalo Creek watershed and the Squabble Creek watershed. Both watersheds have a long history of flooding problems, especially for areas located at the downstream portions of their drainage system. The City's stormwater management requirements for the Squabble Creek watershed have long been more stringent than those for the Buffalo Creek watershed, requiring detention and other mitigation measures for both non-residential and residential developments. In the Buffalo Creek watershed, detention has normally been a requirement for only non-residential development, although some residential developments have incorporated detention facilities or other mitigation measures for the purpose of preventing increases in flooding and flood damage potential.

As the City is well aware, one of the major flooding issues associated with the Buffalo Creek watershed is the ongoing flooding of homes along Rockwall Lake. These flooded homes, for whatever reason, were allowed to be constructed within flood prone areas prior to the City annexing the area. Although detention requirements for future development within the watershed will not prevent or partially mitigate any of the existing flooding conditions in the vicinity of Rockwall Lake, it is highly recommended that the City provide regulation to at least help prevent the flooding situation from becoming worse in the future. Therefore, it is recommended that the City adopt stormwater management standards for the Buffalo Creek watershed similar to those currently enforced in regulating stormwater within the Squabble Creek watershed. Such standards should include the requirement of providing forms of mitigation to include, but not be limited to, detention facilities to prevent any increases in flood peak discharges and flood elevations at all points downstream of any proposed development, extending downstream to include Rockwall Lake (and the discharges through Rockwall Lake Dam). Additionally, as it has been determined that homes around Rockwall Lake, as well as other structures along Buffalo Creek, begin to flood during storm events that produce less than the 100-year frequency rainfall, this standard should not be limited to just the 100-year flood event, but should also include lesser flood events, such as the 10-year, 25-year, and 50-year floods.

It is recognized that the City's ordinances related to stormwater management already requires that proposed construction not cause any unacceptable increases in flooding on other off-site

properties. However, requiring flood detention facilities for new developments within the Buffalo Creek watershed, that are properly designed, constructed, operated, and maintained, will help prevent the current flooding situation along Rockwall Lake from becoming worse, by helping to prevent faster-rising flood levels and helping to prevent increases in lake flood elevations (to levels more than would otherwise occur for any particular flood).

To be consistent with stormwater management requirements throughout the City, it is further recommended that the City consider similar standards for regulating stormwater in other watersheds. For example, similar flooding situations associated with Wallace Lake, located within the Little Buffalo Creek watershed, could benefit by these requirements for proposed construction within the upstream watershed.

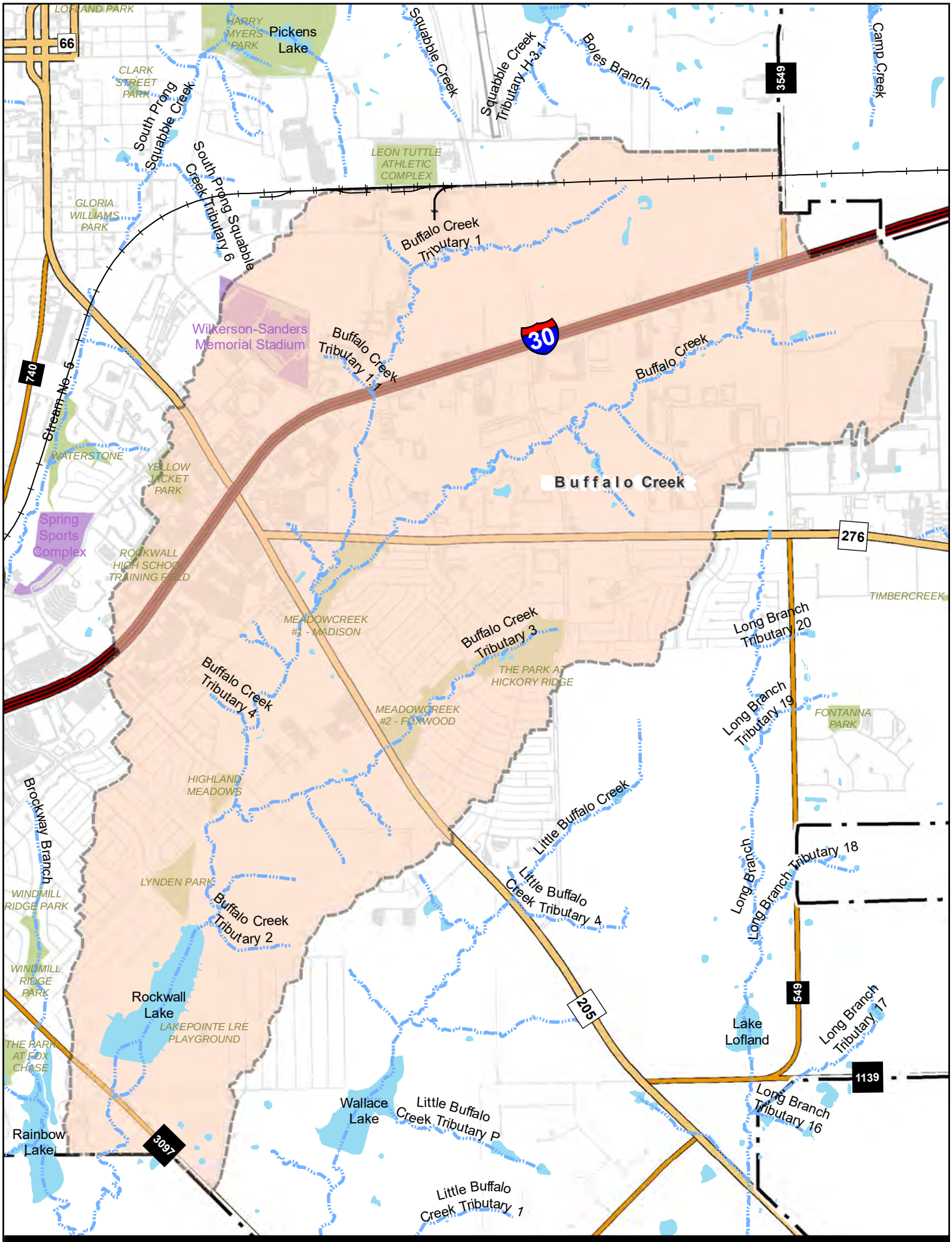
Additionally, the City's Master Drainage Study for the Buffalo Creek watershed has become outdated in many respects. Therefore, it is further recommended that the hydrologic and hydraulic digital computer models for the watershed be updated as soon as possible. Providing such models to engineering consultants for their use in design and analyses of future development projects will help reduce the burden of complying with the City's requirements of proving that proposed construction will not cause increased flooding at Rockwall Lake and along streams downstream of their projects.

Please feel free to contact me if you have any questions or would like to discuss these recommendations.

Sincerely,

Dwayne Stubblefield

Dwayne Stubblefield, P.E., CFM
President
HydroLogical Support Services, LLC
[TBPE Firm No. F-13821]



City of Rockwall

600 Feet

Date: 9/30/2019

The data represented on this map was obtained with the best methods available. Data is supplied from various sources and accuracy may be out of the City of Rockwall's control. The verification of accuracy and / or content lies entirely with the end user. The City of Rockwall does not guarantee the accuracy of contained information. All information is provided 'As Is' with no warranty being made, either expressed or implied.

Buffalo Creek Watershed

CITY OF ROCKWALL

ORDINANCE NO. 19-XX

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS, AMENDING THE ROCKWALL CODE OF ORDINANCES IN CHAPTER 38. SUBDIVISIONS; ARTICLE I. IN GENERAL; SECTION 38-23 STANDARDS FOR DESIGN OF DEVELOPMENTS WITHIN SUBDIVISIONS ADOPTED; PROVIDING FOR SPECIAL CONDITIONS; PROVIDING FOR A PENALTY OF FINE NOT TO EXCEED THE SUM OF TWO THOUSAND DOLLARS ($2,000.00) FOR EACH OFFENSE; PROVIDING FOR A SEVERABILITY CLAUSE; PROVIDING FOR A REPEALER CLAUSE; PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the governing body of the City of Rockwall, in the exercise of its legislative discretion, has concluded that the "Standards for Design of Development Within Subdivisions" should be updated in order to reflect certain amendments.

NOW, THEREFORE, **BE IT ORDAINED by the City Council of the City of Rockwall, Texas that:**

Section 1. Chapter 38. "Subdivisions;" Article I. "In General;" Section 38-23 "Standards for Design of Developments Within Subdivisions Adopted" of the Code of Ordinances is hereby amended so as to delete subsection "c" in its entirety and replace it with a new subsection "c" which shall hereafter read as follows:

~~(c) The October 2016 updated of the Standards for Design and Construction are adopted replacing the Standards of Design, Standard Construction Specifications, dated August 2003, a copy of which is on file for public inspection in the city secretary's office~~

(c) The October 2019 updated of the Standards for Design and Construction are adopted replacing the Standards of Design, Standard Construction Specifications, dated October 2016, a copy of which is on file for public inspection in the city secretary's office

Section 2. Chapter 38. "Subdivisions;" Article I. "In General;" Section 38-23 "Standards for Design of Developments Within Subdivisions Adopted" of the Code of Ordinances is hereby amended so as to delete subsection "d" in its entirety and replace it with a new subsection "d" which shall hereafter read as follows:

~~(d) The Public Works Construction Standards and Specifications, North Central Texas, 4th Edition, October 2004 as amended by the City of Rockwall are adopted replacing the Standard Specifications for Public Works Construction, North Central Texas, 3rd Edition, 1998.~~

(d) The Public Works Construction Standards and Specifications, North Central Texas, 5th Edition, November 2017 as amended by the City of Rockwall are adopted replacing the Standard Specifications for Public Works Construction, North Central Texas, 4th Edition, 2004.

Section 3. A new, 2019 version of the city's "Standards for Design of Developments Within Subdivisions Adopted" is hereby adopted as reflected in **"Exhibit A"** of this ordinance, a copy of which shall be kept on file for public inspection within the city secretary's office.

Section 4. Any person, firm, or corporation violating any of the provisions of this ordinance shall be deemed guilty of a misdemeanor and upon conviction shall be punished by a penalty of fine not to exceed the sum of Two Thousand Dollars ($2,000.00) for each offense and each and every day such offense shall continue shall be deemed to constitute a separate offense;

Section 5. If any section or provision of this ordinance or the application of that section or provision to any person, firm, corporation, situation or circumstance is for any reason judged invalid, the adjudication shall not affect any other section or provision of this ordinance or the application of any other section or provision to any other person, firm, corporation, situation or circumstance, and the City Council declares that it would have adopted the valid portions and applications of the ordinance without the invalid parts and to this end the provisions of this ordinance shall remain in full force and effect.

Section 6. This ordinance shall be cumulative of all other ordinances of the City and shall not repeal any of the provisions of those ordinances except in those instances where the provisions of those ordinances are specifically repealed or those in direct conflict with the provisions of this ordinance.

Section 7. This ordinance shall take effect immediately from and after its passage and approval and the publication of the caption of said ordinance as the law in such cases provides, and it is so ordained.

PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF ROCKWALL, TEXAS, this the 4th day of November, 2019.

_____
Jim Pruitt, Mayor

ATTEST:

_____
Kristy Cole, City Secretary

APPROVED AS TO FORM:

_____
Frank Garza, City Attorney

1st Reading: 10-21-2019

2nd Reading: 11-4-2019

“EXHIBIT A”

(INSERT DOCUMENT HERE)

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CITY OF ROCKWALL, TEXAS

STANDARDS OF DESIGN AND CONSTRUCTION

City of Rockwall

The New Horizon

ENGINEERING DEPARTMENT

October 2019

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City of Rockwall
The New Horizon

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1. GENERAL REQUIREMENTS

1.1 Introduction

The "Standards of Design" are generated to implement the provisions of the Subdivision Ordinance and to provide for the orderly, safe, healthy and uniform development of the area within the corporate city limits and within the surrounding City, extraterritorial jurisdiction (ETJ).

The 5th Edition of the NCTCOG Standard Specifications for Public Works Construction dated November 2017 as modified by the City of Rockwall Special Provisions are supplemental and are made a part of these Standards of Design. These documents are to be considered as the minimum requirements of engineering design. The adherence to the requirements of these documents and/or the approval by the City of Rockwall and its agents in no way relieves the developer or their engineer of the responsibility for adequacy of design, which may require more stringent standards than these, the completeness of plans and specifications or the suitability of the completed facilities. In unusual circumstances, the City of Rockwall may determine that designs other than those of the Standards are necessary and will inform the developer of such requirements before final engineering review.

The developer and/or their representative shall obtain authorization from the City of Rockwall, in writing, for any deviations from the requirements set forth in the Standards of Design, Standard Specifications for Construction or Standard Details.

1.2 Standards of Design

The Standards of Design, as adopted by the City of Rockwall, are set forth herein. These standards shall be considered as the minimum requirements, and it shall be the responsibility of the developer to determine if more stringent requirements are necessary for a particular development. It is not intended that the Standards of Design cover all aspects of a development. For those elements omitted, the developer will be expected to provide designs and facilities in accordance with good engineering practice and to cause the facilities to be constructed utilizing first class workmanship and materials. The City Engineer reserves the right to request additional information not covered within these Standards of Design to be included in the design plans by the developer/design engineer in order to validate the intent, safety, constructability, readability and competency of the design plans.

Developer/Engineer must ensure that all design and construction is in accordance with all Federal, State and local regulations and must provide certification on final plans. A copy of all determinations, permits, and approvals

received from Federal, State, and local agencies must be provided to the Engineering Department prior to approval.

Engineering design and plans submitted to the Engineering Department by the developer/design engineer shall be in conformance with the adopted Standards of Design and Construction that are in affect when the 1st submittal is received by the Engineering Department. If subsequent submittals have not been received within one (1) year of the previous submittal, any subsequent submittals must conform to the current adopted Standards of Design and Construction. Approved construction plans will expire within one (1) year of approval date, and must be reviewed and revised to meet the current adopted Standards of Design and Construction.

1.3 Standard Specifications for Construction

The City of Rockwall Special Provisions to the NCTCOG Standard Specifications for Public Works Construction, 5th Edition, November 2017, as adopted by the City of Rockwall is referenced in this document. The Standard Specifications for construction set forth the minimum requirements for materials and workmanship for streets, parking lots, sidewalks, drainage, water and wastewater systems.

1.4 Standard Details

In an effort to have uniformity and to facilitate maintenance, the City has adopted the North Central Texas Council of Governments (NCTCOG) Standard Drawings as modified by the City of Rockwall Special Provisions for certain facilities such as manholes, street sections, sidewalks, water, wastewater, storm water, curb inlets, barrier free ramps, etc. The City of Rockwall Special Provisions can be obtained from the City Engineering Department. The NCTCOG Standard Specifications can be obtained from the North Central Texas Council of Governments, Regional Information Center 817-695-9140.

1.5 Inspection of Construction by City Personnel

Inspection of construction and verification of compliance to the plans and specifications shall be conducted by the City of Rockwall staff under the direction of the City Engineer. The facilities included in this inspection requirement are streets, sidewalks, parking lots, alleys, storm drainage facilities, water distribution systems, wastewater collection system, etc. The developer shall advise all of his construction contractors of this requirement. No development will be accepted by the City until all construction has been approved by the City of Rockwall's staff. The developer shall be responsible for any additional expense to the City at a rate established by the City at that time when inspection is done after normal business hours of the City. The date of acceptance will be when all items have been accepted by the City. Twenty months from the date of acceptance the City will determine any failures or defects and repairs will be made by the contractor.

The accepted method of inspection for underground utilities shall be videoed and the City will require a copy of such inspection. The developer or contractor shall be responsible for the cost of the videoed inspection.

1.6 Franchise and Public Utilities to be Underground

All franchise and public utilities within a residential development shall be placed underground. Utilities are defined for this purpose as water pipelines, wastewater pipelines, storm water pipelines, natural gas pipelines, telephone wires, cable TV wires and electric wires. In case of special or unique circumstances, the City may grant variances or exceptions to this requirement. Any request for variance or exception should be submitted in writing to the City of Rockwall setting forth the justification for an exception. The granting of a variance or exception by the City will be in writing. No work will be accepted without written approval from the City Engineer or in the case of franchise utilities, the Planning Director. Commercial developments may have overhead utilities as approved by the City Council.

1.7 Submittal to Utility Companies

The developer shall be responsible for submittal of information needed to design private utilities for the development. This information shall be submitted to the franchise (gas, electric, phone, and cable) companies. Written confirmation from the franchise companies shall be submitted to the Engineering Department, verifying that the affected utility companies have installed their respective utilities prior to engineering acceptance of project.

1.8 Requirements of the Final Engineering Drawings

The final engineering drawings shall conform to the established “Engineering Drawings Requirements” and these Standards of Design. The Engineering Drawings Requirements can be found the Appendix.

The final engineering drawings will consist of drawings showing all information necessary to completely review the engineering design of improvements proposed for or affected by the site and sealed by a Registered Professional Engineer within the State of Texas.

1.9 Engineering Plan Approval/Construction Permit Release

All review fees (plan, flood study, TIA, Lift station, etc.) shall be paid prior to engineering construction permit release and submittal of building permit.

1.10 Easements and ROW

All easements and right-of-way required for construction of a proposed project must be approved and accepted for filing prior to the approval or release of the final design/construction drawings.

A. Requirements for On-Site Easements and Right-of-Way Dedication to the City:
   1. All easements and right-of-way shall be dedicated on a plat. No separate instruments will be allowed.
   2. No structures (buildings, walls, fences, decks, swimming pools, signage/monuments, etc.) are allowed in or over any easements or right-of-ways. No trees shall be planted within 10' of any public water or sewer line 10" in diameter or larger. No trees shall be planted within 5' of any public water and sewer line less than 10" in diameter. No trees shall be planted within 5' of any public storm system.
   3. All drainage and detention easements shall be maintained, repaired, and replaced by the property owner. This statement is to be noted on the plat.
   4. No public utilities allowed in detention easements.
   5. All right-of-ways shall have a minimum 10' utility easement dedicated adjacent to them.
   6. Easement dimensions and other special requirements can be found in the utility's respective section of these Standards.

B. Requirements for Off-Site Easements Dedicated to the City:
   1. All easement and right-of-way documents shall be written by the City.
   2. Owner/Developer shall furnish the City a current title report and, metes and bounds description, and exhibit that is signed and sealed by a Texas Registered Professional Land Surveyor that shows the easements' or right-of-way, location, and current ownership information.
   3. All easements shall be reviewed and approved by the City prior to releasing the documents for signatures by the property owners.
   4. The individual or entity requesting the easement shall pay all filing fees required by the County.
   5. The individual or entity shall return, to the City, all originally signed documents and a check for filing fees made out to Rockwall County for filing.
   6. All filing information for all easements must be shown on all plats.
   7. After recordation, a copy of the filed document will be forwarded to the property owner.

1.11 Final Acceptance

Final Acceptance shall occur when all the items on the Checklist for Final Acceptance have been completed and signed-off by the City. An example of the

checklist for final acceptance has been included in the Appendix. Items on the checklist for final acceptance will vary per project and additional items not shown on the check list may be required. After improvements have been constructed, the developer shall be responsible for providing to the City "As Built" or "Record Drawings". The Design Engineer shall furnish all digital files of the project formatted in Auto Cad 14, or 2000 format or newer **and** Adobe Acrobat (.pdf) format with a CD-ROM disk or flash drive. The disk or drive shall include a full set of plans along with any landscaping, wall plans, and details sheets.

Submit 1-set of printed drawings of the "Record Drawings" containing copies of all sheets. The printed sheets will be reviewed by the construction inspector **PRIOR** to producing the "Record Drawing" digital files on disk or flash drive. This will allow any revisions to be addressed prior to producing the digital files.

Record Drawing Disk drawings shall have the Design Engineers seal, signature and must be stamped and dated as "Record Drawings" or "As Built Drawings" on all sheets.

The City of Rockwall will not accept any Record Drawing disk drawings which include a disclaimer with the like or similar verbiage. A disclaimer shall not directly or indirectly state or indicate that the design engineer or the design engineer's surveyor/surveyors did not verify grades after construction, or that the Record Drawings were based solely on information provided by the construction contractor/contractors. Any Record Drawings which include like or similar disclaimer verbiage will not be accepted by the City of Rockwall.

Example of Acceptable Disclaimer:

To the best of our knowledge ABC Engineering, Inc., hereby states that this plan is As-Built. This information provided is based on surveying at the site and information provided by the contractor.

1.12 Changes in Standards of Design, Construction Specifications and this Document

These Standards of Design, Construction Specifications and this document can be modified by City Council through ordinance or resolution. This document can also be updated time to time to reflect changes in City requirements. It is the responsibility of the user to obtain the latest revisions of the City's requirements.

2. STREETS

2.1 General

The street system, including the street layout, shall be in accordance with generally accepted engineering practices and in compliance with the Comprehensive Plan, the latest Thoroughfare Plan, the Zoning Ordinances, the Subdivision Regulations and other applicable regulations. The drainage system, as incorporated into the street system, shall comply with Section 3 of this document. The plans and specifications, design computations, if required, and other applicable data shall be submitted to the City for review. Construction shall not commence prior to approval of the plans and specifications by the City. All changes during construction shall be submitted to the Engineering Department for approval prior to any construction modifications.

2.2 Street Arrangement

Unless otherwise approved by the City, provisions shall be made for the extension of existing major arterials, collector streets and local streets in accordance with the Thoroughfare Plan and any specific street alignments as adopted by the City Council.

Off-center intersections will be considered for approval only for minor collector and local streets and only when there is a minimum property line separation of 125’ unless otherwise approved by the City Engineer.

Within residential areas, the following design elements are encouraged: (A) Developing only a limited number of access points to arterial streets bordering the subdivision; (B) More than one point of access; (C) Incorporate curvilinear streets into the plan and (D) Incorporating a discontinuous residential street network, which utilizes three-way intersections in lieu of four-way intersections. When these factors are incorporated into a residential street plan, the result is enhanced character and traffic safety.

2.3 Thoroughfare and Street Geometry

Geometric design standards are presented in two formats within this section. Table 2.1 identifies specific design criteria for each standard roadway type. Figure 2.1A and 2.1B shows the typical cross-section for each standard roadway type. It is noted that dimensions shown are to the face of curb, unless specifically identified otherwise.

Each roadway type is keyed to the City Thoroughfare Plan, with the exception of local streets. The reader is referred to this document for information as to the locations where these roadways are to be used.

City of Rockwall
The New Horizon

Table 2.1 Thoroughfare Geometric Design Standards

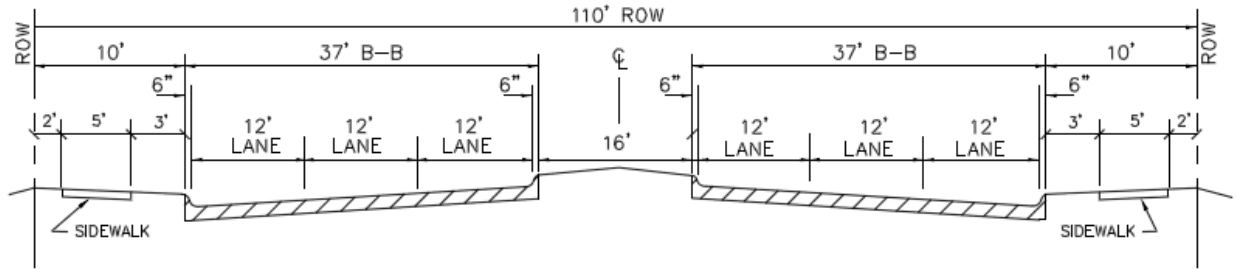
Thoroughfare Designation	P6D	M4D	M4U	Minor Collector	M3U		
Thoroughfare Type	Principal Arterial Divided 6-Lane	Minor Arterial Divided 4-Lane	Major Collector Undivided 4-Lane	Minor Collector/ Local Commercial Undivided	Minor Collector w/ Continuous Left Turn Lane	Local (Residen -tial)	Alley
Number Traffic Lanes	6	4	4	2	2	2	1
Minimum Lane Width (feet)	12	12	11	11 + 2 Parking	12	14.5	12
Minimum R.O.W. * Width (feet)	110	85	65	60	70	50	20
Design speed (m.p.h.)	45	40	35	30	30	30	20
Posted Speed (m.p.h.)	40	35	30	25	30		
Stopping sight distance (feet)	400	325	275	200	200	200	125
Median Width ** (feet)	16	14	—	—	Left Turn Lane Width 14’	—	—
Minimum Lateral Clearance (feet)	6	6	6	6	6	—	—
Parking Permitted	NO	NO	NO	COM.-SOME RES.-YES	NO	RES.-YES	NO
Minimum Horizontal Centerline Curvature (feet)	1200	850	Com.-700 Res.-600	Com.-500 Res.-350	Com.-500 Res.-350	Res.-250 Elbow - 50’	See Details
Crest Vertical Curve Minimum K Value	120	80	50	30	30	30	10
Sag Vertical Curve Minimum K Value	90	70	50	40	40	40	20
Maximum Grade (%)	7.5 (For max length of 200’)	7.5 (For max length of 200’)	7.5	7.5	7.5	10.0	10.0
Minimum Grade (%)	0.7	0.7	0.7	0.7	0.7	0.7	0.7

* **RIGHT-OF-WAY REQUIREMENTS FOR STATE HIGHWAYS AND/OR THE PROVISION OF RIGHT TURN LANES OR OTHER INTERSECTION IMPROVEMENTS MAY EXCEED THIS MINIMUM R.O.W. STANDARD.**

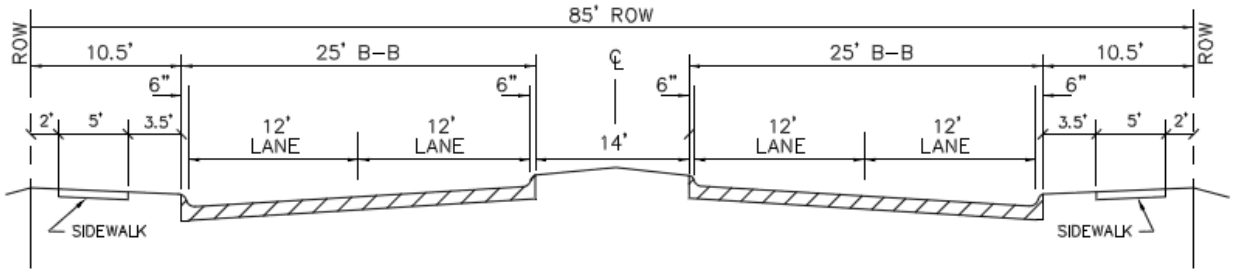
** **LARGER MEDIANS MAY BE REQUIRED TO PROVIDE FOR MULTIPLE TURN LANES.**

*** **LOCAL RESIDENTIAL CUL-DE-SACS SHALL HAVE A MINIMUM R.O.W. RADIUS OF FIFTY-SEVEN AND HALF FEET (57.5’).**

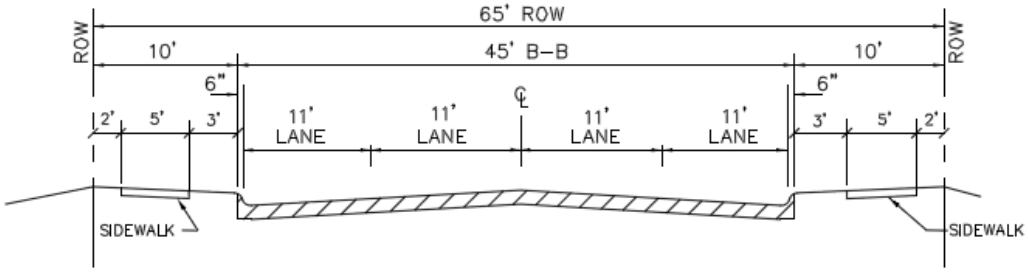
**** **CROSS-SLOPE VARIANCE NEEDS APPROVAL FROM CITY ENGINEER.**



PRINCIPAL ARTERIAL DIVIDED 6-LANE
P6D

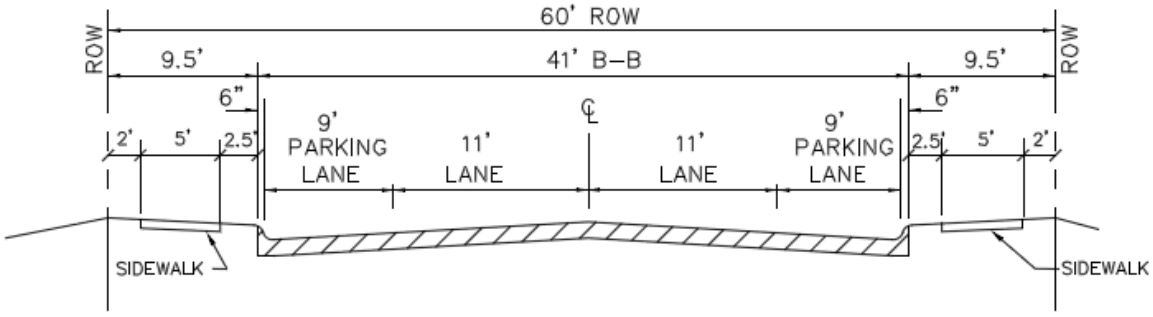


MINOR ARTERIAL DIVIDED 4-LANE
M4D

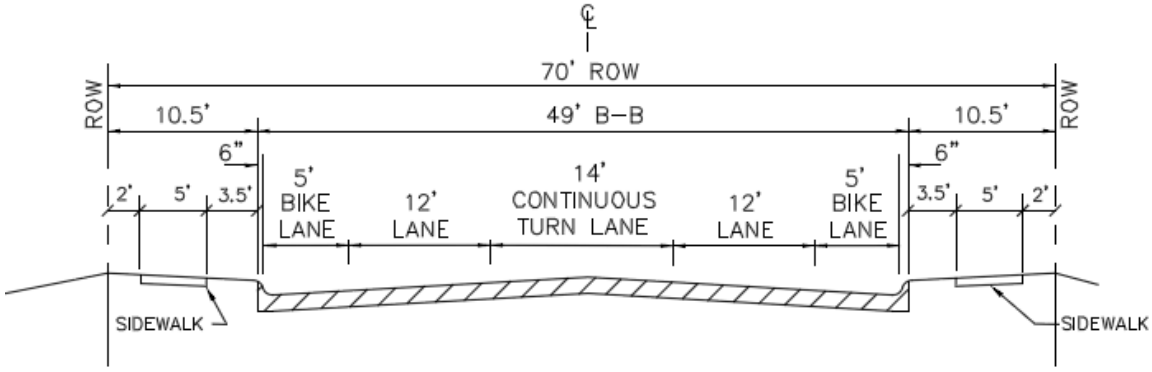


MAJOR UNDIVIDED COLLECTOR 4-LANE
M4U

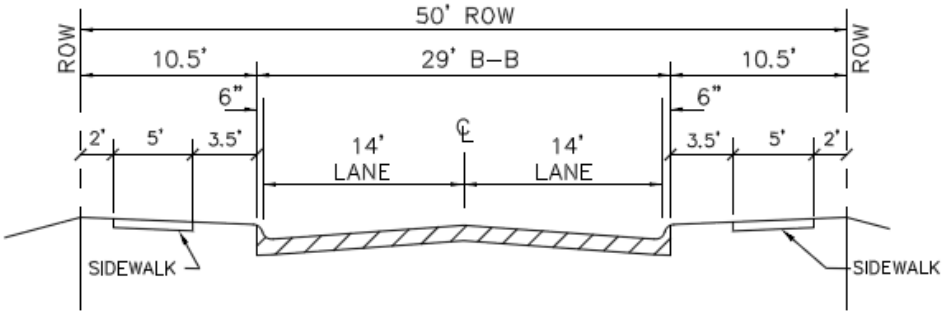
Figure 2.1A: Typical Thoroughfare Cross Sections



MINOR COLLECTOR AND/OR LOCAL COMMERCIAL UNDIVIDED

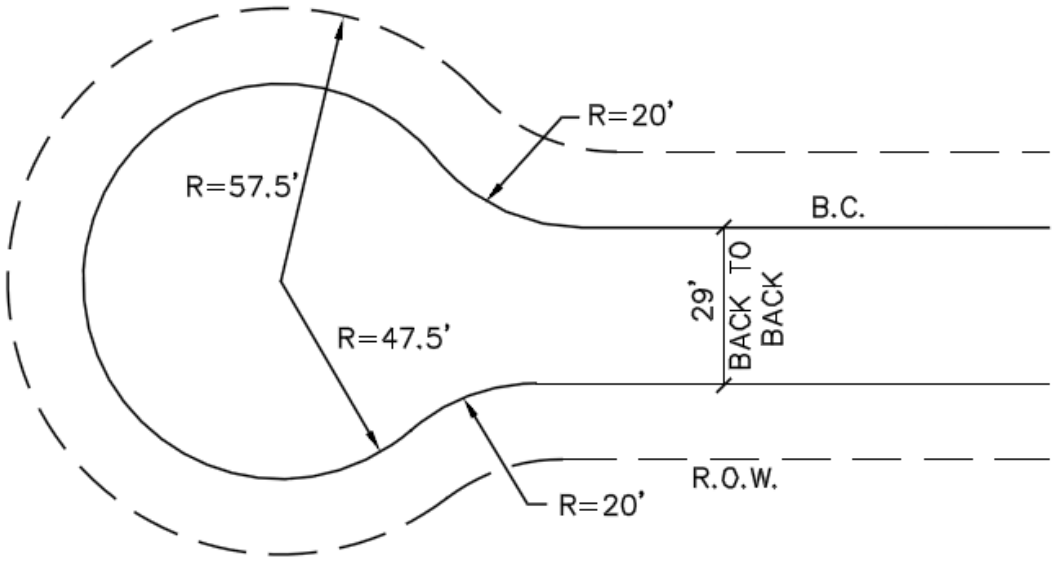


MINOR COLLECTOR – 2 LANE WITH CONTINUOUS LEFT TURN LANE
M3U

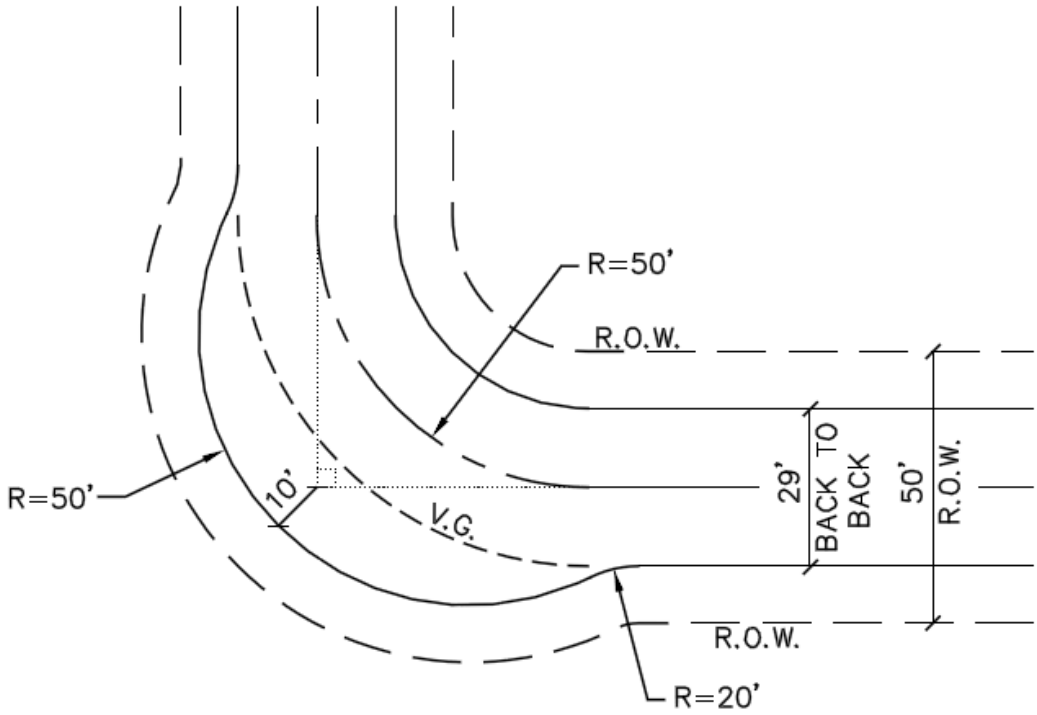


LOCAL (RESIDENTIAL STREET)

Figure 2.1B: Typical Thoroughfare Cross Sections



TYPICAL CUL-DE-SAC



TYPICAL EYEBROW

Figure 2.1C: Typical Thoroughfare Cross Sections

2.4 Turn Lanes

All left turn storage areas shall be eleven (11) feet wide with minimum storage requirements for left-turn lanes as in Figure 2.2. The transition curves used in left-turn lanes shall be two (2), 250-foot radius reverse curves with a total transition length of 100 feet. Medians less than seven (7') feet wide (face to face) are required to be constructed of reinforced integral stained and stamped color concrete a minimum of six (6") inch thick median pavement. All median noses are to be constructed of City approved integral stained and stamped color concrete. The color and pattern to be approved by the City. The paver system shall be installed a distance of ten (10') feet from the end of the nose.

2.5 Median Openings, Width, Location and Spacing

Arterial thoroughfares in Rockwall have raised medians. Arterials having continuous two-way left turn lanes are discouraged and may be utilized only in special circumstances with the approval of the City Council.

Median openings at intersections shall be from right-of-way to right-of-way of the intersecting street, unless otherwise approved by the City Engineer.

The width of mid-block median openings shall not be less than 60 feet, but no greater than 70 feet.

Using the above requirements, examples of the minimum distance between median openings on a divided street where left-turn storage is provided in both directions are:

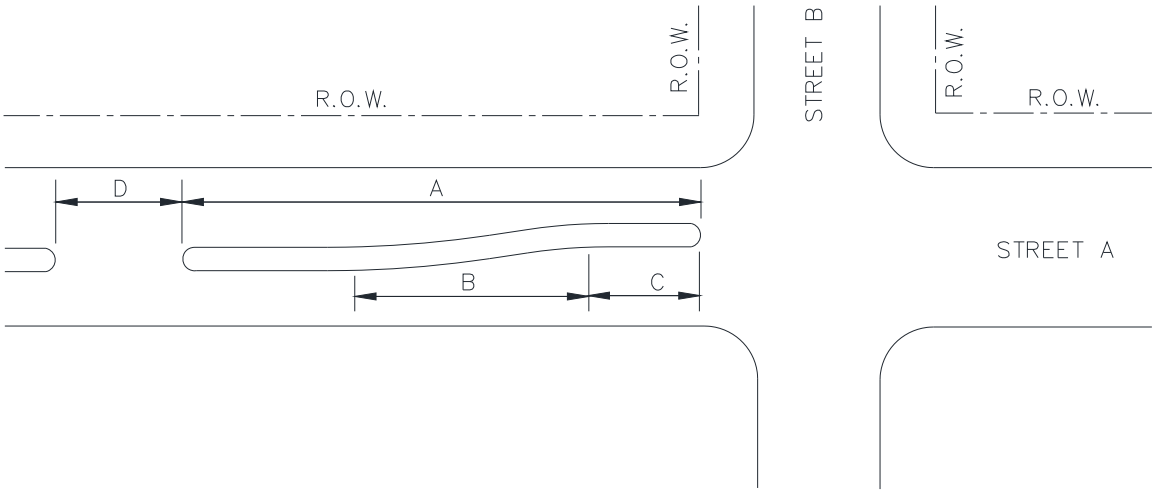
A. 310 feet from nose to nose of the median from the intersection of two major thoroughfares to a street or drive (see Figure 2.2);

B. 260 feet from nose to nose of the median from the intersection of two secondary thoroughfares or a secondary thoroughfare and a major thoroughfare to a residential street or a drive, and;

C. 220 feet from nose to nose of the median for intersection combinations of drives and/or residential streets.

Medians less than seven (7') feet wide are required to be constructed of a City approved paver or stamped concrete system. All median noses are to be constructed of City approved paver or stamped concrete system, a distance of ten (10') feet from the end of the nose. Any median that has landscaping requires a mow ramp to be installed for access. Noses shall be a solid poured steel reinforced concrete bullet nose.

Figure 2.2: Median Design Standards



INTERSECTING STREET TYPE		MINIMUM LENGTH (FEET)			
STREET A	STREET B	A	B	C*	D**
Principal Arterial (6 Lanes)	Principal Arterial (6 Lanes)	310	100	150	60
Principal Arterial (6 Lanes)	Minor Arterial (4 Lanes)	260	100	100	60
Principal Arterial (6 Lanes)	Major Collector (4 Lanes) Minor Collector (2 Lanes)	260	100	100	60
Principal Arterial (6 Lanes)	Local/Private (2 Lanes)	220	100	60	60
Minor Arterial (4 Lanes)	Principal Arterial (6 Lanes)	310	100	150	60
Minor Arterial (4 Lanes)	Minor Arterial (4 Lanes)	260	100	100	60
Minor Arterial (4 Lanes)	Major Collector (4 Lanes) Minor Collector (2 Lanes)	260	100	100	60
Minor Arterial (4 Lanes)	Local/Private	220	100	60	60

LEFT-TURN STORAGE AREA WIDTH 11' MINIMUM

MEDIAN WIDTH (SEE GEOMETRIC DESIGN STANDARD FOR PRINCIPAL AND MINOR ARTERIAL).

***MINIMUM LENGTH – ACTUAL LENGTH DEPENDENT UPON ANTICIPATED TURN VOLUME**

** **OR STREET WIDTH + 8 FEET – WHICHEVER IS GREATER. A VARIANCE MAYBE GRANTED BY CITY COUNCIL ON A CASE BY CASE BASIS.**

2.6 Driveway Locations

Minimum standards for driveway separation accessing the same site are shown in Figure 2.3. This standard applies to all non-residential uses.

There is a minimum distance upstream and downstream from adjacent intersections within which driveways should not be located. This separation distance varies with the classification of street and is shown in Figure 2.3. This standard applies to all non-residential users.

At mid-block access points, there is a minimum distance from a median nose, within which driveways should not be located. This is shown in Figure 2.3 and is equally applicable along both major and minor arterials for non-residential uses. All proposed paving connections to existing paving requires a longitudinal butt joint connection.

2.6.1 Driveways on TxDOT Facilities

Driveways on TxDOT facilities shall be placed in accordance to City Standards set forth in this section and the requirements of the current TxDOT's Access Management Manual and require TxDOT Driveway Permit approval. TxDOT Driveway Permits shall be processed through the City Engineering Department. TxDOT Permit Plan sets shall be 11"x17" in size and signed and sealed by a licensed professional engineer with the State of Texas. Permit plan sets shall include: typical sections, paving plan and profile, all applicable TxDOT standard details, traffic control plans sheets, striping plans, demo plans, drainage plans (drainage area map, storm sewer plans and profiles, culvert plans and profiles), and any other items required by TxDOT or City Engineer to construct the driveway. A Traffic Impact Analysis shall be submitted to the Engineering Department with all TxDOT Driveway Permits.

2.7 Block Lengths

In general, streets shall be provided at such intervals as to serve cross traffic adequately and to intersect with existing streets. Where no existing plats control, the blocks shall be not more than 1,600 feet in length. Block arrangements must provide access to all lots, and in no case, shall a block interfere with traffic circulation.

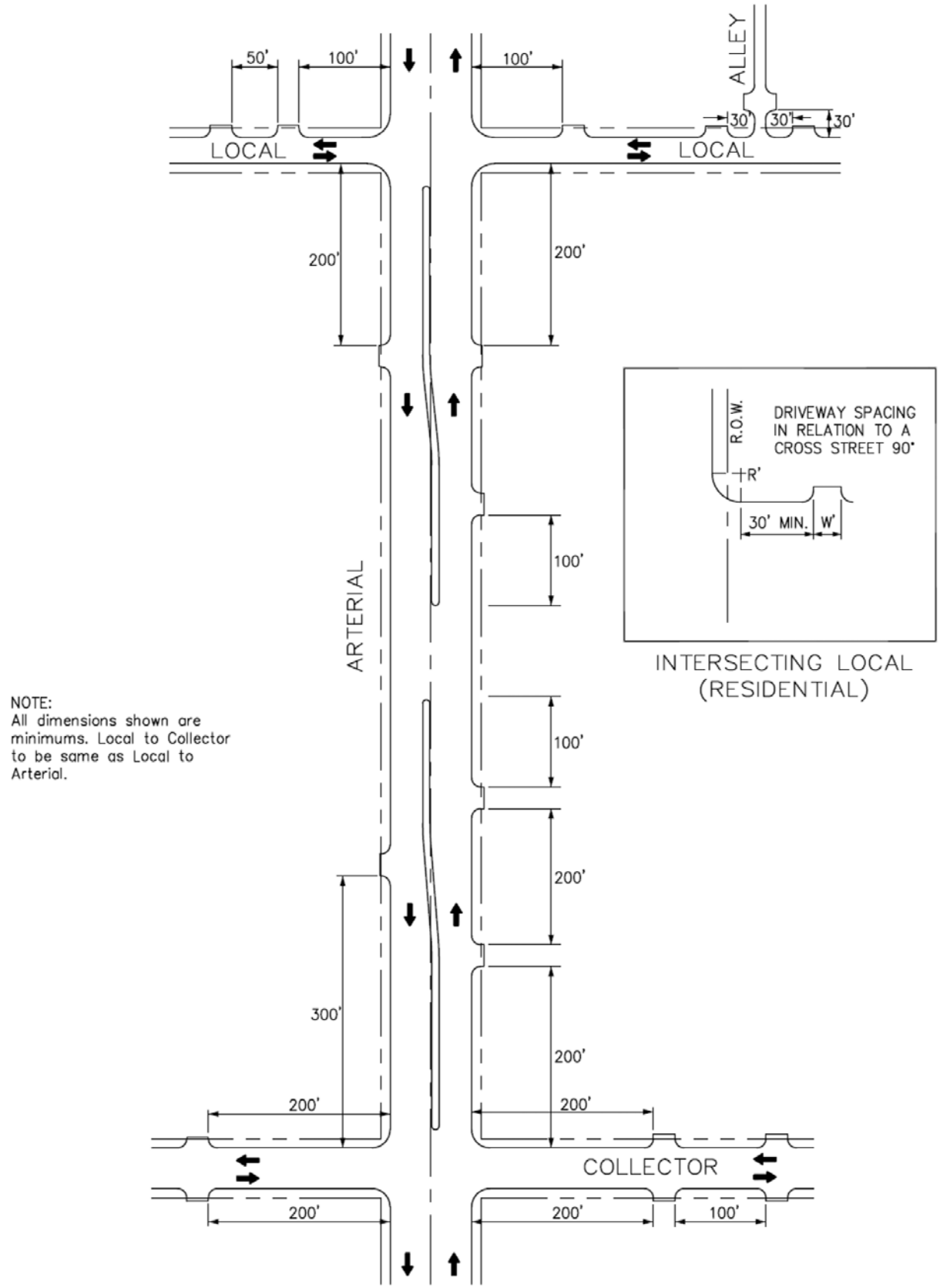


Figure 2.3: Minimum Driveway Spacing & Corner Clearance

2.8 Street Intersections

More than two streets intersecting at one point shall be avoided. All streets and thoroughfares should intersect other streets and thoroughfares at an angle of ninety (90) degrees unless otherwise approved by the City Engineer.

Arterial and collector street intersections shall have property line corner clips with a minimum tangent distance of thirty (30) feet. Residential streets shall not normally be required to have a ROW corner clip at their intersection with other streets or thoroughfares, but a 10-foot by 10-foot sidewalk corner easement will be required.

Visibility easements will be required for all ninety (90°) degree intersections. For all intersections that are not ninety (90°) degrees, an engineered visibility easement is required by the design engineer.

A. Arterial/Collector street intersections - thirty (30) foot by thirty (30) foot easement
B. Residential street intersections - twenty (20) foot by twenty (20) foot easement
C. Alley to street intersections - ten (10) foot by ten (10) foot easement

Curb radii at intersections shall have a minimum radius of thirty (30) feet along arterials, twenty-five (25) feet along collectors and twenty (20) feet along residential streets.

In any case where streets intersect at an angle of other than ninety (90) degrees, the City may require non-standard right-of-way corner clips and curb return radii.

All proposed paving connections to existing paving requires a longitudinal butt joint connection.

2.9 Relation to Adjoining Streets

The system of streets designed for the development, except in unusual cases, must connect with streets already dedicated in adjacent developments. Where no adjacent connections are platted, the streets must be the reasonable projection of streets in the nearest subdivided tracts and must be continued to the boundaries of the tract development, so that other developments may eventually connect with the proposed development. Strips of land controlling access to or egress from other property or any street or alley or having the effect of restricting or damaging the adjoining property for development or subdivision purposes or which will not be taxable or accessible for special improvements shall not be permitted in any development unless such reserve strips are conveyed to the City on fee simple. This determination is made by the City

Planning Director or City Engineer. When such access is needed to maintain permanent City owned utilities, the roadway will be an improved right-of-way. If the utilities are temporary, an improved easement may be approved.

2.10 Dead End Streets, Cul-de-Sacs and Courts

Cul-de-sacs are permitted and encouraged within residential subdivisions. Use of this design shall provide proper access to all lots and shall not exceed six hundred (600) feet in length, measured from the center of the cul-de-sac to the center of the intersecting street (not a dead end street). Cul-de-sac shall have a minimum paving radius of forty-seven and half (47 ½) feet and a minimum right-of-way radius of fifty-seven and half (57 ½) feet. Specific aspects of the standard cul-de-sac design are given in Figure 2.1C. In lieu of the typical design shown, the City may approve alternative concepts for a specific application.

2.11 Alleys and Alley Widths

Alleys shall be provided in all residential areas and shall be paved with steel reinforced concrete. No alley may be over 1,000 feet long. The City Council may waive the residential alley requirement, if it is in the best interest of the City. Alleys may be required in commercial and industrial districts. The City may waive this requirement where other definite and assured provisions are made for service access such as off-street loading, unloading and parking consistent with and adequate for the uses proposed. The minimum right-of-way width of an alley shall be twenty (20) feet. Dead-end alleys shall not be permitted. The City may waive this requirement where such dead-end alleys are unavoidable and where adequate turnaround facilities have been provided. Adequate provisions shall be made at all intersections in order that equipment, such as garbage collection vehicles and maintenance vehicles, can maneuver the corners. The interior edge of the pavement, at the corners, shall have a minimum radius of thirty (30) feet. The exterior edge of the pavement, at the corners, shall have a minimum radius of twenty (20) feet. The alley paving is to be flared at the street intersection. The right-of-way limits shall be expanded, if necessary, beyond the minimum requirement in order to include all of the paved section and utilities within the right-of-way of the alley. Alley turnouts shall be paved to the property line and shall be fifteen (15) feet wide at that point. All alleys shall have a minimum of twelve (12) feet of steel reinforced paved concrete roadway. Alley shall have a minimum thickness of seven (7) inches on the exterior edges and five (5) inches in the center sections.

2.12 Street Grades

Arterial streets may have a maximum grade of seven and one-half (7 ½) percent, for a maximum continuous distance of two hundred (200) feet. Collector streets may have a maximum grade of seven and one-half (7 ½) percent. Residential streets may have a maximum grade of ten (10) percent, unless otherwise

approved by the City, where the natural topography is such as to require steeper grades. All streets must have a minimum grade of at least seven-tenths (0.7) of one (1) percent. Centerline grade changes with an algebraic difference of more than one (1) percent shall be connected with vertical curves in compliance with the minimum length requirements set forth in Table 2.2.

Table 2.2A: Crest Vertical Curves

Design Speed (MPH)	Coeff. of Friction (a)	Stopping Sight Dist. (Ft.)	Stopping Sight Dist. Rounded for Design (Ft.)	K	K Rounded for Design
15	0.42	72.98	75	4.01	5
20	0.40	106.83	125	8.59	10
25	0.38	146.70	150	16.19	20
30	0.36	193.58	200	28.20	30
35	0.34	248.72	250	46.55	50
40	0.32	313.67	325	74.03	80
45	0.31	383.12	400	110.44	120

(a) AASHTO, p. 316

ROUNDED
MINIMUM LENGTH OF VERTICAL CURVE IN FEET
For Speeds and K Values Shown Below
(L = KA)

Algebraic Grade Diff. (%) (A)	MPH	15	20	25	30	35	40	45
	K	5	10	20	30	50	80	120
1		5	10	20	30	50	80	120
2		10	20	40	60	100	160	240
3		15	30	60	90	150	240	360
4		20	40	80	120	200	320	480
5		25	50	100	150	250	400	600
6		30	60	120	180	300	480	720
7		35	70	140	210	350	560	840
8		40	80	160	240	400	640	960
9		45	90	180	270	450	720	1080
10		50	100	200	300	500	800	1200
11		55	110	220	330	550	880	1320
12		60	120	240	360	600	960	1440
13		65	130	260	390	650	1040	1560
14		70	140	280	420	700	1120	1680
15		75	150	300	450	750	1200	1800

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Table 2.2B: Sag Vertical Curves

Design Speed (MPH)	Coeff. of Friction (a)	Stopping Sight Dist. (Ft.)	Stopping Sight Dist. Rounded for Design (Ft.)	K	K Rounded for Design
15	0.42	72.98	75	8.13	10
20	0.40	106.83	125	14.75	20
25	0.38	146.70	150	23.56	30
30	0.36	193.58	200	34.78	40
35	0.34	248.72	250	48.69	50
40	0.32	313.67	325	65.69	70
45	0.31	383.12	400	84.31	90

(a) AASHTO, p. 316
(b) AASHTO. p. 312

ROUNDED
MINIMUM LENGTH OF VERTICAL CURVE IN FEET
For Speeds and K Values Shown Below
(L = KA)

Algebraic Grade Diff. (%) (A)	MPH	15	20	25	30	35	40	45
	K	10	20	30	40	50	70	90
1		10	20	30	40	50	70	90
2		20	40	60	80	100	140	180
3		30	60	90	120	150	210	270
4		40	80	120	160	200	280	360
5		50	100	150	200	250	350	450
6		60	120	180	240	300	420	540
7		70	140	210	280	350	490	630
8		80	160	240	320	400	560	720
9		90	180	270	360	450	630	810
10		100	200	300	400	500	700	900
11		110	220	330	440	550	770	990
12		120	240	360	480	600	840	1080
13		130	260	390	520	650	910	1170
14		140	280	420	560	700	980	1260
15		150	300	450	600	750	1050	1350

2.13 Pavement Design

Traffic projections for next 30 years, engineered paving designs, and sub-grade conditions are required for the pavement design section determinations of all collector and arterial streets.

2.13.1 Subgrade

Subgrades shall be compacted and finished to a smooth uniform surface. Subgrades of native material which have a Plasticity Index (P.I.) of fifteen (15) or more shall be lime stabilized to a minimum depth of six (6) inches. The lime stabilization shall be used for the full width of the street, back of curb to back of curb, plus twelve (12) inches on outside of the curb. The minimum lime content shall be six (6) percent of the dry weight of the material (at least 27 lbs. per square yard). Lime stabilization or concrete stabilization may be required for soils showing a P.I. of 15 or less. Type of stabilization and paving design will be determined prior to pavement construction by a certified geotechnical testing lab. The subgrade materials will be tested in accordance to the Standard Specifications for Construction, unless otherwise approved by the City. In general, the soils testing will include the testing of Atterburg limits and testing of sulfates to determine if lime stabilization is infeasible. Laboratory tests must be submitted to the Engineering Department for approval to determine amount of lime required. Subgrades should be compacted to ninety-five (95) percent standard densities. No sand is allowed under any paving.

2.13.2 Steel Reinforced Concrete Pavement

All pavement shall be steel reinforced size and spacing shall conform to Table 2.3 below. All non-structural cracks in paving shall be routed and sealed as determined by the City. All reinforcing steel placed within the public right-of-way shall be grade 60 steel and comply with Texas Department of Transportation specifications.

Fly ash may be used in concrete pavement locations provided that the maximum cement reduction does not exceed 20% by weight per cubic yard of concrete. The fly ash replacement shall be 1.25 pounds per 1.0 pound of cement reduction.

At a minimum all concrete pavement shall conform to Table 2.3.

Table 2.3: Steel Reinforced Concrete Pavement Design

Street/Pavement Type	Minimum Thick-ness (inches)	Strength 28-Day (psi)	Minimum Cement (sacks / CY)		Steel Reinforcement	
			Machine placed	Hand Placed	Bar #	Spacing (O.C.E.W.)
Arterial *	10”	3,600	6.0	6.5	#4 bars”	18”
Collector *	8”	3,600	6.0	6.5	#4 bars	18”
Residential	6”	3,600	6.0	6.5	#3 bars	24”
Alley	7”-5”-7”	3,600	6.0	6.5	#3 bars	24”
Fire Lane	6”	3,600	6.0	6.5	#3 bars	24”
Driveways	6”	3,600	6.0	6.5	#3 bars	24”
Barrier Free Ramps	6”	3,600	N/A	6.5	#3 bars	24”
Sidewalks	4”	3,000	N/A	5.5	#3 bars	24”
Parking Lot/Drive Aisles	5”	3,000	5.0	5.5	#3 bars	24”
Dumpster Pads	7”	3,600	6.0	6.5	#3 bars	24”

* Paving section designs for arterials and collectors shall be based off 30 year projected traffic volumes and geotechnical analysis/report. (Paving section design shall include but not limited to the following: pavement thickness, reinforcing size and spacing, pavement strength, subgrade thickness, subgrade treatment type (lime or cement))

Concrete batch designs for all paving, sidewalks, and sewer/storm structures are to be reviewed and approved by the Engineering Department. All batch designs shall be submitted with history of recent cylinder breaks for each separate strength requirement (machine placement and hand placed). All batch designs shall have the current date, project name, and use labeled on each design. Submit batch designs to the Engineering Department a minimum of ten (10) days prior to the projected placement date for review and approval.

During construction the contractor shall furnish the following at his own expense:

- Batch plant control from a qualified commercial laboratory. Laboratory personnel shall be competent to determine free moisture in aggregates and make needed adjustments in control of the mix and slump.

- Prepare a minimum four compression cylinders for each 150 cubic yards of concrete or fraction thereof, with one cylinder break at 7 days, one at 14 days, and a minimum of two cylinders broken at 28 days. Note* No averaging on cylinder breaks.

- Testing labs are to submit copies of any and all concrete cylinder breaks that do not meet 28 day break specifications. Cores are to be taken within ten (10) days of any 28 day cylinder break failures.

- Test data and copies of all laboratory reports for site work are to be directed to the attention of the designated engineering construction inspector that is assigned to the project.

The City of Rockwall may suspend concreting operations if the quality of the concrete being placed is not acceptable or due to adverse climate conditions. Concrete placement shall cease if the concrete temperature meets or exceeds ninety-five (95) degree Fahrenheit. If in the opinion of the owner or the City of Rockwall concrete placement operations shall cease a combination of temperature, wind, and humidity create conditions which are adversely affecting the condition of the concrete. Concrete placement shall also cease if concrete temperature is below forty (40) degrees Fahrenheit and falling. Except by specific written authorization of the owner/City of Rockwall, no concrete shall be placed when the air temperature is less than forty (40) degrees Fahrenheit and falling but may be placed when the air temperature is above thirty-five (35) degrees Fahrenheit and rising, "Pending No Freezing Weather is Imminent" with the temperature being taken in the shade away from artificial heat. When and if such permission is granted, the contractor shall furnish sufficient protective material and devices to enclose and protect the fresh concrete in such a way as to maintain the temperature of fifty (50) degree Fahrenheit for a period of at least five (5) days. No concrete shall be placed on frozen subgrades. If in the opinion of the owner or the City of Rockwall concrete operations shall cease if a combination of temperature, wind, and humidity create conditions which are adversely affecting the condition of the concrete, then concrete placement shall cease. It is to be distinctly understood that the contractor is responsible for the quality and strength of the concrete placed under any weather conditions.
Maximum time intervals between the addition of mixing water and/or cement to the batch, and the placing of concrete in the forms shall not exceed the following:

Air or Concrete Temperature Which Ever is Higher	Maximum Time From Addition Of Water To Placement
Non-Agitated Concrete	
Up to 80° F	30 Minutes
Above 80° F	15 Minutes
Agitated Concrete	
Up to 75° F	90 Minutes
75° to 89° F	60 Minutes
Over 89° F	45 Minutes

The use of an approved set-retarding admixture will permit the extension of the above time maximums, by thirty (30) minutes for agitated concrete only.

2.14 Parkways, Grades and Sidewalks

All parkways shall be constructed to conform to top of curb grades with a standard transverse slope of one-quarter (1/4) inch per foot rise from top of curb to right-of-way. All City right-of-way shall be sodded if disturbed.

Where the natural topography is such as to require steeper grades, transverse slopes (except for sidewalk) up to three-quarter (¾) inch per foot may be used with approval of the City of Rockwall.

Sidewalks shall be provided for all residential streets in subdivisions zoned for one or two family dwellings and on all streets designated on the adopted Master Thoroughfare Plan. Barrier free ramps and sidewalks along screening walls, landscaped areas, trails, parks, open space, greenbelts, and/or drainage ways, shall be installed by the Developer with street construction and the sidewalks in front of residential lots shall be installed by the home builder. The City may require sidewalks in other locations. Sidewalks shall be five (5) feet in width and shall have two (2) feet of green space between the Right of Way line and the outside edge of sidewalk. Sidewalks shall be located wholly within the street Right of Way, sidewalk corner clip easement, or road easement. If a fire hydrant is too close to the sidewalk, swerve sidewalk toward the right-of-way line to maintain five (5) feet clear path. If sidewalk has to be built outside the right-of-way, a sidewalk easement is required. This requirement may be waived by the City Council as provided for in Section 24-17 of the Code of Ordinances.

Sidewalks/Trails wider than 5’ will be required to have engineered details.

Sidewalks placed adjacent to the back of the curb must be six (6) feet wide and lugged in to the curb. Sidewalks to be place against the back of curb shall be approved by the City Engineer.

2.14.1 Roadway Reconstruction

During a roadway reconstruction project if a block of a street to be reconstructed does not currently have sidewalks in place, a six (6) foot sidewalk against/adjacent to the curb shall be required on both sides of the roadway within that street block if the following criteria are met:

1. The roadway is above a residential/local classification or on the currently adopted Thoroughfare Plan. (i.e. Minor Collector, Major Collector, Minor Arterial and Major Arterial) and has an Average Daily Traffic (ADT) of 750 vehicles or more per day; or,
2. Any portion of the street block is located within 1,000 feet of a school, city park, or church. In cases where the street block is located within this 1,000 foot buffer the street block shall have a direct connection to another street block or sidewalk system that is also located within the 1,000 foot

buffer. Any street block or sidewalk system that is inhibited from connecting to an existing street block or sidewalk system by a physical barrier (e.g. bridges) may be exempted from this requirement at the discretion of the City Engineer.

For the purpose of this section a street block shall be defined as the section of the road that extends from one (1) street intersection to another, or from a street intersection to the end of a cul-de-sac or dead-end.

This section shall only apply to City initiated reconstruction projects.

2.15 Driveways/Drive Aisles

2.15.1 Residential

Steel reinforced concrete residential driveways to serve single car garages shall not be less than twelve (12) feet in width. Two car garages, carports and/or storage areas shall not be less than eighteen (18) feet nor more than twenty four (24) feet in width at the property line. The width of the driveway for a three car garage shall be twenty eight (28) feet or larger on a case by case basis.

Residential driveways shall be separated from one another by a distance of at least ten (10) feet. The radii of all residential driveway returns shall be a minimum of five (5) feet and shall not extend past the adjoining property line. The driveway approaches devoted to one use shall not occupy more then sixty percent (60%) of the frontage abutting the roadway or alley.

2.15.2 Multi-Family and Non-Residential

Steel reinforced concrete driveways providing access to multi-family or non-residential uses shall have a minimum width of twenty four (24) feet and a maximum width of forty five (45) feet when measured at their narrowest point near, or at, the property line. The minimum radius for these uses shall be twenty-five (25) feet. Larger radii are encouraged. Limitations on permissible locations for these driveways are addressed in Section 2.6, Driveway Locations. Driveway radii returns shall not extend across abutting property lines. The drive aisles shall have a minimum width of twenty four (24) feet.

2.15.3 Grades

The change in grade between the roadway cross slope and the slope of the driveway apron is important to ensure a smooth, low speed turning maneuver. The maximum algebraic change in grade is shown in Table 2.4. An abrupt change in grade will cause the front bumper to drag on the surface of the street and driveway.

Table 2.4: Driveway Grades and Grade Change

Type	Max Grade	Max Algebraic Change in Grade
Residential	14%	12%
Non-Residential	8%	8%

When an algebraic change in grade occurs within a driveway of more than 4% vertical curve will be required. The minimum recommended lengths of vertical curve for the corresponding change in grade for driveway profiles are shown in Table 2.5. It is recommended to put a 2 foot vertical curve where ever the algebraic change in grade is less than 4%.

Table 2.5: Vertical Curve Lengths for Driveways

Algebraic Change in Grade	Minimum Length (ft)	
	Crest Curve	Sag Curve
< 4%	2	2
4% - 5%	5	6
6% - 8%	5	7
9% – 12%	6	8

All driveway profiles should be designed to accommodate a sidewalk crossing at a maximum allowable cross-slope of 2% in order to meet ADA requirements. A sidewalk crossing grade of 2% shall be incorporated into the driveway even if a sidewalk is not to be constructed at the same time.

Reference Figure 2.4 for driveway profiles on an upgrade and Figure 2.5 for driveway profiles on a downgrade. No downgrade driveways will be allowed for new development or construction. If an existing driveway with a downgrade already exists it shall be reconstructed to conform to Figure 2.5. All down grade driveways shall have a raise that must be equal to or above the top of curb elevation.

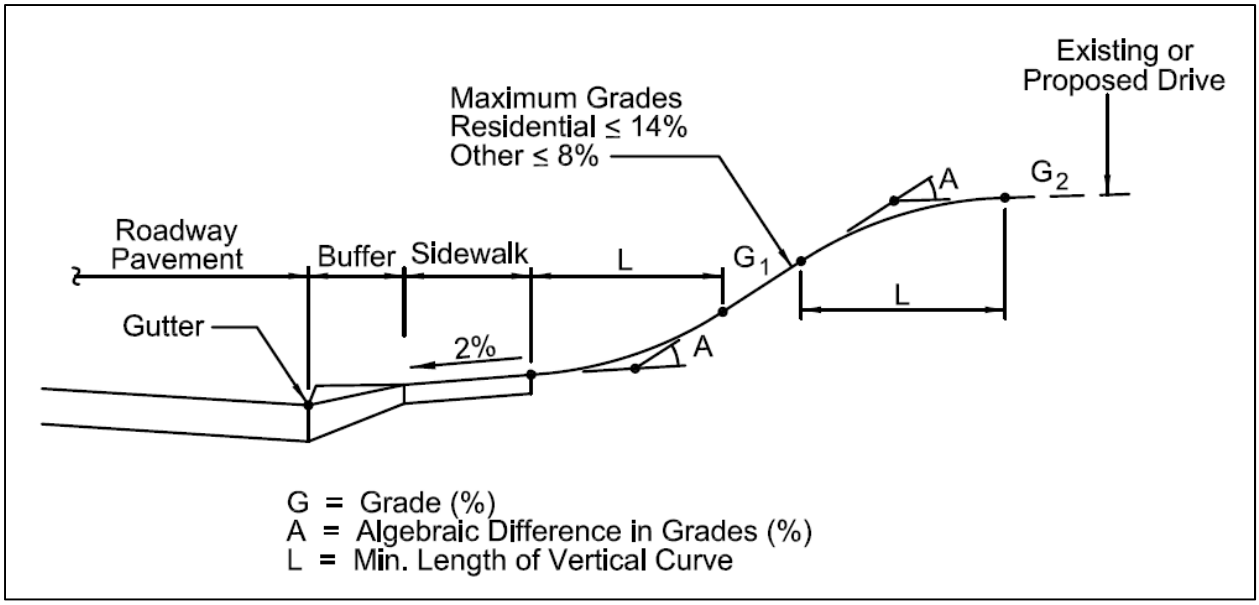

Figure 2.4: Driveway Profiles on an Upgrade

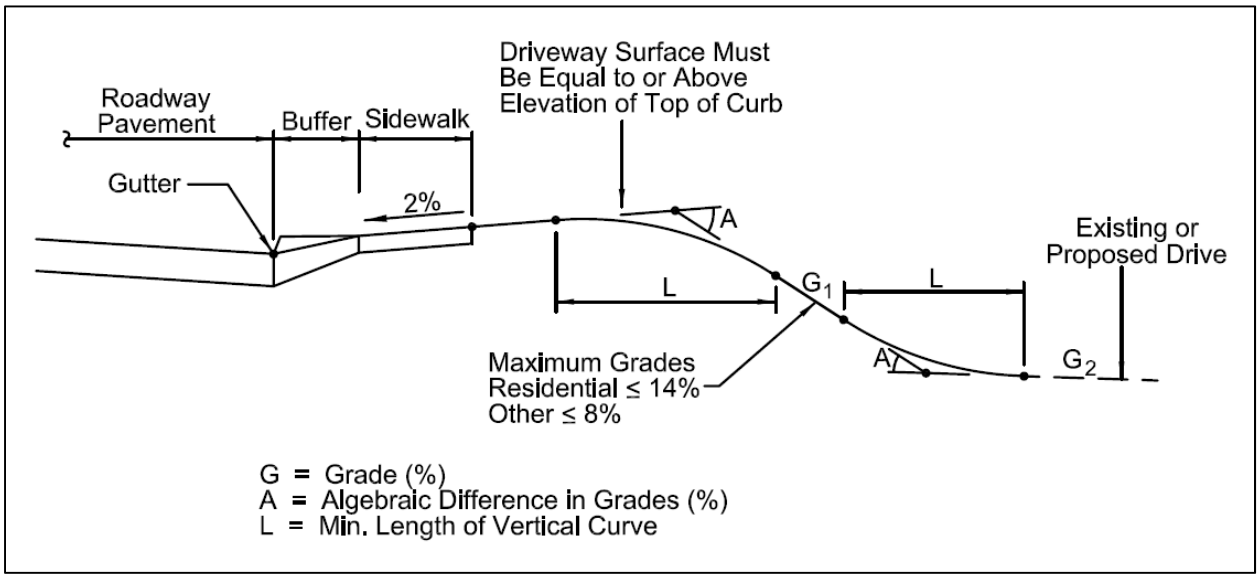

Figure 2.5: Driveway Profiles on a Downgrade

2.16 Traffic Information and Control Devices

Any work disturbing traffic on City streets shall require a signed and sealed traffic control plan by a Registered Professional Engineer in the State of Texas. All signage in City right-of-way shall conform to the Texas Manual of Uniform Traffic Control Devices.

The developer shall be responsible for and arrange for the installation of all pavement striping, regulatory, warning, guide, and school zone signs including posts, as shown on the plans or as directed by the City. Street name signs shall be installed at each intersection. Examples of regulatory, warning, information and guide signs are as follows:

A. Regulatory signs shall include, but are not limited to, STOP, 4-WAY, YIELD, KEEP RIGHT and speed limit signs.

B. Warning signs shall include, but are not limited to, DEAD END, NO OUTLET, DIVIDED ROAD, DIP, and PAVEMENT ENDS.

C. Guide signals shall include, but are not limited to, street name signs, DETOUR, direction arrow and advance arrow.

D. Traffic striping and buttons shall be provided by the developer as shown on plans or as directed by the City.

All signage within medians shall be break away pole bases.

2.16.1 Regulatory Signage

Regulatory signs should be used only where justified by engineering judgment. All signage plans shall be reviewed and approved by the City of Rockwall Engineering Department and be designed in accordance with the principles described in the current Texas Manual on Uniform Traffic Control Devices (TMUTCD).

All street and regulatory signage shall be installed, inspected and approved, prior to final acceptance of the project. This inspection typically takes place as part of the Engineering Department's final walkthrough. Any sign related issue/issues will be noted on the projects final punch list.

A. A detailed street and regulatory signage plan is to be submitted to the City of Rockwall Engineering Department. All signs shall be shown in the engineering plans for review and approval. The signage plan shall be shown on a separate signage & pavement marking layout sheet or as a part of the plan & profile sheet. The plan shall identify the specific sign

designation, size and location for each sign. Sign standards shall also be included in the engineering plans.

B. All signage installed shall comply with the current "*Texas Manual on Uniform Traffic Control Devices*" and the "*Standard Highway Sign Designs for Texas."* The sign layout drawings shall show the color and dimensions of all sign face legend components including background color, legend color, borders, symbols, letter size and style.

C. The developer shall be responsible for furnishing and installing all regulatory signage, warning signage and street name signage along with all necessary sign mounts in accordance with the approved engineering plans. A sample production sign shall be submitted to the Traffic Signs & Pavement Markings Supervisor for review and approval. The sample shall be directed to the City of Rockwall Service Center located at 1600 Airport Road, Rockwall Texas 75087. The sample sign must be submitted at least 10 days prior to the scheduled installation date.

D. For a street with a cul-de-sac end, a standard W 14-2a shall be mounted over the street name blade, if the cul-de-sac is not clearly visible from the adjoining roadway, or is located in excess of 400 linear feet from the adjoining roadway.

2.16.2 Street Name Blades

A. Street name sign blades shall be double-sided with rounded corners.

B. Street Name Blades shall be nine-inch (9") tall flat aluminum. The blades shall be 0.080 inches thick and be a minimum of 36" long.

C. The lettering for the street signs shall be 3M 3930 high Intensity prismatic material sheeting for street, regulatory and warning signs and shall be high intensity diamond grade type III prismatic. The street sign background shall be green and the legend shall be white.

D. The street sign blade must incorporate the current City of Rockwall logo. The logo shall consist of white Scotchlite Series 3930 high intensity prismatic material. (Product Code 3930)

E. Block Numbers are required on all street name blades and shall be located on the top right corner of the street blade.

F. The lettering for the street blades shall be composed of a combination of lower-case letters with initial upper-case letters. The Clearview TCAD-1W font shall be used. The lettering shall be composed of initial upper-case letters of at least 6 inches in height and lower case letters of at least 4.5

inches in height. For supplementary lettering to indicate the type of street (such as Street, Avenue or Road) shall be composed of initial upper-case letters at least 3-inches in height and lower-case letters at least 2.25 inches in height. Abbreviations may be used (for example St., Ave., or Rd) except the street name itself. The supplementary lettering shall be located at the lower right corner of the street blade, under the block number.

G. The street blade sign shall consist of green Scotchlite 3930 high intensity prismatic material background (product code 3937) and white Scotchlite 3930 high intensity prismatic material for the lettering (product code – 3930). The background sheeting shall be white 3M 390 high intensity prismatic material. The background material shall be applied to the full width and height of the sign blank leaving no metal exposed. The background material shall be one continuous piece of material. Patching of background material is not allowed and any sign with patching material of any type will be rejected by the City.

   Alternative Option:
   As an alternative, the foreground color may be green transparent Scotchlite ElectroCut1177 film (E.C. film). Lettering shall be cut out and removed producing a single continuous piece of green transparent film material.

2.16.3 Standard Street Sign Pole and Fixtures

A. Standard Street Sign Post – shall be 12’ long - minimum (2-3/8”) galvanized steel round post with a minimum of 60 mil wall thickness.

B. Standard Post Installation Depth – sign post shall be installed into solid ground to a minimum depth of 24-inches and anchored with a minimum of 60lbs of concrete.

C. Standard Post Bracket – shall be (18”) cast aluminum round post bracket street sign mount for bottom street blade.

D. Standard Top Crossing Bracket – shall be (12”) cast aluminum top crossing street sign bracket mount for top street blade.

E. Standard Mounting Bracket Assemblies – shall be (2-2/8”) diameter aluminum round post interlocking bracket x 2 per pole.

2.16.4 Decorative Sign Poles and Fixtures

The City of Rockwall will allow the installation of decorative signs and posts or other non-standard items by Developers/Homeowners Associations on a case-by-case basis provided that their installation does not result in an adverse

impact to the public safety and that there is no cost to the City for installation or maintenance. Residential developer requesting such installations will be required to give the recorded documentation of an incorporated Homeowner's Association (HOA) to the City. The City of Rockwall maintains only standard street and regulatory signs/post installed on public streets within its designated right-of-ways. The City of Rockwall does not maintain decorative sign poles and fixtures installed by developers or HOA.

If the developer elects to install non-standard decorative signs, sign poles and fixtures, the designated HOA must enter into a maintenance agreement with the City covering the hold harmless provisions. These provisions shall be noted on the approved final plat for the subdivision. The platted maintenance provisions will serve as the agreement and applies to all non-standard decorative signs, poles/post, hardware, or any other attachments. The City of Rockwall has no maintenance or other responsibility to these items. The ownership and maintenance of all such signs, poles and fixtures become the maintenance responsibility of the designated HOA.

Decorative Sign Pole/Fixture Submittals:

A detail of the decorative sign poles, pole fixtures and base mounting shall be included with the submittal of the civil engineering construction plans. The submittal shall also include a street/site plan indicating the location and identification of all proposed signage and post to scale.

HOA Maintenance - Responsibilities and Provisions:

A. The HOA is responsible for maintaining all non-standard decorative signs, poles/post, hardware, attachments or other approved non-standard items under this agreement. The City of Rockwall has no maintenance or other responsibility to these items. The City of Rockwall and the HOA agree the Association will bear any and all maintenance cost related to the said improvements. The City has the statutory authority to install and maintain traffic control devices for vehicular traffic on public streets/roads within the city limits of the City of Rockwall, Texas. This agreement in no way constitutes a change in that authority and does not constitute any delegation of this authority to the Association.

B. The City of Rockwall reserves the right to install temporary replacement signs using standard sign post mounting or alternate temporary mounting when decorative sign posts and signs are damaged. Routine maintenance/replacement of damaged signs, posts and any sign mounting backboard/trim/hardware or other fixtures is the sole responsibility of the HOA and must be repaired within 4 weeks of reporting to the HOA.

C. The City of Rockwall will not handle, store or be responsible for any decorative non-standard sign, post or associated fixtures installed under this agreement.

D. All signs (regulatory and warning) shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (Texas MUTCD) and the "Standard Highway Sign Designs for Texas."

E. Sign posts must be of sufficient height to mount the sign in conformance with the current (Texas MUTCD) requirements. Most typical installations require a vertical clearance of 7 feet from the bottom edge of the sign to the ground surface. Overhead signs must conform to all required standards.

F. Signs/posts must be installed in locations as provided in the approved engineering/construction plans or as otherwise approved by the City of Rockwall. On occasion, it may be necessary to re-locate signage/poles based engineering judgment, study or when otherwise deemed necessary by the City.

G. The City of Rockwall reserves the right to approve or disapprove any sign/pole design and/or location. The City of Rockwall must approve the color of signposts and any requested sign mounting/trim.

2.16.5 Miscellaneous

Street address markers shall be installed for each lot in the subdivision. The markers shall be located at the center of the lot on the face of the curbs. The address markers shall have a deep green background with reflective white numbers. The number size shall be four (4) inches in height. The background of the address marker shall be eighteen (18) inches in length and from the top of curb to the gutter flow line. The address marker shall show the full numerical portion of the address of the lot.

All signage for multifamily, commercial, retail and industrial developments are required to have a separate permit from the building department. Signs, including any overhangs, are not allowed in any right-of-ways and/or easements. Location of any signage is not approved on engineering plans

2.17 Temporary Traffic Control

When the normal function of the roadway is suspended through closure of any portion of the right-of-way, temporary construction work zone traffic control devices shall be installed to effectively guide the motoring public through the

area. Consideration for road user safety, worker safety, and the efficiency of road user flow is an integral element of every traffic control zone.

All traffic control plans shall be prepared and submitted to the Engineering Department in accordance with the standards identified in Part VI of the most recent edition of the TMUTCD. Lane closures will not occur on roadways without an approved traffic control plan. Traffic control plans shall be required on all roadways as determined by the City Engineer or the designated representative.

All traffic control plans must be prepared and signed and sealed by an individual that is licensed as a professional engineer in the State of Texas. All traffic control plans and copies of work zone certification must be submitted for review and approval a minimum of three (3) weeks prior to the anticipated temporary traffic control.

The contractor executing the traffic control plan shall notify all affected property owners two (2) weeks prior to any the closures.

Any deviation from an approved traffic control plan must be reviewed by the City Engineer or the designated representative. If an approved traffic control plan is not adhered to, the contractor will first receive a verbal warning and be required to correct the problem immediately. If the deviation is not corrected, all construction work will be suspended, the lane closure will be removed, and the roadway opened to traffic.

All temporary traffic control devices shall be removed as soon as practical when they are no longer needed. When work is suspended for short periods of time at the end of the workday, temporary traffic control devices that are no longer appropriate shall be removed or covered. The first violation of this provision will result in a verbal warning to the construction foreman. Subsequent violations will result in suspension of all work at the job site for a minimum of 48 hours. All contractors working on City funded projects will be charged one working day for each 24 hour closure.

Lane closures on any major or minor arterial will not be permitted between the hours of 6:00 am to 9:00 am and 4:00 pm to 7:00 pm. Where lane closures are needed in a school area, they will not be permitted during peak hours of 7:00 am – 9:00 am and 3:00 pm to 5:00 pm. Closures may be adjusted according to the actual start-finish times of the actual school with approval by the City Engineer. The first violation of this provision will result in a verbal warning to the construction foreman. Subsequent violations will result in suspension of all work at the job site for a minimum of 48 hours. All contractors working on City funded projects will be charged one working day for each 24 hour closure of a roadway whether they are working or not.

2.18 Street Lighting

All developments shall provide streetlights. In general, lights should be located at street intersections and at intervals no greater than four hundred (400) feet apart. Street lights shall be centered one and half (1 ½) feet off the back of curb.

2.19 Barrier Free Ramps

Barrier free ramps shall be provided in all commercial areas and in residential areas which have sidewalks. Ramps shall be located to provide access in accordance with the standards set by the Texas Department of Licensing and Regulation (TDLR) at all pedestrian sidewalks. Laydown curbs and ramps shall be constructed at all street intersections and driveways whether or not sidewalks are being installed. Laydown curbs and ramps shall be constructed by the developer. Barrier free ramps shall have truncated dome plates in the color approved by the City. No truncated dome pavers or ridges allowed.

2.20 Off-Street Parking

All parking areas and spaces shall be designed and constructed of steel reinforced concrete in accordance with the following requirements:

1. All parking areas and spaces shall be designed and constructed of steel reinforced concrete so as to have free ingress and egress at all times.

2. No parking space or parking area shall be designed so as to require a vehicle to back into a public street or across a public sidewalk, except in the case of one and two family dwelling units.

3. Minimum Dimensions for Off-Street Parking:

   a) Ninety-degree parking (Figures 2.6a and 2.6b) – All parking spaces shall be a minimum of nine (9) feet in width. Each parking space adjacent to a building shall not be less than twenty (20) feet in length. Dual head in parking spaces should be a minimum of twenty (20) feet in length. Parking spaces not adjacent to a building or dual head may be eighteen (18) feet in length with two (2) feet of clear (no obstruction including landscaping, lighting, wheel stops, and/or signage) over hang between curb and sidewalk or property line. Maneuvering space shall not be less than twenty-four (24) feet.

   b) Sixty-degree angle parking (Figures 2.7a and 2.7b) – Each parking space shall be not less than nine (9) feet wide perpendicular to the parking angle nor less than twenty and one tenth (20.1) feet in length when measured at right angles to the building or parking line. Maneuvering space shall be not less than fourteen and one half (14 ½)

feet for one way traffic or twenty two (22) feet for two way traffic perpendicular to the building or parking line.

c) Forty-five degree angle parking (Figures 2.8a and 2.8b) – Each parking space shall not be less than nine (9) feet wide perpendicular to the parking angle nor less than nineteen (19) feet in length when measured at right angles to the building or parking line. Maneuvering space shall be not less than twelve (12) feet for one way traffic or twenty-one (21) feet for two-way traffic perpendicular to the building or parking line.

d) Parallel Parking – Each parking space shall not be less than nine (9) feet in width and twenty-two (22) feet in length. Maneuvering space will not be less than twenty (20) feet.

e) Handicap Space Parking – Where handicapped parking is required or installed, the design shall be as in Figure 2.9.

f) When off-street parking facilities are provided in excess of minimum amounts herein specified, or when off-street parking facilities are provided, but not required by this chapter, said off-street parking facilities shall comply with the minimum requirements for parking and maneuvering space herein specified.

g) Each parking space/stall shall be striped to the minimum dimension detailed out above in this section.

h) No dead-end parking shall be allowed for more than six (6) parking spaces. A minimum turnaround of a 15 feet wide by 64 feet long or a cul-de-sac shall be provide and striped off as “No Parking”. If there are less than six (6) parking spaces a 24 feet by 15 feet would be allowed and would need to be signed as “No Parking”.

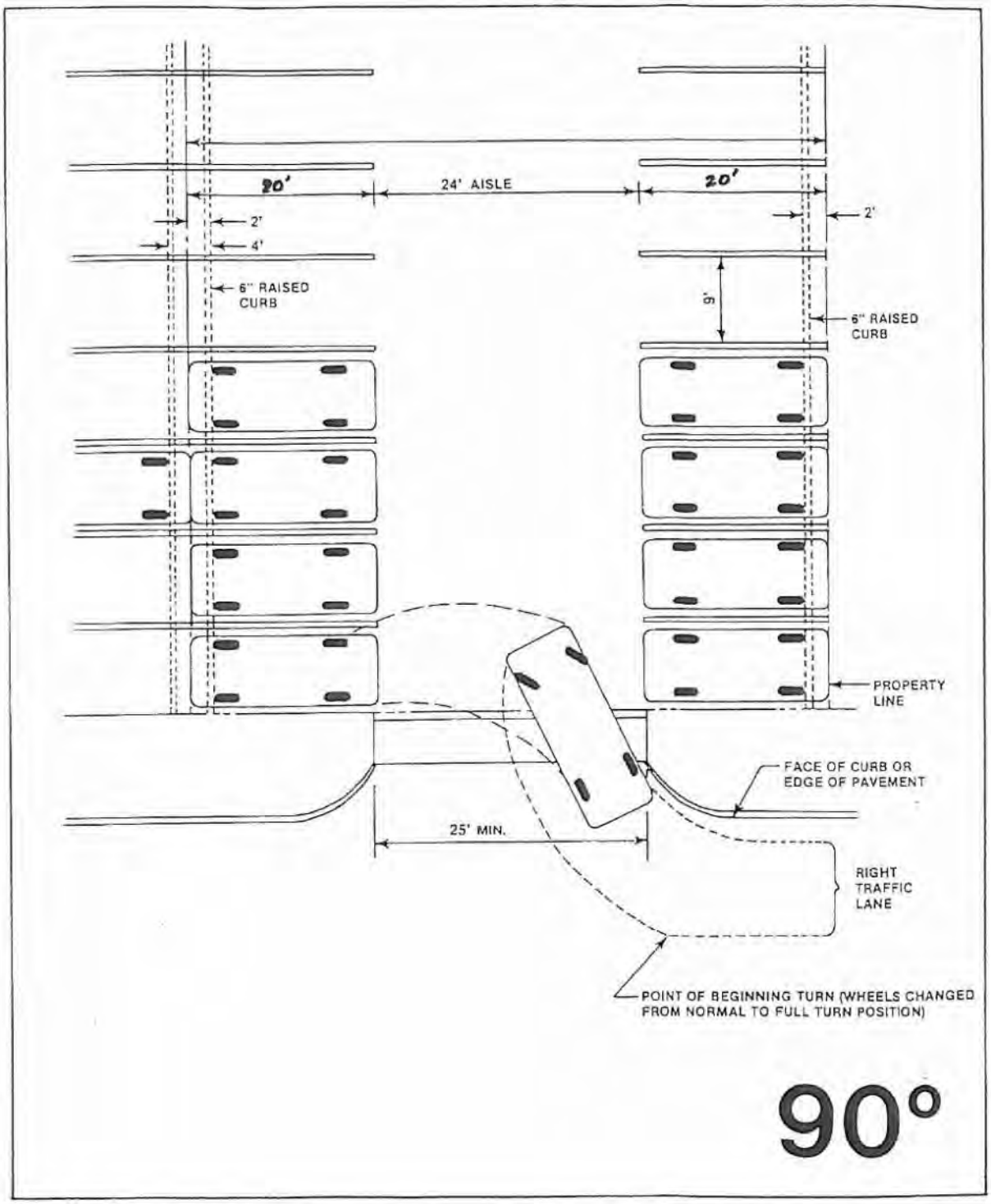

Figure 2.6a: 90° Parking – Double Row

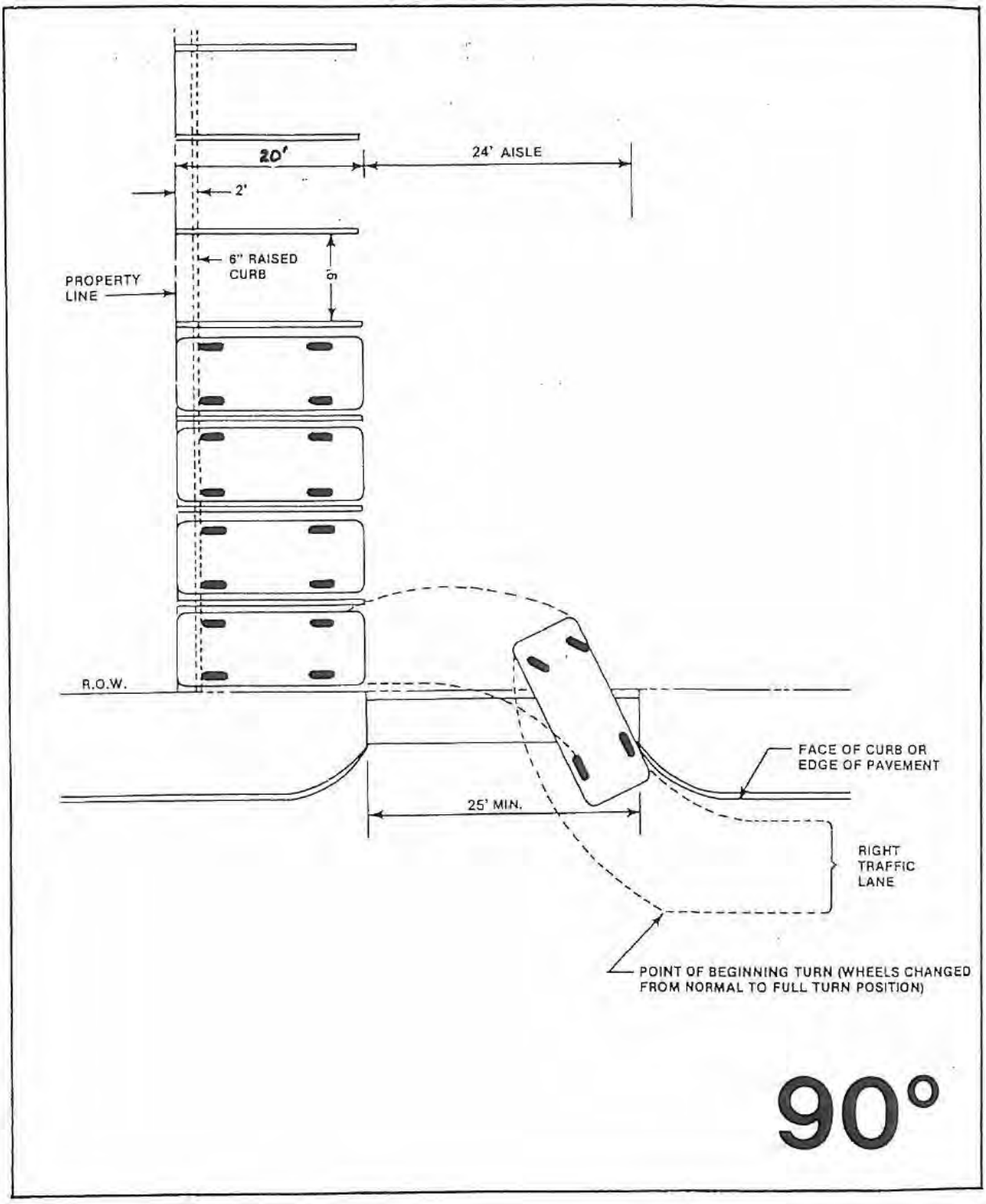

Figure 2.6b: 90° Parking – Single Row

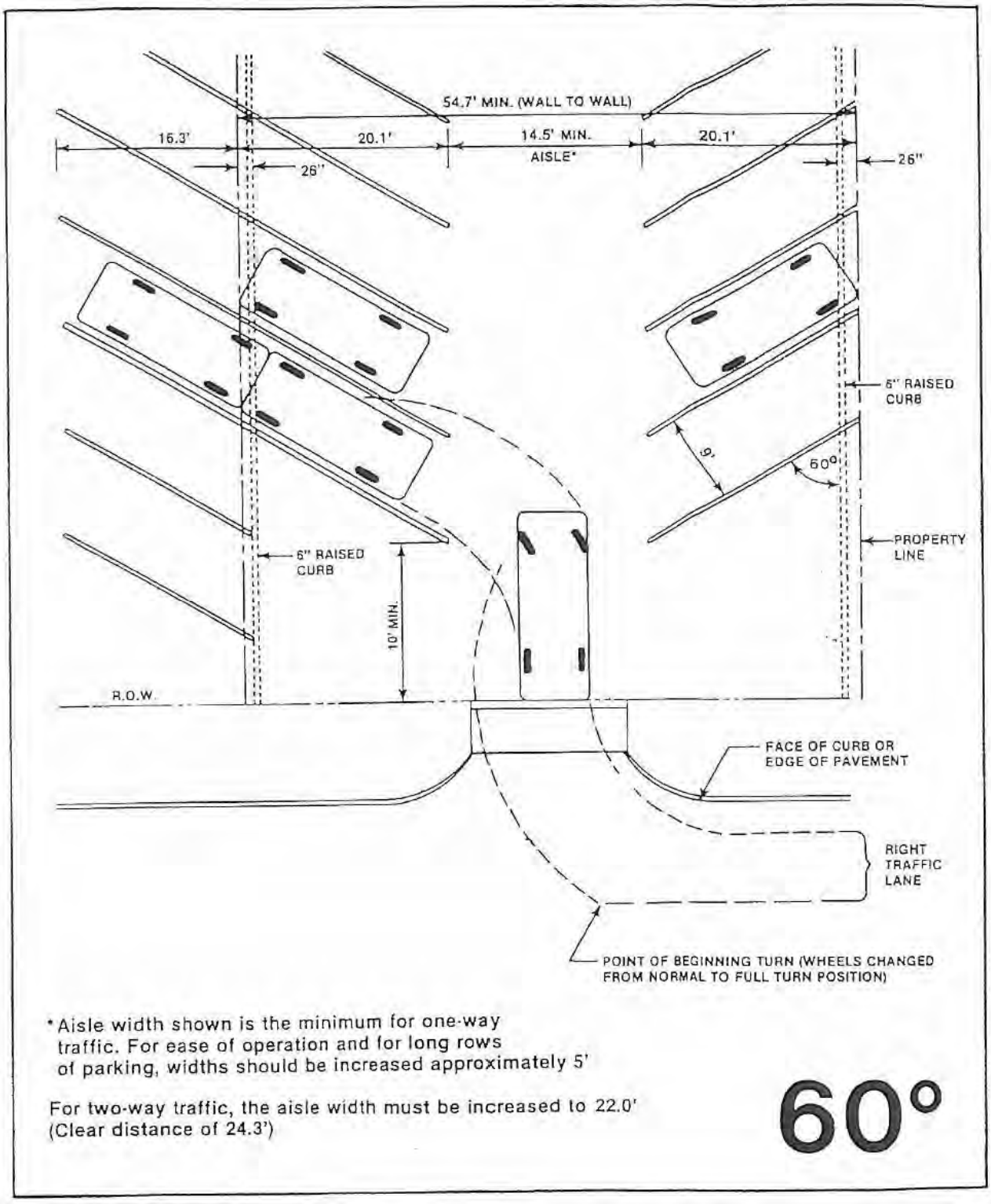

Figure 2.7a: 60° Parking – Double Row

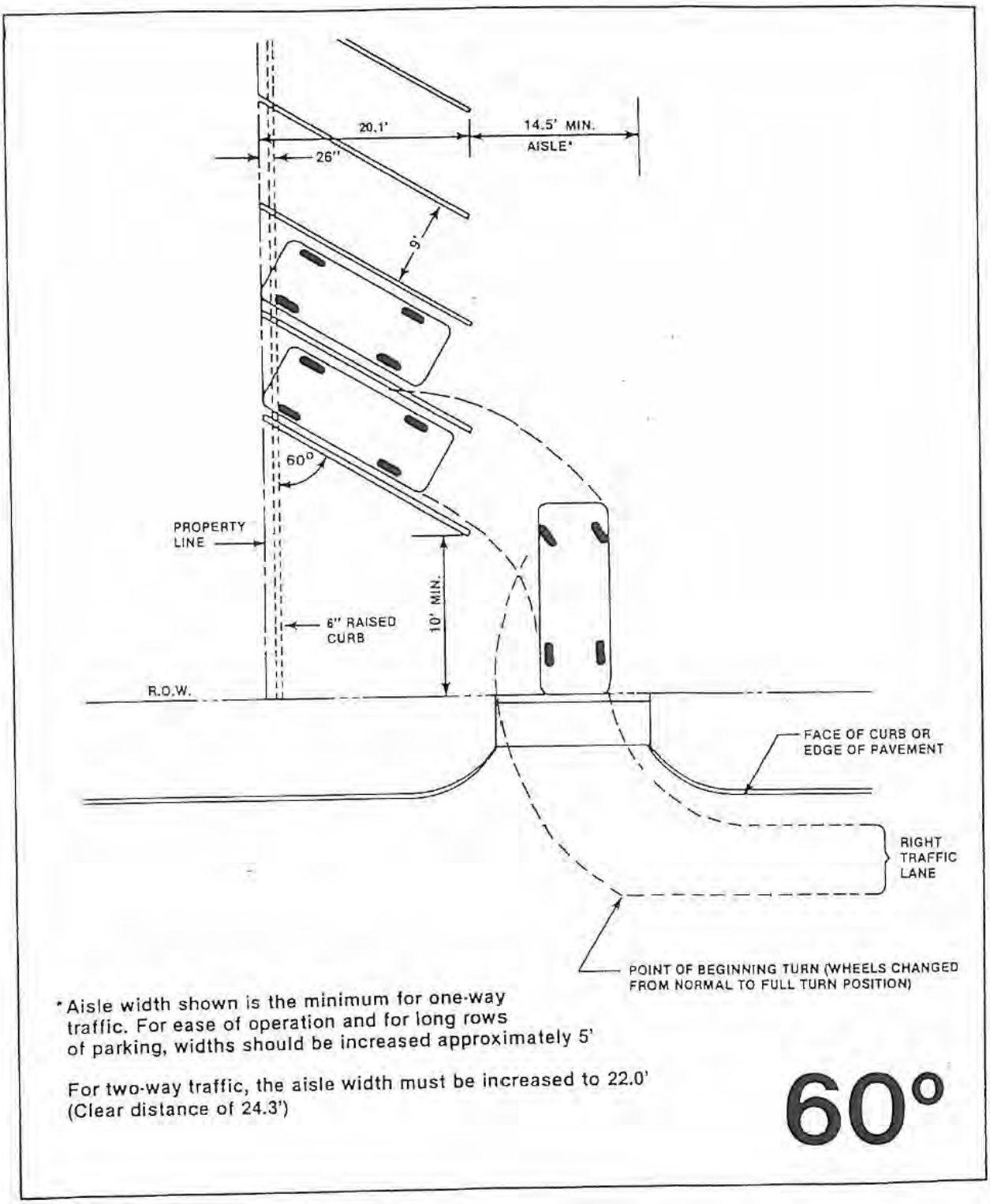

Figure 2.7b: 60° Parking Single Row

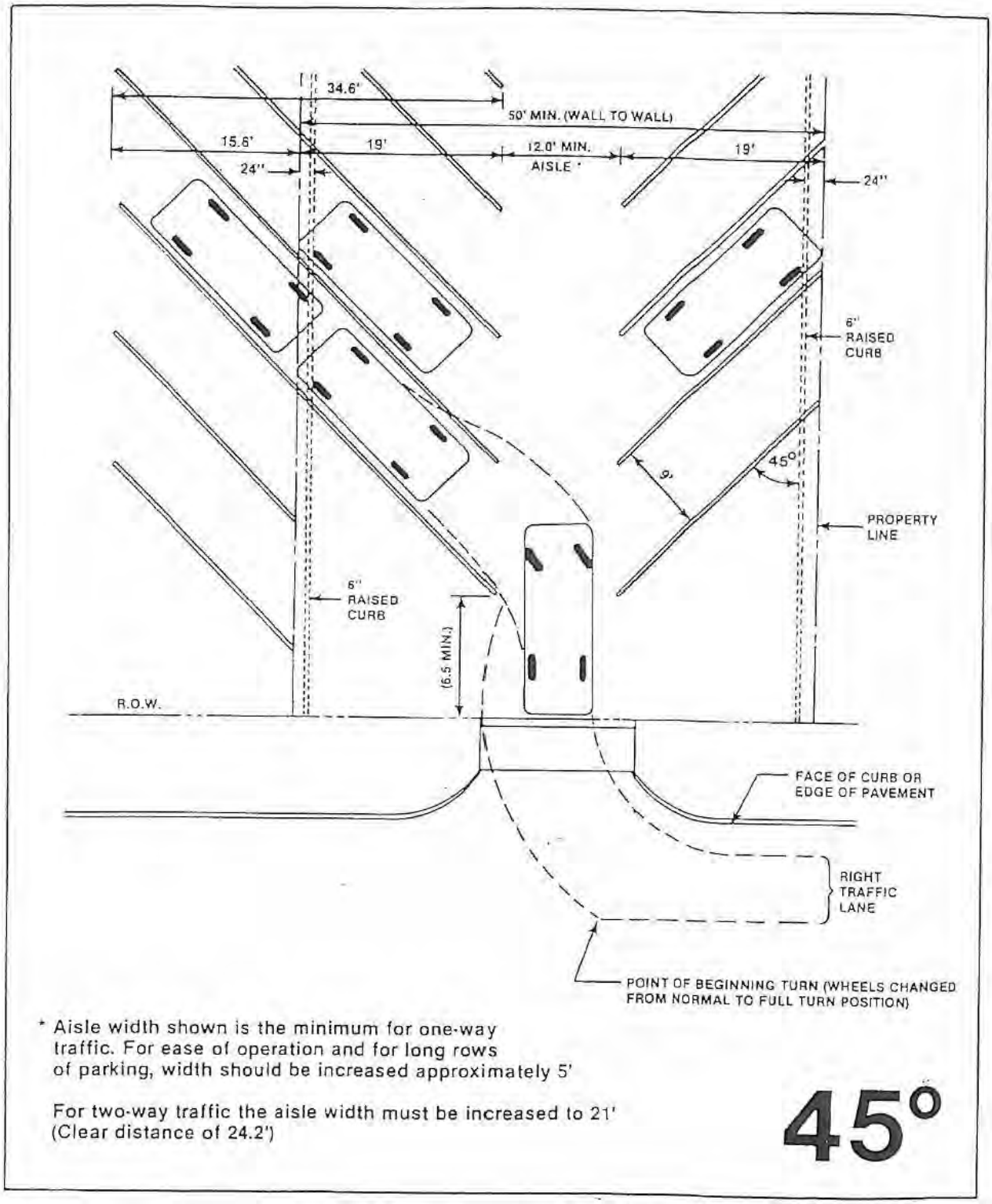

Figure 2.8a: 45° Parking - Double Row

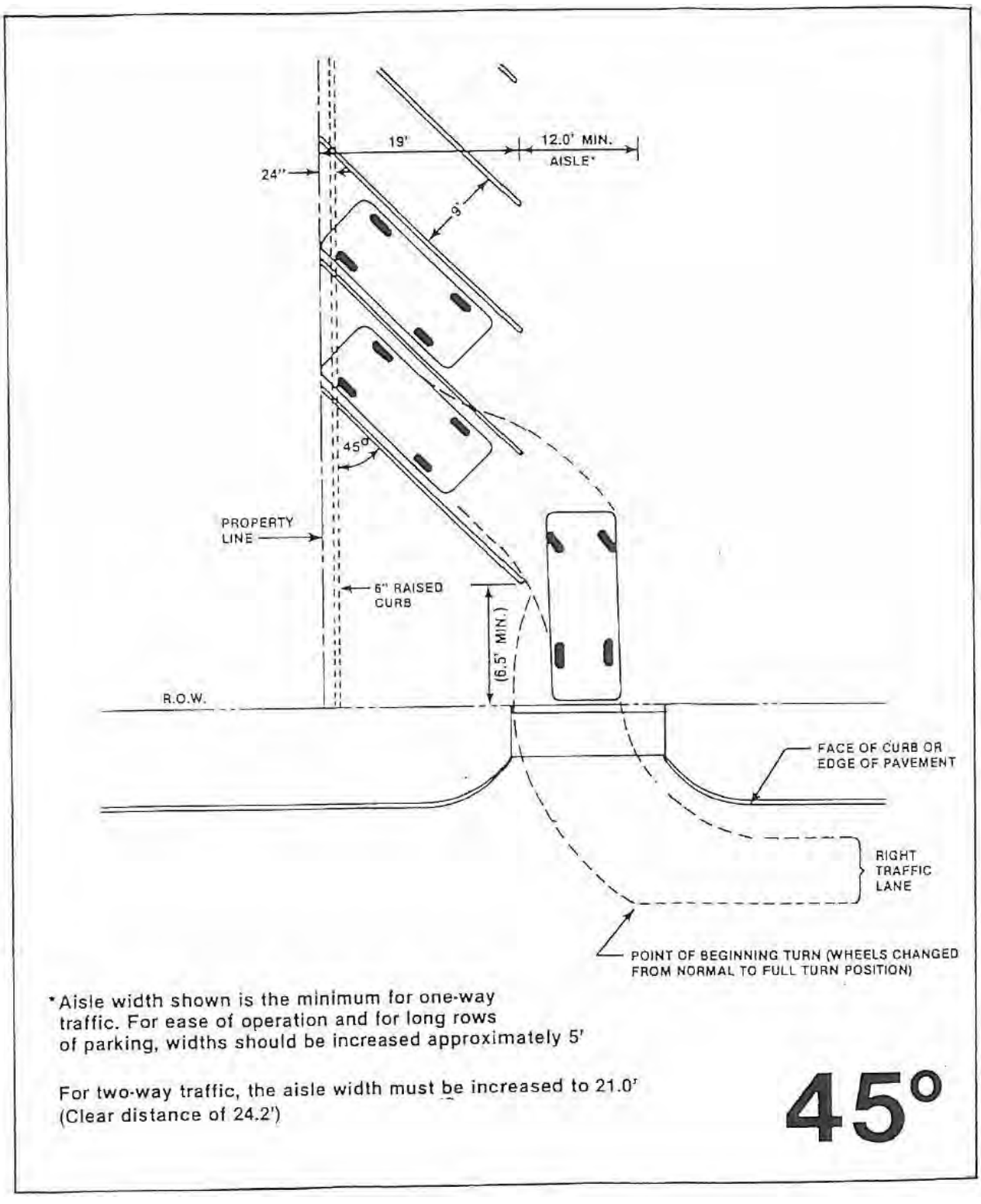

Figure 2.8b: 45° Parking – Single Row

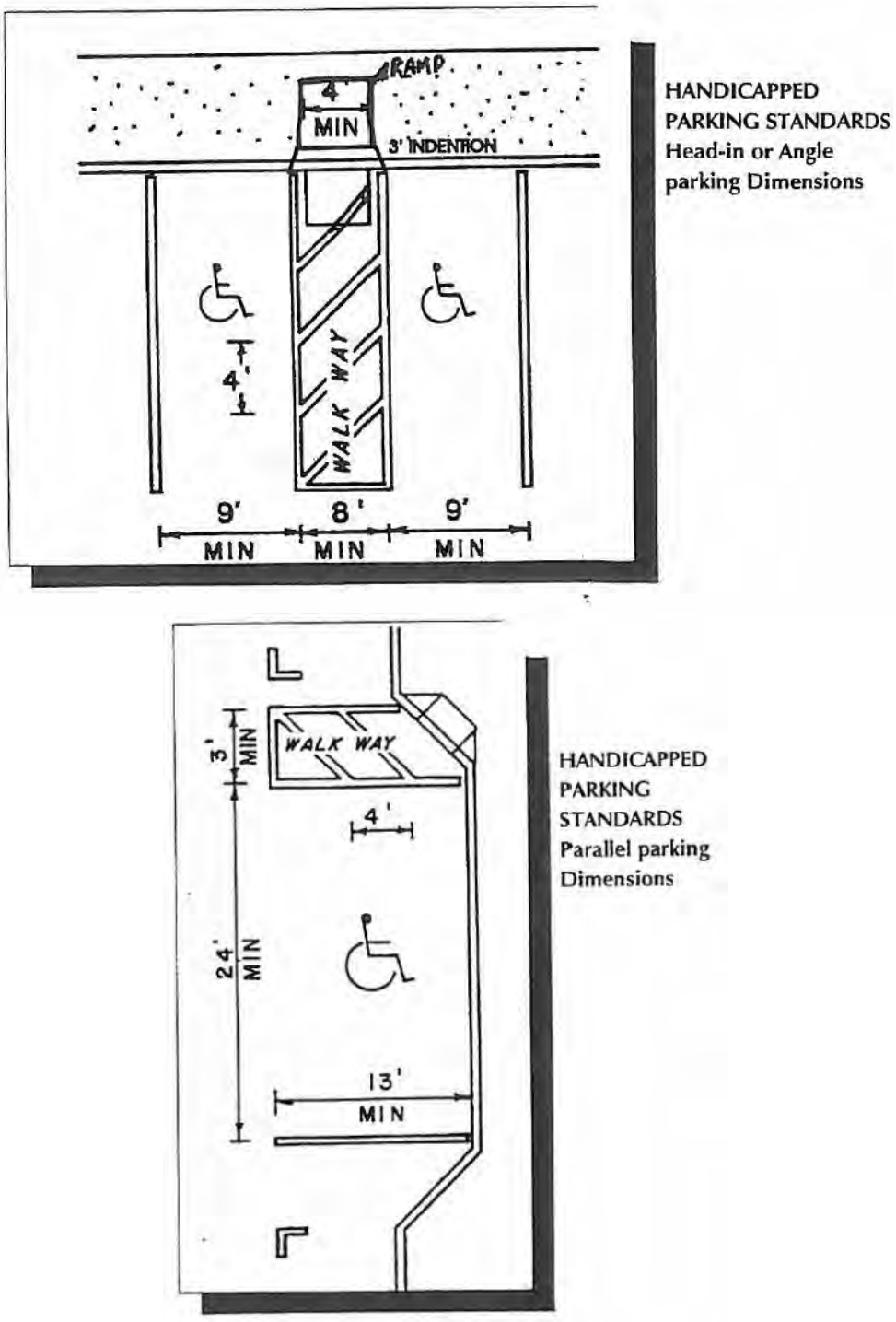

Figure 2.9: Handicap Space Parking

4. Paving Standards:

   a) Unless otherwise approved by the City Council or as specified in these standards, all parking lots shall be paved with steel reinforced concrete and designed according to City standards and specifications. The parking lanes must be clearly marked by approved paint, buttons or other material.

   b) All driveway approaches shall be constructed of steel reinforced concrete in the same strength, thickness, and reinforcing as the adjacent street and shall be curbed per City standards.

   c) All parking lot pavement and drive aisles shall be steel reinforced concrete except for existing asphalt parking lots being rehabilitated. A steel reinforced concrete or asphalt pavement (rehabilitated parking lots) design shall be provided to the City Engineer for review and approval.

   d) Industrial and commercial parking lot pavement shall be steel reinforced concrete and designed by a Professional Engineer. Pavement design shall be submitted to the City for approval.

   e) The pavement within a designated loading area shall be designed and constructed to carry the additional loading of merchandise, goods, sanitation pick-up, etc., in order to prevent any unnecessary failure in the pavement itself. The pavement design shall be included in the engineering construction plans and specifications and submitted to the City Engineer for approval. The pavement design is shall designed by a Geotechnical Engineer.

   f) Fire lane shall have a maximum running slope of ten (10) percent and a cross slope of five (5) percent. A vertical curve is required for grade breaks greater than one (1) percent.

5. Dead end parking shall be designed and constructed with a minimum length of fifteen (15) feet and width of twenty-four (24) feet turnaround space provided at the end of the dead end parking area.

6. If a portion of an existing street is removed for construction, the entire concrete panel must be removed and replaced with the same strength steel reinforced concrete and one (1”) inch thicker than the existing thickness.

7. All entrances or exits in a parking lot shall be a minimum of thirty (30) feet from the beginning point of any corner radius.

8. All entrances or exits in a parking lot shall be a minimum of twenty-four (24) feet and a maximum of forty-five (45) feet in width, unless one-way, in which

case they shall both be a minimum of twelve (12) feet, or as approved by the City Council.

9. No parking areas or parking spaces shall be allowed to pave over or utilize public right-of-way, with the exception of approved entrances and exits, unless the City Council grants an exception and/or a facilities agreement.

10. All multi-family and commercial parking areas and parking spaces shall be designed and constructed to protect adjacent residences from the direct glare of headlights of vehicles using the parking area.

11. No City street curb, alley or street pavement may be cut without a permit from the City.

12. If required, the contractor shall submit a traffic control design to the City of Rockwall Engineering Department prepared by a registered professional engineer prior to beginning of construction. The contractor shall provide signs and barricades in construction areas and comply with the Texas Department of Transportation standard of work zone traffic control. Employees exposed to public vehicular traffic, shall be provided with and wear warning vest or other suitable garments marked with or made of reflective or high visibility material. The contractor shall provide flagman when working inside an active street right-of-ways where necessary.

2.21 Traffic Impact Analysis and Mitigation

2.21.1 Purpose

The purpose of a Traffic Impact Analysis (TIA) is to assess the effects of specific development activity on the existing and planned thoroughfare system. Development activity may include, but is not limited to, rezoning, preliminary site plans, site plans, preliminary plats, driveway permits, certificates of occupancy, and Thoroughfare Plan amendments.

2.21.2 Determination of Applicability

The need for a TIA shall be determined by the City based upon the results and recommendation from a pre-development meeting. It shall be the responsibility of the applicant to demonstrate that a TIA should not be required. If a TIA is required, the level of effort for a TIA submission shall be determined based on the criteria set forth in Table 2.6.

2.21.3 Applicability of TIA Requirements

A. Zoning, Site Plan and Platting – These TIA requirements shall apply to all requests for land use changes which will establish a land use that is deemed to be more intense than the land use depicted on the Land Use

Plan contained within the Comprehensive Plan for a particular property. Applicable requests will also include zoning, site plan, and platting cases, Thoroughfare Plan amendments, and/or where deemed necessary by the City Engineer, Director of Planning and Zoning, the Planning and Zoning Commission, or the City Council. Special circumstances -- *including but not limited to development with no case history* -- may also require a TIA.

B. Development – These TIA requirements shall apply to all development requests for land uses, except single-family residential developments, which will generate over 100 total trips during the AM or PM peak hour. Applicable development requests include all development related applications. Special cases, in which site generated peak hour trip activity is different from that of the adjacent street (weekdays 7:00-9:00 a.m. and 4:00-6:00 p.m.), may require an additional separate analysis. Such circumstances may include, but are not limited to, the establishment of commercial/retail, entertainment or institutional developments or activity. The TIA requirement may be waived for a development request if a TIA was performed previously with the zoning request and the conditions listed in the report are still current.

    I. Single-Family Residential Exception – A TIA for single-family residential development will not be required if the development contains fewer than six (6) dwelling units unless special circumstances exist, as determined by the City Engineer and/or Director of Planning and Zoning. These special circumstances may include, but are not limited to, impacts to other residential developments from cut-through traffic, inadequate site accessibility, the construction or delay of construction of a thoroughfare prior to or after the anticipated date of construction resulting from a proposed development, or the street or access system not being anticipated to accommodate the expected traffic generation.

C. Depending upon the specific site characteristics of the proposed development, one or more of the following elements may also be required as part of the TIA: an accident analysis, sight distance analysis, traffic simulation, traffic signal warrant analysis, queuing analysis, right/left-turn lane analysis, access spacing analysis, link capacity analysis, and/or traffic circulation plan.

Table 2.6: Criteria for Determining TIA Study Requirements

Analysis Category	Criteria	TIA Analysis Periods[1]	Study Area[4]
I	Projected site generated ADT of 750 OR Projected site generated peak hour trips of 100 per hour AND No significant modification of traffic signals or roadway geometry proposed	1. Existing year 2. Opening year[2]	1. All driveway access points, adjacent roadways, and major intersections 2. All signalized intersections on each street serving the site within ¼ mile of the site boundary
II	Projected site generated ADT of 751-2,000 OR Projected site generated peak hour trips of 101-250 per hour OR Installation or modification a traffic signal or roadway geometry proposed, regardless of project size	1. Existing year 2. Opening year[3] 3. Five years after completion	1. All driveway access points, adjacent roadways, and major intersections 2. All signalized intersections and major unsignalized intersections on each street serving the site within ½ mile of the site boundary
III	Projected site generated ADT exceeds 2,000 OR Projected site generated peak hour trips exceeds 250 per hour OR Installation or modification of two or more traffic signals, addition of travel lanes, or modification of interchange proposed, regardless of project size	1. Existing year 2. Opening year[3] 3. Five years after completion	1. All driveway access points, adjacent roadways, and major intersections 2. All signalized intersections and major unsignalized intersections on each street serving the site within 1 mile of the site boundary

1. Analysis periods shall include build and no-build scenarios. Assume full occupancy for each phase as they open.
2. Assume full build-out and occupancy.
3. Additional analysis periods relating to completion of interim phases may be considered for phased developments to support delaying construction of planned mitigations until future phases are constructed. Assume full build-out and occupancy of each particular phase
4. The City may enlarge or reduce the study area depending on the project. This is meant to provide general guidance to the developer. Land uses within the study area should include recently approved or pending development adjacent to the site.

2.21.4 Requirements for TIA Updates

A TIA shall be updated when the time or circumstances of the original study fall within the parameters presented in Table 2.7. The applicant is responsible for the preparation and submittal of appropriate documentation in order for City staff to process the zoning or development application. A TIA for site development requests must be updated if two (2) years have passed since the original submittal and/or approval, or if existing or assumed conditions have changed within the defined study area.

Table 2.7: Criteria for Determining TIA Update Requirements

Original TIA Report was based on:	Changes to the Originally Proposed Development:	
	Access Changed[1] OR Trip Generation Increased by more than 10%	Access Not Changed AND Trip Generation Increased by less than 10%
Zoning; or Preliminary Site Plan or Site Plan that is less than 2 years old	Letter Amendment Required: Identify and report only analysis conditions that have changed	Letter Documenting Change (No analysis is required)
Preliminary Site Plan or Site Plan that is more than 2 years old	Prepare New Study. Must meet all current TIA requirements	Prepare New Study. Must meet all current TIA requirements.

1. Changed access includes proposed new access or refinement of general access locations not specifically addressed in original proposed development.

2.21.5 Funding Resources

A. The Developer will be responsible for all costs related to the design, construction and implementation of all recommended mitigations that have been accepted and deemed required by the City Engineer, not otherwise funded by other government agencies. The City Engineer may require consideration of alternative mitigation options that may not have been included in the TIA.

B. The TIA may take into account the city/state/county approved traffic improvements with dedicated funding. Prior to issuance of a Certificate of Occupancy (CO) permit, the Developer shall complete any required traffic improvements approved by the City as a result of the development which have not been funded or otherwise completed by government agencies. The City may approve delaying the construction of required improvements based on the development's phasing.

2.21.6 Responsibility of TIA Preparation and Review

A. A TIA shall be prepared in accordance with all of the guidelines in this section and submitted in accordance with the Development Review Schedule set by the City. The responsibility for TIA preparation shall rest with the applicant and must be performed by a Professional Engineer (P.E.) licensed in the State of Texas with experience in traffic and transportation engineering. The final TIA report must be signed and sealed by the P.E. responsible for the analysis to be considered for review by the City. Application and review fees are due at the time of each submittal. City staff and consultants shall serve primarily in a review and advisory capacity and will only provide data to the applicant when available.

B. It shall be the responsibility of the applicant to submit two (2) printed and one (1) electronic PDF draft TIA reports and executive summaries prior to the zoning and/or development request submission. The proper number of reports, the timing for submission, and the review of these reports shall be based on standard City development review procedures. Incomplete TIAs or failure to submit a TIA prior to the submission shall delay consideration of zoning and development requests. Should it be determined during the review of any zoning and/or development plans that a TIA is required, consideration shall be deferred until the applicant submits a completed TIA, the TIA has been reviewed, and the City has approved the TIA.

C. The City and/or the City's consultant shall review the TIA and provide comments to the applicant. It shall be the responsibility of the applicant to submit two (2) printed and one (1) electronic PDF finalized TIA reports and executive summaries once all review comments have been addressed. Electronic submission may substitute for the required hard copies only with written authorization of the City Engineer.

2.21.7 TIA Standards

A. Capacity Analysis – A capacity analysis for appropriate peak periods shall be conducted for all driveways, intersections, and streets identified during the pre-development meeting. Capacity calculations shall include both near term and long-term projections. Capacity calculations must be based on the operational analysis technique contained in the most current edition of the Highway Capacity Manual (HCM). Alternative calculations must be approved by the City Engineer.

B. Design Level of Service – The minimum acceptable level of service (LOS) within the City shall be defined as LOS "D" in the peak hour for all critical movements/intersections and links. All development impacts on both thoroughfare and intersection operations must be measured against

this standard.

C. Trip Generation Resources – The City's standard for trip generation rates for various land use categories shall be those found in the latest edition of *Trip Generation Manual* published by the Institute of Transportation Engineers (ITE) or other published or recognized sources applicable to the region. Alternate trip generation rates may be accepted on a case-by-case basis if the applicant can provide current supporting data substantiating that their development significantly differs from the ITE rates. The City and/or City's consultant must approve alternative trip generation rates in writing in advance of the TIA submission.

D. Trip Reductions – Trip reductions for pass-by trips and mixed-use developments will be permitted, subject to analytical support provided by the applicant and approved by the City and/or the City's consultant on a case-by-case basis. Assumptions relative to automobile occupancy, transit mode share, or percentage of daily traffic to occur in the peak hour must be documented and will be considered subject to analytical support provided by the applicant.

E. Study Horizon Years – The TIA must evaluate the impact of the proposed development on both existing traffic conditions and future traffic conditions for the horizon year(s) as specified in Table 2.6. Horizon year(s) are defined as any analysis year beyond the existing year. These applications should take into account the Master Thoroughfare Plan or pending amendments.

F. Traffic Data Collection – Appropriate traffic counts shall be collected. These shall include weekday/weekend daily and peak-hour traffic counts at all locations as directed by the City, Weekday counts shall be taken on a typical Tuesday, Wednesday or Thursday unless other days are required/approved. Peak-hour intersection turning movement counts shall include 15-minute increments. Traffic counts used in a TIA shall be less than one (1) year old and should occur outside of holiday time periods and when public schools are in session unless otherwise approve by the City Engineer. The City Engineer may request additional counts based on specific conditions. The existing counts shall be presented in figures/exhibits for each intersection counted with original data sheets provided in the Appendix.

G. Design Standards – The TIA must evaluate site access characteristics including, access spacing requirements, left/right-turn lane requirements, visibility and sight distance requirements, as needed, relative to City of Rockwall and Texas Department of Transportation (TxDOT) requirements, as appropriate. Any TIA with access to a TxDOT facility must meet TxDOT minimum standards and requirements.

H. Traffic Signal Timing and Phasing – The analysis of all existing traffic signals shall be based on the most current signal timing plans, if available. When signal timing plans are not available the assumed signal timing shall be based on field observations, actuation/detection capabilities and corridor coordination and offsets.

2.21.8 TIA Methodology

A. Site Location/Study Area – A brief description of the size, general features, and location of the site, including a map of the site in relation to the study area and surrounding vicinity. The description should include all existing and proposed traffic control devices within the study area, posted speed limits on all existing, adjoining or impacted roads, pedestrian facilities, intersection layout, and lane usages. If applicable to the project, information may also include lane widths and right of way widths for all existing roads impacted by the development. Photographs may be included to document existing transportation conditions;

B. Existing Zoning – A description of the existing zoning for the site and adjacent property, including land area by zoning classification and density by Floor Area Ration (FAR), square footage, number of hotel rooms, and dwelling units, etc. (as applicable);

C. Existing Development – A description of any existing development on the site and adjacent to the site. If applicable, include impacts to existing development.

D. Site Access – A description or illustration of the existing and proposed site access points and associated turn lanes and/or median openings, including cross-section, lane assignment, turn restrictions, throat width, curb radii, turn-lane requirements, sight distance calculations and access spacing conditions;

E. Proposed Zoning/Site Development – A description of the proposed zoning/development for the site, including land area by zoning classification and density by FAR, square footage, number of hotel rooms, and dwelling units, etc. (as applicable); identify recently approved or pending land uses within the area;

F. Thoroughfare System – A description and/or map of existing planned/proposed thoroughfares and traffic signals for horizon year(s) within the study area;

G. Model Assumptions and Design Factors – The roadway network must be modeled as accurately as possible using field data measurements, industry standards and engineering judgement. This includes, but is not limited to, intersection/roadway segment geometries, traffic flow characteristics and traffic signal phasing and operations;

H. Existing Traffic Volumes – Recent traffic counts for the study area including pedestrian and bike volumes where appropriate;

I. Projected Traffic Volumes – Background traffic projections within the study area for the horizon year(s). Background traffic projections shall include the growth in regional traffic as well as the traffic that will be generated by the undeveloped land adjacent to the site and/or within the study area that is likely to develop by the horizon year(s), as determined by the City Engineer and/or City's Consultant. These traffic projections shall be based upon recently approved development applications, the current zoning on the undeveloped land, the City's Future Land Use Plan or the requested future land use of the development;

J. Density of Development – A table displaying the amount of development assumed for existing zoning and/or the proposed development (using gross floor area, dwelling units, occupied beds, etc., as required by the trip generation methodology);

K. Existing Site Trip Generation – A table displaying trip generation rates and total trips generated by land use category for the appropriate peak hours and on a daily basis for each phase and full development based on existing zoning (if applicable), and including all appropriate trip reductions (as approved by the City and/or City's consultant);

L. Proposed Site Trip Generation – A table displaying trip generation rates and total trips generated by land use category for the appropriate peak hours and on a daily basis for each phase and full development based on existing zoning (if applicable) and/or proposed development, and including all appropriate trip reductions (as approved by the City and/or City's consultant);

M. Net Change in Trip Generation (for rezoning cases) – Proposed trip generation minus existing trip generation (if applicable); the net increase in trips to be added to base volumes for the design year;

N. Trip Distribution and Traffic Assignment – Tables and/or figures/exhibits of trips generated by the proposed development (or net change in trips, if applicable) added to the existing and projected volumes, as appropriate, with distribution and assignment assumptions, unless computer modeling has been performed. Each step of the procedure should be clearly shown in enough detail so that all calculations can be verified;

O. Level of Service Evaluations – Capacity analyses for appropriate peak hours for both existing conditions and horizon year(s) projections for intersections, thoroughfare links, median openings and turn lanes associated with the site, as applicable. Results of the capacity analyses must be summarized in exhibits and/or tables for each analysis period

and scenario providing the level of service designation and average control delay for each intersection overall and for each major lane group as applicable. Volume-to-capacity ratio and 95th percentile queues should be provided for all movements found to operate at a deficient level of service;

P. Intersection Control Evaluations – The need for new intersection controls (i.e. traffic signals, all-way stop control) shall be based on warrants and include their impact on the performance of the transportation system;

Q. Evaluation of Proposed/Necessary Mitigation – Capacity analyses for appropriate peak hours for intersections, thoroughfare links, median openings and turn lanes associated with the site under proposed/necessary traffic mitigation measures;

R. Conclusions – Identification of all thoroughfares, driveways, intersections, and individual movements that exceed LOS D or and any operational problems likely to occur;

S. Recommendations – Identify and summarize any necessary roadway improvements and time frames for improvements to occur. Include any intersections, turn lanes, etc which will not be improved to LOS D or better and support for why improvements are not provided. Mitigation measures should be consistent with Traffic Impact Mitigation section below;

T. Other information required for proper review – As requested by the City Engineer and/or the City's consultant.

2.21.9 TIA Report Format

A. The TIA report must be prepared on 8½" x 11" sheets of paper. However, it may contain figures/exhibits on larger sheets, provided they are folded to this size. All text and map products shall be computer-based and provided in both published format and computer file format (PDF). In addition, all electronic files used as part of the traffic analysis (i.e., Synchro, HCS, Passer II/III, CORSIM, VISSIM, ARCADY, etc.) shall be provided.

B. Traffic volumes must be illustrated on prepared figures/exhibits depicting appropriate movements at each study intersection. This includes, existing and horizon year(s) (i.e. projected background traffic volumes, site generated traffic volumes, background + site generated).

C. The sections of the TIA report should be categorized according to the outline shown below:

I. Executive Summary
II. Introduction
    a. Purpose & Overview of Study
III. Existing Conditions
    a. Site Location/Study Area
    b. Existing Zoning/Development
    c. Study roads/streets and intersections
    d. Traffic Volumes
IV. Proposed Development
    a. Zoning, phasing, densities, etc.
    b. Site Trip Generation
    c. Net Change in Trip Generation (if applicable)
    d. Trip Distribution and Traffic Assignment
V. Projected Volumes
    a. Background Volumes
    b. Background + Site Volumes
VI. Analysis
    a. Level of Service Evaluations
    b. Warrant studies (as applicable)
    c. Link Capacity (as applicable)
    d. Sight Distance (as applicable)
    e. Access Spacing (as applicable)
    f. Left-turn/Right-turn Lanes (as applicable)
    g. Accident (as applicable)
    h. Queuing (as applicable)
    i. Mitigations
VII. Summary/Conclusions
VIII. Recommendations
IX. Appendices

2.21.10 Traffic Impact Mitigation

A. Mitigation of traffic impacts shall be required if the proposed development would cause a facility or traffic movement (if applicable) to exceed LOS D, or where it already exceeds LOS D and the development would contribute five percent (5%) or more of the total traffic during any projected horizon year. If mitigation is required, the applicant must only mitigate the impact of the proposed development, and would not be responsible for alleviating any deficiencies in the thoroughfare system that may occur without the proposed development.

B. Mitigation is not required if it can be shown that the traffic impacts of the project are fully mitigated ten (10) years after the final opening with any improvements that are already programmed to be implemented within five (5) years of the initial opening.

2.21.11 Administration of the TIA

Based on the results of the TIA and actions recommended by the City staff, the City's consultant, the Planning & Zoning Commission and/or the City Council, as appropriate, the City shall take one or more of the following actions:

A. Approve the zoning or development request, if the project has been determined to have no significant impact or where the impacts can be adequately mitigated;

B. Approve the development request, subject to a phasing plan;

C. Recommend study of the City Thoroughfare Plan to determine amendments required to increase capacity;

D. Recommend amendment of the Capital Improvement Program (CIP) to expedite construction of needed improvements; or

E. Deny the zoning or development request, where the impacts cannot be adequately mitigated.

2.21.12 Cost of TIA Review

The City may utilize an engineering consulting firm to assist City staff in the review of a TIA. The cost of this consultant review shall be borne by the developer, engineer, or property owner submitting the TIA. The City shall first obtain a cost estimate from the engineering consultant for the TIA review at time of the initial TIA submittal. Before the review begins, the developer, engineer, or property owner submitting the TIA shall deposit with the City funds equal to the cost estimate. The City shall disburse the funds to the consulting engineer as the review progresses. Should the consultant fees exceed the initial estimate, the developer, engineer or property owner submitting the TIA shall be informed of the shortage and a new estimate made by the consultant engineer to complete the TIA review. Additional funds will then be deposited with the City by the developer, engineer or property owner submitting the TIA to cover the estimated shortfall before the review of the study resumes. Any unused funds to be reimbursed to the developer, engineer or property owner submitting the TIA. If review process is performed by City staff, the City will submit a cost estimate for TIA review at time of the initial engineering submittal.

3. STORM DRAINAGE FACILITIES

3.1 Introduction

Drainage facilities shall be designed and constructed at such locations and of such size and dimensions to adequately serve the development and the contributing drainage area upstream of the development. The developer shall provide all the necessary easements and rights-of-ways required for drainage structures including, but not limited to, storm drains and open channels, (lined or unlined), flood detention facilities, and stormwater diversion or containment facilities (such as levees, dams, berms and stream diversions). The minimum easement widths for drainage facilities shall be per Table 3.1. For detention pond easements, water lines and wastewater lines will not be allowed in the easement. A variance to allow retaining walls in detention easement will require approval by the Planning and Zoning Commission with appeals being heard by the City Council.

Table 3.1: Drainage Easements – Minimum Width

		Minimum Easement Width (ft)
Conduit Size	18" – 48" RCP	20'
	48" – 72"RCP	25'
	Box 3' – 4' span, RCB	20'
	Box 5' – 8' span, RCB	25'
	Box 9' – 12' span, RCB	30'
Depth of Conduit	< 14'	20'
	14' - 16'	25'
	17' – 20'	30'
	21' – 23'	35'
	> 23'	40'
Open Channel		15' wider than top width of channel
Emergency Overflow Flume		20'
Creeks/Stream/Floodplains		Reference Erosion Hazard Setback Section
Detention Ponds		Set at 100-YR freeboard elevation. (Ref. Minimum Freeboard Requirements Section)

The design flows for the drainage system shall be calculated by the Rational Method in accordance with the requirements set forth in this document unless otherwise noted within these Standards (such as where the unit hydrograph methods are required). Curbs, inlets, manholes, etc. shall be designed and constructed in accordance to the Standard Details. Materials and construction procedures shall conform to the requirements of the Standard Specifications for Construction.

The developer shall provide plans, specifications, and design calculations for all drainage structures. All open channels that are not concrete lined shall be designed to prevent erosion (Table 3.11). The City shall specifically approve the type of methods used for prevention of erosion.

The design, size, type and location of all storm drainage facilities shall be subject to the approval of the Engineering Department. The requirements set forth herein are considered minimum requirements. **The developer and their engineers shall bear the total responsibility for the adequacy of design. The approval of the facilities by the City in no way relieves the developer and their engineer of this responsibility.**

The design factors, formulas, graphs and procedures described shall serve as means to prove that adequate conveyance of storm water and adequate flood prevention within the City is being provided. Responsibility for the actual design remains with the developers and design engineer of record. Deviation from the requirements of these standards shall require the approval of the City Engineer.

The City, as a participant in the National Flood Insurance Program (NFIP), must enforce all parts of its adopted Flood Hazard Damage Prevention and Erosion Control Ordinance, as approved by the Federal Emergency Management Agency (FEMA). Therefore, the requirements of that ordinance are adopted and included as a part of the City's Standards of Design and Construction.

The developer shall be responsible for the necessary facilities to provide drainage patterns and drainage controls such that properties within the overall watershed, whether upstream or downstream of the development, are not adversely affected by storm drainage from facilities on the development. These are outlined in the Storm Drainage Management Plan Section 3.4.

The storm drainage management plan provided as part of the final engineering drawings shall address how storm water on the proposed development and affected adjoining properties will be controlled during phased and completed development. Off-site improvements may be required to carry the additional flows caused by the proposed development. If the downstream system is insufficient to carry the proposed flow without causing potentially increased flood damages, detention will be required to release only the flow amount capable of being carried in the existing system.

Storm drainage released from the site will be discharged to a natural water course or storm sewer system of an adequate size to convey the 100-year storm runoff expected after development.

All storm drainage structures shall be constructed with a minimum of 4,200 psi concrete in 28 days with a cement content of not less than 6.5 sack per cubic yard for machine placed and not less than 7.0 sack per cubic yard for hand

place. All batch designs shall be reviewed and approved by the Engineering Department. All batch designs shall have the current date, project name, and use labeled on each design. Submit batch designs to the Engineering Department a minimum of ten (10) days prior to the projected placement date for review and approval. If pre-cast structures are being utilized, shop drawings must be submitted to the City Engineer for approval along with the batch design which is provided by the manufacturer. All drainage structures shall be double formed. No earth forms will be allowed.

3.2 Storm Drainage Design Criteria

3.2.1 Rational Method

For all drainage areas less than 160 acres, the rational method of computing runoff may be used for design of small drainage facilities (such as storm sewer systems, inlets, street gutter, and small detention facilities. The rational method is expressed by the following equation:

$$Q = CIA$$

Equation 3.1

where:

Q = The storm flow rate at a given point (cfs)
C = runoff coefficient (the ratio of rainfall to peak runoff) as indicated in Table 3.2
I = The average intensity of rainfall, for a period equal to the time of flow from the farthest point of the drainage area to the point of design and is obtained from Figure 3.1. (inches/hr)
A = The area that is contributing to the point of design (acres)

3.2.1.1 Runoff Coefficient (C)

For design of proposed drainage facilities using the Rational Method, runoff coefficients shall be based on the future land use. The runoff coefficients for different land uses should be taken from Table 3.2. A weighted runoff coefficient shall be used if different land uses are contributing to a discharge design point.

3.2.1.2 Time of Concentration

The time of concentration is defined as the longest time, without unreasonable delay, that will be required for water to flow from the upper limit of a drainage area to the point of concentration. The time of concentration to any point in a storm drainage system is a combination of the “inlet time” and the time of flow in the storm drain. The inlet time is the period of time required for water to flow over the surface of the ground to the storm drain inlet. The time of concentration for any one design point shall not exceed ten (10) minutes for storm drain designs.

Using the Rational Method for small drainage acres under average conditions, the minimum time of concentration from the upstream end of a drainage system will coincide with Table 3.3.

Table 3.2: Runoff Coefficient for Types of Land Use

TYPE OF AREA OR LAND USE	ADOPTED RUNOFF COEFFICIENT
Parks or Open Areas	0.35
Single Family Residential or Duplex	0.50
School	0.70
Apartments	0.75
Townhouse	0.80
Churches	0.80
Industrial	0.90
Commercial Business	0.90
Mercantile District	0.90
Retail	0.90
Parking Lot	0.90
Major and Minor Arterials – R.O.W.	0.90

Table 3.3: Minimum Inlet Time of Concentration

TYPE OF AREA OR LAND USE	MINIMUM INLET TIME (minutes)
Parks or Open Areas	20
Single Family Residential or Duplex	10
School	10
Apartments	10
Townhouse	10
Churches	10
Industrial	10
Commercial Business	10
Mercantile District	10
Retail	10
Parking Lot	10
Major and Minor Arterials – R.O.W.	10

Under circumstances which will produce times of concentration in excess of those shown in Table 3.3 the following NRCS TR55 methodology shall be used to determine the time of concentration (Tc). This method separates the flow through the drainage area into sheet flow, shallow concentrated flow, and open channel flow. The Tc is the sum of travel times for sheet flow, concentrated shallow flow and open channel flow. The time of concentration flow path and sheet flow path and following calculations shall be shown in the plans.

A. Sheet Flow: The maximum allowable length for sheet flow shall be no more than 100 feet, if not prior to 100 feet. Guidelines for determining the maximum allowable sheet flow length are provided in Unit Hydrograph Method Section. The T_t in minutes for sheet flow is determined using the following equation:

$$T_t = \frac{0.007(nl)^{0.8}}{(P_2)^{0.5}S^{0.4}}$$

Equation 3.2

where:
T_t = travel time, (hr)
n = Manning's roughness coefficient, (Table 3.4)
l = flow length, (ft)
P_2 = 2-year, 24-hour rainfall, (Table 3.5a)
S = land slope of hydraulic grade line (ft/ft)

Table 3.4: Sheet Flow 'n' Values

Surface Description	n (1)
Smooth surfaces (concrete, asphalt, gravel, or bare soil)	0.011
Fallow (no residue)	0.05
Cultivated soils:	
Residue cover less than 20%	0.06
Residue cover greater than 20%	0.17
Grass:	
Short Prairie Grass	0.15
Dense grasses	0.24
Bermuda grass	0.41
Range (natural)	0.13
Woods:	
Light underbrush	0.40
Dense underbrush	0.80

(1) These "n" values are only applicable for flow depths of approximately 0.1 foot or less where sheet flow occurs. For greater flow depths, typically concentrated shallow overland flow or channel flow occurs, with lower "n" values typical of those generally used in open-channel flow.

B. Shallow concentrated flow travel time is computed as:

$$t_{SC} = \frac{L_{SC}}{3600 K S_{SC}{}^{0.5}}$$

Equation 3.3

where:
t_{sc} = shallow concentrated flow time, (hr)
L_{sc} = shallow concentrated flow length, (ft)
K = 16.13 for unpaved surface, 20.32 for paved surface
S_{sc} = shallow concentrated flow slope, (ft/ft)

C. Channel Flow travel time shall be computed by dividing the channel length by the flow rate obtained from Manning's Equation. This is shown by Equation 3.4.

$$t_{ch} = \frac{L_{ch}}{3600 \frac{1.49}{n} R^{\frac{2}{3}} S_{ch}{}^{\frac{1}{2}}}$$

Equation 3.4

where:
t_{ch} = channel flow time, (hr.)
L_{ch} = channel flow length, (ft)
S_{ch} = channel flow slope, (ft/ft)
n = Manning's roughness coefficient (Table 3.11)
R = channel hydraulic radius (ft), $R = \frac{a}{p_w}$
where: a = cross sectional area (ft^2)
p_w = wetted perimeter (ft)

Since urbanization is anticipated on all drainage areas, all drainage improvements shall be designed for the case of fully developed watersheds. It is generally not practical to design improvements to gravity drainage systems in stages to match development, except in the case of unlined ditches, and then, it is essential that ultimate rights-of-way be obtained at the outset. When the watershed in question is basically undeveloped, the developer shall attempt to anticipate future fully developed conditions and storm water drainage patterns and flow characteristics when determining the time of concentration.

3.2.1.3 Rainfall Intensity (I)

The Rainfall intensity shall be taken from Figure 3.1 below for the minimum inlet time above.

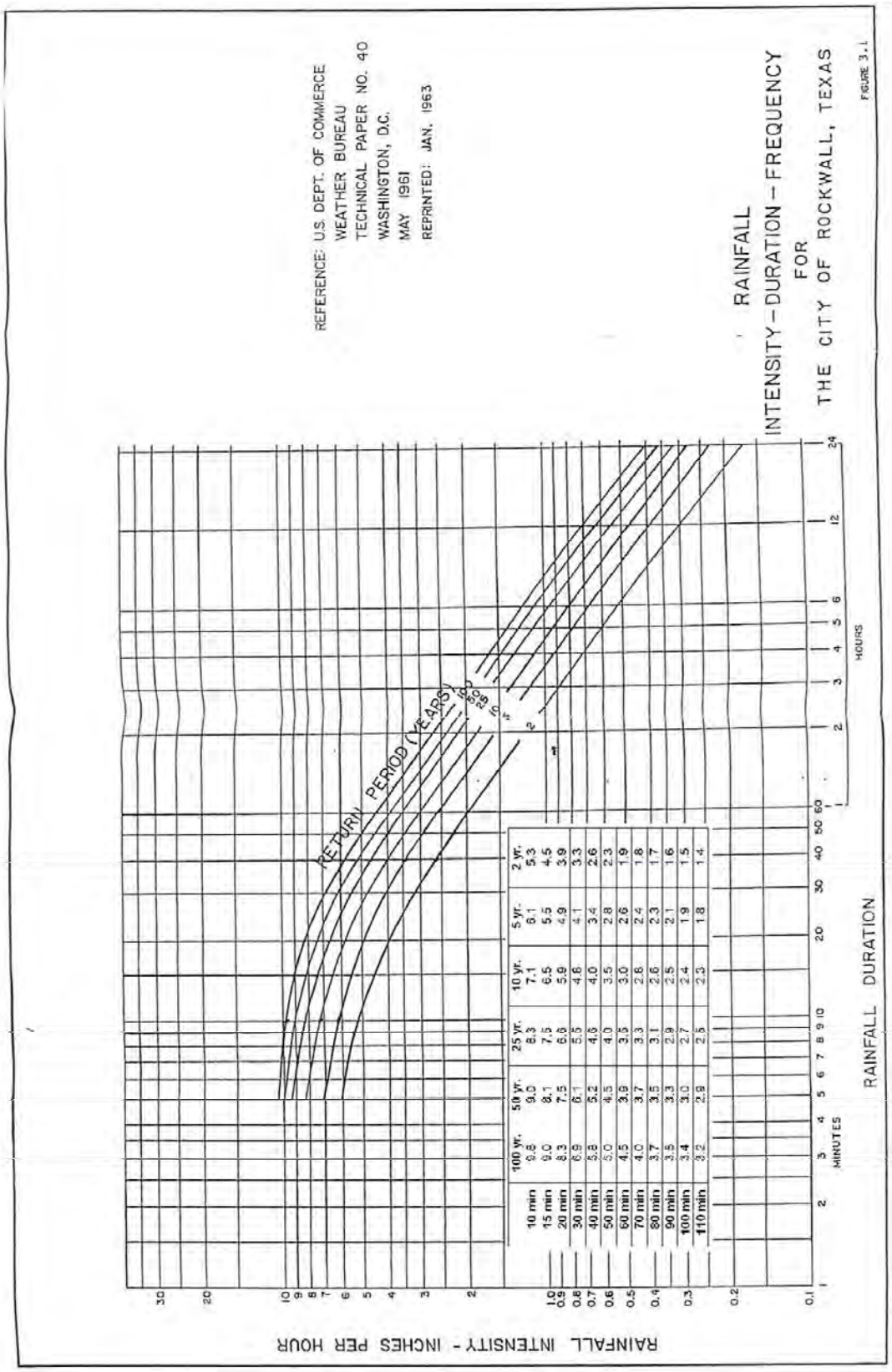

Figure 3.1: IDF Curve

3.2.2 Unit Hydrograph Method

For contributing drainage areas greater than 160 acres, the unit hydrograph method, shall be used to determine the peak storm discharge quantities. This method shall also be used for verification of adequacy of stormwater detention facilities with contributing drainages areas that are equal to or greater than 20 acres.

The City will utilize an engineering consulting firm to assist City staff in the review of a flood and detention studies that utilize the Unit Hydrograph Method. The cost of this consultant review shall be borne by the developer, engineer, or property owner submitting the study. The City shall first obtain a cost estimate from the engineering consultant for the study review at time of the initial study submittal. Before the review begins, the developer, engineer, or property owner submitting the study shall deposit with the City funds equal to the cost estimate. The City shall disburse the funds to the consulting engineer as the review progresses. Should the consultant fees exceed the initial estimate, the developer, engineer or property owner submitting the study shall be informed of the shortage and a new estimate made by the consultant engineer to complete the study review. Additional funds will then be deposited with the City by the developer, engineer or property owner submitting the study to cover the estimated shortfall before the review of the study resumes. Any unused funds to be reimbursed to the developer, engineer or property owner submitting the study. If review process is performed by City staff, the City will submit a cost estimate for study review at time of the initial engineering submittal.

The use of a unit hydrograph method shall be based upon standard and accepted engineering principles used in the profession. Acceptable methods include the Natural Resources Conservation Service (NRCS) Technical Release Number 55 (TR-55) for drainage areas 160 acres to 2,000 acres and NRCS's Technical Release Number 20 (TR-20), or the United States Army Corps of Engineers HEC-HMS models for drainage areas 160 acres or more. When the flood study involves a watershed that does not already have any available hydrology model, or in the case where conversion of an existing model to a later version hydrology model is desired, the City's preference is the latest version of HEC-HMS model available.

When the unit hydrograph method is used, a flood study report shall be prepared and provided to the City Engineer, documenting the methodology, assumptions, derivation of all data used, and results of the study. In order to maintain consistency of all hydrologic studies within the City, the following requirements/conditions shall be used when preforming the unit hydrograph method. These requirements/conditions shall be included in the plan set and the flood study report:

1. Use the NRCS 24-hour Type III Rainfall Distribution.
2. Use wet antecedent soil moisture conditions (AMC-III).
   a. Storm runoff/loss parameter calculations, such as NRCS runoff curve numbers (CN). CN values should first be computed based on average antecedent soil moisture conditions (AMC-II) to the nearest 0.1 value (CN2), based on hydrologic soil group, land cover and treatment practices. Then compute the CN3 value for AMC-III conditions, to the nearest 0.1 value, using the NRCS conversion equation as follows:

$$CN_3 = \frac{23CN_2}{10 + 0.13CN_2}$$

Equation 3.4a

3. Compute both pre-construction conditions (based on existing off-site watershed conditions) and post-construction conditions and show comparison in summary table of results.
4. In addition to No. 3 compute projected future fully developed conditions to determine design elevations and erosion protection.
5. 24-hour rainfall storm totals, (See Table 3.5a)
6. Time of Concentration (Tc) and Lag Time Calculations, computed to the nearest 0.01 hour: The lag time is generally considered to be 0.6 x Tc. The Tc calculations should include sheet flow travel time, shallow concentrated flow travel time, channel flow travel time, and travel time associated with any storm sewer system pipes, street gutter flow, and other travel times. Storm sewer pipe travel time may be derived based on design velocities and pipe flow lengths from available or proposed sewer pipe plans. General guidelines pertaining to NRCS TR-55 methodology for determining flow times for sheet flow, concentrated shallow flow, channel flow, and other flow types are included in the section above. The length of sheet flow used with the unit hydrograph method should be determined based on the following procedures to determine where sheet flow ends:
   a. Field investigations, where possible, to detect overland drainage patterns and where sheet flow transitions to other types of overland or pipe flow (such as observation of beginning of overland flow rill erosion patterns or entrance to a storm water inlet).
   b. Information from topographic maps, such as deflections in elevation contours indicating where sheet flow ends and shallow concentrated flow or channel flow may begin.
   c. For areas where previous construction has occurred, review of as-built drainage plans.
   d. High-resolution photography, which may indicate locations where overland flow begins to form shallow concentrated flow as evidenced by erosion patterns.
   e. If the length of sheet flow cannot be determined by the above procedures, or if it is determined by the above procedures to be

greater than 100 feet, the maximum length to be used shall be the lesser of 100 feet or the length computed by the following equation [as taken from the NRCS National Engineering Handbook, Part 630 – Hydrology, Chapter 15]:

$$L = \frac{100S^{0.5}}{n}$$

Equation 3.4b

where:
L = limiting sheet flow length, (ft)
S = land slope over length L, (ft/ft)
n = Manning's roughness coefficient over length L

7. When using a unit hydrograph procedure, mixing the hydrology modeling data with data based on differing procedures is not acceptable:
   a. The time of concentration should be calculated using actual travel time computations. [Do not assume a 10-minute inlet time as assumed in Rational Method].
   b. Use total storm precipitations (inches) listed in Table 3.5a. [Do not use rainfall intensities (inches/hour) or derive total storm precipitation based on the Rational Method rainfall intensities].
   c. For detention ponds with drainage areas greater than 20 acres, if a proposed pond and dam is first designed based on Modified Rational Method, but is found to be inadequate when checked with the unit hydrograph method, then it should be re-designed to safely pass the maximum required design storm using the unit hydrograph method, without flow passing over the top of the dam (and with required freeboard) and without increased discharges being passed downstream from the project site.
8. Drainage areas shall be rounded to the nearest 0.01 acre (0.000001 sq. mi.) in hydrology models, as well as for areas of land use and soil categories when computing composite runoff curve numbers.
9. Impervious areas of a drainage basin should be included within the computed composite runoff curve number calculations used in the hydrology models (instead of using a percentage of impervious area in combination with a weighted curve number in hydrology models that contain that option).
10. Stream reach hydrograph routing computations within hydrology models must be performed using a procedure that accounts for the effects of channel and floodplain storage (such as Modified Puls method), so that impacts on flood discharges due to loss of flood valley storage within the reach, whether caused by currently proposed construction or due to future development, can be determined.

11. NRCS runoff curve numbers listed in NRCS's Technical Release 55 (TR-55) for urban and residential districts are generally inappropriate for typical developments in the City of Rockwall, due to the indicated low percentage of impervious areas indicated with the values. Therefore, curve numbers typical of conditions in the City of Rockwall are included in Table 3.5b. These values should be used in most cases; however, other curve numbers for conditions not listed in Table 3.5b may be derived and used if reasonably justified and documented.
12. Options available in hydrology models to automatically compute pond spillway discharges, based on spillway or outlet type or configuration, are sometimes limited and often do not adequately represent the designed spillway. In such cases, pond water surface elevations versus discharges may need to be computed by other methods and entered into the hydrology model as user defined paired data.

Table 3.5a: Precipitation Frequency Estimates (Inches) for Rockwall, Texas

ARI* (Years)	Duration															
	5 min	10 min	15 min	30 min	60 min	2 hr	3 hr	6 hr	12 hr	24 hr	2 days	3 days	4 days	7 days	10 days
1	---	---	---	1.23	1.60	1.85	2.03	2.44	2.88	3.30	---	---	---	---	---
2	0.495	0.83	1.06	1.47	1.90	2.31	2.54	3.03	3.52	4.09	4.76	---	5.53	6.35	7.09
5	0.58	0.97	1.24	1.79	2.36	3.08	3.35	4.02	4.77	5.48	6.21	---	7.22	8.39	9.24
10	0.64	1.07	1.37	2.02	2.69	3.62	3.95	4.75	5.64	6.57	7.39	---	8.40	9.83	10.90
25	0.73	1.22	1.57	2.35	3.17	4.25	4.65	5.73	6.59	7.67	8.80	---	10.12	11.56	12.87
50	0.80	1.34	1.72	2.61	3.53	4.75	5.20	6.35	7.50	8.70	9.91	---	11.54	13.25	14.53
100	0.87	1.47	1.88	2.87	3.90	5.25	5.77	7.02	8.50	9.75	11.32	---	13.09	14.60	16.25
500	---	---	---	---	---	---	---	---	---	12.0	---	---	---	---	---
PMP*	---	---	---	---	---	---	---	30.8	36.4	41.5	46.80	49.2	---	---	---

* ARI = Average Recurrence Interval

* PMP = Probable Maximum Precipitation

References: U.S. Department of Commerce / National Oceanic and Atmospheric Administration / National Weather Service and U.S. Department of the Army:

1. Technical Memorandum NWS HYDRO-35, *Five- to 60-Minute Precipitation Frequency for the Eastern and Central United States*, June 1977.
2. Technical Paper No. 40, *Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years*, May 1961.
3. Technical Paper No. 49, *Two- to Ten-Day Precipitation for Return Periods of 2 to 100 Years in the Contiguous United States*, 1961
4. Hydrometeorogical Report No. 51, *Probable Maximum Precipitation Estimates, United States East of the 105th Meridian*, June 1978.

Note: For rainfall durations of 5 minutes through 60 minutes, rainfall frequency estimates for ARI's of 2 years through 100 years are based on Technical Memorandum NWS HYDRO-35, which supersedes values presented in Technical Paper No. 40.

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Table 3.5b: NRCS Runoff Curve Numbers (AMC_{II}) for Various Land Use Classifications

Land Use Classification	Hydrologic Soil Group			
	A	B	C	D
Wooded (Wf)	36	60	73	79
Wooded (Wg)	30	55	70	77
Open Space/Range/Pasture (OSf)	49	69	79	84
Open Space/Range/Pasture (OSg)	39	61	74	80
Cultivated, Straight Row (Csr)	72	81	88	91
Cultivated, Contoured w/o Terracing (Cc)	70	79	84	88
Cultivated, Contoured and Terraced (Cct)	66	74	80	82
Residential (R20) **	59	74	82	86
Residential (R30) **	60	75	83	87
Residential (R40) **	66	78	85	88
Residential (R50) **	69	80	86	89
Residential (R60) **	74	83	88	91
Residential (R70) **	80	87	91	93
Bare Soil	77	86	91	94
Commercial/Business/Multifamily (CBM)	89	92	94	95
Industrial	81	88	91	93
Dirt or Gravel Roads, R.O.W. (Rd)	76	85	89	91
Paved Roads, R.O.W. (Rp)	83	89	92	93
Inundated (W)	100	100	100	100
Urban High Runoff Equivalent *	83	89	92	94

* Urban high runoff equivalent is used only for projected fully-developed watershed conditions.
** Residential coding refers to percent impervious (for example, R60 is for 60% impervious) (For areas that fall between listed Values, Please round to the nearest coding.)
Note: Curve numbers listed above are for average antecedent moisture conditions (AMC_{II}).

3.2.3 Design Storm Frequencies

The design storm frequencies shall be the 100-year storm.

For the Rational Method the relationship between rainfall intensity, duration and frequency is set forth in Figure 3.1. These curves have been developed using Technical Paper No. 40, “Rainfall Frequency Atlas of the United States” by the U.S. Weather Bureau.

For the Unit Hydrograph Method the total rainfall for the 24-hour duration storm is used. See Table 3.5a.

3.2.4 Drainage Calculations Summary Tables

The calculations of the storm water discharge shall be provided to the City. As a minimum, the engineering plans shall include:

- Existing and Proposed Drainage Area Calculations Table using Form 3.1,
- Inlet Calculations Table using Form 3.2
- Storm Sewer Calculations Table using Form 3.3.
- Open Channel Calculations Table using Form 3.4
- Culvert Design Calculations Table using Form 3.5

Form 3.1: Drainage Area Calculations Table

Areas Drained					Weighted Runoff Coeff. C	C*A
Area ID	Total Drainage Area	Parks or Open Area (C=0.35)	Residential (C=0.5)	Comm. (C=0.9)		
	(acres)	(acres)	(acres)	(acres)	(acres)	(acres)
(1)	(2)	(3)	(4)	(5)	(6)	(7)

Time of Concentration T_C	Design Storm Frequency	Intensity I	Storm Runoff Q	Drains To/ Remarks
(min)	(yrs)	(in/hr)	(cfs)	
(8)	(9)	(10)	(11)	(12)

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Instructions for Form 3.1: Drainage Area Calculation Table

Column (1)	Drainage area identification number or designation
Column (2)	Total Drainage area in acres
Column (3 to 5)	Area drained for each land use type in acres (add additional columns for different land use areas as needed) Runoff Coefficient taken from Table 3.2
Column (6)	Weighted Runoff Coefficient calculated from Columns 2 to 5
Column (7)	Product of Column (2) and Column (6)
Column (8)	Minimum inlet time of concentration taken from Table 3.3
Column (9)	Design Storm Frequency, shall be 100-yr for all areas
Column (10)	Using the time of concentration and design storm frequency, the rainfall intensity is taken from Figure 3.1
Column (11)	Solution of Equation 3.1
Column (12)	A detailed description of where the drainage area drains to including but not limited to Inlet ID, Street Location, Creek Name, Detention Pond Designation, etc.

3.2.5 Flow in Streets

Capacity of Arterials, Collectors and Residential streets shall be calculated using a straight crown: Storm water flow in streets having a straight crown shall be calculated as follows:

$$Q = \frac{0.56}{n} S_x^{\frac{5}{3}} S^{\frac{1}{2}} T^{\frac{8}{3}}$$

Equation 3.5

where:
Q = gutter flow rate, (cfs)
n = Manning's roughness coefficient; value = 0.0175
S = the longitudinal slope of the street gutter, (ft/ft)
S_x = pavement cross slope, (ft/ft)
T = ponded width, (ft)

3.2.6 Flow in Alleys

Capacity of alleys should be taken from Manning's Equation:

$$Q = \frac{1.49}{n} AR^{2/3} S^{1/2}$$

Equation 3.6

where:
Q = alley flow rate, (cfs)
n = Manning's roughness coefficient; value = 0.0175
A = cross sectional area of flow, (ft^2)
R = hydraulic radius, (ft)
S = the longitudinal slope of the alley, (ft/ft)

3.2.7 Permissible Spread of Water (Ponding Width)

3.2.7.1 General

Spread of water refers to the amount of water that may be allowed to collect in streets during a storm of specific design frequency. The following Equation 3.7, a re-arranging of Equation 3.5, shall be used to determine the ponding width "T" for straight crowned streets. (Arterials, Collectors and Residential).

$$T = 1.24\left(\frac{Qn}{{S_x}^{5/3}S^{1/2}}\right)^{\frac{8}{3}}$$

Equation 3.7

where:
Q = gutter flow rate, (cfs)
n = Manning's roughness coefficient; value = 0.0175
S = the longitudinal slope of the street gutter, (ft/ft)
S_x = pavement cross slope, (ft/ft)
T = ponded width, (ft)

In order that excess storm water will not collect in streets during a storm of the design frequency, the following spread of water values shall be used for the various types of streets. Figure 3.2 provided below shows the relationship between thoroughfare type, gutter flow capacity and street slope based on maximum permissible ponding width described in the next sub-sections.

3.2.7.2 Major and Minor Arterials (P6D & M4D) – Divided

Based on pavement cross-slope of 2.0%, the 100-year Design Frequency flow shall not exceed the elevation of the lowest top of curb. The design engineer shall verify that one lane of traffic in each direction shall remain free of ponding in the 100-year storm event.

3.2.7.3 Collector Streets – (M4U, M3U & Minor Collector)

Based on a straight cross-slope with a roof top crown of six (6) inches, the 100-year storm event flows shall not exceed the top of curb, six (6) inches.

3.2.7.4 Residential Streets

Based on a straight cross-slope with a roof top crown of six (6) inches, the 100-year storm event flows shall not exceed the top of curb, six (6) inches.

3.2.7.5 Alleys

The 100-year Design Frequency shall not exceed the capacity of the alley pavement, a depth of five (5) inches. No ponding will be allowed beyond the pavement edge. Alley paving to be warped to drain the paving toward the inlet.

3.2.7.6 Parking Lots

The 100-yr design frequency shall not exceed a depth of six (6) inches except where on pavement detention is occurring where one (1) foot in depth is permissible.

3.2.8 Inlet Design

3.2.8.1 General

Determination of the required size of the storm drain inlets will be based on the calculations called out in this section and the instructions for FORM 3.2: Inlet Design Calculations Table.

3.2.8.2 Types of Inlets

City requires the use of depressed curb inlets. A depressed curb inlet is more efficient than a non-depressed inlet because a depressed inlet induces a greater cross-flow toward the inlet allowing less water to flow past it. Also, the transition out of the depression causes a backwater effect, which further increases the capacity of the storm drain. A gutter depression for all curb inlets shall be six (6) inches, as shown in the Standard Details. Inlets shall be sized in multiplier of five (5) feet (5, 10, 15 and 20). Construction of inlets shall be in accordance with the Standard Details. Use Table 3.6 for the selection of inlets to be used within the City. No grate inlets are allowed without approval from the City Engineer.

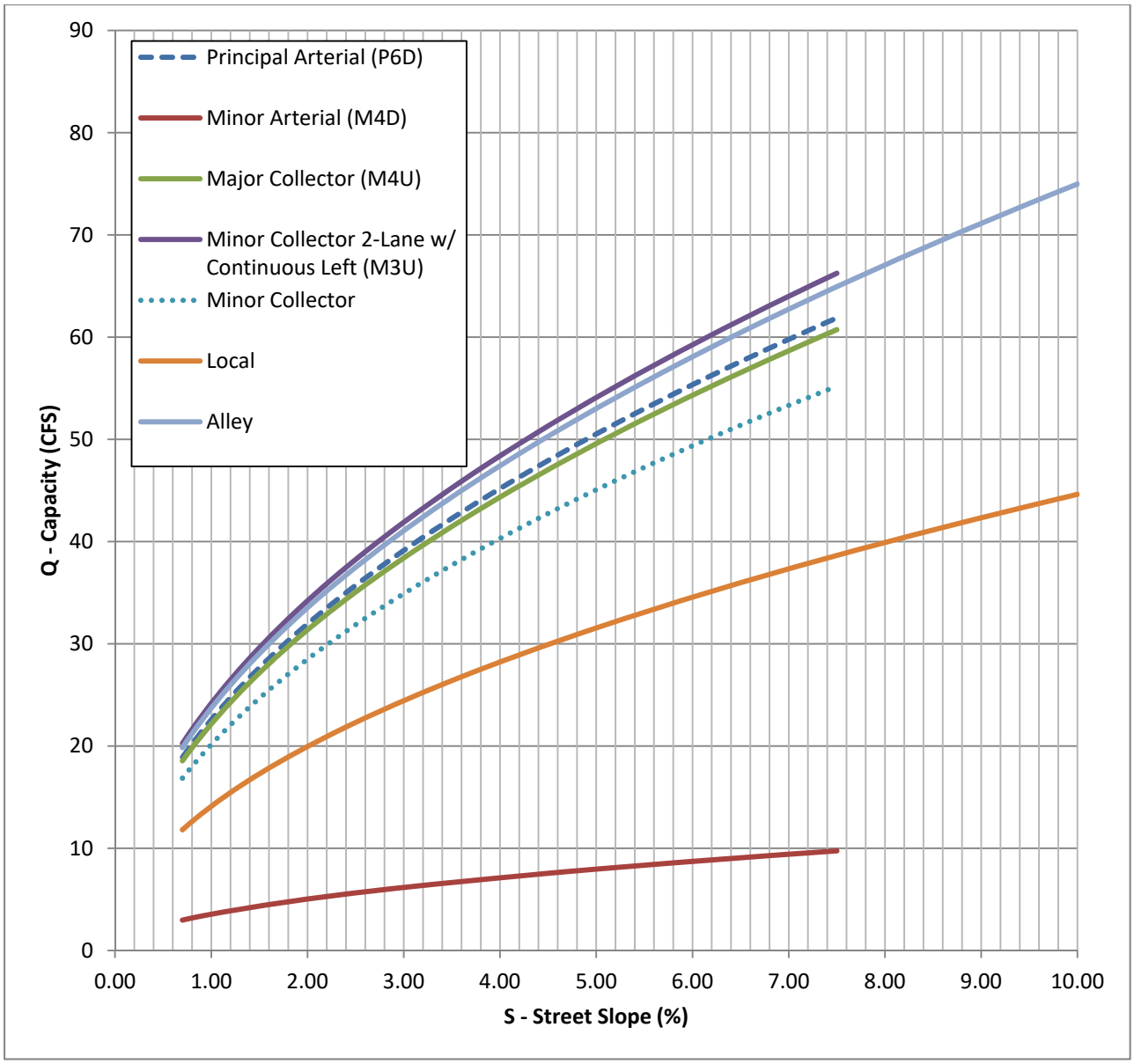


Figure 3.2: Thoroughfare Gutter Capacity based on Maximum Permissible Ponding Width

Table 3.6: Storm Drain Inlets

INLET DESCRIPTION	AVAILABLE INLET SIZES	WHERE USED	DESIGN EQUATIONS
Standard Curb Opening Inlet on Grade	5' 10' 15' 20'	Arterials (P6D & M4D) Collectors (M4U, Minor & M3U) Local (Residential) Alley	Equation 3.8 through 3.16
Standard Curb Opening Inlet at Low Point	5' 10' 15' 20'	Arterials (P6D & M4D) Collectors (M4U, Minor & M3U) Local (Residential) Alley	Equation 3.17 & 3.18
Recessed Curb Opening Inlet on Grade	5' 10' 15' 20'	**Street Grade 6% or Greater** Arterials (P6D & M4D) Collectors (M4U, Minor & M3U)	Equation 3.8 through 3.16
Combination Inlet on Grade	4' 6' 8'	Combination Inlets to be Used Where Space Behind Curb Prohibits Other Inlet Types and Alleys **City Engineer Approval Required**	
Combination Inlet at Low Grade	4' 6' 8'	Combination Inlets to be Used Where Space Behind Curb Prohibits Other Inlet Types and Alleys **City Engineer Approval Required**	
Grate Inlet	2 Grate 3 Grate 4 Grate 6 Grate	**No grate inlets are allowed without approval from the City Engineer**	
Drop Inlet	2'x2' 3'x3' 4'x4' 5'x5'	Open Channels/Area Drain	Equation 3.19 & 3.20

3.2.8.3 Location

All inlets (edge of opening) shall be a minimum of ten (10) feet from street or driveway curb return. Recessed inlets will be required to be installed at all inlet locations where the street grade is to be 6% or greater except on residential streets. At locations where depressed inlets are expected to interfere with pedestrian activity, usually at crosswalks or interior spans of the block used for parking, a depression of less than six (6) inches may be required. These locations may require additional inlet width to compensate for the reduced depression. The City will consider all variances from a standard six- (6) inch gutter on an individual basis.

A. Major and Minor Arterials (Divided): Inlets shall be located at street intersections, at low points of grade or where the gutter flow exceeds the permissible spread of water criteria. Inlets shall be located, when possible, on lesser traveled streets or alleys when grades permit. Inlets located on arterials and where street grade is 6% or greater shall be recessed in order to minimize interference of the gutter depression with travel lanes. In super-elevated sections, inlets placed against the

center medians shall have no gutter depression and shall intercept gutter flow at the point of vertical curvatures to prevent flow from crossing the arterial. Unless expressly approved by the City Engineer, storm waters will not be allowed to cross arterials on the surface in valley gutters or otherwise. All sag inlets will require a reinforced concrete emergency overflow flume. The capacity of the emergency overflow flume shall equal or exceed the 100-yr design storm flow coming to the sag point.

B. Collector Streets: Inlets shall be located at street intersections, low points of grade or where the gutter flow exceeds the permissible spread of water criteria. Inlets shall be located, when at all possible, on lesser traveled streets or alleys where grade permits. All sag inlets will require a reinforced concrete emergency overflow flume. The capacity of the emergency overflow flume shall equal or exceed the 100-yr design storm flow coming to the sag point.

C. Residential Streets: Inlets shall be located at street intersections, low points of grade or where the gutter flow exceeds the permissible spread of water criteria. All sag inlets will require a reinforced concrete emergency overflow flume unless the design engineer calculates that the street will carry the overflow above the crest of the roadway without the water surface elevation exceeding the top of curb. The capacity of the emergency overflow flume shall equal or exceed the 100-yr design storm flow coming to the sag point.

D. Alleys: Inlets shall be located before intersections with streets, alley to alley intersections, change in alley directions, low points of grade or where the gutter flow exceeds the permissible spread of water criteria. All sag inlets will require a reinforced concrete emergency overflow flume. The capacity of the emergency overflow flume shall equal or exceed the 100-yr design storm flow coming to the sag point.

E. Parking Lots: Inlets shall be located at all sag points and before ponding exceeds six (6) in depth except when on pavement detention is occurring.

3.2.8.4 Curb Inlets On-Grade

The sizing of curb inlets on-grade shall be done based on the following Equations 3.8 through 3.16 and Figure 3.3. Figures 3.4 through 3.9 are provided as reference for On-Grade Curb Inlet Capacities on the City Thoroughfares.

$$L_r = 0.6Q^{0.42}S^{0.3}\left(\frac{1}{nS_e}\right)^{0.6}$$

Equation 3.8

where:
Lr = length of curb inlet required (ft)
Q = flow rate in gutter (cfs)
S = longitudinal slope (ft./ft)
n = Manning's roughness coefficient, value = 0.0175
Se = equivalent cross slope (ft./ft.)

$$S_e = S_x + \frac{a}{W}E_0$$

Equation 3.9

where:
S_e = equivalent cross slope (ft/ft)
S_x = cross slope of the road (ft/ft)
a = gutter depression depth (ft), all inlet depressions shall be 0.50 feet (6 inches)
W = gutter depression width (ft)
standard inlets W = 2.0 ft, recessed inlets W = 3.0 ft
E_o = ratio of depression flow to total flow

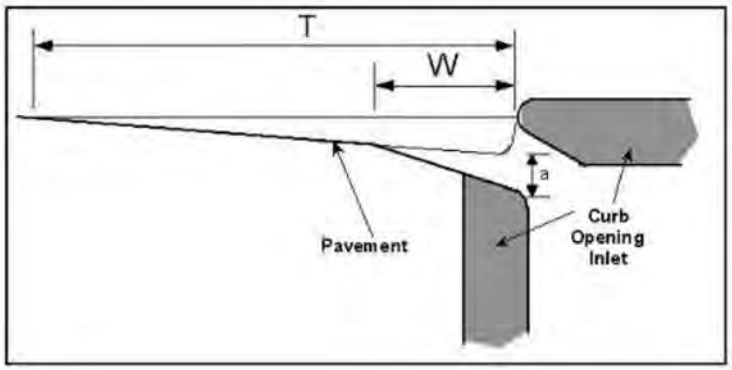


Figure 3.3: Gutter Cross-Section Diagram

$$E_0 = \frac{K_W}{K_W + K_0}$$

Equation 3.10

where:
E_0 = ratio of depression flow to total flow
K_W = conveyance of the depressed gutter section (cfs)
K_0 = conveyance of the gutter section beyond the depression (cfs)

$$K = \frac{1.486A^{5/3}}{nP^{2/3}}$$

Equation 3.11

where:
K = conveyance of cross section (cfs)
A = area of cross section (ft^2)
n = Manning's roughness coefficient, value = 0.0175
P = wetted perimeter (ft)

$$A_W = WS_X\left(T - \frac{W}{2}\right) + \frac{1}{2}aW$$

Equation 3.12

where:
A_W = area of depressed gutter section (ft^2)
W = gutter depression width (ft)
standard inlets W = 2.0 ft, recessed inlets W = 3.0 ft
S_X = cross slope (ft/ft)
T = calculated ponded width (ft)
a = gutter depression depth (ft), all inlet depressions shall be 0.50 feet (6 inches)

$$P_W = \sqrt{(WS_X + a)^2 + W^2}$$

Equation 3.13

where:
P_W = wetted perimeter of depressed gutter section (ft)
W = gutter depression width (ft)
standard inlets W = 2.0 ft, recessed inlets W = 3.0 ft
S_X = cross slope (ft./ft)
a = gutter depression depth (ft), all inlet depressions shall be 0.50 feet (6 inches)

$$A_0 = \frac{S_X}{2}(T - W)^2$$

Equation 3.14

A_0 = area of gutter/road section beyond the depression width (ft^2)
S_X = cross slope (ft/ft)
W = gutter depression width (ft)
standard inlets W = 2.0 ft, recessed inlets W = 3.0 ft
T = calculated ponded width

$$P_0 = T - W$$

Equation 3.15

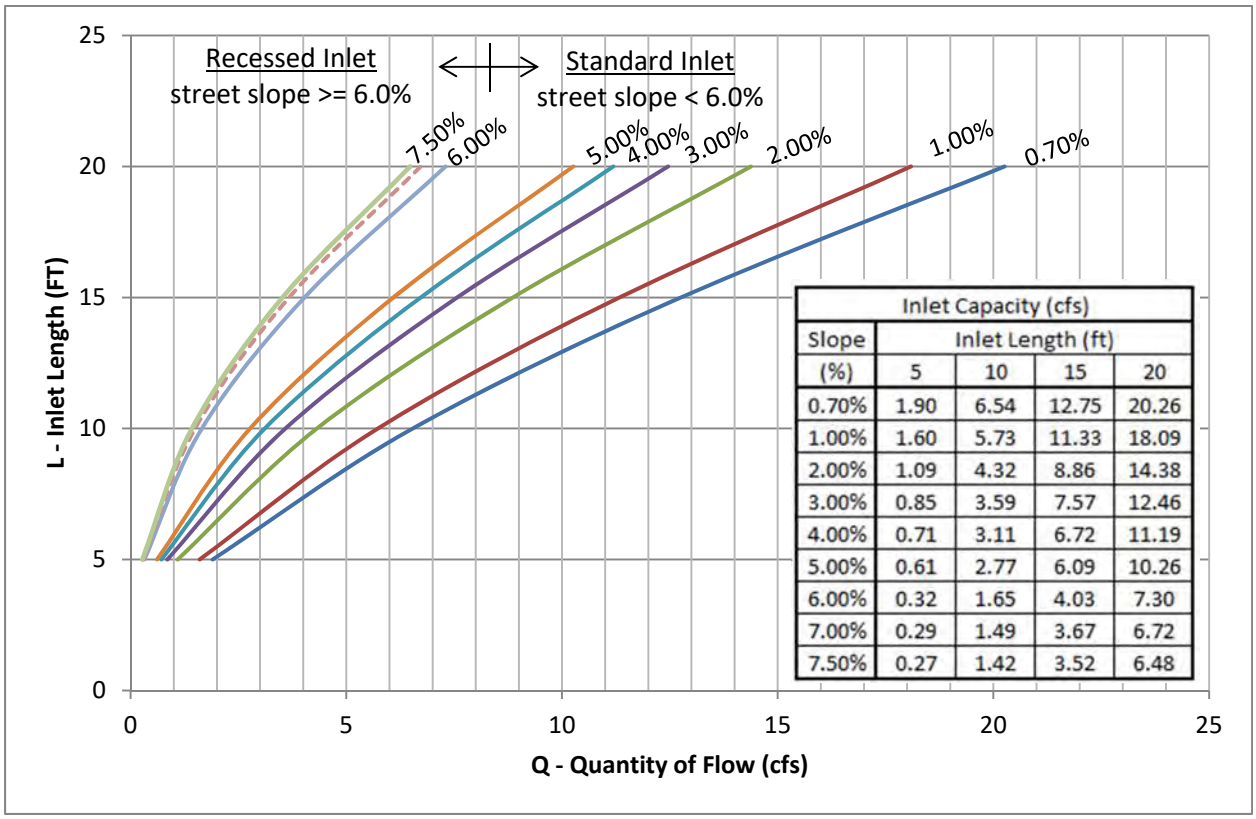
P_0 = wetted perimeter of the depressed gutter section (ft)
T = calculated ponded width (ft)
W = gutter depression width (ft)
(standard inlets W = 2.0 ft, recessed inlets W = 3.0 ft)

For determining the bypass of an curb inlet on grade use the following Equation 3.13 which factors in the ratio of the actual length of curb inlet (L_a) to the length of inlet required (L_r)

$$Q_{bypass} = Q\left(1 - \frac{L_a}{L_r}\right)^{1.8}$$

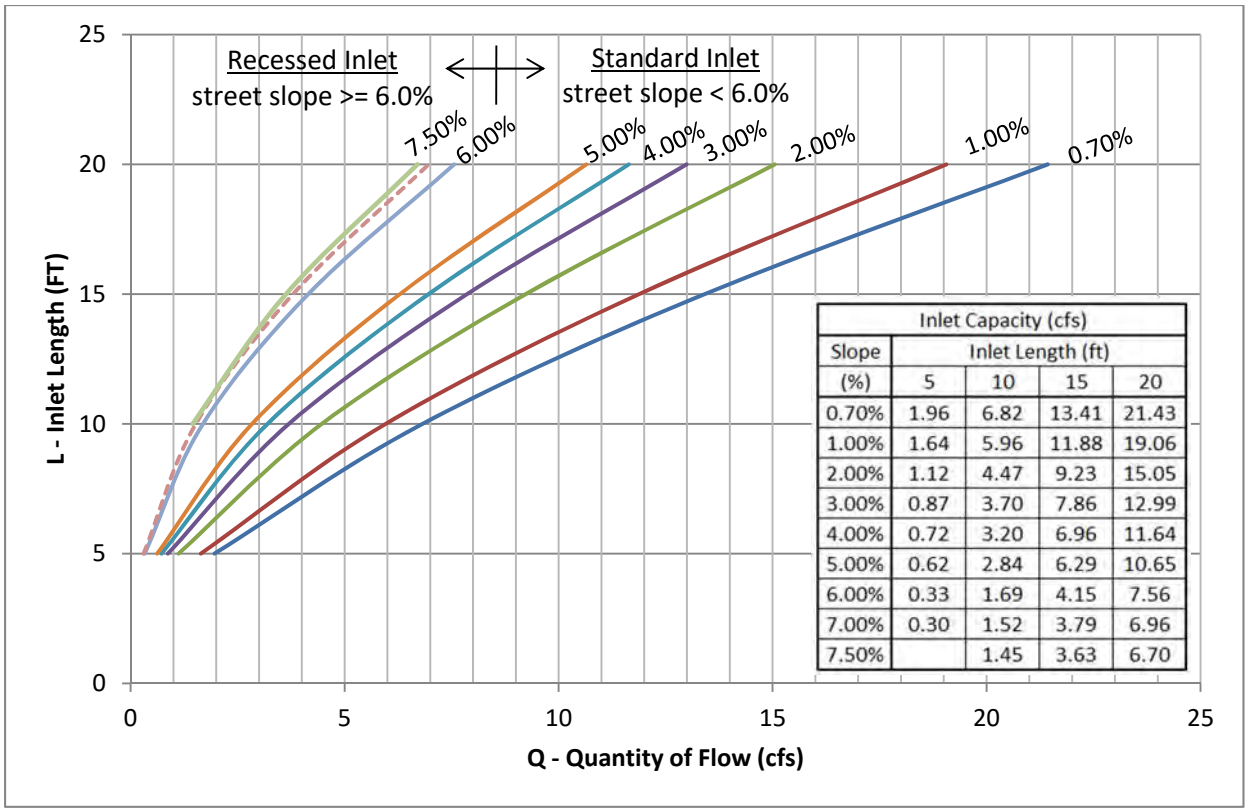
Equation 3.16

where:
Q_{bypass} = carryover discharge (cfs)
Q = total discharge (cfs)
L_a = design length of the curb opening inlet (ft)
L_r = length of curb opening inlet required to intercept the total flow (ft)



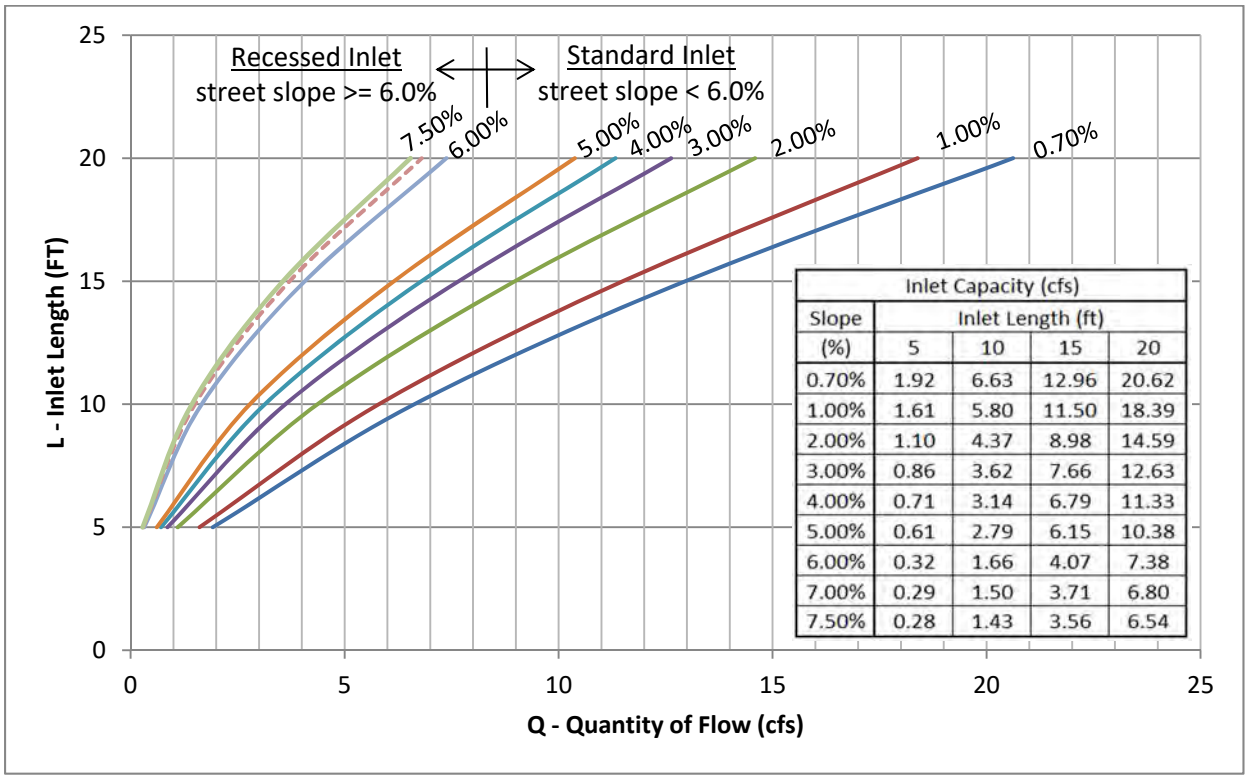
Inlet Capacity (cfs)				
Slope	Inlet Length (ft)			
(%)	5	10	15	20
0.70%	1.90	6.54	12.75	20.26
1.00%	1.60	5.73	11.33	18.09
2.00%	1.09	4.32	8.86	14.38
3.00%	0.85	3.59	7.57	12.46
4.00%	0.71	3.11	6.72	11.19
5.00%	0.61	2.77	6.09	10.26
6.00%	0.32	1.65	4.03	7.30
7.00%	0.29	1.49	3.67	6.72
7.50%	0.27	1.42	3.52	6.48

Figure 3.4: Curb Inlet Capacity On-Grade Principal & Minor Arterial (P6D & M4D)



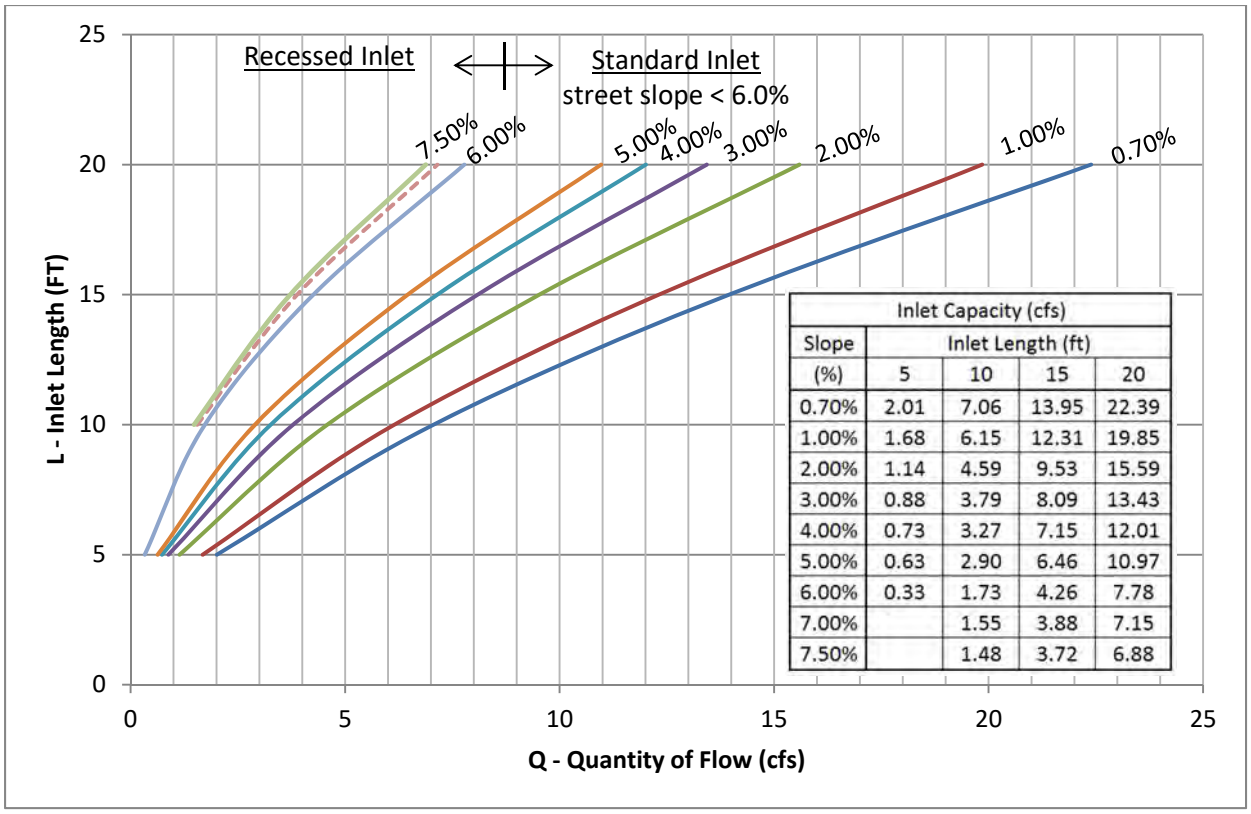
Inlet Capacity (cfs)				
Slope	Inlet Length (ft)			
(%)	5	10	15	20
0.70%	1.96	6.82	13.41	21.43
1.00%	1.64	5.96	11.88	19.06
2.00%	1.12	4.47	9.23	15.05
3.00%	0.87	3.70	7.86	12.99
4.00%	0.72	3.20	6.96	11.64
5.00%	0.62	2.84	6.29	10.65
6.00%	0.33	1.69	4.15	7.56
7.00%	0.30	1.52	3.79	6.96
7.50%		1.45	3.63	6.70

Figure 3.5: Curb Inlet Capacity On-Grade Major Collector (M4U)



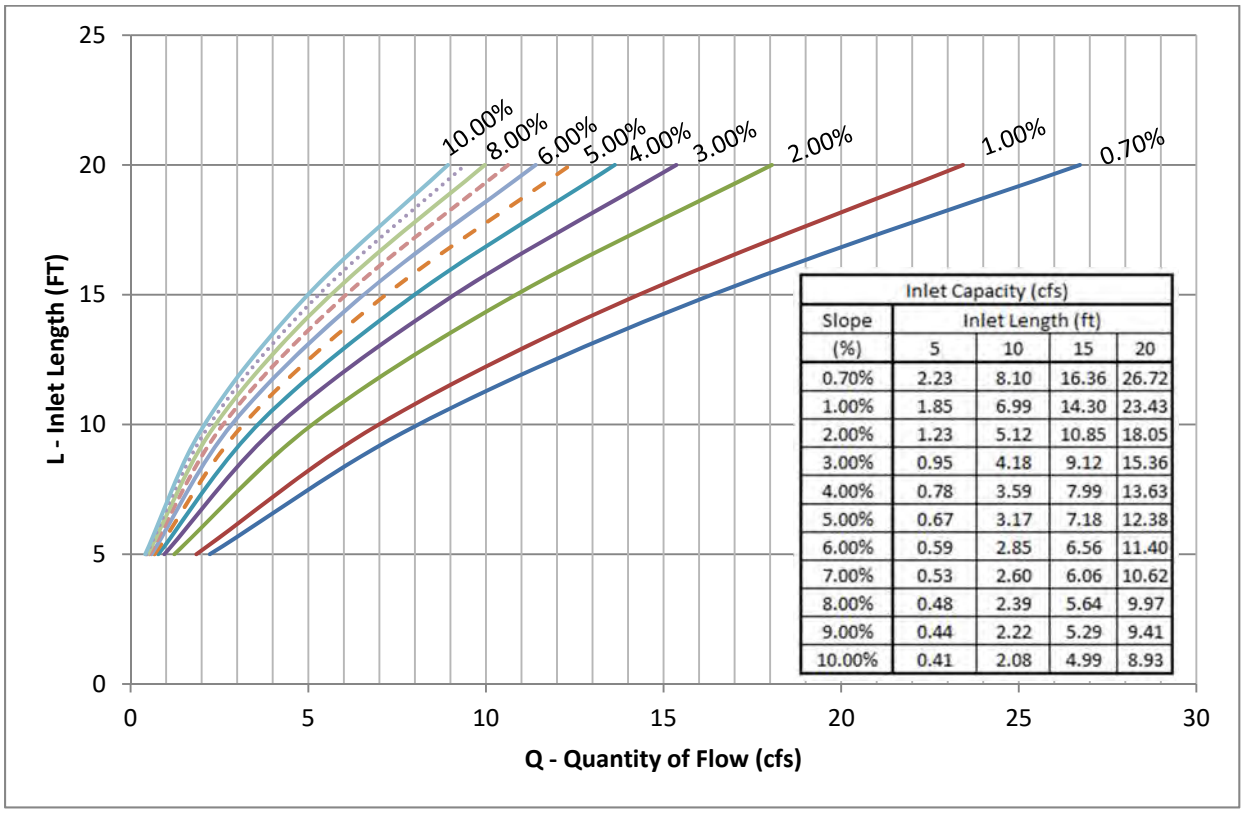
Inlet Capacity (cfs)				
Slope	Inlet Length (ft)			
(%)	5	10	15	20
0.70%	1.92	6.63	12.96	20.62
1.00%	1.61	5.80	11.50	18.39
2.00%	1.10	4.37	8.98	14.59
3.00%	0.86	3.62	7.66	12.63
4.00%	0.71	3.14	6.79	11.33
5.00%	0.61	2.79	6.15	10.38
6.00%	0.32	1.66	4.07	7.38
7.00%	0.29	1.50	3.71	6.80
7.50%	0.28	1.43	3.56	6.54

Figure 3.6: Curb Inlet Capacity On-Grade Collector 2-Lane w. Continuous Left (M3U)



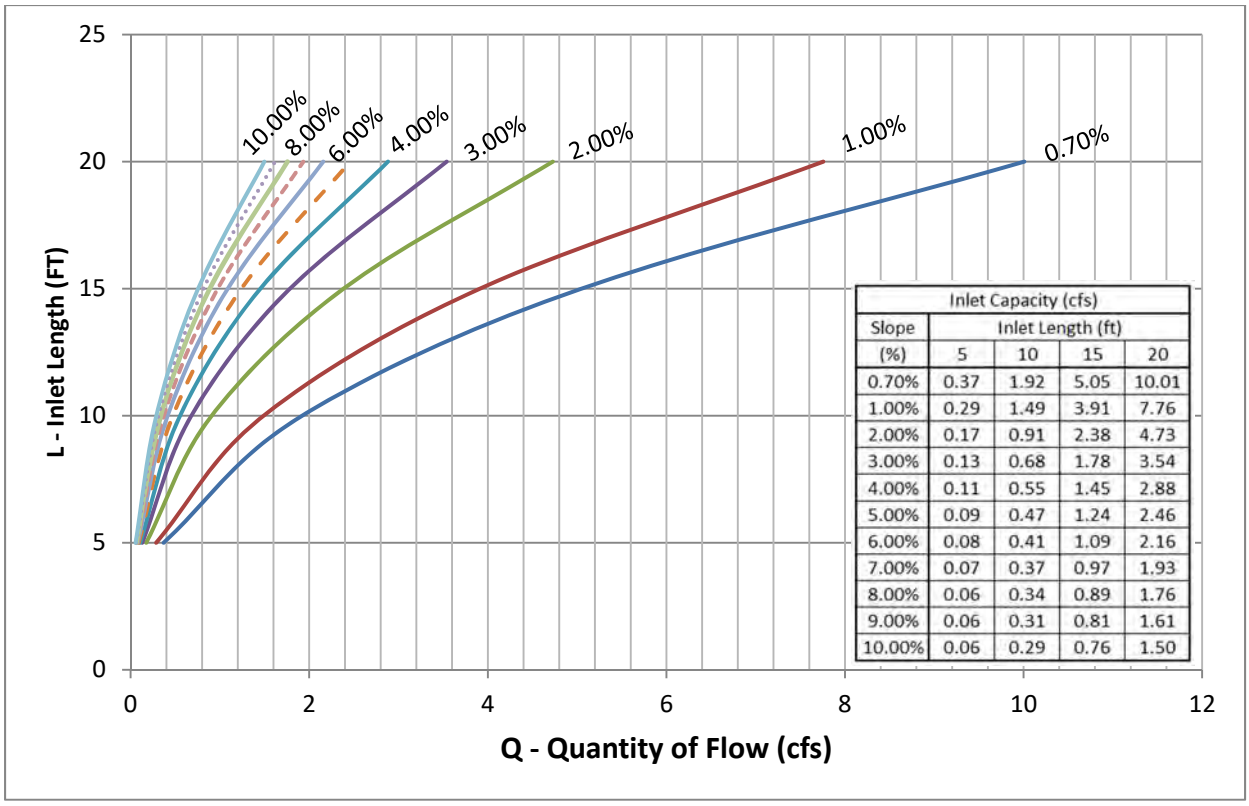
Inlet Capacity (cfs)				
Slope	Inlet Length (ft)			
(%)	5	10	15	20
0.70%	2.01	7.06	13.95	22.39
1.00%	1.68	6.15	12.31	19.85
2.00%	1.14	4.59	9.53	15.59
3.00%	0.88	3.79	8.09	13.43
4.00%	0.73	3.27	7.15	12.01
5.00%	0.63	2.90	6.46	10.97
6.00%	0.33	1.73	4.26	7.78
7.00%		1.55	3.88	7.15
7.50%		1.48	3.72	6.88

Figure 3.7: Curb Inlet Capacity On-Grade Minor Collector



Inlet Capacity (cfs)				
Slope	Inlet Length (ft)			
(%)	5	10	15	20
0.70%	2.23	8.10	16.36	26.72
1.00%	1.85	6.99	14.30	23.43
2.00%	1.23	5.12	10.85	18.05
3.00%	0.95	4.18	9.12	15.36
4.00%	0.78	3.59	7.99	13.63
5.00%	0.67	3.17	7.18	12.38
6.00%	0.59	2.85	6.56	11.40
7.00%	0.53	2.60	6.06	10.62
8.00%	0.48	2.39	5.64	9.97
9.00%	0.44	2.22	5.29	9.41
10.00%	0.41	2.08	4.99	8.93

Figure 3.8: Curb Inlet Capacity On-Grade Local (Residential) Street



Inlet Capacity (cfs)				
Slope	Inlet Length (ft)			
(%)	5	10	15	20
0.70%	0.37	1.92	5.05	10.01
1.00%	0.29	1.49	3.91	7.76
2.00%	0.17	0.91	2.38	4.73
3.00%	0.13	0.68	1.78	3.54
4.00%	0.11	0.55	1.45	2.88
5.00%	0.09	0.47	1.24	2.46
6.00%	0.08	0.41	1.09	2.16
7.00%	0.07	0.37	0.97	1.93
8.00%	0.06	0.34	0.89	1.76
9.00%	0.06	0.31	0.81	1.61
10.00%	0.06	0.29	0.76	1.50

Figure 3.9: Curb Inlet Capacity On-Grade Alley

3.2.8.5 Curb Inlets at Sag/Low Point

Determining the capacity of curb inlets at sag/low point shall be taken from Equation 3.17 while the inlet operates as a weir until the water depth approaches 1.4 times the curb opening height.

$$Q = 2.3(L + 1.8W)y^{1.5}$$

Equation 3.17

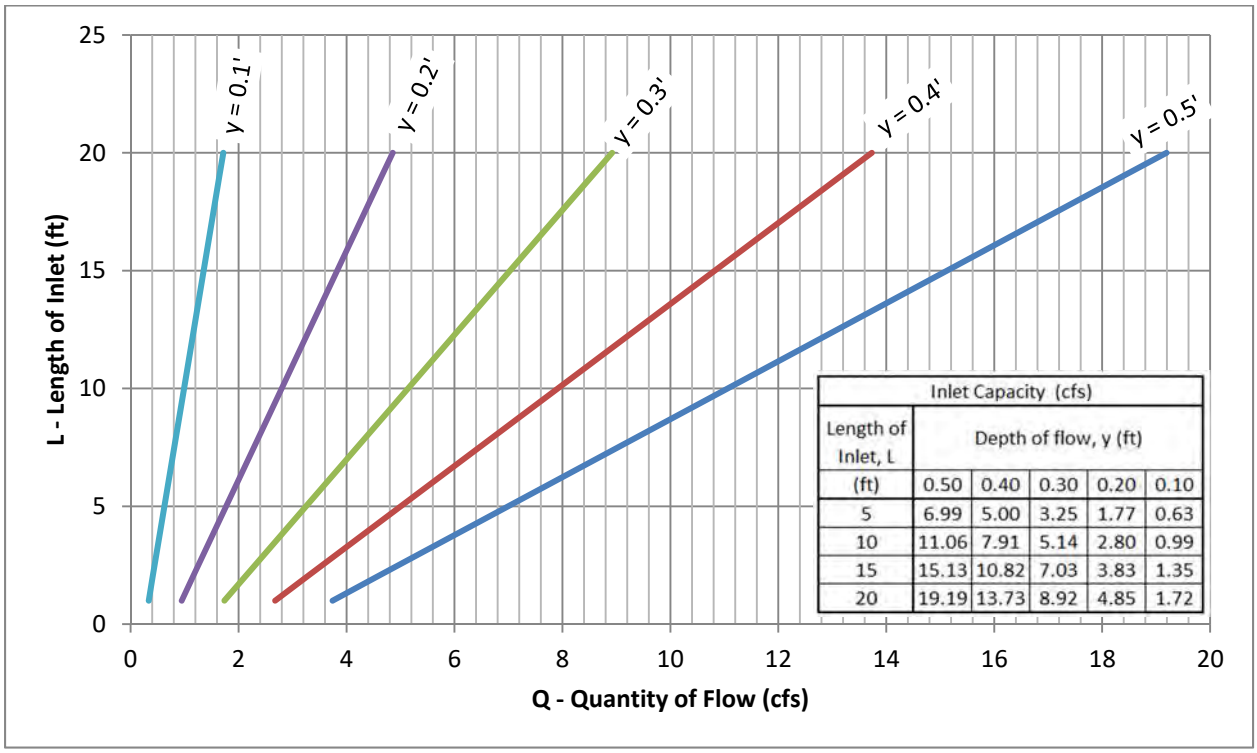
Equation 3.14 can be rearranged to find the required curb inlet length at a sag point as shown in Equation 3.18.

$$L = \frac{Q}{2.3y^{1.5}} - 1.8W$$

Equation 3.18

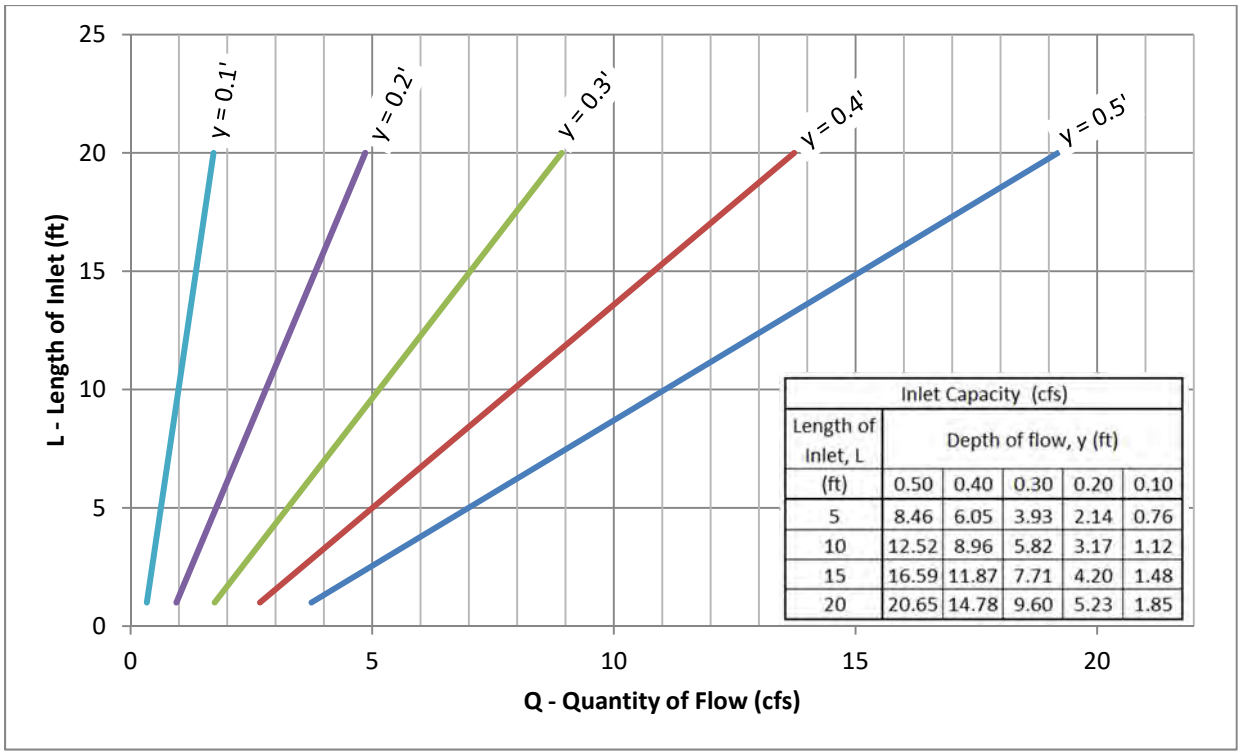
where:
Q = total flow reaching inlet (cfs)
y = depth of flow (ft)
L = length of curb inlet opening (ft)
W = gutter depression width (ft)
standard inlets W = 2.0 ft, recessed inlets W = 3.0 ft

Figures 3.10 through 3.11 are provided as reference for Standard and Recessed Sag Curb Inlet Capacities.



Inlet Capacity (cfs)					
Length of Inlet, L	Depth of flow, y (ft)				
(ft)	0.50	0.40	0.30	0.20	0.10
5	6.99	5.00	3.25	1.77	0.63
10	11.06	7.91	5.14	2.80	0.99
15	15.13	10.82	7.03	3.83	1.35
20	19.19	13.73	8.92	4.85	1.72

Figure 3.10: Standard Curb Inlet Capacity Sag/Low Point



Inlet Capacity (cfs)					
Length of Inlet, L	Depth of flow, y (ft)				
(ft)	0.50	0.40	0.30	0.20	0.10
5	8.46	6.05	3.93	2.14	0.76
10	12.52	8.96	5.82	3.17	1.12
15	16.59	11.87	7.71	4.20	1.48
20	20.65	14.78	9.60	5.23	1.85

Figure 3.11: Recessed Curb Inlet Capacity Sag/Low Point

3.2.9 Drop Inlets / 'Y' Inlet Design

The capacity of drop inlets shall be taken from the Equation 3.19. All drop inlets shall be sized to have a maximum allowable head (depth of water) on the inlet to be six (6) inches.

$$Q = 3.087Ly^{3/2}$$

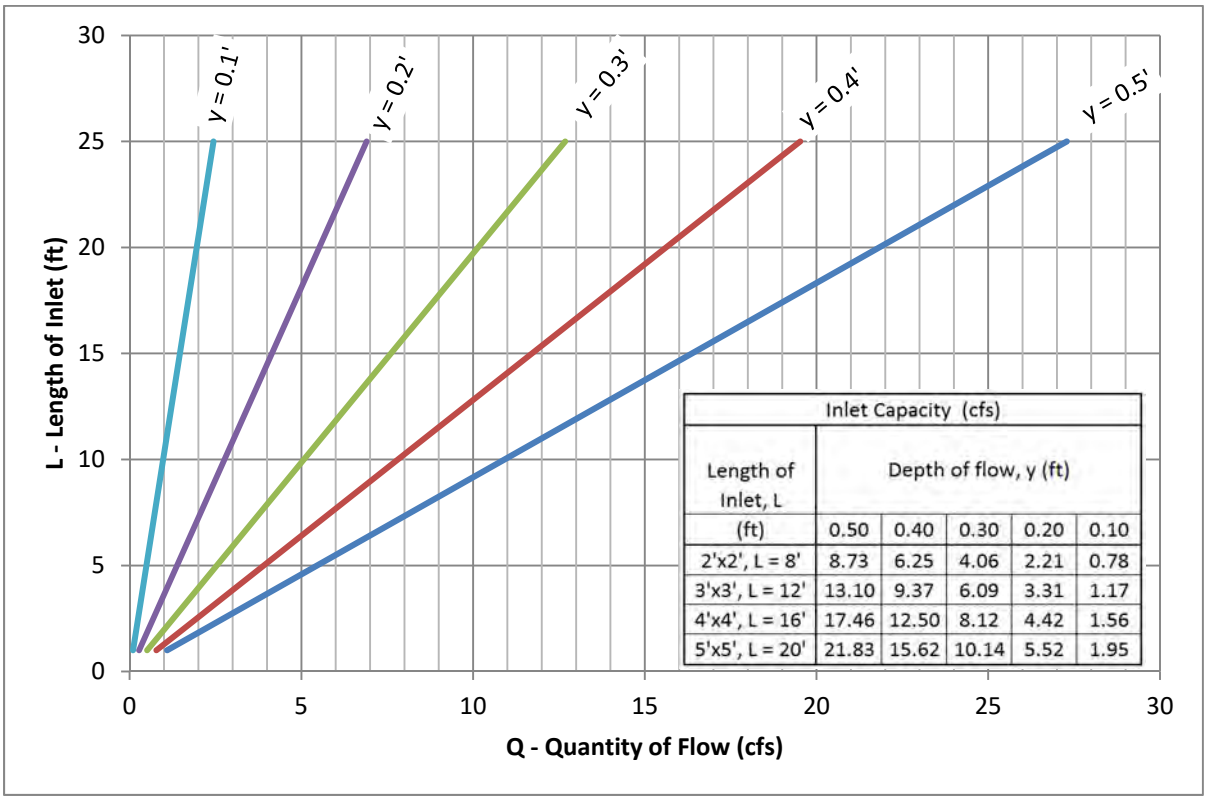
Equation 3.19

The equation can be rearranged to find the length of Drop Inlet opening as shown in Equation 3.20.

$$L = \frac{Q}{3.087y^{3/2}}$$

Equation 3.20

where:
Q = flow to inlet (cfs)
L = length of inlet opening (ft)
y = depth of water (head) at inlet (ft)



Inlet Capacity (cfs)					
Length of Inlet, L	Depth of flow, y (ft)				
(ft)	0.50	0.40	0.30	0.20	0.10
2'x2', L = 8'	8.73	6.25	4.06	2.21	0.78
3'x3', L = 12'	13.10	9.37	6.09	3.31	1.17
4'x4', L = 16'	17.46	12.50	8.12	4.42	1.56
5'x5', L = 20'	21.83	15.62	10.14	5.52	1.95

Figure 3.12: Drop/'Y' Inlet Capacity

3.2.1 Combination and Grate Inlet Design

When allowed by the City Engineer combination and grate Inlets shall be sized using Figures 3.13 through Figure 3.20.

City of Rockwall
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Form 3.2: Inlet Design Calculations Table

Inlet ID	Location				Area Runoff					
	Alignment	Station	Offset	Design Freq.	C	Area ID	Time of Concen-tration Tc	Intensity I	Area A	Runoff Q
				(yr)			(min)	(in/hr)	(acres)	(cfs)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)

	Upstream Bypass C*A	Total Gutter Flow Q_a	Gutter Flow								
			Thorough-fare Type	On-Grade/ Sag	Manning's n	Long Slope S	Crown Type	Cross Slope S_X	Depression		
									Depth a	Width W	
	(cfs)	(cfs)				(ft/ft)		(ft/ft)	(ft)	(ft)	
	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	

Gutter Flow					Inlets Capacity			
Ponding Width/ Spread		Depth of Gutter Flow		Max. Allowable Flow based on Max. Allowable Ponding Width $Q_{allow\ gutter}$	Depressed Gutter Section		Section Beyond Depression	
(allow) T_{allow}	(actual) T_{actual}	(allow) y_{allow}	(actual) y_{actual}		Area	Wetted Perimeter	Area	Wetted Perimeter
					A_W	P_W	A_0	P_0
(ft)	(ft)	(ft)	(ft)	(cfs)	(ft^2)	(ft)	(ft^2)	(ft)
(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)

Inlets Capacity							Inlet By-pass			
Conveyance		Ratio of Depression flow to Total Flow E_0	Equivalent Cross-slope, S_e	Inlet Length		Inlet Capacity Q_C	Flow Q_{bypass}	C*A	To Inlet ID	Remarks
Depression Section Kw	Section Beyond Depression K_0			Required $L_{Req'd}$	Actual L_{actual}					
(cfs)	(cfs)		(ft/ft)	(ft)	(ft)	(cfs)	(cfs)			
(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)

City of Rockwall
The New Horizon

Instructions for Form 3.2: Inlet Design Calculation Table

Column (1)	Inlet number or designation, starting with the most upstream inlet.
Column (2)	Street Alignment/ Name in which the inlet is located.
Column (3)	Station along the alignment in which the inlet is located.
Column (4)	Offset distance and side (RT/LT) inlet is located.
Column (5)	Design Storm Frequency, shall be 100-yr for all inlets.
Column (6)	Runoff coefficient taken from Table 3.2.
Column (7)	Contributing drainage area ID.
Column (8)	Minimum inlet time of concentration taken from Table 3.3.
Column (9)	Using the time of concentration and design storm frequency, the rainfall intensity is taken from Figure 3.1.
Column (10)	Runoff area to inlet in acres.
Column (11)	Solution of Equation 3.1.
Column (12)	Taken from Column (39) of the upstream inlet.
Column (13)	$= Column\ (9)\left\{\begin{matrix} Column(12) + \\ \{Column(6) * Column(10)\} \end{matrix}\right\}$
Column (14)	Thoroughfare Type Taken from Section 2 Streets, (P6D, M4D, M4U, M3U, Minor Collector, Local, Alley, Parking).
Column (15)	Determined by location of inlet (On-Grade or Sag).
Column (16)	Manning's n value.
Column (17)	Street longitudinal gutter slope of the street taken in (feet/feet).
Column (18)	Street crown type on which the inlet is located.
Column (19)	Street cross-slope in feet/feet .
Column (20)	Gutter depression depth, reference Figure 3.3.
Column (21)	Gutter depression width, reference Figure 3.3.
Column (22)	Determined by the type of thoroughfare in the permissible spread width section.
Column (23)	Solution of Equation 3.7.
Column (24)	The product of Column (22) and Column (19).
Column (25)	The product of Column (23) and Column (19).
Column (26)	Solution of Equation 3.5 using the maximum allowable pond width from Column (22).
Column (27)	Solution of Equation 3.12.
Column (28)	Solution of Equation 3.13.
Column (29)	Solution of Equation 3.14.
Column (30)	Solution of Equation 3.15.
Column (31)	Solution of Equation 3.11 using Columns (27) and (28).
Column (32)	Solution of Equation 3.11 using Columns (29) and (30).
Column (33)	Solution of Equation 3.10.
Column (34)	Solution of Equation 3.9.
Column (35)	Solution of Equation 3.8 for on-grade curb inlets, Equation 3.18 for sag curb inlet, or Equation 3.20 for drop inlets.
Column (36)	Selected Inlet Size.
Column (37)	The capacity of the selected inlet size of Column (35), solution found by

	iteratively solving for capacity based on Equation 3.8 for curb inlets, Equation 3.17 for sag curb inlets, Equation 3.19 for drop inlets.
Column (38)	For on-grade inlets the solution of Equation 3.16.
Column (39)	Equal Column (38) divided by Column (9).
Column (40)	Next downstream inlet to which by the by-pass is going.
Column (41)	Special design comments are entered here.

EXAMPLE

Known:

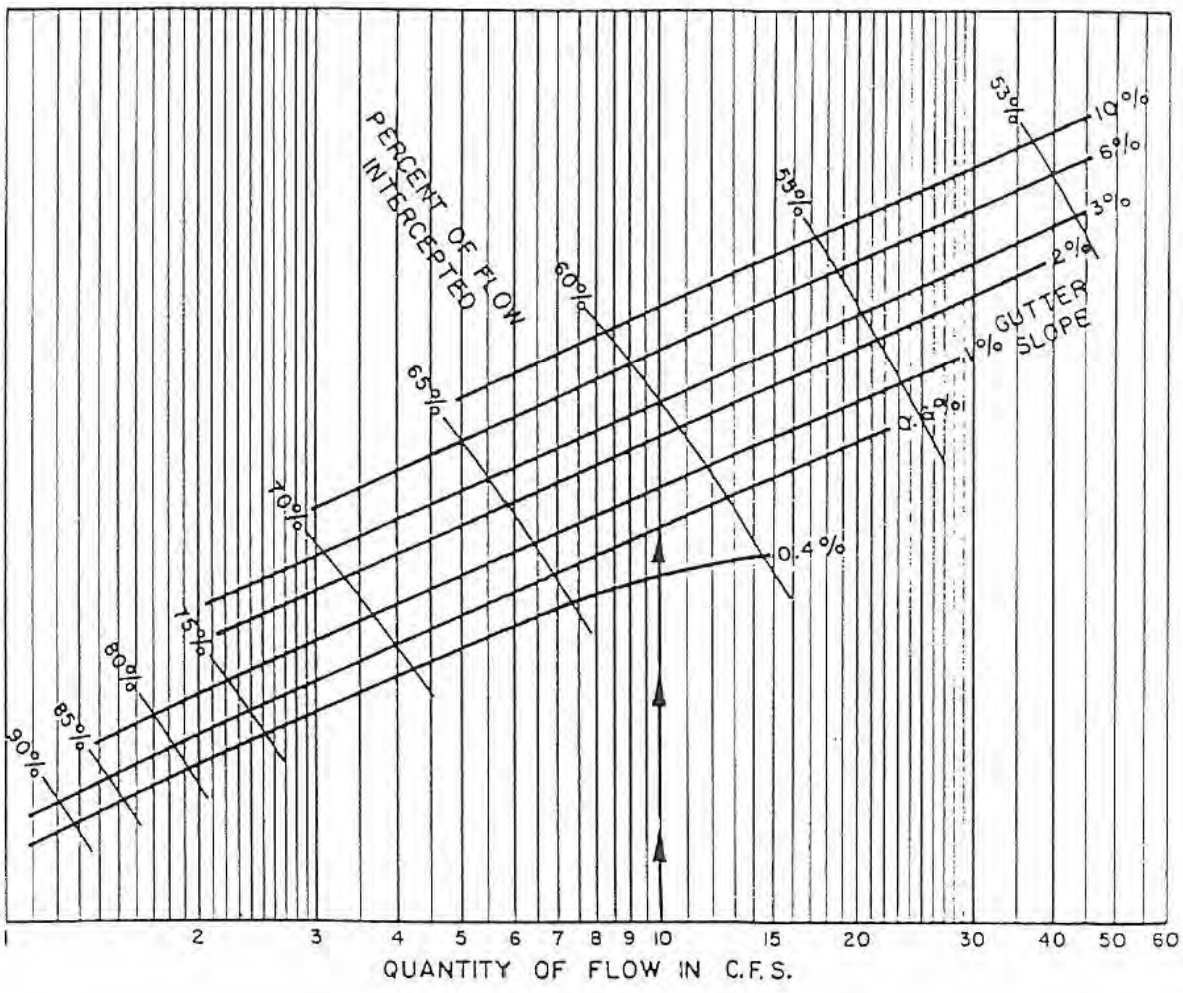
Quantity of Flow = 10.0 c.f.s.
Gutter Slope = 0.6 %

Find:

Capacity of Two Grate Combination Inlet

Solution:

Enter Graph at 10.0 c.f.s.
Intersect Slope = 0.6 %
Read Percent of Flow Intercepted = 62 %
62 % of 10.0 c.f.s. = 6.2 c.f.s. as Capacity of Two Grate Combination Inlet
Remaining Gutter Flow = 10.0 c.f.s – 6.2 c.f.s. = 3.8 c.f.s.



TWO GRATE COMBINATION INLET CAPACITY CURVES ON GRADE

Figure 3.13: Two Grate Combination Inlet Capacity Curves on Grade

EXAMPLE

Known:

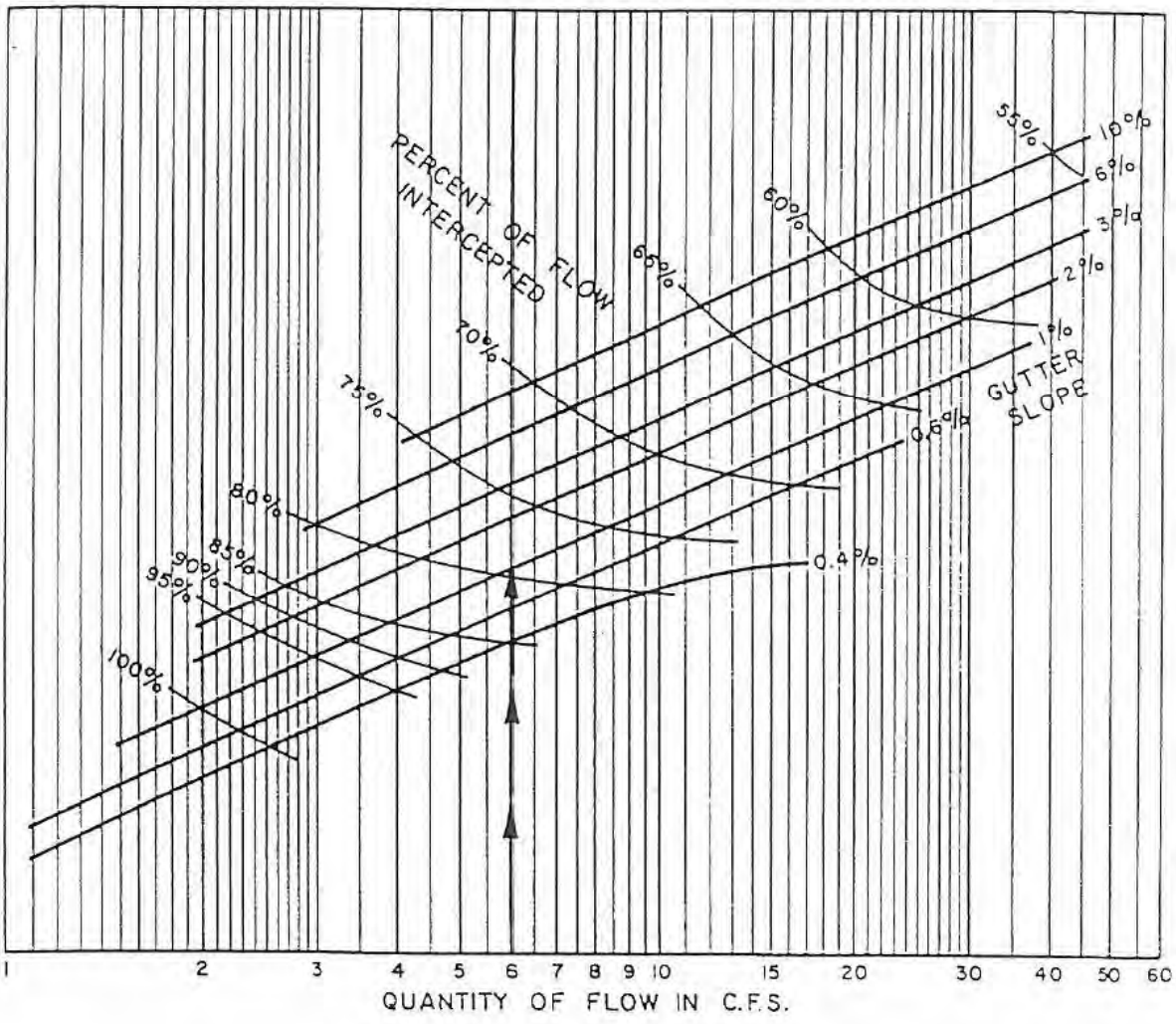
Quantity of Flow = 6.0 c.f.s.
Gutter Slope = 1.0 %

Find:

Capacity of Four Grate Combination Inlet

Solution:

Enter Graph at 6.0 c.f.s.
Intersect Slope = 1.0 %
Read Percent of Flow Intercepted = 79 %
79 % of 6.0 c.f.s. = 4.7 c.f.s. as Capacity of Four Grate Combination Inlet
Remaining Gutter Flow = 6.0 c.f.s. – 4.7 c.f.s. = 1.3 c.f.s.



FOUR GRATE COMBINATION INLET
CAPACITY CURVES
ON GRADE

Figure 3.14: Four Grate Combination Inlet Capacity Curves on Grade

EXAMPLE

Known:

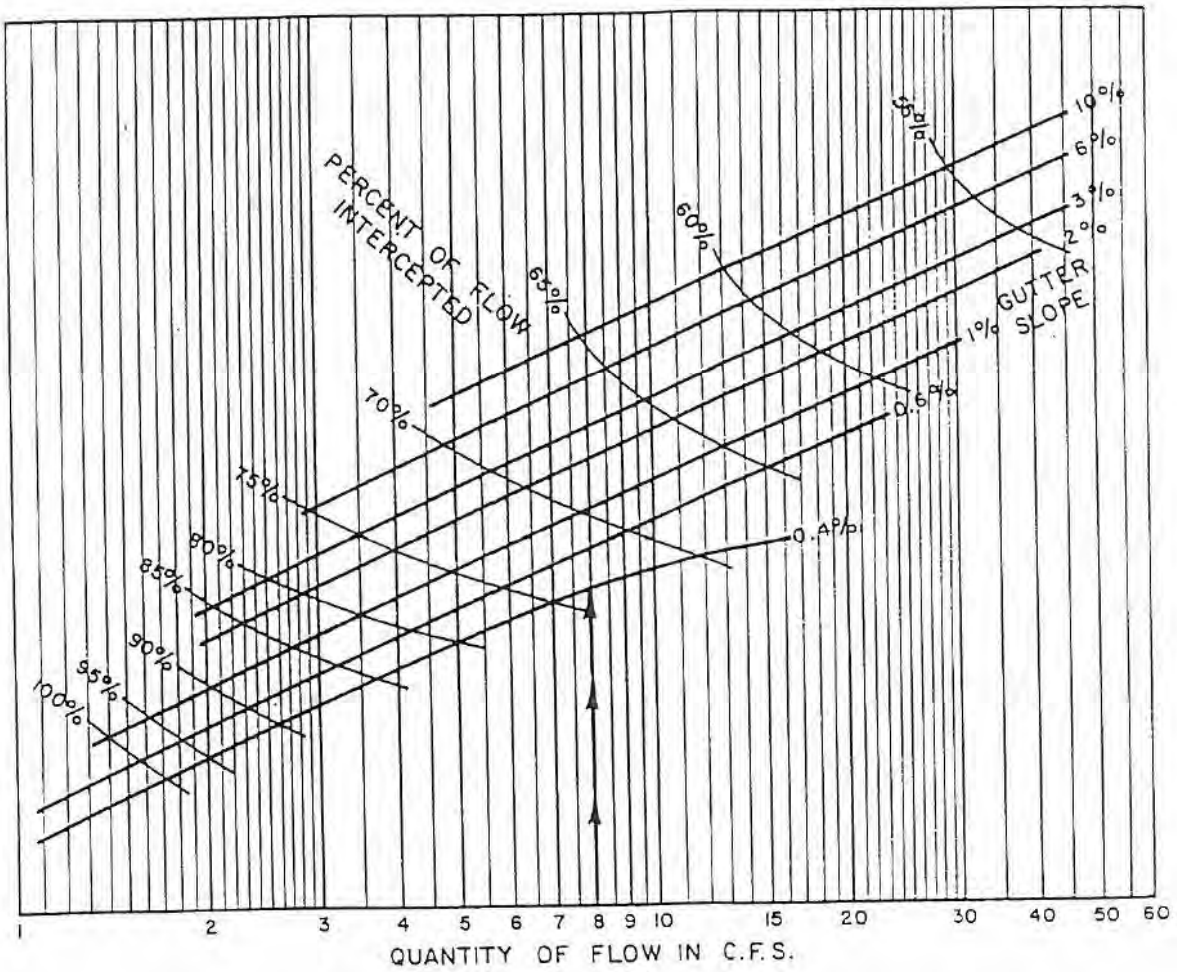
Quantity of Flow = 8.0 c.f.s.
Gutter Slope = 0.4%

Find:

Capacity of Three Grate Inlet

Solution:

Enter Graph at 8.0 c.f.s.
Intersect Slope = 0.4%
Read Percent of Flow
Intercepted = 74%
74% of 8.0 c.f.s. = 5.9 c.f.s.
as Capacity of Three Grate Inlet
Remaining Gutter Flow =
8.0 c.f.s. – 5.9 c.f.s. = 2.1 c.f.s.



THREE GRATE INLET AND
THREE GRATE COMBINATION INLET
CAPACITY CURVES
ON GRADE

Figure 3.15: Three Grate Inlet and Three Grate Combination Inlet Capacity Curves on Grade

EXAMPLE

Known:

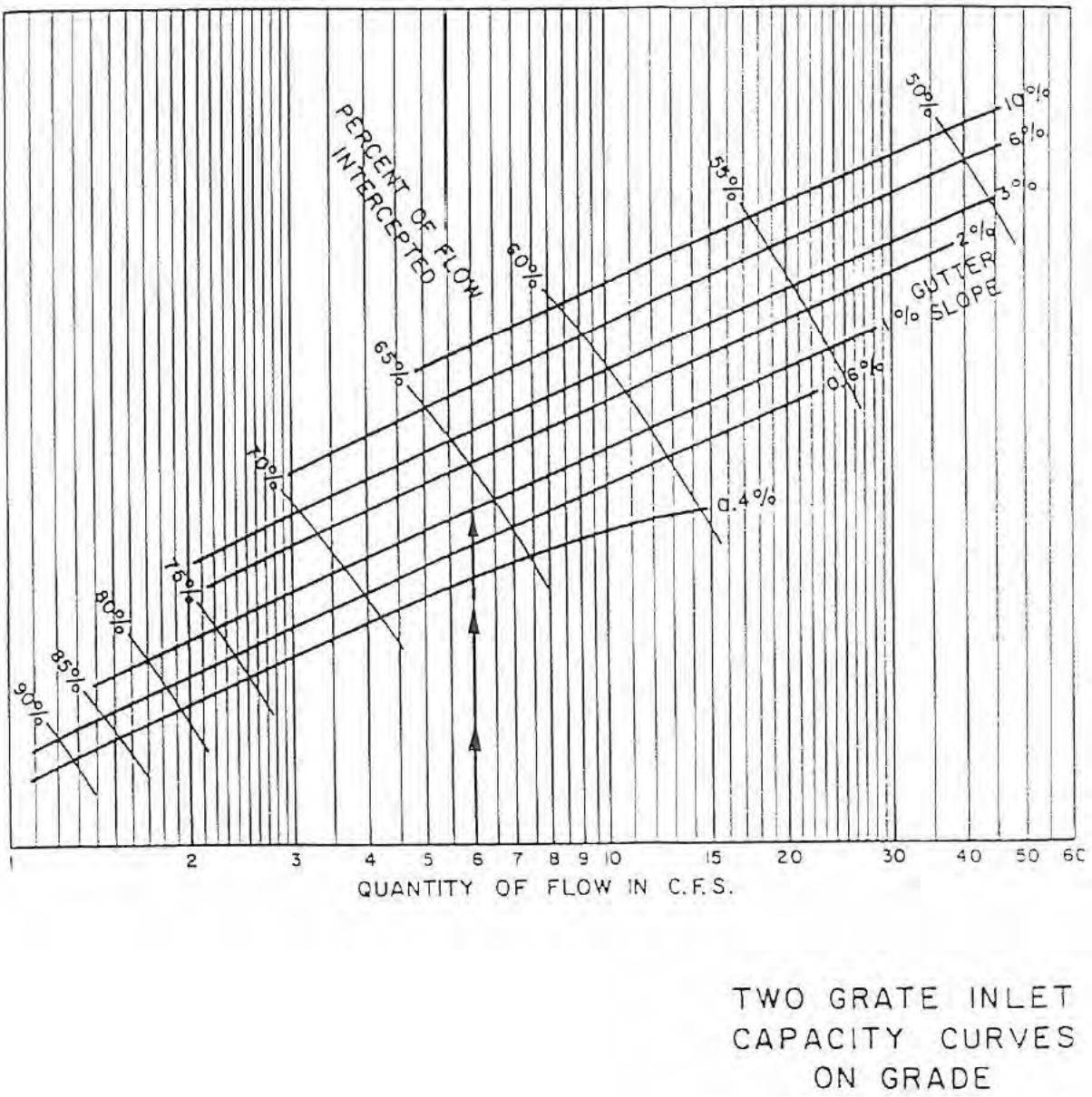
Quantity of Flow = 6.0 c.f.s.
Gutter Slope = 1.0%

Find:

Capacity of Two Grate Inlet

Solution:

Enter Graph at 6.0 c.f.s.
Intersect Slope = 1.0%
Read Percent of Flow
Intercepted = 66%
66% of 6.0 c.f.s. = 4.0 c.f.s.
as Capacity of Two Grate Inlet
Remaining Gutter Flow =
6.0 c.f.s. – 4.0 c.f.s. = 2.0 c.f.s.



TWO GRATE INLET
CAPACITY CURVES
ON GRADE

Figure 3.16: Two Grate Inlet Capacity Curves on Grade

EXAMPLE

Known:

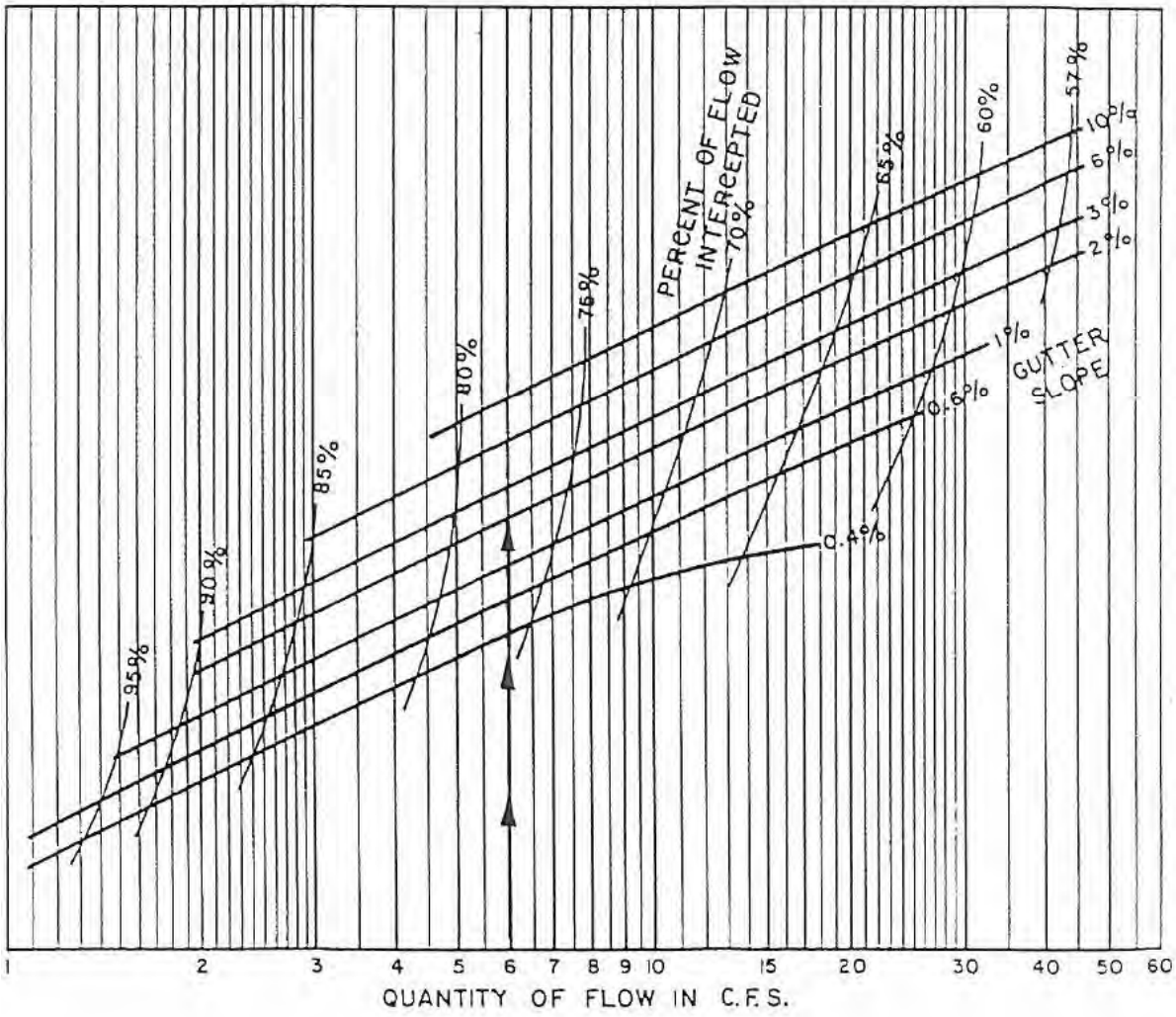
Quantity of Flow = 6.0 c.f.s.
Gutter Slope = 1.0%

Find:

Capacity of Four Grate Inlet

Solution:

Enter Graph at 6.0 c.f.s.
Intersect Slope = 1.0%
Read Percent of Flow
Intercepted = 77%
77% of 6.0 c.f.s. = 4.6 c.f.s.
as Capacity of Four Grate Inlet
Remaining Gutter Flow =
6.0 c.f.s. – 4.6 c.f.s. = 1.4 c.f.s.



FOUR GRATE INLET
CAPACITY CURVES
ON GRADE

Figure 3.17: Four Grate Inlet Capacity Curves on Grade

EXAMPLE

Known:

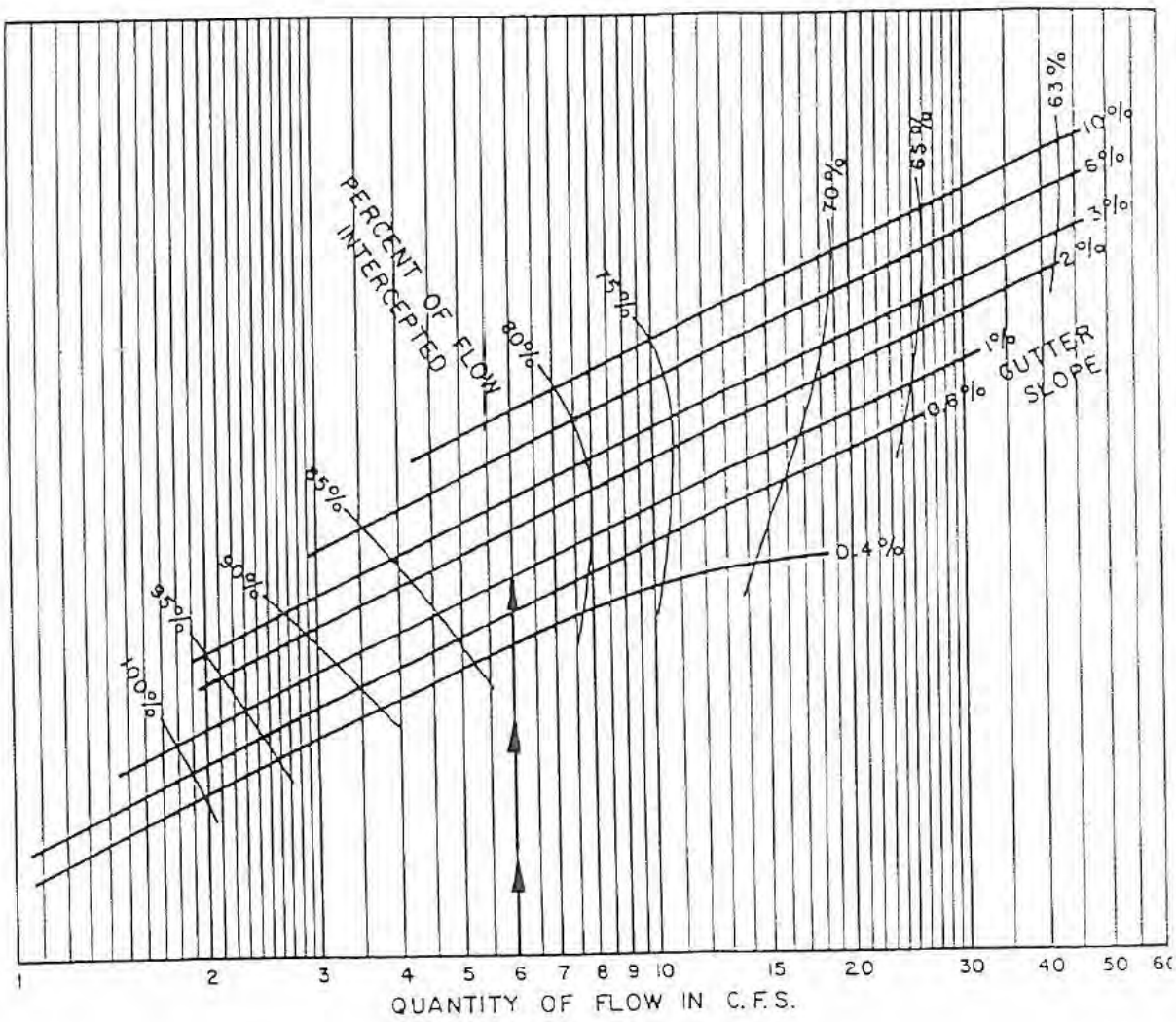
Quantity of Flow = 6.0 c.f.s.
Gutter Slope = 1.0%

Find:

Capacity of Six Grate Inlet

Solution:

Enter Graph at 6.0 c.f.s.
Intersect Slope = 1.0%
Read Percent of Flow
Intercepted = 82%
82% of 6.0 c.f.s. = 4.9 c.f.s.
as Capacity of Six Grate Inlet
Remaining Gutter Flow =
6.0 c.f.s. − 4.9 c.f.s. = 1.1 c.f.s.



SIX GRATE INLET
CAPACITY CURVES
ON GRADE

Figure 3.18: Six Grate Inlet Capacity Curves on Grade

EXAMPLE

Known:

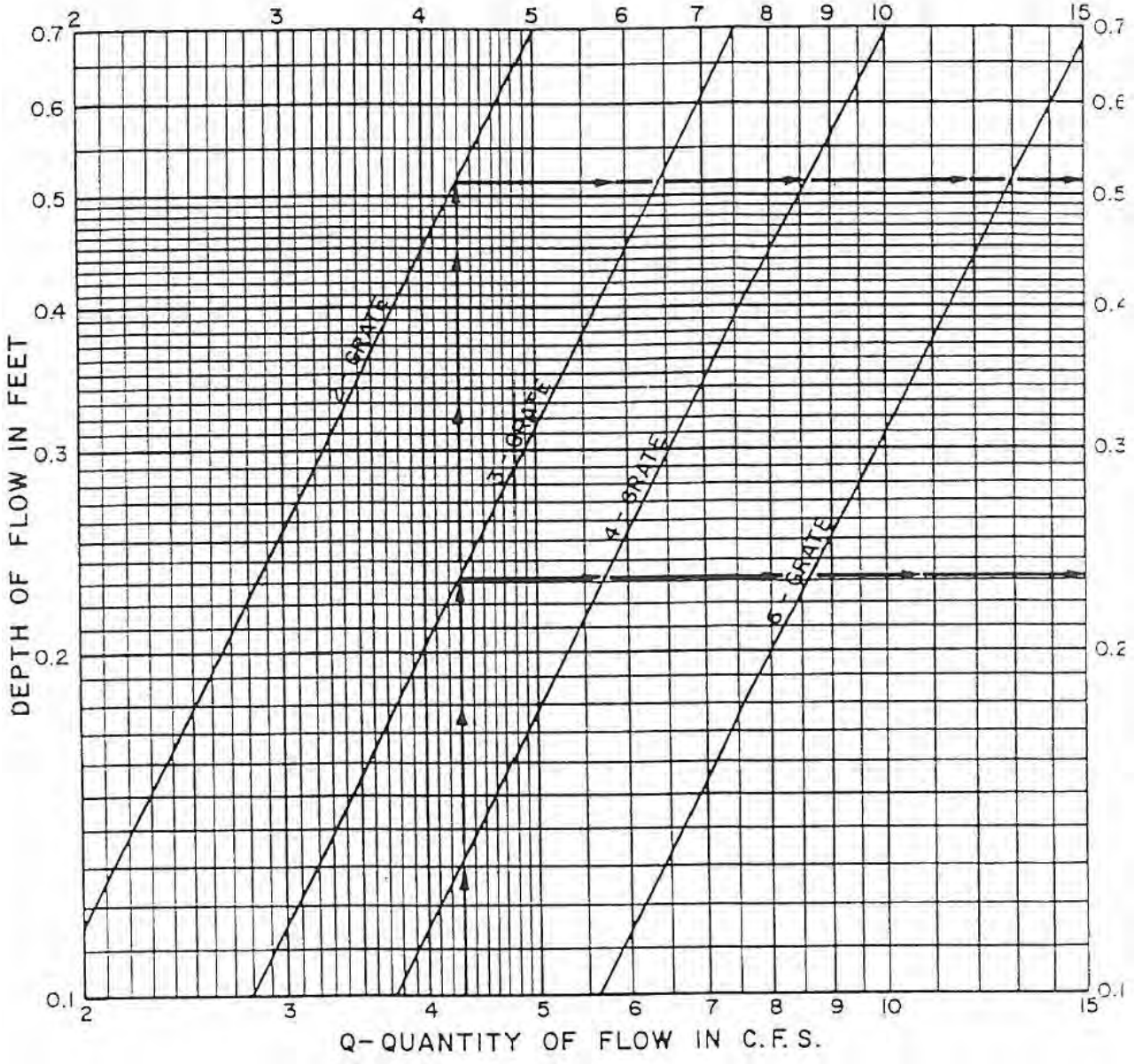
Quantity of Flow = 4.3 c.f.s.
Maximum Depth of Flow Desired at Low Point = 0.3'

Find:

Inlet Required

Solution:

Enter Graph at 4.3 c.f.s.
Intersect 3 - Grate at 0.23'
Intersect 2 - Grate at 0.51'
Use 3 - Grate



GRATE INLET
CAPACITY CURVES
AT LOW POINT

Figure 3.19: Grate Inlet Capacity Curves at Low Point

EXAMPLE

Known:

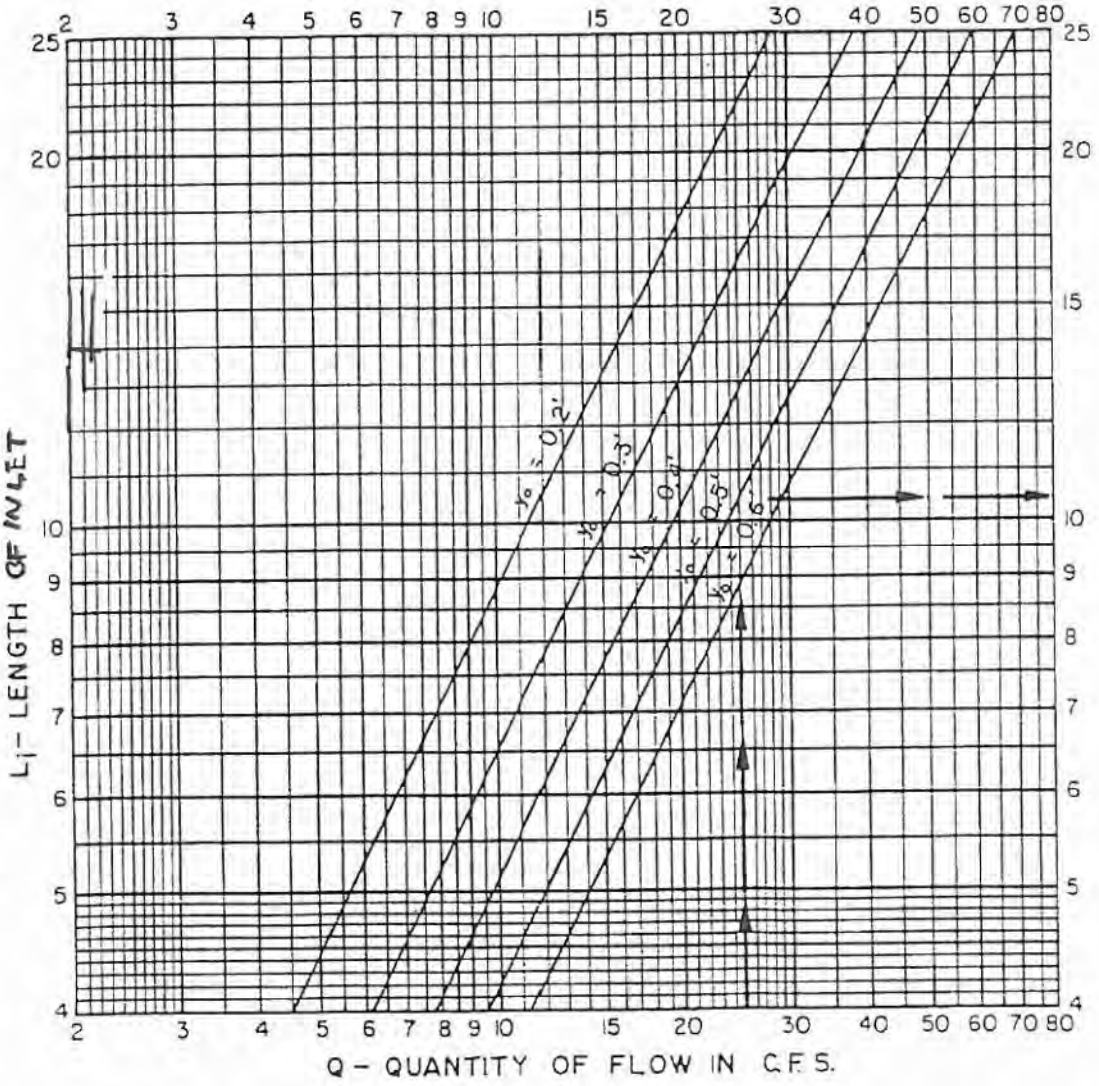
Quantity of Flow = 25.0 c.f.s.
Maximum Depth of Flow Desired
At Low Point (y_o) = 0.5'

Find:

Length of Inlet Required (L_i)

Solution:

Enter Graph at 25.0 c.f.s.
Intersect y_o = 0.5'
Read L_i = 10.4'
Use 12' Inlet



ROUGHNESS COEFFICIENT n = .0175	
STREET WIDTH	CROWN TYPE
ALL	Straight and Parabolic

COMBINATION INLET CAPACITY CURVES AT LOW POINT

Figure 3.20: Combination Inlet Capacity Curves at Low Point

3.2.2 Flow in Storm Drain Conduits and Their Appurtenances

3.2.2.1 Hydraulic Gradient of Conduits

A storm drainage conduit must have sufficient capacity to discharge a design storm with a minimum of interruption and inconvenience to the public using streets and thoroughfares. The size of the conduit is determined by accumulating runoff from contributing inlets and calculating the slope of a hydraulic gradient from Manning's Equation:

$$S_f = \frac{Qn^2}{1.49AR^{2/3}}$$

Equation 3.21

where:
Q = flow in conduit, (cfs)
n = Manning's roughness coefficient; value = 0.013
A = cross sectional area of flow, (ft^2)
R = hydraulic radius, (ft)
S_f = hydraulic friction slope, (ft/ft)

Hydraulic gradient for the selected conduit size shall be 1.50' below gutter (2.0' below top of curb) for each contributing inlet to insure that the selected conduit will carry the design flow at an elevation below the gutter profile. As the conduit size is selected and the hydraulic gradient is plotted between each inlet pickup point, a head loss due to a change in velocity and pipe size must be incorporated in the gradient profile.

At an outfall/headwall the starting hydraulic grade line (HGL) for a conduit system shall be set to the greater of the following: the conduit soffit or the 100yr water surface elevation for the receiving channel or detention pond.

Concrete pipe conduit shall be used to carry the storm water, and flow chart, FIGURE 3.21, based on Manning's Equation may be used to determine the various hydraulic elements including the pipe size, the hydraulic gradient and the velocity. Special hydraulic calculators are also available for solution of Manning's Equation.

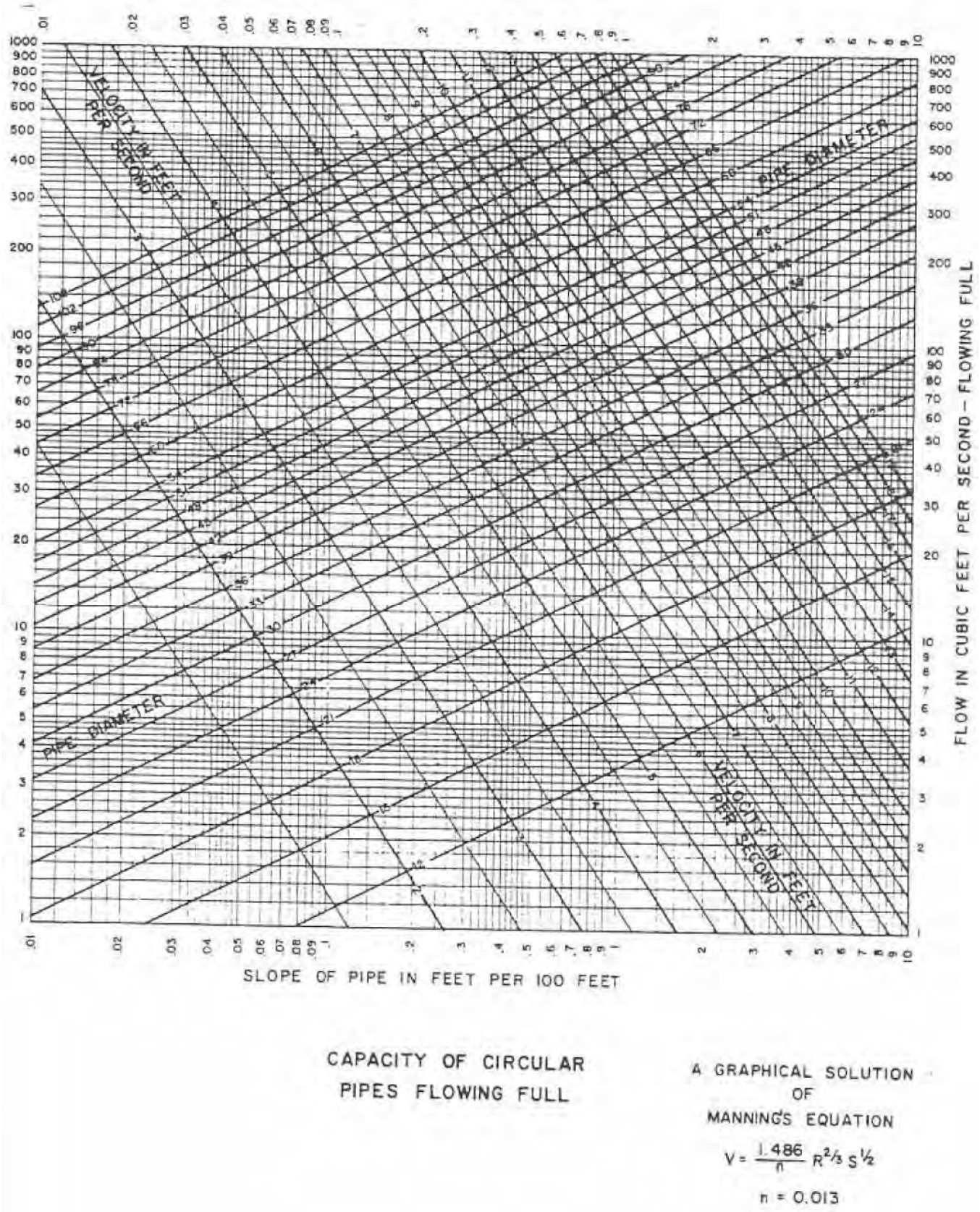


Figure 3.21: Capacity of Circular Pipes Flowing Full

The roughness coefficient 'n' for storm sewer conduit shall be 0.013.

With the hydraulic gradient established, considerable latitude is available for establishment of the conduit flow line. The inside top of the conduit must be at or below the hydraulic gradient thus allowing the conduit to be lowered where necessary. The hydraulic gradient at every inlet should be plotted directly on the construction plan profile worksheet and adjusted as necessary.

There will be hydraulic conditions, which cause the conduits to flow partially full, and where this occurs, the hydraulic gradient should be shown at the inside crown (soffit) of the conduit. This procedure will provide a means for conservatively selecting a conduit size, which will carry the flood discharge.

All public storm sewer systems shall be reinforced concrete pipe. Storm sewer pipe, with two (2) feet or less of cover, are required to be Class IV reinforced concrete pipe. All storm pipes and laterals are required to have a plan and profile on engineering plans. All flow data (Q_{100}, Q_{cap}, velocity, hydraulic slope) is required at every change in pipe size, slope and/or change in flow rate.

3.2.2.2 Minor Head Losses

When establishing the hydraulic gradeline of a storm sewer, minor head losses at points of turbulence shall be calculated and included in the computation of the hydraulic gradeline.

Entrance Losses

Entrance losses to a closed storm sewer system from an open channel or lake shall be calculated using Equation 3.22.

$$H_L = K_E \frac{{V_1}^2}{2g}$$

Equation 3.22

where:
H_L = head loss (ft)
K_E = head loss coefficient (see Table 3.7).
V_1 = velocity in the downstream conduit (ft/s)
g = the acceleration of gravity (32.3 ft/s^2)

Table 3.7: Entrance Loss Coefficients

Type of Structure and Design of Entrance	Coeff. K_E
Pipe (Concrete)	
Projecting from fill, socket end (groove-end)	0.2
Projecting from fill, square cut end	0.5
Headwall or headwall and wingwalls	
Socket end of pipe (groove-end)	0.2
Square-edge	0.5
Rounded (radius = 1/12D)	0.2
Mitered to conform to fill slope	0.7
End-section conforming to fill slope	0.5
Beveled edges, 33.7- or 45-degree bevels	0.2
Side- or slope-tapered inlet	0.2
Pipe, or Pipe-Arch, (Corrugated Metal)	
Projecting from fill (no headwall)	0.9
Headwall or headwall and wingwalls square-edge	0.5
Mitered to conform to fill slope, paved or unpaved slope	0.7
End-section conforming to fill slope	0.5
Beveled edges, 33.7- or 45-degree bevels	0.2
Side- or slope-tapered inlet	0.2
Box (Reinforced Concrete)	
Headwall parallel to embankment (no wingwalls)	
Square-edged on 3 edges	0.5
Rounded on 3 edges to radius of 1/12 barrel dimension or beveled edges on 3 sides	0.2
Wingwalls at 30- to 75-degrees to barrel	
Square-edged at crown	0.4
Crown edge rounded to radius of 1/12 barrel dimension dimension, or beveled top edge	0.2
Wingwall at 10- to 25-degrees to barrel	
Square-edged at crown	0.5
Wingwall parallel (extension of sides)	
Square-edged at crown	0.7
Side- or slope-tapered inlet	0.2

Inlet Losses

Inlet losses shall be calculated using Equation 3.23.

$$H_L = 1.25 \frac{V_{Lat}{}^2}{2g}$$

Equation 3.23

where:
H_L = head loss (ft)
V_{LAT} = velocity in the lateral (ft/s)
g = the acceleration of gravity (32.2 ft/s^2)

Expansion Losses

For pipe size expansions, head loss shall be calculated using the following Equation 3.24.

$$H_L = \left(1 - \left(\frac{D_1}{D_2}\right)^2\right)\frac{V_1{}^2}{2g}$$

Equation 3.24

Where:
H_L = head loss (ft)
V_1 = upstream velocity (ft/s)
D_1 = upstream conduit diameter (ft)
D_2 = downstream conduit diameter (ft)
g = the acceleration of gravity (32.2 ft/s^2)

Manhole and Bend Losses

Head losses associated with manholes for pipe direction changes and bends in pipes of equal diameter shall be calculated using Equation 3.25.

$$H_L = K_j\frac{V_2{}^2}{2g}$$

Equation 3.25

Where:
H_L = Head loss (ft)
K_j = Head loss coefficient (see Table 3.8).
V_2 = Downstream velocity (ft/s)
g = the acceleration of gravity (32.2 ft/s^2)

Junction Losses

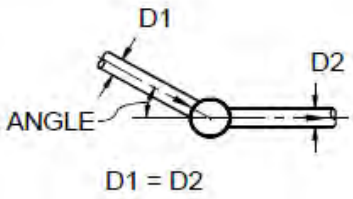
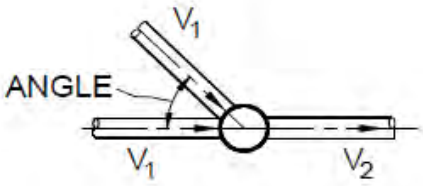
Head losses associated with wye connections or manholes with branch laterals entering the main line shall be calculated by using Equation 3.26.

$$H_L = \frac{V_2{}^2}{2g} - K_j\frac{V_1{}^2}{2g}$$

Equation 3.26

Where:
H_L = Head loss (ft)
V_1 = Velocity in the upstream conduit (ft/s)
V_2 = Velocity in the downstream conduit (ft/s)
K_j = Head loss coefficient from Table 3.8.
g = the acceleration of gravity (32.2 ft/s^2)

Table 3.8: Velocity Head Loss Coefficients for Closed Conduits

MANHOLE AT CHANGE IN PIPE DIRECTION		
DESCRIPTION	ANGLE	HEAD LOSS COEFFICIENT Kj
	90°	0.55
	60°	0.48
	45°	0.42
	30°	0.3
	0°	0.05
BENDS IN PIPES		
DESCRIPTION	ANGLE	HEAD LOSS COEFFICIENT Kj
	90°	0.5
	60°	0.43
	45°	0.37
	30°	0.25
JUNCTION		
DESCRIPTION	ANGLE	HEAD LOSS COEFFICIENT Kj
	0°	1
	22 1/2°	0.75
	45°	0.5
	60°	0.35
	90°	0.25

3.2.2.3 Minimum Grades

Storm drains should operate with flow velocities sufficient to prevent excessive deposits of solid materials; otherwise objectionable clogging may result. The controlling velocity with regard to sediment deposition is near the bottom of the conduit and considerably less than the mean velocity of the storm. Storm drains shall be designed to have a minimum mean velocity flowing full of 2.5 feet per second (f.p.s.). Table 3.9 indicates the minimum grades for concrete pipe with "Manning's "n" = 0.013 and flowing at 2.5 f.p.s.

Table 3.9: Minimum Grades for Storm Drain Pipelines

Pipe Dia. (Inches)	Slope (foot/foot)	Pipe Dia. (Inches)	Slope (foot/foot)
18	0.0018	48	0.0005
21	0.0015	54	0.0005
24	0.0013	60	0.0004
27	0.0011	66	0.0004
30	0.0009	72	0.0003
33	0.0008	78	0.0003
36	0.0007	84	0.0003
39	0.0006	90	0.0002
42	0.0006	96	0.0002
45	0.0005	102	0.0002

3.2.2.4 Maximum Velocities

The slope of a storm sewer should also be such that excessive velocities will not damage the pipeline or drainage structures. Table 3.10 delineates the maximum desirable velocities for storm sewer.

Table 3.10: Maximum Velocities in Closed Conduits

Type of Conduit	Maximum Velocity
Culverts	15 f.p.s.
Inlet Laterals	15 f.p.s.
Storm Sewer Pipe	12.5 f.p.s.

* The maximum velocities shall be the actual velocity – full flow or partial flow.

3.2.2.5 Discharge of Storm Drain Pipe

Storm drain pipes discharging into Lake Ray Hubbard shall be set such that the top of the pipe shall be set at elevation 435.5 or otherwise approved by the City Engineer. Discharge into Lake Ray Hubbard will require approval from the City of Dallas. Pipes discharging into the lake

shall run to the lake to prevent erosion of the shoreline (City of Dallas detail, see Exhibit 3A). Where storm drain pipes discharge into water courses, the invert of the pipe shall be at the same grade as the low point of the water course and angled a maximum of sixty (60) degrees to flow downstream. Adequate grouted rock riprap or other erosion protection shall be provided. Storm sewers shall discharge into open channels at a maximum velocity of eight (8) feet per second.

3.2.2.6 Manholes

Storm drain manholes shall be located at intervals not to exceed five hundred (500) feet for all underground storm conduit systems. Manholes shall also be placed at locations where CCTV and Vac-con equipment can inspect/clean entire system without getting stuck or unable to make bends/wye connection turns. Therefore manholes shall also be placed where there is no more than one (1) bend or wye connection between manholes or inlets. Inlet and manhole lids shall be twenty-four (24) inches with locking lids.

3.2.2.7 Lateral Lines

The minimum size of reinforced concrete storm sewer line from the inlet box to the collector lines shall be eighteen (18) inches in diameter for a discharge of less than 10 cfs. Where discharge exceeds 10 cfs and/or connects to a ten (10) foot inlet, lateral lines shall be a minimum of twenty-one (21) inches in diameter.

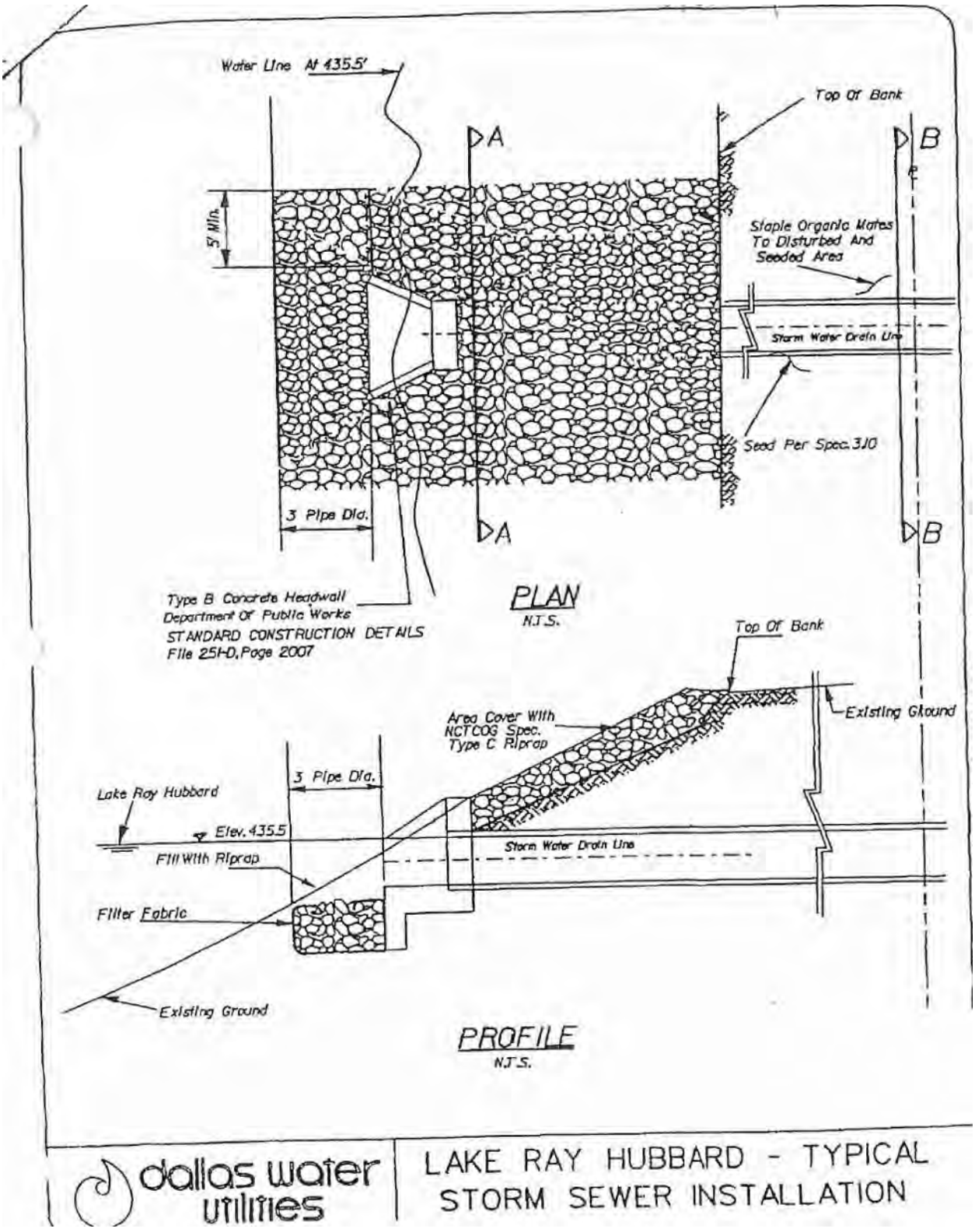

Water Line At 435.5'
Top Of Bank
A
B
5' Min.
Staple Organic Mates To Disturbed And Seeded Area
Storm Water Drain Line
Seed Per Spec. 310
3 Pipe Dia.
A
B
Type B Concrete Headwall
Department Of Public Works
STANDARD CONSTRUCTION DETAILS
File 25HD, Page 2007
PLAN
N.T.S.
Top Of Bank
Existing Ground
Area Cover With NCTCOG Spec. Type C Riprap
3 Pipe Dia.
Lake Ray Hubbard
Elev. 435.5
Fill With Riprap
Storm Water Drain Line
Filter Fabric
Existing Ground
PROFILE
N.T.S.
dallas water utilities
LAKE RAY HUBBARD - TYPICAL STORM SEWER INSTALLATION

Exhibit 3A

3.2.2.8 100-Year Flood Zones

Where the Federal Emergency Management Administration (FEMA) has defined a flood hazard area with regard to a drainage course as shown on the effective Flood Insurance Rate Maps (FIRMs), the flood hazard zone and the floodplain, floodway, cross-section lines and water surface elevations at each cross-section, if available, shall be shown on the plat and engineering plans.

3.2.2.9 Local 100-Year Flood Zones

Where flood information has not been determined for streams, creeks, channels, or impoundments located within or adjacent to a proposed development, the 100-year fully developed flood elevations and flood boundaries shall be determined by the developers' engineers. The local floodplain, cross-section lines and water surface elevations at each cross-section shall be shown on the plat and engineering plans.

3.2.2.10 Floodplain Markers

The City will provide floodplain markers to be installed by the developer which shall be placed at the property corner of each lot adjacent to the flood plain and a maximum distance apart of 300 feet along the floodplain line.

3.2.2.11 Inlet Markers

The City will provide "No Dumping, Drains to Waterway" inlet markers to be installed on each inlet by the developer.

3.2.2.12 Dumpsters

If a dumpster is to facilitate any type of food, food by-product, or oil/grease based product disposal, the dumpster site area shall drain through a private oil/water separator prior to connecting to the storm water system. All dumpster surface area must drain into a private slot or area drain to prevent any drainage from leaving the dumpster area. This private system shall discharge into a storm system and cannot discharge into a wastewater system.

3.2.2.13 Fueling Stations

If there is a fueling station on the site the storm line serving the fueling station drainage area shall have an oil/water separator installed before leaving the site. This private system shall discharge into a storm system and cannot discharge into a wastewater system.

3.2.2.14 Testing

All storm sewers and laterals shall be visually inspected by photographic means (television and DVD) at the contractor's expense prior to final acceptance by the City of Rockwall. Any sags, open joints, cracked pipes, etc. shall be repaired or removed by the contractor at the

contractor's expense. Pipes shall be cleaned prior to televising the pipe. The contractor shall furnish a DVD to the Engineering Department inspector for review.

3.2.3 Storm Sewer Design – Closed Conduit

3.2.3.1 General

To facilitate the design of closed conduit storm sewers, design will be based on the calculations called out in this section and the instructions for Form 3.3: Storm Sewer Calculations. Form 3.3 in its entirety shall be included in the plans and calculations shall be provided for each system including laterals.

Form 3.3: Storm Sewer Calculations Table

SYSTEM ID	Conduit Properties								
	Collection Point Station		Length	# of Barrels	Pipe Size	Box		Type	Area
	U/S	D/S				Span	Rise		
			(ft)		(inches)	(ft)	(ft)		(ft^2)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

Conduit Properties						Incremental Drainage Area			
Wetted Perimeter P_W	Hydraulic Radius	Manning's n	Flowline Elevation		Slope	Inlet ID	Area	Runoff Coeff. C	Incre-mental C*A
			Up-stream	Down-stream					
(ft)	(ft)				(ft/ft)		(acres)		
(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)

Accum-ulated C*A	Up-stream T_C	Design Storm Freq.	Intensity I	Runoff Q	Conduit Capacity Q_C	Partial Flow	Velocity V	Time in Conduit
	(min)	(yr)	(in/hr)	(cfs)	(cfs)	(Yes/No)	(ft/s)	(min)
(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)

Friction Slope S_f	Friction Head-loss	HGL		Headloss Calculations					Design HGL	Top of Curb Elev.	HGL Depth Below T/C	Remarks
		U/S	D/S	$\frac{V_1^2}{2g}$	$\frac{V_2^2}{2g}$	Jct. Type	Coeff. K_J	Head-loss H_L				
(ft/ft)	(ft)			(ft)	(ft)			(ft)			(ft)	
(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)

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Instructions for Form 3.3: Storm Sewer Calculation Table

Column (1)	System ID, if private label (ex. Line-A, Line-B, ….; Lat-A1, Lat-A2, ….)
Column (2)	Storm sewer line station at the upstream end of conduit section
Column (3)	Storm sewer line station at the downstream end of conduit section
Column (4)	Length of Conduit segment, equal to Column (2) minus Column (3)
Column (5)	Number of barrels of conduit
Column (6)	Size of Pipe in inches
Column (7)	Span of Box Conduit
Column (8)	Rise of Box Conduit
Column (9)	Conduit Type (ex. RCP, RCB, PVC, HDPE, ….)
Column (10)	Conduit area
Column (11)	Wetted Perimeter
Column (12)	Equal to Column (10) divided by Column (11)
Column (13)	Manning's Roughness Coefficient
Column (14)	Conduit flowline elevation at the upstream end of conduit section
Column (15)	Conduit flowline elevation at the downstream end of conduit section
Column (16)	Conduit slope in feet/feet
Column (17)	The incremental drainage area ID contributing to the conduit section
Column (18)	The incremental drainage area in acres contributing to the conduit section
Column (19)	The incremental drainage area runoff coefficient contributing to the conduit section
Column (20)	Equal to Column (18) multiplied by Column (19)
Column (21)	Equal to Column (20) plus Column (21) of the upstream conduit section
Column (22)	Equal to inlet Tc if most upstream conduit section, or the sum of previous conduit section Column (22) and Column (29)
Column (23)	Design Storm Frequency shall be 100-yr
Column (24)	Shall be taken from Figure 3.1 using Columns (22) and (23)
Column (25)	Solution of Equation 3.1 using Columns (21) and (24)
Column (26)	Solution of Manning's Equation 3.6 where the conduit is flowing full (depth of flow is equal to height of conduit)
Column (27)	Yes, if Column (25) < Column (26). No, if Column (25) ≥ Column (26)
Column (28)	The actual velocity within the conduit
Column (29)	Equal to Column (4) divided by Column (28) divided by 60 sec/min
Column (30)	Solution of Equation 3.21
Column (31)	Equal to Column (4) multiplied by Column (30)
Column (32)	Upstream Hydraulic Grade Line. Equal to Column (33) plus Column (31)
Column (33)	This is the beginning hydraulic gradient of the line. It is equal to the Design HGL Column (38) for the next downstream segment, or the beginning HGL of the system.
Column (34)	Velocity Head of the incoming pipe at the wye, junction, inlet or manhole.
Column (35)	Velocity Head of the outgoing pipe (the pipe segment being analyzed) at the wye, junction, inlet or manhole.
Column (36)	Upstream junction type (ex. Inlet, 60° Wye, 30° Bend, Jct. Box, ….)

Column (37)	Taken from Tables 3.8
Column (38)	Taken for Equations 3.23 through 3.26 depending on Junction Type
Column (39)	Upstream Hydraulic Grade Line design point of the conduit segment. Column (24) plus Column (32)
Column (40)	The top of curb elevation at which the inlet is located
Column (41)	Equal to the Column (40) minus Column (39)
Column (42)	Special design comments are entered here.

3.2.4 Storm Sewer Design – Open Channels

3.2.4.1 General

All channels shall be designed to have a minimum bottom width of six (6) feet and based on a maximum flow and a minimum flow line slope of one (1) percent. Side slopes of channels shall not be steeper than one (1) foot rise to four (4) feet horizontal distance. Where slopes are steeper than 4 to 1, the slopes shall be concrete lined for slope protection. In unlined open channels, the side slopes and channel slopes shall be such that erosion is controlled and the channel is stable. Channels discharging into Lake Ray Hubbard must have City of Dallas approval and shall have inverts a minimum of two (2) feet below normal conservation pool level (435.5). Channels discharging into water courses shall have the same invert level as the water course.

The instructions for Form 3.4: Open Drainage Channel Calculations Table, have been included in this section to facilitate the hydraulic design of an open channel.

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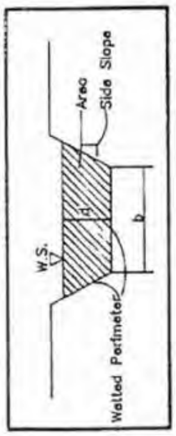
OPEN CHANNEL CALCULATIONS



PROJECT NAME ____________ BY ____________

LINE NAME ____________ DATE ____________

CHANNEL STATION From	To	Channel Type	Flow "Q" (c.f.s.)	Roughness Coeff. "n"	Slope "S" (ft./ft.)	"$S^{1/2}$"	$\frac{Q \times n}{1.486 \times S^{1/2}}$	Width "b" (feet)	Depth "d" (feet)	Side Slope	Area "A" (sq.ft.)	Wetted Perimeter "WP" (feet)	Hydraulic Radius "$R = \frac{A}{WP}$"	$R^{2/3}$	$A \times R^{2/3}$	Velocity $V = \frac{Q}{A}$	Velocity Head $\frac{V^2}{2g}$ (ft.)	REMARKS
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

Form 3.4: Open Channel Calculations Table

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INSTRUCTIONS FOR FORM 3.4:
OPEN DRAINAGE CHANNEL CALCULATIONS

Column (1)	Downstream limit of the section of channel under consideration.
Column (2)	Upstream limit of the section of channel under consideration.
Column (3)	Type of channel as shown shall be either Type I natural unimproved channel, Type II unlined with maintenance section, (concrete pilot channel) or Type III, concrete lined channel.
Column (4)	Flow in the section of channel under consideration.
Column (5)	Roughness coefficient of the channel cross-section taken from TABLE 3.11.
Column (6)	Slope of the channel which is most often parallel to slope of the hydraulic gradient.
Column (7)	Square root of Column (6).
Column (8)	Calculation is made using the values in Columns (4), (5) and (7).
Column (9)	Assumed width of the bottom width of the channel.
Column (10)	Assumed depth of flow.
Column (11)	Assumed slope of the sides of the channel.
Column (12)	Area of flow which is calculated based on Columns (9), (10) and (11).
Column (13)	Wetter perimeter calculated from Columns (9), (10) and (11).
Column (14)	Value is calculated from Columns (12) and (13).
Column (15)	Column (14) raised to 2/3 power.
Column (16)	Product of Column (13) times Column (15).
When the value of Column (16) equals the value of Column (8) the channel has been adequately sized. When the value of Column (16) exceeds the value of Column (8) by more than five percent, the channel width or depth should be decreased and another trial section analyzed.	
Column (17)	Calculation is based on the values of Columns (4) and (12)
Column (18)	Calculation is based on Column (17)
Column (19)	Remarks concerning the channel section analyzed may be entered.

Table 3.11: Roughness Coefficients for Open Channels and Maximum Velocity

Channel Description	Roughness Coefficient Minimum	Roughness Coefficient Normal	Roughness Coefficient Maximum	Maximum Velocity
Minor Natural Streams - Type I Channel				
Moderately Well Defined Channel				
Grass and Weeds, Little Brush	0.025	0.030	0.033	8
Dense Weeds, Little Brush	0.030	0.035	0.040	8
Weeds, Light Brush on Banks	0.030	0.035	0.040	8
Weeds, Heavy Brush on Banks	0.035	0.050	0.060	8
Weeds, Dense Willows on Banks	0.040	0.060	0.080	8
Irregular Channel with Pools and Meanders				
Grass and Weeds, Little Brush	0.030	0.036	0.042	8
Dense Weeds, Little Brush	0.036	0.042	0.048	8
Weeds, Light Brush on Banks	0.036	0.042	0.048	8
Weeds, Heavy Brush on Banks	0.042	0.060	0.072	8
Weeds, Dense Willows on Banks	0.048	0.072	0.096	8
Flood Plain, Pasture				
Short Grass, No Brush	0.025	0.030	0.035	8
Tall Grass, No Brush	0.030	0.035	0.050	8
Flood Plain, Cultivated				
No Crops	0.025	0.030	0.035	8
Mature Crops	0.030	0.040	0.050	8
Flood Plain, Uncleared				
Heavy Weeds, Light Brush	0.035	0.050	0.070	8
Medium to Dense Brush	0.070	0.100	0.160	8
Trees with Flood State below Branches	0.080	0.100	0.120	8
Major Natural Streams - Type I Channel				
The roughness coefficient is less than that for minor streams of similar description because banks offer less effective resistance.				
Moderately Well Defined Channel	0.025	---	0.060	8
Irregular Channel	0.035	---	0.100	8
Unlined Vegetated Channels - Type II Channel				
Mowed Grass, Clay Soil	0.025	0.030	0.035	8
Mowed Grass, Sandy Soil	0.025	0.030	0.035	6
Unlined Non-Vegetated Channels - Type II Channel				
Clean Gravel Section	0.022	0.025	0.030	8
Shale	0.025	0.030	0.035	10
Smooth Rock	0.025	0.030	0.035	15
Lined Channels - Type II				
Smooth Finished Concrete	0.013	0.015	0.020	15
Riprap (Rubble)	0.030	0.040	0.050	12

3.2.5 Culvert Design

3.2.5.1 General

The design of culverts shall be sized to convey the discharge of the design flood frequency of 100-yr fully-developed watershed. The hydraulic calculations shall be entered into Form 3.5, which is further described herein. If computer modeling software is used in culvert design such as HY-8, HEC-RAS, etc. all input and output parameters shall be included in the plans, or in a certified report referenced in the plans.

Where a parallel culvert is to be placed in a roadside ditch the culvert headwalls shall start at the end of the curb return and extend beyond the return.

1. Information in the upper right of form:

- Culvert Location – This is a word description of the physical location.
- Length – The actual length of the culvert.
- Total Discharge, Q – This is the flow computed on FORM 3.1.
- Design Storm Frequency – 100-year storm
- Roughness Coefficient, n – value = 0.013.
- Maximum Discharge Velocity – Obtained from TABLE 3.12.
- Tailwater – This is the design depth of water in the downstream channel and is obtained in connection with the channel design performed on FORM 3.4.
- D.S. Channel Width – This is the bottom width of the downstream channel. The culvert should be sized to approximate this width whenever possible.
- Entrance Description – This is a listing of the actual condition as shown in the “Culvert Entrance Data” shown on the calculation sheet.
- Roadway Elevation – The elevation of the top of curb at the upstream end of culvert.
- U.S. Culvert F.L. – The flow line of the culvert at the upstream end.
- Difference – The difference in elevations of the roadway and the upstream flow line.
- Required Freeboard – The vertical distance required for safety between the upstream design water surface and the roadway elevation or such other requirements, which may occur because of particular physical conditions.
- Allowable Headwater – This is obtained by subtracting the freeboard from the difference shown immediately above.
- D.S. Culvert F.L. – The flow line elevation of the downstream end of the culvert.

- Culvert Slope, S – This is the physical slope of the structure calculated as indicated.

The instructions for FORM 3.5: Culvert Design Calculations Table have been included in this section to facilitate the hydraulic design of a culvert.

Table 3.12: Culvert Discharge Velocities

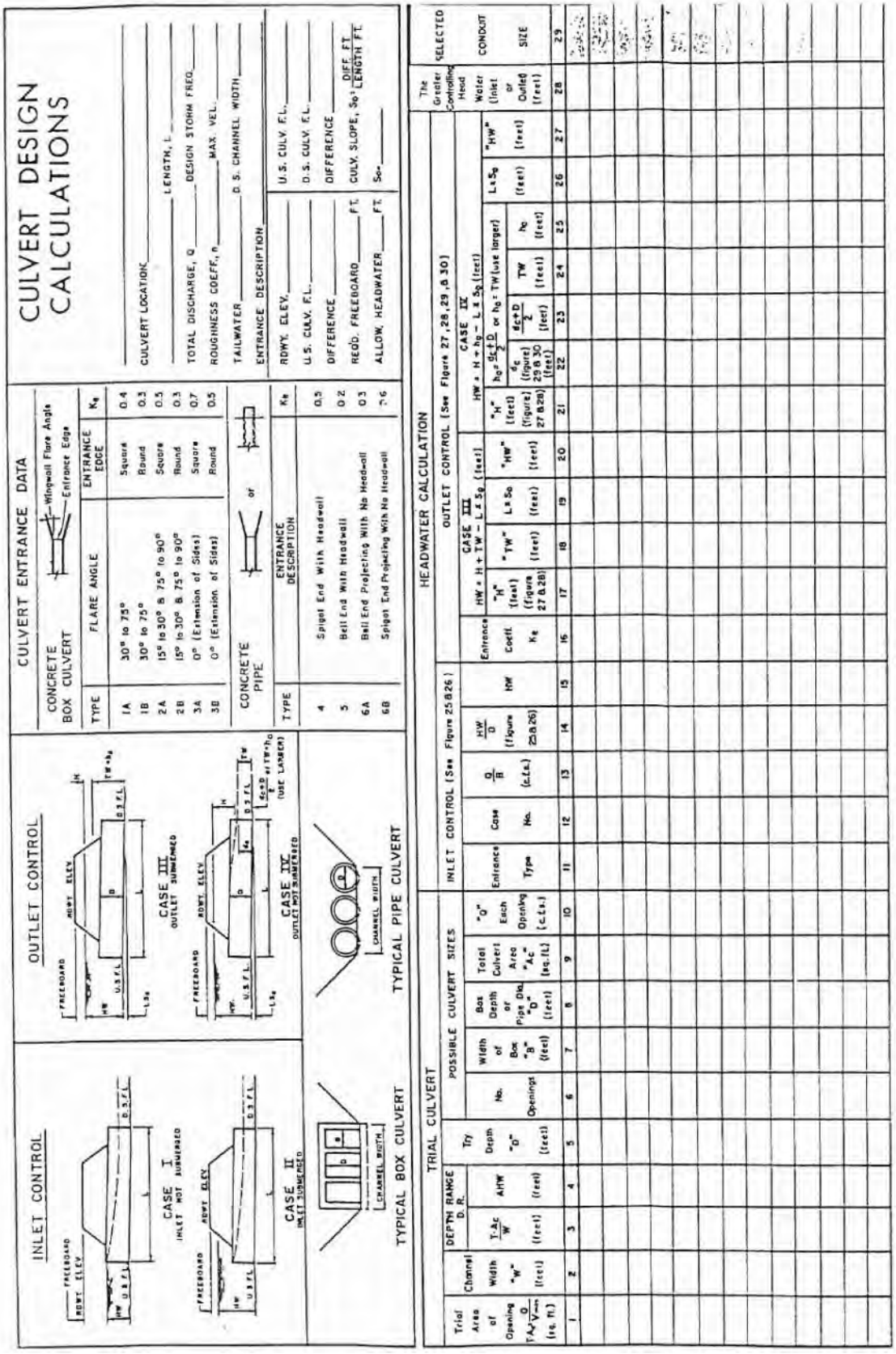
Culvert Discharges On	Maximum Allowable Velocity (f.p.s.)
Earth (Sandy)	6
Earth (Clay)	8
Sodded Earth	8
Concrete	15
Shale	10
Rock	15

*Velocities are based on actual velocity – partial or full flow

INSTRUCTIONS FOR FORM 3.5:
CULVERT DESIGN CALCULATONS

Columns 1 through 10 deal with selection of trial culvert size and are explained as follows:	
Column 1	Total design discharge, Q, passing through the culvert divided by the allowable maximum velocity gives trial total area of culvert opening.
Column 2	Culvert width should be reasonably close to the channel bottom width, W, downstream of the culvert.
Column 3	Lower range for choosing culvert depth is trial area of culvert opening, Column 1 divided by channel width, Column 2.
Column 4	Allowable headwater obtained from upper right of sheet.
Column 5	Trial depth, D, of culvert corresponding to available standard sized and between the numerical values of Columns 3 and 4.
Columns 6, 7 and 8 are solved simultaneously based on providing a total area equivalent to the trial area of opening in Column 1.	
Column 6	Number of culvert openings.
Column 7	Inside width of one opening.
Column 8	Inside depth of one opening if culvert is box structure or diameter if culvert is pipe.
Column 9	Column 6 multiplied by Column 7 and Column 8.
Column 10	Total discharge divided by number of openings shown in Column 6.
Columns 11 through 15 (Inlet Control) and 16 through 27 (Outlet Control) deal with headwater calculations which verify hydraulics of trial culvert selected and are explained as follows.	
Column 11	Obtained from upper right of sheet.

Column 12	When the allowable headwater is equal to or less than the value in Column 8, enter Case I. When the allowable headwater is more than the value in Column 8, enter Case II.
Column 13	Column 10 divided by Column 7.
Column 14	Obtained from FIGURE 3.22 for box culverts or FIGURE 3.23 for pipe culverts.
Column 15	Column 14 multiplied by Column 8.
Column 16	Obtained from upper part of sheet.
Column 17	Obtained from FIGURE 3.24 for box culverts and FIGURE 3.25 for pipe culverts.
Column 18	Tailwater depth from upper right of sheet.
Column 19	Culvert slope, S, multiplied by culvert length, both obtained from upper right of sheet.
Column 20	Sum of Columns 17 and 18, minus Column 19.
Column 21	Obtained from FIGURE 3.24 for box culverts and FIGURE 3.25 for pipe culverts.
Column 22	Critical depth obtained from FIGURE 3.26 for box culverts and FIGURE 3.27 for pipe culverts.
Column 23	Sum of Columns 22 and 8 divided by 2.
Column 24	Tailwater depth from upper right of sheet.
Column 25	Enter the larger of the two values shown in Column 23 or Column 24.
Column 26	Previously calculated in Column 19 and may be transposed.
Column 27	The sum of Columns 21 and 25 minus Column 26.
Column 28	Enter the larger of the values from either Column 15, Column 20 or Column 27. This determines the controlling hydraulic conditions of the particular size culvert investigated.
Column 29	When the Engineer is satisfied with the hydraulic investigations of various culverts and has determined which would be the most economical selection; the description should be entered.



Form 3.5: Culvert Design Calculations Table

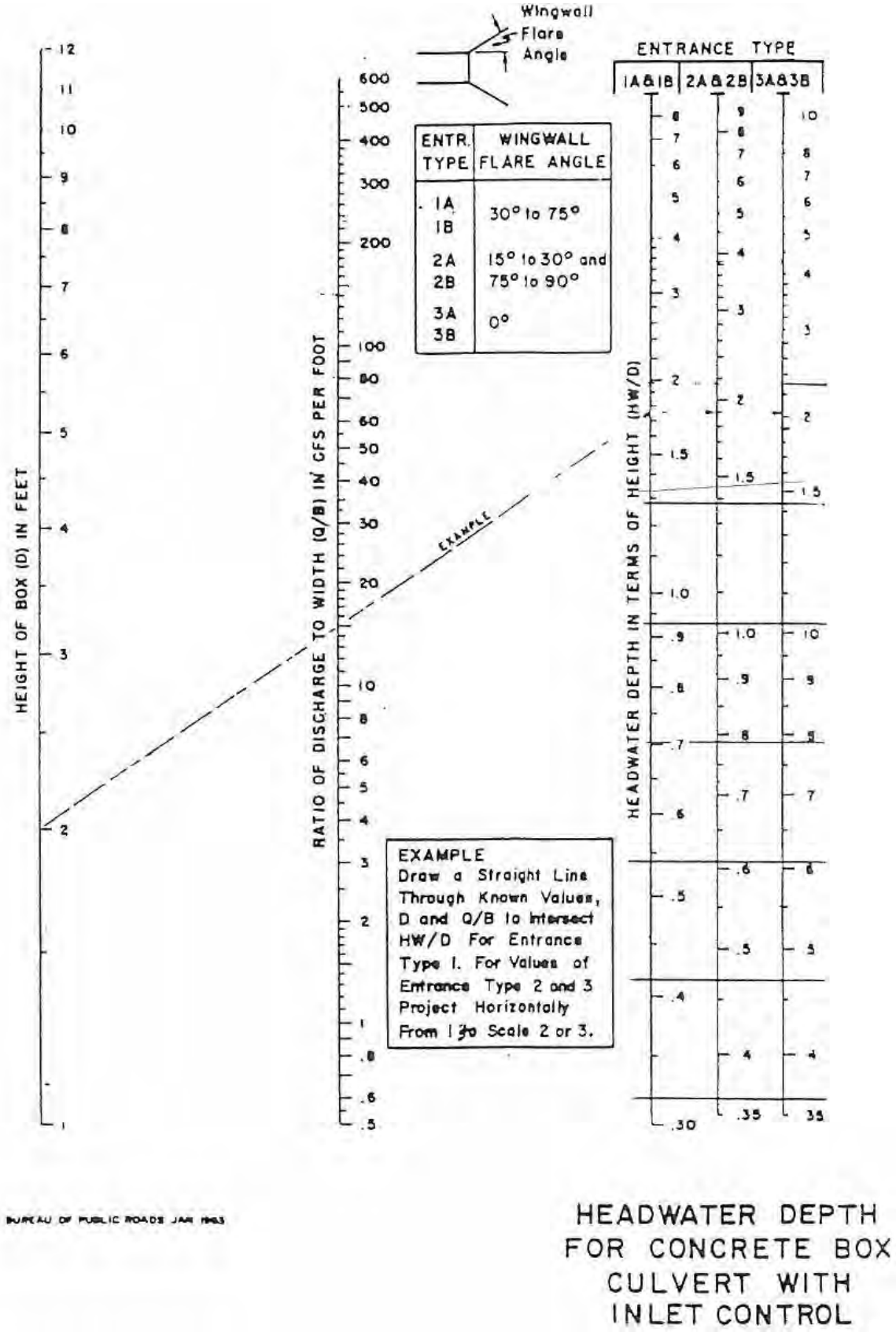


Figure 3.22: Headwater Depth for Concrete Box Culvert with Inlet Control

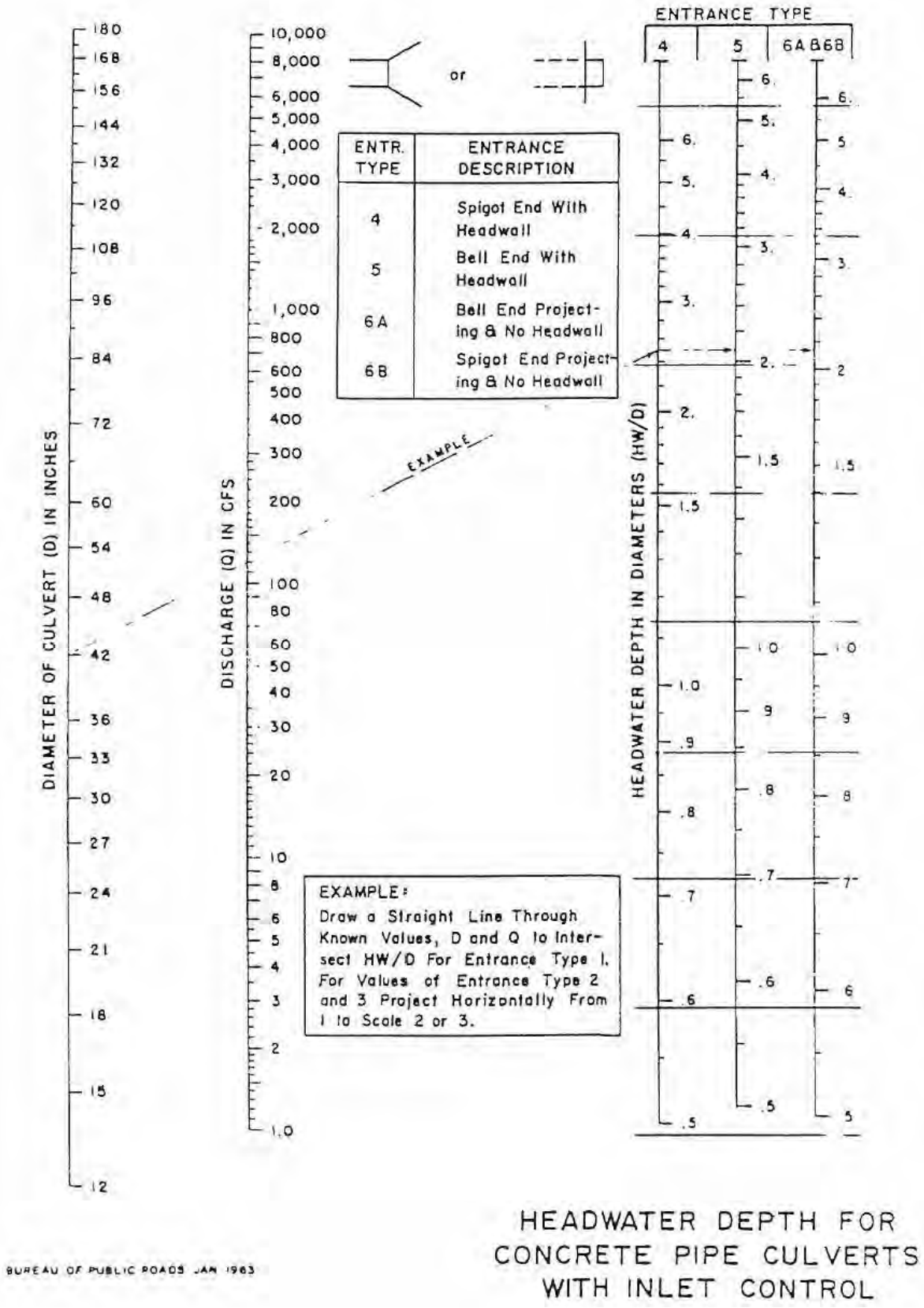


Figure 3.23: Headwater Depth for Concrete Pipe Culvert with Inlet Control

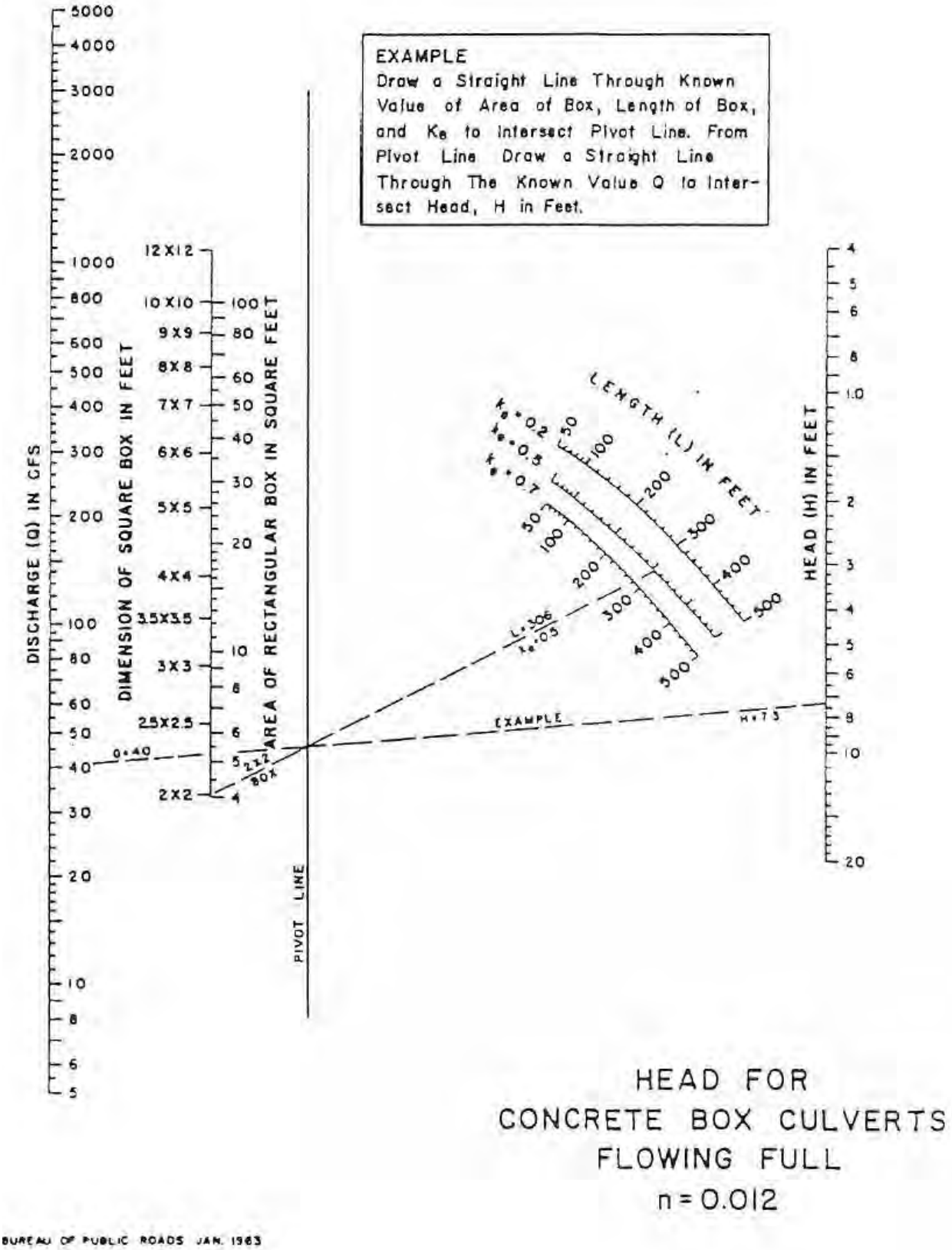


Figure 3.24: Head for Concrete Box Culvert Flowing Full

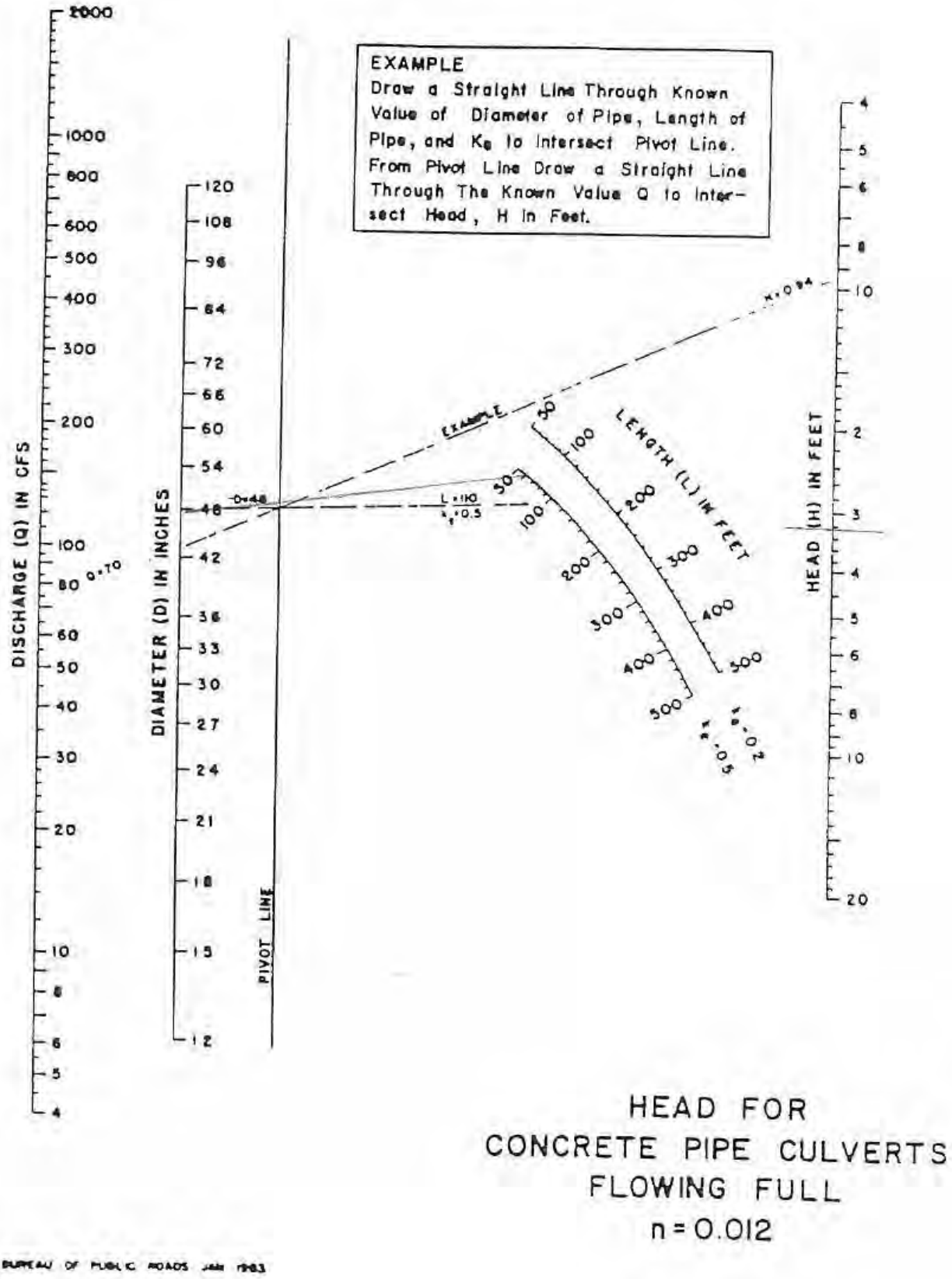


Figure 3.25: Head for Concrete Pipe Culverts Flowing Full

EXAMPLE

Known:

Discharge = 200 c.f.s.

Width of Conduit = 5'

Q/B = 40

Find:

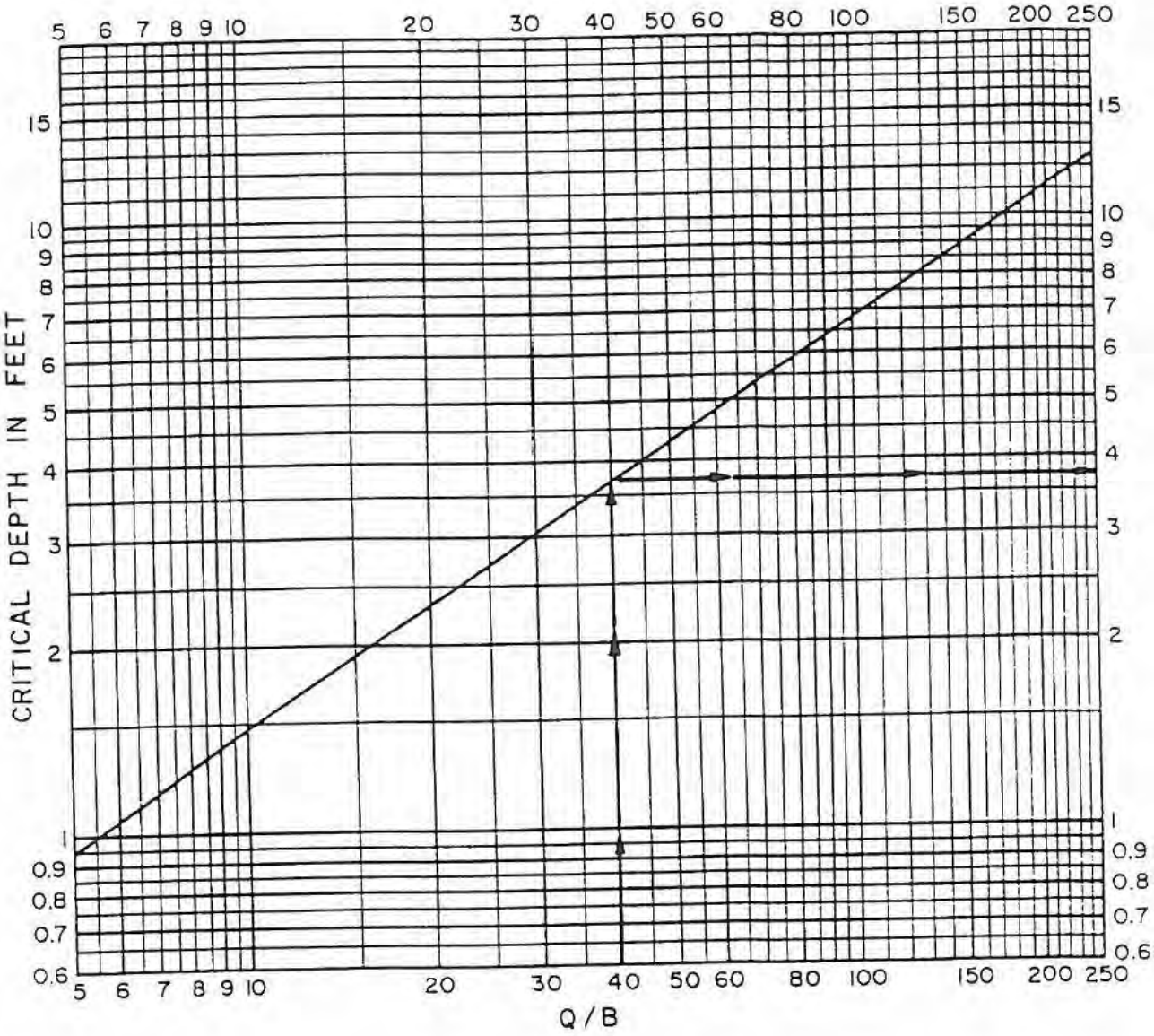
Critical Depth

Solution:

Enter Graph at Q/B = 40

Intersect Critical Depth

at 3.7



CRITICAL DEPTH OF FLOW FOR RECTANGULAR CONDUITS

Figure 3.26: Critical Depth of Flow for Rectangular Conduits

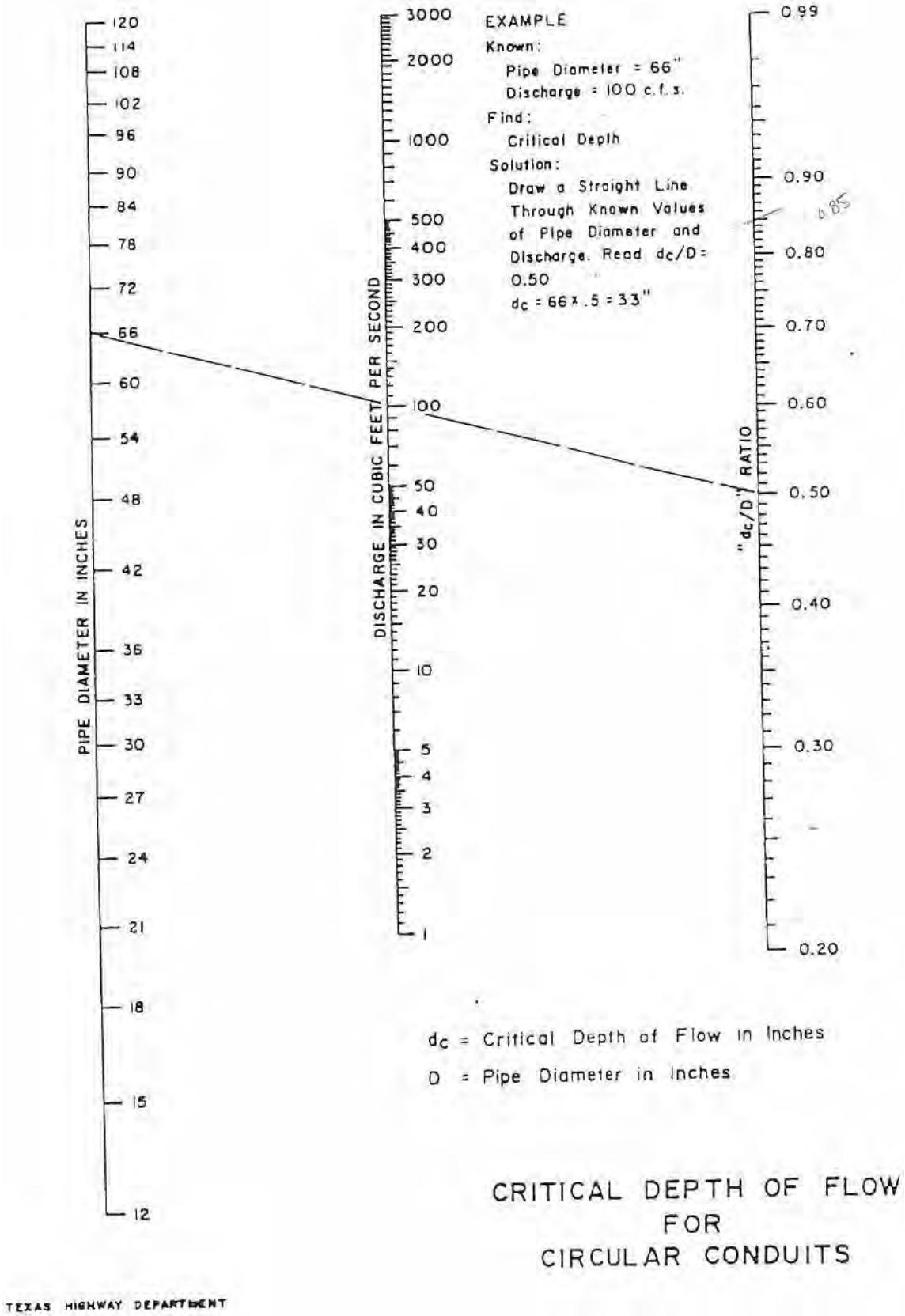


Figure 3.27: Critical Depth of Flow for Circular Conduits

3.2.6 Bridge Design

A. A scour analysis shall be performed and submitted in or with the design plans.

B. For all bridges a flood study report shall be prepared and provided to the City Engineer, documenting the methodology, assumptions, derivation of all data used, and results of the study.

C. The 100-yr projected fully developed water surface elevation shall not be increased upstream or downstream of the bridge.

3.2.7 Erosion Hazard Setback

3.2.7.1 Definition and Purpose

Erosion hazard setbacks shall be determined for every stream and creek (flowing or not) in which natural channels are to be preserved. The purpose of this erosion hazard setback is to reduce the potential for any damage to a private lot, building, utilities or street right-of-way caused by the natural erosion of the creek bank and to minimize the expenditure of public funds for stream bank stabilization projects. The erosion hazard setback shall be included within the drainage easement and its own lot and block that is maintained by the property owner for the stream/creek for any property plat or re-plat.

3.2.7.2 Determination

The erosion hazard setback shall be determined by the following steps:

- Locate the toe of the natural stream bank. The toe may be located outside of the low flow channel.
- Project at a 4(H):1(V) line sloping away from the center of the creek/stream until it intersects natural ground or the new proposed elevation, whichever results in the greater setback.
- From this intersecting point continue an additional 15 feet horizontally away from bank. This shall set the limit of the erosion hazard setback.
- In certain scenarios the calculated erosion hazard setback is within the 100-yr fully developed floodplain. In these scenarios, the erosion hazard setback shall be set to 10 feet beyond the 2 foot of freeboard elevation for the 100-yr fully developed floodplain.

The typical erosion hazard setback established by steps above is shown in Figure 3.28.

Proof of determination of the above shall be included in the Engineering Plan set. It shall include the following:

- Locating and labeling of the toe of the natural stream bank. If trapezoidal in nature both toes shall be identified.
- Existing one-foot topographic contours of the entire site.
- Projected hypothetical one-foot contours representing the 4(H):1(V) line sloping away from the center of the creek/stream until it intersects natural ground or the new proposed elevation
- Show and label hypothetical projected intersecting point/top of 4:1 slope line.
- Show and label Erosion Hazard Setback (15 foot offset away from bank of intersecting point/top of 4:1 slope line)
- Show and label 100-yr fully developed floodplain.
- Show and label 2 foot freeboard line.
- Show and label 10 foot offset of the 2 foot freeboard line.
- Show and label the required Drainage Easement that encompasses the Erosion Hazard Setback and Floodplain.

3.2.7.3 Non-Permitted Structures

The following are non-permitted structures within the erosion hazard setback: building, wall, parking lot, driveway, fences, decks, swimming pools, signage, monumentation, detention structures/ponds or other structures. Water and wastewater lines shall be placed beneath the projected 4:1 slope line. The pipe shall be concrete encased when there is less than 4 foot of cover from the 4:1 slope line.

3.2.7.4 Modifications

Any modifications to the erosion hazard setback will require the following items and approval by the City Engineer:

- A geotechnical and stream geomorphological stability analysis signed and sealed by a licensed professional geotechnical engineer within the State of Te xas.
- Structural plans, calculations and report of the permanent stream bank stabilization measures signed and sealed by a licensed professional structural engineer within the State of Texas.
- Grading permit.
- Adequate access to maintain the stream bank stabilization measures indefinitely.

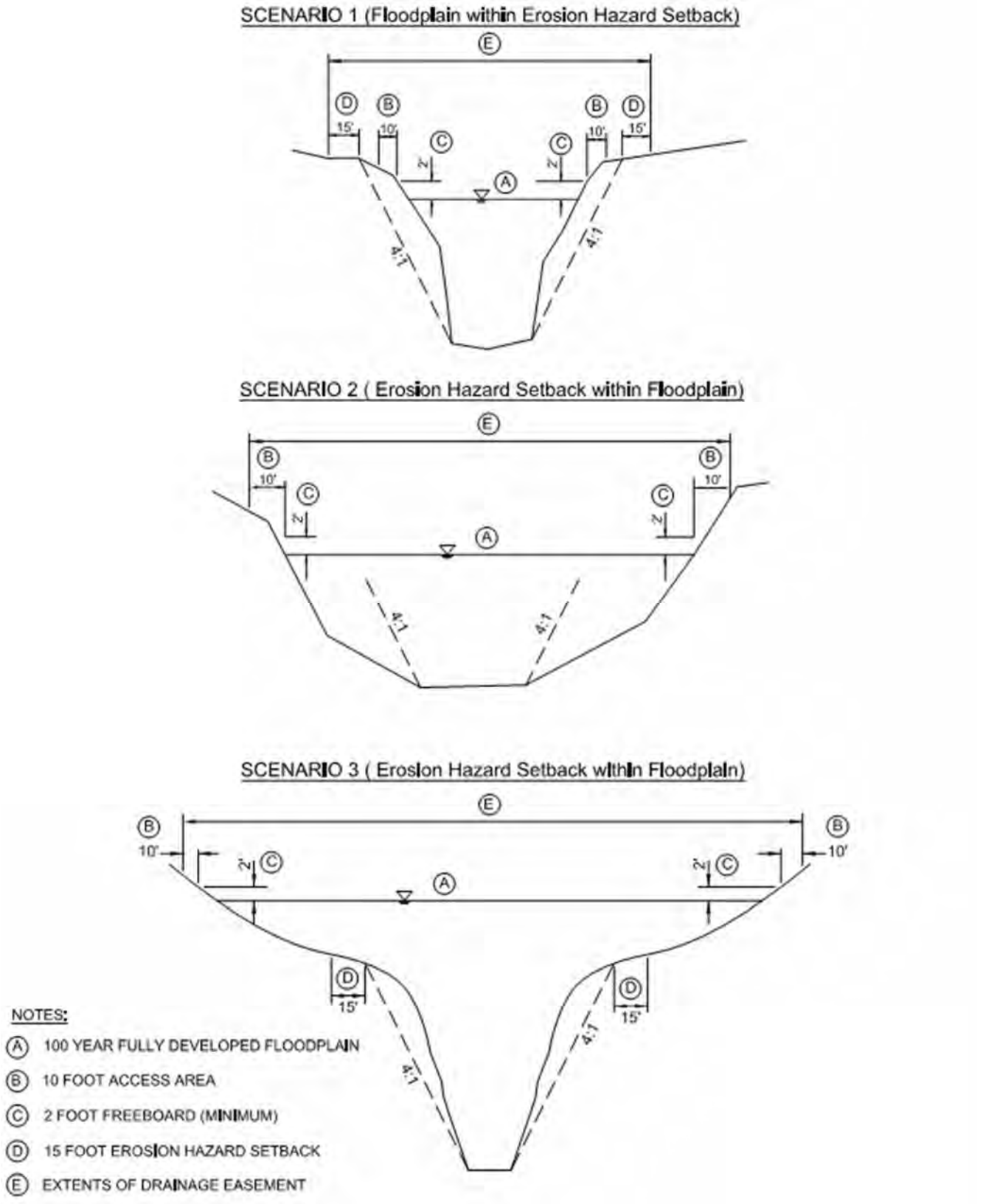


Figure 3.28: Erosion Hazard Setbacks and Drainage Easements

3.3 Minimum Freeboard Requirements

To help prevent flood damages and protect public safety, all design elevation requirements related to water surface elevations and flood elevations shall be based, at a minimum, on the 100-year flood, fully-developed watershed conditions. The difference between a minimum design elevation above the 100-year flood is commonly referred to as minimum freeboard. Table 3.13 provides a summary of absolute minimum freeboard requirements for design and construction in the City of Rockwall. However, prudent engineering in setting design elevations should be incorporated into any design. In some situations, a greater freeboard than those listed in Table 3.13 may be required by the City, at the discretion of the City Engineer, or as required by State and Federal regulations and guideline, depending of flood hazard potential in relation to property damages and public safety. The City's minimum freeboard requirements are not intended to take precedence over State and Federal regulations (except when the City's requirements exceed those set by State and Federal regulations). The minimum elevations of all flood protection levees and all dams must meet requirements of all State and Federal regulations and guidelines.

Table 3.13: Minimum Freeboard Requirements

Description	Minimum Freeboard above 100-year Flood Elevation (ft)*
Minimum Floor Elevations (including basements and sunken floor areas):	
Residential	2.0
Non-Residential (unless flood proofed; see flood damage prevention ordinance	2.0
Building Pad Elevations for Structures (at lowest adjacent structure grade)	1.0
Dams (freeboard above effective crest elevation of dam, after allowing for settlement and consolidation of embankment):	
Less than or equal to 5-ft maximum height	1.0
More than 5-ft maximum height (must meet State and Federal Requirements)	2.0
Dams with entire embankment having overflow protection (such as concrete)	1.0
Detention and Retention Ponds (freeboard along all shoreline areas around the pond):	
Per dam height:	
With Dams less than or equal to 5-ft maximum height	1.0
With Dams more than 5-ft maximum height	2.0
Incised Ponds (no dam)	1.0
Per area draining to pond:	
1 acre or less drainage area	0.0
5 acres to 1 acre drainage area	1.0
Greater than 5 acres	2.0
Flood Protection Levees, Dikes, or Walls (City Engineer Approval Required):	
Significant or High Hazard Flood Damage or Public Safety Potential	3.0
Low Hazard Flood Damage Potential or Public Safety Potential	2.0
Public Roadways, Alleys, and Parking Lots (as measured from edge of pavement/top of curb)	1.0

Channels	1.0
Bridges (as measured from lowest point of low chord)	1.0
Culverts (as measured from edge of pavement/top of curb)	1.0
Sanitary Sewer and Water Manhole Covers	2.0

*The 100-year flood elevations as determined based on discharges resulting from a fully-developed watershed. Greater freeboard may be required, at discretion of City Engineer (depending on flood hazard potential) or by State and Federal Regulations.

3.4 Detention

3.4.1 Intent

It is the City's intent to utilize detention (or detention/retention) of storm water runoff as a solution towards control of potential hazards created by storm water runoff including; reduction in the impact on downstream storm water drainage facilities; prevention of erosive conditions in water drainage ways; protection against downstream and adjacent property damage; and preservation of existing floodplains along major creeks. Detention basins may also improve water quality by allowing some sediment to settle out.

3.4.2 Where is Detention Required?

A. All non-residential development (or other redevelopment areas that will not impact the storm water flow) shall construct detention facilities.

B. Residential developments shall construct detention facilities if it is determined that the downstream system does not have adequate hydraulic capacity for the developed flow and the capacity of the downstream system cannot be increased to allow the conveyance of the developed flows.

C. All development within the Squabble Creek, Buffalo Creek and Little Buffalo Creek watersheds will construct detention facilities and provide a flood study using hydrology and hydraulic models, to prove that the proposed development will not cause any increase in peak flood discharge rates and flood elevations at all computed points downstream of the proposed development. For Squabble Creek this study shall extend downstream to Lake Ray Hubbard, for Buffalo Creek it shall extend downstream through Rockwall Lake Dam, for Little Buffalo Creek it shall extend downstream to the crossing of Horizon Road(FM 3097)..

3.4.3 Type of Detention Facilities

The following detention facilities are to be utilized for detention.

3.4.3.1 Site of ½ Acre or Less

A. Underground
B. On concrete Parking Surface (max 1-foot water depth)

3.4.3.2 Site of Greater Than ½ Acre, On-site

A. Underground

B. On concrete Parking Surface (max 1-foot water depth)
C. Detention Basin
- Side Slopes 4 to 1, or Less (no fencing allowed)
- Area to be Landscaped
- Maintained by Developer
- Additional Amenities Preferred
- Ownership Stays With Property Owner
- Dams Over 5-foot to be approved by State. Dam must meet state dam safety guidelines.

3.4.3.3 Greater Than ½ Acre, Off-site Shared

A. Detention Basin Shared with Other Developments
- May Expand Existing Pond
- No Increase in 100-year Flood Plain Elevation
- Capacity Expanded Above Existing Water Surface
- Need Engineering Study

B. Flow to Regional Detention Basin
- Regional Facility Manager (owner of facility) Must Approve Improvements
- Developer/s Funds Improvements to Regional Basin
- Developer/s Improves Storm Water Conveyance System to Basin (based on fully-developed 100-year flow)
- Dams Over 5-foot to be approved by State. Dam must meet state dam safety guidelines.
- Dam Cannot be Over 15-feet tall
- Basins with Water Retention to have Stored Water Depth of at Least 4-feet
- Need Landscaping and Amenity Features (Approved by Planning Dept.)
- Facility Manager to Assure Good Retained Water Quality
- Trash Collectors Required at Outfall Structures
- Side Slopes to be 4 to 1 or Less
- Developer/Owner Owns and Maintains Basin
- Facility Manager to Develop and Perform Maintenance Program
- Underground (preferred); Natural Open Channel (existing creek with 100-year developed capacity); Developer/s to Obtain Additional Drainage Easement for 100-year Developed Flow Area; No Concrete or Gabion Sidewalls
- Possible Pro-rata from Other Developments that Utilize Basin

C. Existing Lake
- Lake Manager Must Approve
- Developer/s Fund Improvements to Lake
- Developer/s Improves Storm Water Conveyance System to Lake (developed 100-year flow): Underground (preferred); Natural Open Channel (existing creek with developed 100-year capacity);

Developers to Obtain Additional Drainage Easement for 100-year Developed Flow Area; No Concrete or Gabion Channel Sidewalls
- Additional Storage Out of 100-year Storage

3.4.3.4 Existing Ponds

A. Developer/s Improve Existing Undesirable Detention Facilities
   - Remove Fencing Where Possible
   - Provide Concrete Flume in Bottom
   - Provide Landscaping
   - Improve Maintenance Access
   - Reconstruct with Underground System
   - Remove Pond by Conveying Storm Water Flow to Shared Detention Facility without adverse impacts to other properties.

3.4.4 Geometry, Restrictions and Appurtenances

A. Detention ponds shall have a side slope 4:1 or flatter.

B. The detention pond bottom grade shall be at a minimum of 1% slope. A 4-inch thick concrete low flow flume shall be installed from the ponds inlet structure/structures to the outfall structure.

C. All detention ponds and reserved shoreline shall have the appropriate amount of freeboard as called out in Table 3.13 – Minimum Freeboard Requirements from the 100-year water surface, based on flood inflows determined assuming fully-developed watershed conditions (without consideration of any future upstream detention), including incised ponds (without embankment/dams), or a higher design criteria if required by the State.

D. The State of Texas has jurisdiction of all dams, regardless of dam height or impoundment storage size, if they are classified by State regulations and guidelines with hazard classifications as “high – or significant-hazard”. [Reference: Texas Administrative Code, Title 30, Part 1, Chapter 299, Subchapter A, (a)(3)]. Dams with maximum height of over 5 feet must be approved by the State, unless the dam maximum height is less than 15 feet and a registered professional engineer licensed in Texas adequately shows, with an engineering study using the State of Texas Dam Safety guidelines and regulations, that a sudden breach of the dam during and a major flood event, as specified and determined by the State’s procedures, would not cause any significant increase in flooding or significant increase is flood damages as compared to a non-breach of the dam during a non-breach flood event. For dams permanently impounding water, the study should also determine the extent of additional flooding that would be caused by a sudden breach of the dam during non-flooding events. If the breach of the dam can be proven to not cause any significant flood

damages (other than to the dam embankment), then it can be proven to be classified as a "low-hazard" dam by State definition, and the dam may be exempt, at the City Engineer's discretion, from requiring State review and approval. However, regardless of whether the dam design is reviewed by the State, all dams, regardless of size, must have an emergency spillway and be designed, constructed, maintained, and operated per State Dam Safety Guidelines, including emergency action management. The maximum height of the dam, hazard classifications, and "significant" increased flooding (as related to embankment breach analyses) are determined based on the State's definitions and regulations.

E. No detention is allowed in the FEMA 100-yr and local 100-yr fully developed floodplain.

F. No detention pond is allowed with outlet elevation below a receiving stream's or channel's 100-yr fully developed flood elevation.

G. No franchise utilities (Gas, Electric, Cable, Telephone, Communications, etc.), water lines and wastewater lines (except storm systems) are allowed in detention ponds, and detention easements.

H. Underground detention systems must be a fully enclosed pipe system.

I. The detention pond shall have an emergency overflow in case the main outfall structure gets clogged. The emergency overflow shall be sized to pass the fully-developed 100-year flood at a minimum, or greater based on State Dam Safety requirements. City-approved erosion protection shall be placed along the length of the emergency overflow to the flowline of the receiving structure, creek or channel, and extended as necessary to prevent erosion of the dam structure.

J. The detention systems are to be installed and verified for design compliance along with the associated storm sewer and outfall structures and drainage channels, prior to any paving operations. All constructed detention ponds, drainage ways, and open channels shall have the sides and bottom stabilized with sod or anchored seeded matting prior to any paving construction (including building slab). The matting or sod shall be anchored at high velocity locations if deemed necessary. Erosion protection is to be placed at the pond's outflow structure along with any associated erosion BMP's noted on the erosion control plan

K. Sometimes a detention facility will be utilized by several developments, and then a pro-rata agreement/detention masterplan may be entered into with the development constructing the facility and the other developments utilizing the facility Without a pro-rata agreement/detention master plan of all parties in advance of construction of all combined developments, no

new proposed development will be allowed to take credit for any "over detention" of a previous development or the reduction of discharges from a previous development within the watershed in the determination of detention requirements.

L. Detention pond outfall structures shall be fitted with a trash rack.

3.4.5 Detention Calculations

The detention design calculations and outfall rating curves shall be included in the plans and flood study. Increased peak discharges from the detention basin are not allowed for the 5-year, 10-year, 25-year and 100-yr frequency floods based on existing off-site conditions.

3.4.5.1 Methodology

Detention facilities that have a drainage area of less than 20 acres shall be sized using the Modified Rational Method. If the drainage area is equal to or greater than 20 acres then the Unit Hydrograph Method shall be used. The Modified Rational method may be used for drainage areas more than 20 acres but the Unit Hydrograph Method must be performed as a comparison. The more conservative of the two methods shall be used to design the pond (and technical documentation of both methods should be provided to the City for review and verification of the most conservative method selected).

The following conditions shall be used when implementing the Modified Rational Method.

A. The proposed development will construct detention facilities to detain the increase in runoff between the existing 100-year flows (C-undeveloped, T_C = 20 minute) and the fully developed flows (C – depends on zoning, T_C = 10 minute). The "C" value is based on zoning, not pervious/impervious areas. Large area of dedicated open space dedicated to City can be considered by City in this value.

B. Storm rainfall intensity (in/hr) for different storm years shall be as follows:

	100 year	50 year	25 year	10 year	5 year	2 year
10 min	9.8	9.0	8.3	7.1	6.1	5.3
15 min	9.0	8.1	7.5	6.5	5.5	4.5
20 min	8.3	7.5	6.6	5.9	4.9	3.9
30 min	6.9	6.1	5.5	4.8	4.1	3.3
40 min	5.8	5.2	4.6	4.0	3.4	2.6
50 min	5.0	4.5	4.0	3.5	2.8	2.3
60 min	4.5	3.9	3.5	3.0	2.6	1.9
70 min	4.0	3.7	3.3	2.8	2.4	1.8
80 min	3.7	3.5	3.1	2.6	2.3	1.7

90 min	3.5	3.3	2.9	2.5	2.1	1.6
100 min	3.4	3.0	2.7	2.4	1.9	1.5
110 min	3.2	2.9	2.5	2.3	1.8	1.4

C. The following is an example calculation on how the Modified Rational Method is performed to determine detention volume:

MODIFIED RATIONAL METHOD DETENTION BASIN DESIGN

Given: A 10-acre site, currently agricultural use, is to be developed for townhouses. The entire area is the drainage area of the proposed detention basin.

Determine: Maximum release rate and required detention storage.

Solution:

1. Determine 100-year peak runoff rate prior to site development. This is the maximum release rate from site after development.

NOTE: Where a basin is being designed to provide detention for both its drainage area and a by-pass area; the maximum release rate is equal to the peak runoff rate prior to site development for the total of the areas minus the peak runoff rate after development for the by-pass area. This rate for the by-pass area will vary with the duration being considered.

2. Determine inflow hydrograph for storms of various durations in order to determine maximum volume required with release rate determined in Step 1.

NOTE: Incrementally increase durations by 10 minutes to determine maximum required volume. The duration with a peak inflow less than maximum release rate or where required storage is less than storage for the prior duration is the last increment.

PROCEDURE

STEP 1. Present Conditions (Agricultural)

$Q = C*I*A$
$C = 0.35$
$T_c = 20$ minutes
$I_{100} = 8.3$ in/hr
$Q_{100} = (0.35)(8.3)(10 \text{ acres}) = 29.05$ cfs (Maximum release rate)

STEP 2. Future Conditions (Townhouses)

C = 0.80
T_c = 10 minutes
I_{100} = 9.8 in/hr
Q_{100} = (0.80)(9.8)(10 acres) = 78.40 cfs

Check various duration storms:

15 minutes	I = 9.0 Q = (0.80)(9.0)(10 acres) = 72.0 cfs
20 minutes	I = 8.3 Q = (0.80)(8.3)(10 acres) = 66.4 cfs
30 minutes	I = 6.9 Q = (0.80)(6.9)(10 acres) = 55.2 cfs
40 minutes	I = 5.8 Q = (0.80)(5.8)(10 acres) = 46.4 cfs
50 minutes	I = 5.0 Q = (0.80)(5.0)(10 acres) = 40.0 cfs
60 minutes	I = 4.5 Q = (0.80)(4.5)(10 acres) = 36.0 cfs
70 minutes	I = 4.0 Q = (0.80)(4.0)(10 acres) = 32.0 cfs
80 minutes	I = 3.7 Q = (0.80)(3.7)(10 acres) = 29.6 cfs
90 minutes	I = 3.5 Q = (0.80)(3.5)(10 acres) = 28.0 cfs
100 minutes	I = 3.4 Q = (0.80)(3.4)(10 acres) = 27.2 cfs
110 minutes	I = 3.2 Q = (0.80)(3.2)(10 acres) = 25.6 cfs

Maximum Storage Volume is determined by deducting the volume of runoff released during the time of inflow from the total inflow for each storm duration.

10 min Storm	Inflow = (10)(78.4 cfs)(60 sec/min)	= 47,040 cf
	Outflow=(0.5)(20 min)(29.05 cfs)(60 sec/min)	= 17,430 cf
		= 29,610 cf
15 min Storm	Inflow = (15)(72.0 cfs)(60 sec/min)	= 64,800 cf
	Outflow = (0.5)(25 min)(29.05 cfs)(60 sec/min)	= 21,788 cf
		= 43,012 cf
20 min Storm	Inflow= (20)(66.4 cfs)(60 sec/min)	= 79,680 cf
	Outflow= (0.5)(30 min)(29.05 cfs)(60 sec/min)	= 26,145 cf
		= 53,535 cf
30 min Storm	Inflow = (30)(55.2 cfs)(60 sec/min)	= 99,360 cf
	Outflow = (0.5)(40 min)(29.05 cfs)(60 sec/min)	= 34,860 cf
		= 64,500 cf
40 min Storm	Inflow = (40)(46.4 cfs)(60 sec/min)	= 111,360 cf
	Outflow = (0.5)(50 min)(29.05 cfs)(60 sec/min)	= 43,575 cf
		= 67,785 cf
50 min Storm	Inflow = (50)(40.0 cfs)(60 sec/min)	= 120,000 cf
	Outflow = (0.5)(60 min)(29.05 cfs)(60 sec/min)	= 52,290 cf
		= 67,710 cf

60 min Storm	Inflow = (60)(36.0 cfs)(60 sec/min)	= 129,600 cf
	Outflow = (0.5)(70 min)(29.05 cfs)(60 sec/min)	= 61,005 cf
		= **68,595 cf**
70 min Storm	Inflow = (70)(32.0 cfs)(60 sec/min)	= 134,400 cf
	Outflow =(0.5)(80 min)(29.05 cfs)(60 sec/min)	= 69,720 cf
		= 64,680 cf
80 min Storm	Inflow = (80)(29.6 cfs)(60 sec/min)	= 142,080 cf
	Outflow = (0.5)(90 min)(29.05 cfs)(60 sec/min)	= 78,435 cf
		= 63,645 cf
90 min Storm	Inflow = (90)(28.0 cfs)(60 sec/min)	= 151,200 cf
	Outflow = (0.5)(100 min)(29.05 cfs)(60 sec/min)	= 87,150 cf
		= 64,050 cf
100 min Storm	Inflow = (100)(27.2 cfs)(60 sec/min)	= 163,200 cf
	Outflow = (0.5)(110 min)(29.05 cfs)(60 sec/min)	= 95,865 cf
		= 67,335 cf
110 min Storm	Inflow = (110)(25.6 cfs)(60 sec/min)	= 168,960 cf
	Outflow = (0.5)(120 min)(29.05 cfs)(60 sec/min)	= 104,580 cf
		= 64,380 cf

Maximum volume required is **68,595 cf** at the 60 min. storm duration.

3.4.5.2 Outfall Structures

Detention out fall structures shall be multi-staged and designed to detain the 5-yr, 10-yr, 25yr and 100-yr storm events without increasing the peak discharge. A chart shall be furnished by the design engineer showing the allowable flows verses the actual flows through the detention pond outflow structure for 5-yr, 10-yr, 25-yr, and 100-yr storm events.

When the design is based on the Modified Rational Method, outfall structures shall be designed in accordance to the equations established in Hydraulic Engineering Circular No. 22, Urban Drainage Design Manual (HEC-22). The Engineer shall include all calculations/ equations for the outfall structure in the plans, including each stage of the structure (5-yr, 10-yr, 25-yr, and 100-yr storm events).

When the detention pond and outfall structure is designed using a Unit Hydrograph Method (hydrology model) and a hydraulic model is being prepared (such as for a detention pond with dam located across a stream for which flood elevations will be determined), the outfall structure discharges may be determined with the hydraulic model. All

flow characteristics and conditions of the outfall structure should be adequately represented in the hydraulic model or other calculations to account for orifice flow conditions, weir flow conditions, and full-pipe and partially-full pipe flow conditions for all discharge openings, pipes, and overflow areas of both the discharge structure and the dam. The resulting discharge versus pond flood elevation data should be adequately represented in the hydrology model to ensure that the flood elevations computed with the hydrology model reasonably agree with those computed by the hydraulic model for all ranges of discharges.

City approved erosion protection shall be placed around the outfall structure and shall extend downstream the entire flow path length to the flowline of the receiving structure, creek or channel. The erosion protection shall extend to 2 feet above the 100-yr water surface elevation.

3.5 Floodplain Studies, Reclamation and Modification

All floodplain studies, reclamation, modification, flood boundary delineations and design of structures within or adjacent to creeks or streams shall meet the following guidelines set forth in this section and the most current Flood Hazard Damage Prevention and Control Ordinance.

A. The qualified professional engineer licensed in the State of Texas shall prepare a flood study report documenting all data, methodology, and assumptions used in the study. The study report shall be properly signed and sealed, and include a concluding statement certifying that the hydrologic and hydraulic study is based on standard engineering practice, that the project is constructed, or proposed to be constructed, as shown in certified engineering plans used in the study such that there will be no adverse increases in flooding or flood damages on other properties and that the project meets the requirements of all parts of the City's current Flood Hazard Damage Prevention and Control Ordinance.

B. Flood studies shall follow the general procedures set by FEMA for applying for a LOMR or CLOMR, including hydrologic and hydraulic modeling; drainage area workmap; floodplain workmap; annotated FIRM; FEMA forms; and complete technical documentation of all data used in the study, including, but not limited to, calculations of times of concentrations or lag times and calculations of other runoff parameters such as NRCS curve numbers. For hydrology models, drainage areas should be determined to the nearest 0.01 acre (0.000015 sq. mi.); times of concentration and lag times should be computed to the nearest 0.01 hour (6 min.); and NRCS composite runoff curve numbers should be computed to the nearest 0.1 value. Other requirements are contained in Unit Hydrograph Method Section of these standards. These

procedures shall be performed even for flood studies not being submitted to FEMA.

C. Floodplains and watersheds shall be modeled using standard practice engineering models that are public domain. The use of computer modeling software that is not public domain will require approval by the City Engineer. [The most recent versions of HEC-HMS and HEC-RAS are currently the City's preferred hydrology and hydraulic models for flood studies. The use of these models is highly encouraged in cases where a conversion from older models is desired or in previously-unstudied areas where new models are to be created].

D. All design elevations shall be based on computed flood elevations using flood discharges for 100-year projected fully-developed watershed conditions, including the effects of changes in storm water runoff and effects of encroachment and changes in flood valley storage caused by the proposed project.

E. All flood study models shall utilize the most current available models from the City or FEMA as base models (if available) and shall incorporate all additional modifications that have occurred since the last update of these models. Conversion of base models to newer approved digital models is allowed, as noted below.

F. Results of hydrology and floodplain hydraulic computer models shall be summarized in tabular form, to show differences in computed 100-year flood discharges and flood elevations. The computer model results to be included in the comparison tables include:

    a. The original effective base hydrology and hydraulic models, if available, as provided by the City or FEMA.

    b. Improved modeling procedures may be allowed and included, such as conversion of original models to newer versions of computer modeling software, such as conversion of HEC-2 models to HEC-RAS and conversion of TR-20 or HEC-1 models to HEC-HMS. Conversion to computer software that is not free public domain software and that is not on FEMA's approved list of computer modeling software must receive approval by the City Engineer. Results of conversion to improved modeling should be performed prior to any updates or corrections to the model data and compared in tabular form with the original base model results.

    c. Corrected hydrologic and hydraulic models (commonly referred to as "corrected effective" models by FEMA procedures) to include any improved data or needed corrections, such as new surveyed floodplain cross sections, inclusion of additional cross sections, or improved

topographic mapping, but should not include and man-made changes to the watershed or floodplain.

d. Pre-project hydrologic and hydraulic models, to update the computer models by adding man-made changes that have occurred in the watershed and floodplain since the date of the original effective base models. [If there are no updates based on man-made changes, then the "corrected effective" and "pre-project" models are the same].

e. Post-project hydrologic and hydraulic models, to include all changes that are included in the pre-project models, plus hydrologic and hydraulic characteristics that are representative of changes based on the project's proposed final completed construction. The post-project hydrology should include changes in runoff conditions related to modifications of land cover and grading, changes in times of concentration or lag times, alteration of stream channels and floodplain areas (including changes in floodplain valley storage and changes in flow velocities), changes in drainage areas and drainage patterns, and any proposed mitigation to prevent increases in flood discharges. The post-project hydraulic models should include effects to floodplain hydraulic characteristics, including changes in floodplain and channel configuration, such as encroachments, excavations, channelization, proposed hydraulic structures, clearing of areas that will be continually maintained, and changes in hydrology (flood discharges). The effects of temporary clearing of vegetation in areas that will not be maintained should not be included.

Hydrologic and hydraulic computer modeling must be provided for both existing watershed conditions (both pre-project and post-project conditions), with summary comparisons of various steps ("a" through "e", above) shown in tabular form, to include computed 100-year discharges and flood elevations. The results of hydrology and hydraulic post-project models will be compared with results of pre-project models to verify compliance of City Standards requiring no increased flooding on other properties. Additionally, hydrology and hydraulic models must be provided based on fully-developed watershed conditions with the proposed project. The results of the fully-developed condition models, will be used to determine compliance with the City's design elevation standards. When construction of a project will be in phases, the City Engineer may require flood studies to be submitted for each phase.

G. When transferring discharges computed by the hydrology models as input data entered into the hydraulic models, round-off of discharges is allowed only to the nearest one (1) cfs. All hydrology models should be set to compute discharges to the nearest one (1) cfs and flood elevations (such as in ponds) to the nearest 0.01 ft. All hydraulic models should be set to compute flood elevations to the nearest 0.01 ft. Locations of flow changes in the hydraulic

model should be carefully determined to avoid undue under-calculation of flood elevations. For example, in order to prevent unreasonable under-calculations of flood elevations along portions streams, discharges computed at sub-basin outlets along a stream should normally be used in the hydraulic model for a reasonable extended portion of the upstream floodplain reach, in order to avoid neglecting all of the lateral inflow within the upper stream reach in the hydraulic model computations.

H. The completed flood study, including detailed technical documentation; printed hydraulic and hydrological model input data and output results, digital model files (as listed in "F", above, for both existing and projected future fully-developed watershed conditions), supporting calculations, drainage area maps, floodplain boundary maps, and certification statement (as noted in "A.", above) shall be submitted to the City for review.

I. The watershed work map(s) should include the following:

a. Multiple watershed work maps may be submitted for pre-project and proposed project conditions, as long as all of the following items are provided.

b. Total watershed drainage area and sub-basin drainage delineation boundaries, including those representative of the original base hydrology model, the corrected drainage delineations (if any), and proposed project changes in drainage delineations and any added sub-basins. All sub-areas should be labeled in agreement with sub-area labels used in the hydrology models.

c. Topography overlaid on high-resolution aerial photography, with elevation contour labeling.

d. Delineation of hydrologic soil groups and land cover conditions (these may be included on a separate map, with drainage delineations).

e. Property boundaries of the tract of land where the proposed project is located, including any proposed division lines for the current and future project phases.

f. Proposed project, with proposed grading and changes in land cover.

g. Stream channel centerline flow path, with flow direction indicated.

h. Flow path used in determining times-of-concentration or lag times (both pre-project and modifications based on proposed construction).

i. Title block, legend, north arrow, and bar scale.

J. The floodplain work map(s) should include the following:

a. Multiple floodplain work maps may be submitted, as long as all of the following items are provided.

b. Floodplain cross sections, with location and orientation relative to the floodplain, with labels in agreement with the stations referenced in the hydraulic models. If the study involves a stream that has been previously studied, stream stationing should be in general agreement with stationing used in the previous study. For streams with no previous flood studies, the stream stationing should be based on channel distance upstream from the stream's point of termination (downstream location of where the stream enters a larger receiving stream or major lake (such as Lake Ray Hubbard).

c. Topography overlaid on high-resolution aerial photography, with elevation contour labeling.

d. Floodplain boundaries and flood elevations for the 100-year flood using discharges for both pre-project existing watershed conditions and modifications based on proposed project discharges.

e. Floodplain boundaries identified on the Flood Insurance Rate Maps as Special Flood Hazard Areas, and floodplain boundaries from previous studies (if available from the City) with 100-year flood elevations.

f. Floodplain boundaries and flood elevations for the 100-year flood based on projected fully-developed watershed conditions, with the proposed project.

g. Stream channel centerline (invert) with direction of flow indicated (for both pre-project and any changes in stream channel centerline based on the proposed construction).

h. Property boundaries of the tract of land where the proposed project is located, including any proposed division lines for the current and future project phases.

i. Title block, legend, north arrow, and bar scale.

K. In order for the City to maintain and update their hydrology and hydraulic computer models, after construction is completed, the developer's engineer must update and submit to the City their final certified flood study report, with hydrology and hydraulic models, along with all supporting calculations, maps,

report, AutoCAD (.dwg files), and GIS files and other exhibits to adequately represent as-built conditions. If the project has been submitted to FEMA, the updated models and revisions to flood study reports should include all modifications that were approved by FEMA.

L. The City Engineer will determine whether the proposed development will require a LOMR or CLOMR. All documentation prepared for submitting to FEMA (LOMRs/CLOMRs) will be reviewed by the City. The City will not approve the flood study prepared for a LOMR, nor sign a LOMR application form, until construction grading associated with the LOMR has been completed, certified "as-built" plans are submitted to the City, construction has been verified by onsite inspection(s), and all required Local, Federal, and State permits and approvals have been received.

M. The City will utilize an engineering consulting firm to assist City staff in the review of a flood study. The cost of this consultant review shall be borne by the developer, engineer, or property owner submitting the flood study. The City shall first obtain a cost estimate from the engineering consultant for the flood study review at time of the initial flood study submittal. Before the review begins, the developer, engineer, or property owner submitting the flood study shall deposit with the City funds equal to the cost estimate. The City shall disburse the funds to the consulting engineer as the review progresses. Should the consultant fees exceed the initial estimate, the developer, engineer or property owner submitting the flood study shall be informed of the shortage and a new estimate made by the consultant engineer to complete the flood study review. Additional funds will then be deposited with the City by the developer, engineer or property owner submitting the flood study to cover the estimated shortfall before the review of the study resumes. Any unused funds to be reimbursed to the developer, engineer or property owner submitting the flood study. If review process is performed by City staff, the City will submit a cost estimate for flood study review at time of the initial engineering submittal.

3.6 Storm Drainage Management Plan

3.6.1 General

Storm drainage facilities shall include all elements of a drainage system consisting of streets, alleys, storm drains, channels, culverts, bridges, swales and any other facility through which or over which storm water flows, all of which the City must have a right in, either in the form of a dedicated right-of-way, floodway or drainage easements.

3.6.2 Site Drainage

All new subdivisions shall provide as part of the subdivision review process a complete storm drainage management plan. This plan will include, but not be limited to, the following: a complete review of all on-site, upstream and downstream drainage within the impacted watershed; determine all on-

site and downstream drainage facility improvements due to the increased runoff from the proposed development and future upstream and downstream developments; and contain calculations necessary to determine compliance with the Standards of Design herein. Detention will be required if the downstream storm system is not capable of handling the proposed drainage flows. The plan shall be done, using current zoning conditions or land use prescribed by the City's Land Use Plan (whichever creates the greatest storm water runoff), with maximum development considered throughout the watershed. The storm drainage plan shall show all necessary improvements with flow data provided at each point of interception of water. As part of the storm drainage plan, the developer shall show a lot grading plan to direct all water to proper intersection points avoiding cross flow of water from lot to lot. All upstream discharge shall be intercepted and carried through the proper intersection points avoiding cross flow of water from lot to lot. All upstream discharge shall be intercepted and carried through the proposed development in compliance with the Standards of Design herein. All discharge from the proposed development shall be designed in accordance with the Standards of Design herein with all necessary improvements being installed by the developer to protect downstream property and adjacent properties from damage. The determination of necessary improvements to existing drainage facilities downstream of a proposed development shall be reviewed by the City Engineer for compliance and adequacy. Deviations from the City Engineer's recommendations and the Standards of Design herein may be approved through the requesting and granting of a variance by the City Council. If a storm drainage plan has been completed prior to new proposed development in question, the developer may use this plan if the City Engineer deems the existing plan is adequate.

3.6.3 Subdivision Development

All subdivision developments shall be built in complete compliance with a storm drainage plan as outlined herein. All lots shall be graded at the time of development in accordance with the plan. All grading shall not exceed a slope of 4 to 1 unless approved by the City Engineer. Approved erosion control shall be provided as part of the development construction on any or all lots within the development to protect the drainage, lot development and adjacent property.

The finish building pad for all subdivision developments shall be elevated to a minimum of 1.0 foot above the crown of the road. In no circumstance shall a building pad and finish floor of any structure be placed below street grade.

3.6.4 Construction Erosion Controls

Construction Erosion Controls shall follow the guidelines set out in NCTCOG's iSWM™ Technical Manual: Construction Controls April 2010, Revised 9/2014 or more recent revision.

In order to address the requirements of pollution reduction at construction sites, a variety of controls should be employed to reduce soil erosion, reduce sediment loss from the site, and manage construction-generated waste and construction related toxic materials. Controls consist of both temporary and permanent methods to reduce pollution from a construction site. The majority of controls address loss of soil from the site. Soil loss in the form of erosion and sediment due to storm events and wind constitute the majority of pollution generated from construction sites. Controls that address erosion and sediment are typically more site specific than waste and toxics management. Erosion and sediment controls are dependent on site slopes, drainage patterns and drainage quantities along with other site-specific conditions. Materials and waste management consists primarily of "good housekeeping" practices which are dependent on the type of construction and the quantity and type of building materials.

Control measures shall follow the control selection guide set forth in the iSWM manual. Control measures from each of the three categories; Erosion Controls, Sediment Controls and the Material and Waste Controls shall be used in the design of an Erosion Control Plan for a site. Standard details called out in Division 1000 of NCTCOG's Standard Specifications and Standard drawing shall be utilizes as well in the development of an erosion control plan.

Control Measures such are Silt Fences, Inlet Protection, rock berms, etc. shall be removed from the site once grass cover has been established. Grass cover shall be determined by the Vegetation section of these Standards.

1. Construction Entrance:

   No crushed concrete is allowed and rock must be a minimum of twelve (12) inches thick using well graded rock with minimum diameters of four (4) to six (6) inches.

2. Silt Fence:

   No wooden stakes to be allowed on any erosion control device.

3. Performance:

   Erosion from construction sites can be a significant water quality problem. Developing areas are cleared of vegetation during

construction leaving the soil exposed and susceptible to erosion. Runoff then transports eroded sediment from these areas and deposits it downstream. The accumulation of silt in streams and ponds is a form of water pollution that is unattractive and impedes drainage.

Prevention is a key aspect of erosion control. Many of the control methods presented herein can be placed in a manner that will protect highly erodible areas such as steep slopes. The prevention of erosion requires prior planning to ascertain the placement of selected control methods. The rewards of this planning will be a significant reduction in soil loss. Not only can soil loss be prevented, but eroded soil can be recovered on the construction site and used for fill.

The particulate material in construction site runoff is generally heavier and larger than particulates in urban runoff. These attributes facilitate the removal of the material whether the removal is by settling in a sediment trap or by filtration through a filter fence. Temporary sediment traps, filters and routing devices an effectively control erosion for construction sites if properly applied. These methods are even more effective when permanent management techniques are used in an effort to control temporary increases in sediment loads.

3.6.5 Lot Development

All lot developments shall include a drainage plan preventing all diversion of water from the approved path of discharge. The builder at the time of permit application shall furnish a grading plan in compliance with the appropriate chapter of the building code adopted by the City, the grading plan for the development and the storm drainage plan approved for that particular development. If the re-grading of a lot is necessary, the builder shall be required to furnish a new drainage plan indicating the diversion and rerouting of the affected storm water. When the re-grading of a lot prevents the drainage from flowing to the proper structures as designated in the drainage plan, then the builder will furnish a registered engineer's review for adequacy of existing structures to which the water is diverted. If improvements are necessary to provide for adequate drainage due to re-grading of a lot, then the improvement must be made at the builder's expense before a grading permit or other permits for construction will be issued by the City. The City Engineer will review the information submitted for compliance with the approved grading and drainage management plan. Accepted City streets are not to be used as an erosion control. No inlet protection is allowed in an accepted City street.

A. Off-Site Cost Sharing: The developer shall be fully responsible for the construction of off-site drainage improvements necessary for his subdivision and the surrounding area, unless other provisions are approved by the City Council. Provisions for reimbursement of cost in excess of those necessary to serve his subdivision, and any other provisions, shall be made a part of a facilities agreement. For any subsequent subdivision utilizing such facilities, any cost due prior developers shall be pro-rated based on the increased contribution of storm water runoff. Such pro-rated amounts shall be made a part of any subsequent agreement, collected by the City and repaid to the original developer making such improvements.

   The original developer shall provide the City with acceptable documentation of actual construction cost from which calculation of reimbursable amounts will be made for inclusion in the facilities agreement.

B. Exemptions: when a development is of two lots or less and in the City Engineer's opinion does not affect existing drainage facilities or affect the adjacent property, the City Engineer may allow the developer to waive any off-site pro-rata costs.

C. All City right-of-ways shall be sodded if disturbed. No artificial grass is allowed in any City right-of-way and/or easements.

D. Before Acceptance of Streets and Alleys silt fencing shall be placed at the back of curb/edge of all pavement.

City of Rockwall
The New Horizon

4. VEGETATION

4.1 General

All seeding, sodding and fertilizer requirements are to be done in accordance with the North Central Texas Council of Governments (NCTCOG) Standards and Specifications (Under Item 202) as modified by the City of Rockwall – Item 202

4.2 Coverage

The developer shall establish grass and maintain the seeded area, including watering, until a "Permanent Stand of Grass" is obtained at which time the project will be accepted by the City. A "Stand of Grass" shall consist of 75% to 80% coverage and a minimum of one-inch (1") in height as determined by the City. Re-seeding will be required in all washed areas and areas that don't grow.

All City right-of-ways shall be sodded if disturbed. No artificial grass is allowed in any City right-of-way and/or easements.

4.3 Planting Season

Type I Bermuda Grass – Hulled
50 lbs./acre, April through June

Type II Annual Rye Grass
40 lbs./acre, September through March

Type III Bermuda Grass – Unhulled
50 lbs./acre, January through March and July through August

A mix of seed shall be used in overlapping planting seasons.

4.4 Additional Information

For a public utility less than 10 inches in size no tree shall be planted within 5 feet of the utility and for a utility greater than or equal to 10 inches in size no tree shall be planted within 10 feet of the utility.

If trees are approved by Zoning to be within the right-of-way then a City approved root barrier will be required to be installed in order to keep roots from degrading the pavement structure.

Vegetation over two feet in height shall not be planted in any visibility easement or potential sight visibility (including medians).

5. WATER AND WASTEWATER SYSTEMS

5.1 General Requirements

The design and construction of the water and wastewater system to serve the development shall be in accordance with good engineering principles, with these Standards of Design, the Standard Specifications for Construction and the Standard Details and with the requirements of the Texas Commission on Environmental Quality (TCEQ).

All materials to be permanently incorporated for use on projects in the City of Rockwall shall be produced in the United States of America, alternate products must be approved in writing prior to installation by the City Engineer. Therefore, "Domestically produced in the United States of America" means all manufacturing processes must occur in the United States of America, to mean, in one of the 50 States, the District of Columbia, Puerto Rico or in the territories and possessions of the United States.

All on-site and off-site water and wastewater mains shall be sized and located to conform to projected demands in accordance with the current Water Master Plan and Wastewater Master Plan and the computer model with regard to the impact of each development on the existing and proposed water system. No construction shall commence prior to the approval of the plans and specifications by the City.

5.1.1 System Capacity Studies

A Water and Wastewater System Capacity Study shall be performed for all developments or re-developments that propose a change in existing land use (change in density) that does not conform to the City's current Water and Wastewater System Master Plan.

The City will utilize an engineering consulting firm to assist City staff in performing Water and Wastewater System Capacity Studies. The cost of this study, by the consultant, shall be borne by the developer, engineer, or property owner requesting the proposed change in land use. The City shall first obtain a cost estimate from the engineering consultant for the study at time of the initial submittal. Before the study begins, the developer, engineer, or property owner submitting for a change in land use shall deposit with the City funds equal to the cost estimate. The City shall disburse the funds to the consulting engineer as the study progresses. Should the consultant fees exceed the initial estimate, the developer, engineer or property owner submitting for the change in land use shall be informed of the shortage and a new estimate made by the consultant engineer to complete the study. Additional funds will then be deposited with the City by the developer, engineer or property owner to cover the estimated shortfall before the study is complete. Any unused funds to be

reimbursed to the developer, engineer or property owner submitting for a change in land use. If review process is performed by City staff, the City will submit a cost estimate for the study at time of the initial submittal.

5.1.2 Connections for Future Adjacent Developments

All development shall accommodate future adjacent and upstream/downstream developments by extending water and wastewater lines across the proposed development in order to create water and wastewater systems connectivity. This connectivity will provided for an ease of future development and limited disturbance to existing developments. These extensions of the water and wastewater facilities shall match the City's Water Master Plan and Wastewater Master Plan.

5.1.3 Easements

If a water or wastewater main is located on private property the mains shall be within an easement that conforms to the minimum width in Table 5.1.

Table 5.1: Water & Wastewater Line Easements – Minimum Width

		Minimum Easement Width (ft)
Conduit Size	<= 48" diameter	20'
	> 48" diameter	Approval City Engineer
Depth of Conduit	< 14'	20'
	14' - 16'	25'
	17' – 20'	30'
	21' – 23'	35'
	> 23'	40'

5.1.4 Separation of Water and Wastewater Lines

All water lines and wastewater lines shall be separated 10 foot horizontally and per TCEQ Rules and Regulations. Refer to the following:

- Chapter 290 - Public Drinking Water SUBCHAPTER D: RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS §§290.38 - 290.47
- Chapter 217 - Design Criteria for Domestic Wastewater Systems SUBCHAPTER C: CONVENTIONAL COLLECTION SYSTEMS §§217.51 - 217.70

For separation between storm lines, a spacing of 5 foot horizontal shall be maintained from outside dimension of storm pipe to the water or wastewater line.

5.1.5 Water and Wastewater Lines within TxDOT Right-of-Way

Water and wastewater lines within or crossing a TxDOT right-of-way shall meet the requirements of the TxDOT District Office and the TxDOT Utility Manual. Utility permits for lines within or crossing TxDOT rights-of-way shall be processed through the City's Engineering Department. TXDOT permit plan

sets shall be 11”x17” in size and signed and sealed by a licensed professional engineer with the State of Texas. Plan sets shall include all applicable TxDOT standard details and traffic control plans sheets to construct the lines.

5.1.6 Boring, Jacking and Tunneling

All water and wastewater mains to be installed in steel casing under existing roadways, railroads, and creeks and shall be installed by a method other than open cut, unless otherwise approved by the City Engineer. All boring of existing water lines mains shall be shall be by dry bore methods. All boring of water and wastewater lines shall be by dry bore methods. No wet bores will be allowed.

Steel casing thickness and diameter size shall be designed by the engineer of record for construction and maintenance of the carrier pipe per the requirements below. Raci patented casing spacers, or approved equal, shall be used. No bends and/or curves are permitted with casing pipes. Casings may also be required where deemed necessary by the City Engineer. The construction bore and receiving pit shall be located at a minimum distance of 4 feet behind the back of curb. The engineer of record shall provide a distance greater than 4 feet where there is no curb or barrier protection at the edge of pavement. Additional bore setback distances or shoring shall be required to maintain roadway integrity and the safety of construction personnel. When bore and receiving pits are located on private property, permanent water and wastewater easements for the pits will be required for the installation and future maintenance of the line.

The engineer of record shall design the pipe casing for the following loading conditions and/or applicable combinations thereof:

- Cooper's E-80 Railway loading or AASHTO HS20 loading, as applicable.
- Earth loading with the height of fill above the casing as shown on the plans as existing or finish grade whichever is greater.
- All other applicable loading conditions, including loads applied during transportation and handling.
- Max casing deflection of ½-inch from the above loading conditions.

Engineer of records shall consider the location, size, and depth of bore and receiving pits relative to existing utilities when establishing the beginning and ending stations.

Manufacturers: Paint Manufacturers for pipe casing shall be 46-465 H.B. Tnemecol – Tnemec Inc. or approved equal.

5.1.7 Crossings

5.1.7.1 Culvert Crossings

A steel encasement pipe shall be used to encase the carrier pipe with a minimum vertical clearance of two (2) feet from the bottom of the culvert and casing pipe. The encasement pipe shall be extended a minimum of five (5) feet from the outside edge of a box culvert or the outside diameter edge of the storm sewer for future maintenance of the carrier pipe. All culvert crossing shall be profiled.

5.1.7.2 Creek Crossings

Water and wastewater lines at creek crossing shall be design to go under the flowline of the crossing. The lines shall be in steel encasement pipe with a minimum vertical clearance of four (4) feet from the encasement pipe and the flowline of the creek to protect from future creek undercutting. The encasement pipe shall be extended to the creeks erosion hazard set back line for future maintenance of the carrier pipe. Where an erosion hazard set back does not exist due to a shallow creek the encasement pipe shall extend 15 feet on either side of the main channel of the creek. All creek crossings shall be profiled and shall show the erosion hazard set back line along with the projected 4(H):1(V) sloping line and 15 foot buffer from the intersecting point of the ground.

Aerial crossing of water lines are not allowed.

Aerial crossings for wastewater lines may be used only when all other alternatives have been evaluated and determined not to be feasible. Aerial crossings of wastewater lines require approval of the City Engineer. If an aerial crossing is to be installed, reference additional requirements in the Wastewater System Section.

5.1.7.3 TxDOT Highway Crossing

A steel encasement pipe shall be used to encase the carrier pipe at all TxDOT highway crossings. The crossing shall be at 90 degree (perpendicular) to the highway. All boring of water and wastewater lines shall be by dry bore methods. No wet bores will be allowed unless approved in writing by the TxDOT District Office.

5.1.7.4 Railroad Crossings

Prior to the design of any railroad crossing, the engineer of record shall contact the railroad and the appropriate regulatory agency to determine if there are any special design and/or construction requirements and shall copy the City Engineer on all correspondence with each regulatory agency.

5.2 WATER SYSTEM

5.2.1 General

All facilities shall be sufficient size to provide adequate capacity for ultimate development as called out in the latest copy of the Water Master Plan. The water mains shall be sized to meet the maximum instant domestic requirements plus an appropriate allowance for fire protection water. The design criteria for water demand shall be submitted to the City with the plans and specifications. The City reserves the right to require larger water mains than required for the proposed development in order to provide capacities for areas outside the development. The developer will be responsible to construct water mains adjacent to his property in accordance with the latest Water Master Plan or as required by the City Engineer.

5.2.2 Connections to Existing Distribution System

Preliminary discussions concerning take-off points in the water system should be conducted with the City of Rockwall Engineering Department or its designated representative prior to finalizing the preliminary designs of the water system, which will serve the development. Connections to the City's existing water system will be allowed only at locations where the City believes that sufficient quantity and pressures are available to meet the projected requirements of the development. In general, the connections to the existing water system shall be made in such a manner to keep "shut-downs" to a minimum. Preference should be given to a tapping valve connection.

In a proposed development where City water is not adjacent to the property but is accessible, the developer shall provide, at their expense, a minimum of eight (8") inch water main, an off-site water main of sufficient size to serve his development or as shown on the City's Water Master Plan, whichever is larger. The City can participate (if funds are available) or collect pro-rata for the oversize of the required line. The City participation must be approved by the City Council. The proposed development may require a loop into the existing water system in order to provide adequate water pressure. The loop will be at the developer's expense. All water main shall be extended to the property lines for future connections.

In general, the City will not approve a development, which cannot be served by extensions to the City water system. Some areas in the City are served by public water supply corporations. The Developer shall contact these public water supply corporations for notification of future development. The Developer shall still be responsible to construct water facilities that meet City requirements and as shown on the City's water master plan. The City will inspect the water facilities.

Under unusual circumstances, the City may consider approval of a private water system, which will supply an adequate quantity of potable water to every lot in a residential development. Such systems must meet the approval of the City, the TCEQ, the State Board of Insurance and other appropriate regulatory agencies. In addition, an agreement between the City and the developer must be executed whereby the City may acquire the system at such time as it can be connected into the City's owned and operated distribution network. In all cases, the engineering drawings shall show the source of water for the development.

5.2.3 Sizing of Water Mains

A. Water mains shall be sized to have maximum velocities of 7 feet per second for maximum daily demands and maximum velocities of 10 feet per second for combined maximum daily demand and fire flow demands.
B. Table 5.2 provides the water demand for residential land uses and non-residential land uses and shall apply for any development where the lot layout has not been finalized. Land uses not listed shall be classified by the land use they most nearly resemble in Table 5.2 or calculated by the engineer in accordance with the anticipated use. The engineer shall submit the maximum daily demand and the maximum hourly demand to the City Engineer for review and approval. The City reserves the right to assign a higher water usage rate, population per unit, and/or units per acre to be used for developments anticipated to generate higher than typical usage rates.
C. The engineer shall sufficiently size all water mains to provide adequate capacity for ultimate development as called out in the latest copy of the City's water master plan. For all developments, re-developments, and any type of facility tying into the City's water distribution system, the following guidelines shall be used:
    i. The engineer shall obtain the available record drawings. When record drawings are not available, field investigations and verifications shall be required prior to construction.
    ii. The standard water main sizes that shall be used are noted in the Table 5.3.
    iii. The minimum water main size to serve residential areas shall be eight inches (8") in diameter
    iv. The minimum water main size serving commercial, business, industrial, etc. shall be eight inches (8").
    v. Fire Flow Demands for all districts shall be calculated with a minimum residual pressure of 20 psi under combined fire and domestic (Maximum Daily Demand) water flow conditions and/or the latest requirement by the TCEQ. The developer shall provide facilities sufficient for fire flows in accordance with the minimum criteria set for by the City's Fire Marshal Office.
    vi. Mains are to be sized to ensure less than 1 foot of head loss per 1000 feet of water main using a Hazen Williams coefficient of C = 110 for the

Maximum Hourly Demand flow rates within the subdivision internal distribution system.

vii. Mains shall be sized to provide service to adjacent properties.

Table 5.2: Water Demand Rates

Land Use	Units Per Acre	Population per Unit	Max Day per Capita (gpcd)	Max Hour per Capita (gpcd)	Max Day per Acre (gpad)	Max Hour per Acre (gpad)
Residential						
Single Family - Low Density	3.5	2.87	350	700		
Single Family - Medium Density	8.0	2.87	350	700		
Single Family - High Density	18.0	2.87	350	700		
Townhome	4.0	2.50	350	700		
Multi Family	12.0-16.0	2.00	350	700		
Mobile Home Park	8.7	2.87	200	360		
Non-Residential						
Mixed Use / Live Work / Downtown			350	700		
Commercial Retail / Business Center					1,500	3,000
Public / Quasi-Public					1,500	2,000
Commercial Industrial					2,000	3,000
Special Commercial Corridor / Technology Employment Center					3,000	3,900
Light Manufacturing *					2,000	3,000
Heavy Manufacturing *					2,500	3,000
Schools (Elementary)			39 per student	52 per student		
Schools (Middle / High Schools / Colleges)					1,500	2,000
Hospitals			720 gpd per bed	864 gpd per bed		
Nursing Homes / Assisted Living			240 gpd per bed	288 gpd per bed		
Restaurants					1,500	3,000
Parks and Open Space					1,500	1,500
Golf Course **					1,000	1,000

* Engineer shall provide the maximum daily demand and maximum hourly demand flows and/or the number and size of water meters proposed for the particular land use for review by the City.

** Engineer shall provide the number and size of water and irrigation meters proposed for the golf course for review by the City.

Table 5.3: Standard Water Main Sizes

8 inch	12 inch	16inch	18 inch	20 inch
24 inch	30 inch	36 inch	42 inch	48 inch
54 inch	60 inch	66 inch	72 inch	-----

5.2.4 Water Mains Location/Alignment

Water pipelines shall be located in the parkways between the back of the curb and the street right-of-way. The location shall be six feet (6') from the back of curb on the north side of east-west streets and on the west side of north-south streets. When horizontal curvature is used the minimum radius of curvature shall be equal to that recommended by the pipe manufacturer.

A blue EMS Locator Pad will be located as shown in the Standard Drawings. Water mains shall have blue EMS locator pads at every two hundred fifty (250') feet, change in direction, valve, curb stop, and service connection to the main water main.

5.2.5 Depth of Cover

The minimum depth of cover for water mains are indicated in Table 5.4.

Table 5.4: Depth of Cover to Top of Pipe

Pipe Size	Minimum Depth of Cover
6 inch through 8 inch	4.0 feet
12 inch through 18 inch	5.0 feet
20 inch and larger	6.0 feet

The engineer shall consider the ultimate roadway elevations in determining the depth of cover. Additional depth of cover shall be required for future development and as directed by the City Engineer. Depths of cover greater than 8 feet shall be approved by the City Engineer.

5.2.6 Pipe Material and Embedment

Water mains shall be PVC pipe conforming to the Standard Specifications for Construction. In general, the water pipelines shall be AWWA C900-16 PVC Pipe (blue in color) for all sizes, DR 14 (PC 305) for pipeline sizes 12-inch and smaller, and DR 18 (PC 235) for 14-inch and larger water pipelines. All pipes shall be installed in embedment material as shown on the Standard Drawings and in conformance with the Standard Specifications for Construction.

5.2.7 Valves

Valves shall be installed to isolate pipe at a minimum of every other fire hydrant and on both sides of all public roadways. All gate valves shall comply with the approved list or an approved equal with resilient seat only and shall conform to and shall be installed according to the Standard Specifications for Construction.

A. Valves shall be placed in straight run sections at spacing no greater than 500 feet.
B. All valve boxes shall be encased in a concrete pad that shall be twelve inches by twelve inches by six inches (24”x24”x6”) and reinforced with No. 3 steel bars.
C. Valve extensions shall be 316 stainless steel.
D. Unless otherwise requested by the developer and approved by the City, valves shall be located in the northwest quadrant of the street intersection.
E. Valves shall be placed at or near the ends of mains in such a manner that a shutdown can be made for a future main extension without causing loss of service on the existing main. A minimum of 20 feet of main shall be installed past the valve and mechanical pipe thrust restraints shall be used to anchor it.
F. Where fire lines are connected to the water main, valves shall be installed on one side of the connection to provide the ability to isolate the main line and continue to provide water to the fire line. The fire line shall be provided with a valve at the connection with the main line.
G. Valve boxes shall be provided for buried valves. They shall be three-piece screw-type cast iron boxes of the extension type. The three pieces shall consist of the top section, bottom section, and cover.
H. Two inch square nuts that would be over 4 feet deep shall have stainless steel valve stem extensions. In these cases, the 2 inch square valve operating nut shall be no greater than 2 feet from the finish grade. Valve box extensions may be cast iron or C-900 PVC.

5.2.7.1 Gate Valves

Valves 12 inches and under shall be Resilient Wedge Gate Valves (RWGV). Valves are required to have 316 Stainless Steel hardware. Gate valves shall be located outside the paved streets and shall be six feet (6’) from back of curb of the intersecting street. In general, gate valves shall be located at street intersections (except for fire hydrant leads).

5.2.7.2 Butterfly Valves

Valves greater than 12 inches shall be flanged butterfly type spaced at a maximum of 1,000 foot intervals. All valves shall have horizontal mounted actuators with a manhole for access to the actuators.

5.2.7.3 Air Release, Air/Vacuum, and Combination Air Valves

A. Air release valves, air/vacuum, and combination air valves shall be required on 16 inch and larger water mains and as necessary for proper system operation. There are three primary functions of the valves that the engineer shall consider as follows:

i. To vent large volumes of air during filling of the line;
ii. To allow air into the pipe during emptying for maintenance and/or repairs; and,
iii. To vent small volumes of air that come out of solution during service.

B. Typically these are installed at high points where the pipeline has a vertical change in gradient. Additional installation locations may be requested by the City Engineer.
C. A fire hydrant shall be required at high points on 12 inch water mains for air relief and flushing maintenance operations. When a fire hydrant cannot be used, an air release valve may be approved by the City Engineer.

5.2.8 Fittings

Mega-lugs or approved equal shall be installed. No compaction fittings allowed. Fittings shall be ductile iron in accordance with AWWA C110 or AWWA C153. All buried metal shall be wrapped in polyethylene tube wrap.

5.2.9 Connection to existing Water Mains

5.2.9.1 Tapping Sleeves and Valves

A. Size on size tapping sleeves are not allowed. The largest allowable tapping sleeve shall be the main line size less one standard pipe size (Example: 16 inch x 12 inch, 8 inch x 6 inch, etc.). If a size on size connection is required, then a cut-in connection shall be used.
B. Connections to an existing line shall be made with full body stainless steel tapping sleeve and valve. A resilient wedge gate valve shall be flanged to the tapping sleeve.

5.2.9.2 Cut-In Connection

When connecting to an existing main, it may be required to provide a cut-in connection with a tee and valve being installed into the existing main in lieu of a tapping sleeve and valve where there is not an existing main line valve between proposed water connection locations as directed by the City Engineer. A test shut down of the existing water main(s) shall be conducted by the Water Department. The requirement for a test shut-down may be waived with approvals of the City Engineer.

5.2.10 Dead-End Mains

A. Dead-end mains shall be avoided and may only be considered when a looped or interconnected water main system is not available. The design of all water

distribution systems should include the opportunity for future looping or interconnect of any approved or proposed dead-end line.

B. All dead-end lines shall only be installed upon approval from the City Engineer and at a maximum length of 150 feet.
C. Dead-end non-residential water mains shall only have one fire hydrant or service without looping the water main.
D. Where dead-end mains are approved, the engineer shall provide flush point at the end of the dead end main.

5.2.11 Fire Hydrants

In general, fire hydrants shall be located at each street intersection and at intervals on the interior of each block.

A. Residential and Duplex
Residential and duplex areas shall have a fire hydrant at each street intersection and at four hundred foot (400') intervals on the interior of each block.

B. Multi Family
Multi-Family areas shall have a fire hydrant at each street intersection and at four hundred foot (400') intervals on the interior of each block and along fire lanes.

C. Commercial, Retail and Industrial
Commercial, retail and industrial areas shall have a fire hydrant at each street intersection and at a maximum of four hundred foot (400') intervals on the interior of each block and along fire lanes

Fire hydrants shall be installed a minimum of three feet (3') and no greater than six feet (6') behind curb of a fire lane, driveway, access, and/or street as measured from the centerline of the fire hydrant to back of curb, edge of pavement, or fire lane. All fire hydrants shall have five feet (5') of clearance around, including parking stall curbs.

The spacing of fire hydrants shall be measured along the street frontage or fire lanes. The City Fire Marshal and Engineering Department shall review all fire hydrant spacing. When a special condition exists due to land use, the Fire Marshal or City Engineer may require additional hydrants for fire protection. All existing fire flows and pressure tests shall be obtained from a private company (City does not perform this test).

Fire hydrants shall comply with the approved list or an approved equal conforming to the requirements set forth in the Standard Specifications for Construction. All fire hydrants shall be installed with a six-inch (6") gate valve on the hydrant lead. The installation shall be as set forth in the

Standard Specifications for Construction. Fire hydrants shall be painted to meet the City's requirements for color code as set forth in the Standard Specifications. In general, the fire hydrant will be reflective silver with differing cap color, which corresponds to the size of hydrant feeder line, as detailed in Approved Water Materials List in the Appendix. Fire hydrants shall be installed at the end of each dead end line. Minimum main size for a fire hydrant shall be eight inches (8") if main is fifty feet (50') or longer. Fire hydrants are not to be powder coated. Fire hydrants are to be a minimum of nineteen (19) inches to a maximum of twenty-eight (28) inches above final grade. All fire hydrants to have five (5) feet of clearance from any structure or parked vehicle. Nozzle diameter shall be two hose nozzles measuring two and one-half (2 ½) inches nominal inner diameter and one pumper nozzle measuring for and one-half (4 ½) inches nominal inner diameter. All nozzles are to have National Standard Hose Threads. The operating nut and nozzle nuts shall be 1 ½ inch pentagon-point to flat size/shape.

A. Standard fire hydrant barrel shoe depth where ever practical shall be 5 feet. The fire hydrant lead line shall be adjusted to meet the standard fire hydrant depth.
B. The connection to the main line shall include a flanged tee connected to a flange by mechanical joint gate valve. The mechanical joint shall be restrained so that the fire hydrant is anchored to the valve.
C. Specifications – Fire hydrants shall be three-way breakaway type no less than 5- 1/4 inch size. Mechanical joint connection is required.

5.2.12 Water Service Connections

Service connections shall be in accordance with the designs shown on the Standard Drawings. The materials shall comply with approved list or approved equal and shall be installed in accordance with the Standard Specifications for Construction.

A. All service pipelines shall be constructed of SDR-9 (Polytube) having a minimum size of one-inch (1"). All connections shall be compression type or approved equal.
B. Detector pads embedded in sand shall be installed above all service connections.
C. All meter boxes shall be set between the sidewalk and the back of curb. Meter box tops shall be set one-half inch to one and one-half inch (1/2" to 1 ½") above the curb, and an angle meter stop shall be set six inches (6") below the meter box top. Meter boxes shall have a one-inch (1") wide slot from five inches (5") below the top of the box to the bottom of the box on the side facing the lot for service connection.
D. A domestic and/or irrigation service connection shall not be allowed on fire hydrant leads.

E. Service saddle shall be double bronze flattened straps (no banded straps shall be allowed) with brass body. Minimum size tap shall be 1 inch diameter.
F. All meters two-inch (2") and under shall be supplied by the City and will be at developer's/contractor's expense. All meters greater than two inches shall be furnished and paid for by the developer/contractor.
G. Concrete meter vaults are required for meter sizes 3 inches and larger, meters and vaults shall be provided by the contractor. Meter vault and meter requirements are shown in the Standard Drawing section.
H. Residential Water Meters
    a. In single family residential developments, the nearest edge of the water meter box shall be a minimum of 6 inches behind the back of curb, and the water service shall be no more than 12 inches deep, covered with a meter box in place at grade. If no curb is present, the water meter shall be located at the right-of-way line, no more than 12 inches deep, covered with a meter box in place at grade. Along roadways without a curb, the water service line shall be constructed at a minimum of 24 inches below the ditch flowline. Meter boxes shall not be placed in the invert of a ditch.
    b. For multi-family, condominium and townhouse developments installation of multiple meter boxes: may only be installed at approved locations. Each service box shall service one (1) lot. Installation on multiple meters per water service will not be allowed. Only one meter per service will be allowed.
I. Non-Residential Water Meters
    a. Installation of non-residential 3-inches and larger meters will include two mainline valves, one bypass valve with chain and lock, and bypass line, all located inside the vault. Clearances between fasteners on valves, strainers, and meters to interior surfaces shall provide adequate room for maintenance.
    b. Non-residential water meters will be located in a water easement and clear of high traffic areas.
    c. Water meter vaults shall be sized according to the size of the water meter and to allow for a minimum of a 12 inch clear working area for maintenance and operation. Minimum water meter vault sizes are shown in the City of Rockwall Standard Details.
    d. Non-residential domestic irrigation meters shall have a testable double check backflow preventer at the meter.

5.2.13 Abandonment of Water Mains

A. The engineer is to note the limits and appropriate conditions for abandoning existing water mains that are being replaced. For lines being abandoned, the engineer should note and locate points of cut and plug at the junction with the line that remains in service.

B. The engineer shall make allowances to permit the existing and proposed mains to remain in service simultaneously thereby providing a means for transferring customer's services from the old main to the new main with minimum interruption. If the construction of a proposed main necessitates the abandoning of the existing main prior to the new main's placement into service, then provisions for a temporary water main with services must be addressed with the design.
C. Abandoned water lines to remain in place shall be cut and plugged and all void spaces within the abandoned line shall be filled with grout, flowable fill or an expandable permanent foam product. Valves, to be abandoned, in place shall have any extensions and the valve box removed and shall be capped in concrete.
D. Existing fire hydrants and valves located on mains being abandoned are to be removed and delivered to the Water Department.

5.3 WASTEWATER SYSTEM

5.3.1 General

All facilities shall be sufficient size to provide adequate capacity for the ultimate development. The wastewater lines shall be sized to meet the peak-day dry weather flow plus an appropriate allowance for infiltration of storm water. The minimum wastewater main size (other than service lines) for all developments shall be eight inches (8") in diameter. The design criteria and calculation shall be submitted to the City with the plans and specifications. The City reserves the right to require a wastewater main of a larger size than that required by the development in order to provide capacities for areas outside of the development. Wastewater systems shall be designed so that all wastewater mains will be gravity flow. The use of a wastewater lift station can only be allowed with written approval by the City Engineer.

Connections to substandard mains and manholes shall not be allowed. Substandard mains shall be determined by the City Engineer based on criteria including, but not limited to: size, material, condition, flow rate, capacity, etc. Offsite improvements may be necessary to provide adequate wastewater service to the site.

All wastewater mains shall be installed at a depth sufficient to permit all water mains to be above the wastewater when the water main has a minimum cover of four feet (4'). In such cases where water mains either cross or otherwise come within 10 feet (10') of a wastewater main, the wastewater main may be PVC pressure pipe with a minimum working pressure class of 150 psi or encased in concrete.

5.3.2 Ownership and Maintenance

5.3.2.1 Ownership

Ownership of wastewater systems shall conform to the following:

- Wastewater mains within right-of-way or easements shall be owned by the City. This shall include the manholes and cleanouts on those lines.
- Wastewater service laterals shall be owned by the property being serviced, from the wastewater main connection to the structure being serviced. This includes any and all manholes and cleanouts on the service lateral.

5.3.2.2 Maintenance

Maintenance of wastewater system shall conform to the following:

- Wastewater mains within right-of-way or easements shall be maintained by the City. This shall include the manholes and cleanouts on those lines.

- Wastewater service lateral shall be maintained by the property owner being served from the structure to the right-of-way line and the City shall maintain from the right-of-way line to the wastewater main.

5.3.3 Connections to Existing Wastewater Collection System

Preliminary discussion concerning entrance points in the wastewater system should be conducted with the City of Rockwall Engineering Department or its designated representative prior to finalizing the preliminary designs of the collection system to serve the development. In a proposed development where City wastewater facilities are not adjacent to the property but are accessible, the developer shall provide, at his expense, an off-site wastewater interceptor of sufficient size to serve his development and the contributing service area (using fully developed flows), or as shown on the City's Wastewater Master Plan, whichever is larger. Developers can request a pro-rata agreement for wastewater over-size above ten (10") inch to be executed with the City, where the City collects a pro-rated amount as other developments connect to the system. This money would be distributed back to the developer that constructed the over-sized system. The pro-rata agreement requires approval by City Council.

Connections to Existing Wastewater Mains – When connecting a 6 inch or larger new line to an existing wastewater main the engineer shall provide a new manhole at the point of connection. Prior to breaking into the existing line the new manhole and upstream pipe segment shall pass inspection by the City Engineer or designated representative. Connections in residential locations shall be completed after the preliminary walk through has been performed by the Engineering Department and approval is granted.

In general, the City will not approve a development which cannot be served by extensions to the City's wastewater collection system unless the development has received an approved variance granted by City Council.

5.3.4 Design Flow

All wastewater collection systems shall be designed in accordance with the current City's Wastewater Master Plan.

Where possible, all collection systems will be laid out so that all lines will be gravity flow unless approved by the City Engineer.

All wastewater collection systems must be designed to covey the peak wet weather flow from the entire service area including offsite areas through the system. The basin delineation shall be provided by using the latest LIDAR and surveyed contours. Contours shall be provided on 2 foot or less intervals.

Flow calculations must include the specifics of the average daily flows, peak factor (ratio of peak to average flows) and the allowance for inflow and infiltration.

5.3.5 Sizing Wastewater Collection Mains

5.3.5.1 General

A. The engineer shall reference the Wastewater Master plan to determine the size of wastewater mains required in order to serve the development. For all developments or re-developments that propose a change in existing land use (change in density) that does not conform to the City's current Wastewater System Master Plan a Wastewater System Capacity Study shall be performed. This shall be done as per Section 5.1.1 – System Capacity Studies.
B. The standard wastewater pipe sizes that shall be used are noted in the Table 5.5.

Table 5.5: Standard Wastewater Collection System Pipe Sizes

8 inch	10 inch	12 inch	15 inch	18 inch
21 inch	24 inch	27 inch	30 inch	33 inch
36 inch	39 inch	42 inch	48 inch	54 inch
60 inch	------	------	------	------

5.3.5.2 Average Daily Flow

A. Table 5.6 shall be used to calculate the average daily wastewater flow. The collection system shall be designed based on the peak flow calculations, plus an allowance for Inflow and Infiltration.
B. For replacement of existing sewer for additional capacity, wastewater flow data will be provided by the City Engineer and the City's wastewater modeling consultant from data generated by the City's Wastewater Master Plan computer model.
C. Wastewater mains with direct connections to service lines shall be designed to be no more than 70% full and interceptors shall be designed for 100% full.
D. Table 5.6 summarizes the residential and non-residential land use wastewater usage rates. Land uses not listed shall be classified by the land use they most nearly resemble in Table 5-8 or calculated by the engineer in accordance with the anticipated use. The engineer shall submit the average daily flow and peak flow calculations including off-site flows within the drainage basin to the City Engineer for review and approval. The City reserves the right to assign a higher wastewater usage rate and/or population per unit to be used for developments anticipated to generate higher than typical usage rates.

Table 5.6: Wastewater Per Capita and Usage Rates

Land Use	Units per Acre	Population per Unit	Average Daily Flow (gallons per person or unit /day)	Average Daily Flow per Acre (gpad)
Residential				
Single Family - Low Density	3.5	2.87	90	
Single Family - Medium Density	8.0	2.87	90	
Single Family - High Density	18.0	2.87	90	
Townhome	4.0	2.5	90	
Multi Family	12.0-16.0	2.00	80	
Mobile Home Park	8.7	2.87	150	
Non-Residential				
Mixed Use / Live Work / Downtown				800
Commercial Retail / Business Center				800
Public / Quasi-Public				1,000
Commercial Industrial				1,500
Special Commercial Corridor / Technology Employment Center				1,200
Light Manufacturing *				1,500
Heavy Manufacturing *				3,000
Schools (Elementary)			30 per student	
Schools (Middle / High Schools / Colleges)			30 per student	
Hospitals			400 per bed	
Nursing Homes / Assisted Living			300 per bed	
Restaurants			50 per seat	
Hotels			200 per room	
Parks and Open Space				0
Golf Course**				100

5.3.5.3 Peak Flow Factor

Peak flow factors are as follows:

A. For average daily flow less than 0.05 MGD – Peak Flow Factor = 5.
B. For average daily flow between 0.05 MGD and 1.0 MGD – Peak Flow Factor = 4.
C. For average daily flow between 1.0 MGD and 2.0 MGD – Peak Flow Factor = 3.5.
D. For average daily flow greater than 2.0 MGD – Peak Flow Factor = 3.

5.3.5.4 Inflow and Infiltration

After determining the peak flow amount, the engineer shall add an average daily inflow and infiltration rate of 400 gpad. The inflow and infiltration amount calculated shall be added to the peak flow calculated, with the resultant being the peak wet weather flow, the basis for design.

5.3.6 Wastewater Mains

Wastewater pipelines shall be located in the parkways between the back of the curb and the street right-of-way. The location shall be six feet (6') from the back of the curb on the south side of east-west streets and on the east side of north-south streets. A green EMS Locator Pad is to be installed at every manhole, cleanout, and service connection to the wastewater main. If a wastewater line is to be constructed greater than 10 feet in depth and services are required than a parallel line is to be constructed at a depth shallower than 10 feet. The deeper line shall be 6' from the back of curb in the pavement side and the shallower line with services shall be 6 feet from the back of curb toward the right of way.

5.3.6.1 Pipe Material

Allowable for gravity wastewater mains shall be per Table 5.7.

Table 5.7: Pipe Materials for Wastewater Gravity Mains

Pipe Size	Pipe Material
4 inch through 15 inch	Green PVC – SDR 35 (ASTM D3034) [less 10 ft cover] Green PVC – SDR 26 (ASTM D3034) [10 ft or more cover]
18 inch and Lager	Green PVC – PS 46 (ASTM F679) [less 10 ft cover] Green PVC – PS 115 (ASTM F679) [10 ft or more cover]

Pipe shall have a minimum earth cover of four (4') feet. All pipes shall be installed in embedment material as shown on the Standard Details and in conformance for the Standard Specification for Construction. Any main with less than minimum cover shall be encased in concrete and is subject to approval by the City Engineer. Depth of cover greater than 20 feet must be approved by the City Engineer. All pipelines shall be tested for infiltration.

5.3.6.2 Minimum Grades

Wastewater lines should operate with velocities of flow sufficient to prevent excessive deposits of solid materials, otherwise objectionable clogging may result. The controlling velocity with regard to sediment deposition is near the bottom of the conduit and considerably less than the mean velocity flowing full of 2.5 feet per second (f.p.s.). Table 5.8 indicates the minimum grades for wastewater pipe with a Manning's "n" = 0.013 and flowing at 2.4 f.p.s.

Table 5.8: Minimum Grades for Wastewater Pipelines

Pipe Size (Inches)	Slope (n = 0.013) (Foot/Foot)	Pipe Size (Inches)	Slope (n = 0.013) (Foot/Foot)
6	0.0050	39	0.0006
8	0.0033	42	0.0006
10	0.0025	45	0.0005
12	0.0023	48	0.0005
15	0.0023	54	0.0004
18	0.0018	60	0.0004
21	0.0015	66	0.0004
24	0.0013	72	0.0003
27	0.0011	78	0.0003
30	0.0009	84	0.0003
33	0.0008	96	0.0002
36	0.0007		

5.3.6.3 Curved Sewers

No vertical curves will be allowed. Horizontal curvature may be allowed by joint deflection or pipe flexure but not both. The Engineer must specify on the plans the method of deflection allowed and the allowable radius or joint deflection for each pipe size.

When pipe flexure is used, the minimum radius of curvature shall be equal to that recommended by the pipe manufacturer or $300*D_0$, where D_0 is the average outside diameter of the pipe in inches, whichever is greater. The Engineer shall note on the plans that when using pipe flexure, all joints are to remain fully seated.

If a joint deflection will be used to provide horizontal curvature, the allowable deflection shall be 5° or 80% of the Manufacturer's recommended maximum joint deflection, or 80% of the National Reference Standard maximum recommended joint reflection, whichever is less. When joint reflection is used, the Engineer must specify the size of mandrel used for reflection testing. The mandrel shall be sized to verify that the maximum joint deflection has not been exceeded.

Horizontal curves shall match change in street direction as near as possible.

5.3.7 Wastewater Service Laterals

Wastewater service pipelines shall be laid to each lot. The service pipelines shall be plastic pipe having a minimum diameter of four inches (4") and shall extend to the property line. Wastewater service pipelines shall be located on the lower side of each lot and as approved on the final construction plans by the City. In general, a service pipeline shall serve only one lot. Special wastewater service sizing may be required in some instances. Where water

and wastewater pipelines pass within nine feet (9') of each other, the method of construction shall be specified in order to meet TCEQ criteria. No wastewater main shall be located nearer than five feet (5') from any tree. Service lines cannot connect to wastewater mains that are over ten feet (10') deep.

Service laterals shall have a minimum horizontal separation of 10 feet downstream from the water service.

Retail and Commercial – Service lateral size shall be 6 inch minimum at a 2 percent minimum grade.

5.3.8 Manholes

In general, manholes shall be located at all intersections of wastewater pipelines, changes in grade, changes in alignment and at distances not to exceed five hundred feet (500'). All manholes will be hydrostatically or vacuum tested. For manholes that have an epoxy coating after constructed, a spark test will be required prior to acceptance. Manhole sizing shall be per Table 5.9 with a thirty inch (30") lid. If a manhole exceeds ten (10') feet in depth, increase the diameter by one (1') foot from the sizes given in Table 5.9.

Table 5.9: Minimum Manhole Sizes

Wastewater Main Size	Minimum Manhole Diameter
6", 8" and 10"	4.0 foot *
12", 15", 18", 21", 24" and 27"	5.0 foot *
30" and 36"	6.0 foot *

* Internal Drop Manholes shall be 6.0 foot minimum

Manholes shall be a minimum of 4,200 psi pre-cast concrete (minimum 6.5 sack mix) or cast-in-place (minimum 7.0 sack mix) and shall conform to Standard Details and the Standard Specifications for Construction. Existing brick manholes shall be replaced. All private manholes shall have covers with the label "Private" forged into the cover.

5.3.8.1 Internal Drop Manholes

Internal drop manholes shall be required when the inflow elevation is more than 18 inches above the outflow elevation. New internal drop manholes shall be constructed with inside drops with a 6 foot minimum diameter. Depending on the depth of the drop manhole and inside clearances between drop bowl apparatus and the manhole, the City Engineer may increase the minimum diameter above 6 feet. Drop manholes shall increase in diameter as necessary to accommodate the pipe for an internal drop connection as necessary to provide 48 inches of clear space for construction and maintenance operations. Within the manhole the inverts shall be sloped to maintain a smooth transition

through the manhole connecting all inlets and outlets. Outside drop connections will not be allowed.

5.3.8.2 Corrosion Protection

All Manholes shall have Raven Liner 405 epoxy coating, ConShield, or approved equal, shall be installed in all new manholes and in existing manholes being modified. Consheild must have terracotta color dye mixed in the precast and cast-in-place concrete. Where connections to existing manholes are made the contractor shall rehab manhole as necessary and install a 125 mil thick coating of Raven Liner 405 or approved equal. Manhole shall be replaced at the developer's/contractor's expense if it cannot be rehabilitated.

5.3.8.3 Watertight Sealed Manholes

All manholes shall be sealed if located in an area of storm water flow (paving, creek, drain way, etc.). When manholes are placed within the limits of the fully developed 100-year floodplain watertight sealed manholes (Type S) shall be used to prevent the entrance of stormwater and properly vent manhole. Manholes installed in the floodplain shall be a minimum of (60") diameter with a concentric flat top that has a rim elevation (2') above the limits of the fully developed 100-year floodplain. When allowed by the City Engineer, manholes may be below the 100-year floodplain but must be bolted and gasketed. Every third manhole shall be vented (2') feet above the fully developed 100-year floodplain elevation or 4 feet above the adjacent ground line, whichever is higher. Manhole rim shall be a minimum of 2 feet above ground line. The engineer shall obtain and provide the elevation of the fully developed 100-year floodplain.

5.3.8.4 Inflow Prevention

In order to reduce the size of wastewater system main trunk lines and reduce the cost of wastewater treatment, efforts to reducing inflow and infiltration into the wastewater collection system shall be taken. All manholes (public or private) shall be fitted with inflow prevention. The inflow prevention shall conform to the measures called out in standard detail R-5031.

5.3.9 Cleanouts

Cleanouts shall be constructed on the end of all lines. The maximum distance between a manhole and an upstream cleanout is two hundred fifty feet (250'). Cleanouts may be located at the end of the line only.

Double clean outs shall be installed for non-residential services at the right-of-way line, property line, or easement line where a public line changes to a private service.

Cleanouts shall conform to the Standard Details and the Standard Specifications for Construction.

5.3.10 Testing

All wastewater lines shall be tested for infiltration in accordance with the procedures set forth in the Standard Specifications for Construction. In general, all wastewater pipes shall be installed so that the completed wastewater will have a maximum exfiltration of one hundred fifty (150) gallons per inch of internal diameter, per mile of pipe, per 24 hours, where the maximum hydrostatic head at the centerline of the pipe does not exceed twenty-five (25) feet. All wastewater pipes shall be inspected by photographic means (television or DVD) prior to final acceptance. The contractor shall furnish a DVD to the Engineering Department Construction Inspector for review. Any sags, open joints, cracked pipes, etc. shall be repaired or removed by the contractor at the contractor's expense. A television survey will be performed as part of the final testing in the twentieth (20^{th}) month of the maintenance period. The City's representative shall be present at all testing. All expenses for this work shall be the developer's responsibility.

5.3.11 Abandoning Existing Wastewater Mains and Manholes

When an existing wastewater line is to be abandoned all services and laterals on the main to be abandoned shall connect back into the system. All existing wastewater mains that are to be abandoned shall be videotaped to determine the location of the services and laterals. A copy of the videos shall be given to the Cities Construction Inspector for review before the line is fully abandoned.

All abandoned wastewater and force main lines shall be cut and plugged and all void spaces within the abandoned line shall be filled with grout, flowable fill or an expandable permanent foam product.

Wastewater manholes shall be abandoned per Standard Drawing No. 5170.

5.3.12 Creek Crossings

Wastewater lines constructed under or over any flowing stream or semi-permanent body of water, such as a marsh or pond, shall be installed inside a separate watertight encasement pipe. Wastewater lines shall have manholes on each side of the crossing.

The engineer of record shall determine the type and limits of any special embedment, and specify the limits for specialized backfills to prevent soil erosion at the areas of trench backfill as approved by the City Engineer.

5.3.12.1 Aerial Creek Crossings

Aerial crossings for wastewater lines may be used only when all other alternatives have been evaluated and determine not to be feasible. Aerial crossings of wastewater lines require approval of the City Engineer.

Aerial crossing shall meet the following requirements:

- The design of all piers, bents, restraints, abutments, steel casing, etc. for the aerial crossing shall be performed and signed and sealed by a Professional Structural Engineer licensed in the State of Texas.
- The engineer of record shall use steel encasement pipe around all aerial carrier pipes. The carrier pipe shall be restrained or welded all around joints or be a monolithic pipe between a span section.
- The pier spacing for the aerial crossing supports must maintain adequate grade, and span the 100-year floodway.
- A span section must withstand the hydraulic forces applied by the occurrence of a 100-year flood including buoyancy. Both the aerial crossing encasement pipe and the supporting structure shall be capable of withstanding impacts from debris and water.
- A scour analysis report prepared by a geotechnical professional engineer shall be submitted to the City Engineer for review.
- A Hydrologic and Hydraulics Study of the aerial crossing shall be performed. The aerial crossing shall not increase the 100-year floodplain water surface elevations or velocities.
- Geotechnical borings at the creek crossing and report shall be prepared by a Professional Geotechnical Engineer licensed in the State of Texas.
- Wastewater lines shall have manholes on each side of the crossing.
- The upstream bent/abutment section of the aerial crossing shall be designed with a minimum 2-inch underdrain at the flowline of the embedment to collect infiltration that is travel within the upstream embedment of the aerial crossing. This shall day light at the aerial crossing current day slope to prevent erosion of the aerial crossing at the upstream end.
- The aerial crossing shall be designed to extend to the erosion hazard setback line with piers and bents.

5.3.12.2 Inverted Siphon

Inverted siphons at creek crossings for wastewater lines are not allowed.

5.4 WASTEWATER LIFT STATIONS AND FORCE MAINS

5.4.1 General

All lift station design plans and specifications shall be submitted to the City Engineer and TCEQ for review and approval prior to construction. Developments which increase the flow to existing lift stations will be subject to a pro-rata charge if sufficient capacity is available in the existing lift station or will be required to increase the capacity of the existing facility. Lift stations and force mains shall be designed and built for the upstream drainage area using a fully developed condition. This will include off-site areas if applicable. Developers are responsible for the construction of regional lift stations and force mains, per the Wastewater Master Plan. Developers can request a pro-rata agreement be executed with the City, where the City collects a pro-rated amount as other developments connect to the system. This money would be distributed back to the developer that constructed the oversized system. The pro-rata agreement requires approval by City Council.

The City will utilize an engineering consulting firm to assist City staff in the review of a report and plans for wastewater lift stations and force mains. The cost of this consultant review shall be borne by the developer, engineer, or property owner submitting the report and plans for wastewater lift stations and force mains. The City shall first obtain a cost estimate from the engineering consultant for the review at time of the initial engineering submittal. Before the review begins, the developer, engineer, or property owner submitting the report and plans for wastewater lift stations and force mains shall deposit with the City funds equal to the cost estimate. The City shall disburse the funds to the consulting engineer as the review progresses. Should the consultant fees exceed the initial estimate, the developer, engineer or property owner submitting the report and plans for wastewater lift stations and force mains shall be informed of the shortage and a new estimate made by the consultant engineer to complete the review. Additional funds will then be deposited with the City by the developer, engineer or property owner submitting the report and plans for wastewater lift stations and force mains to cover the estimated shortfall before the review resumes. Any unused funds to be reimbursed to the developer, engineer or property owner submitting the report and plans for wastewater lift stations and force mains. If review process is performed by City staff, the City will submit a cost estimate for the review at time of the initial engineering submittal.

5.4.2 Design Report and Plans

A typed lift station and force main design report shall be prepared and signed and sealed by a register professional engineer licensed in the State of Texas.

5.4.2.1 Report

The typed report shall include the following information at a minimum:

- A brief summary of project scope that includes:
  - General description of proposed development
  - General explanation on circumstances that warrant a lift station including other options considered.
  - Description of any potential phasing of lift station until sewer basin is built-out, if City Engineer approves lift station size less than fully developed conditions.
- Influent hydraulic calculations showing:
  - Area in acres of the sewer basin and the development.
  - The area of each proposed use for the development and the ultimate projected use for the basin per City Future Land Use.
  - The average design flow and the maximum peak flow for the basin and the development.
  - Elevation of the proposed lift station site.
  - The elevation of the proposed discharge point of the force main.
- Wet well volume calculations
- Force main size with proposed velocities in pipe.
- Power outage records on electric provider letterhead for power outages in area for the past 24 months.
- Opinion of probable costs for lift station, force main, and annual operating and maintenance costs.
- Ground water levels in proposed site area.
- Proposed system's effect on existing system's capacity.
- Odor control methods shall be submitted to the City Engineer for review and approval. The potential odor determination must include the estimated flows immediately following construction and throughout a system's 50-year expected life cycle.

5.4.2.2 Plans

The plan or plans submitted shall contain the following information:

- Scale
- North Arrow
- Vicinity map
- Delineation of the boundary of the proposed development and offsite areas of the sewer basin (service area) in which the development lies. Basin delineation shall be provided using NCTCOG, LIDAR or surveyed contours. Contours shall be provided on 2 foot or less intervals. USGS topo is not permissible.

- Area in acres of the development and of the sewer basin contributing to the lift station.
- Proposed use or uses for the development and service area.
- The proposed lift station location.
- The proposed force main routing.
- Delineation of the 100-year Fully Developed flood plain, FEMA 100-year flood plain and Erosion Hazard setbacks.
- The location and size of the existing collection system at the tie-in point.
- Property lines, easement lines, and right-of-way lines.

5.4.3 Site Selection

The following are the minimum criteria that shall be met for a lift station site.

The station should be located as remotely as possible from populated areas. The lift station site shall not be located within 150 feet of an existing or proposed residential dwelling and 100 feet from a residential lot.

The station shall be protected from the 100-year flood and shall be accessible during a 100-year flood. The elevation of the site shall be a minimum of 1 feet above both the Fully Developed 100-year flood plain.

The station site and its access shall be dedicated to the City as a wastewater easement. The fencing set back shall be 5 feet from the easement line to allow for a landscape and drainage buffer.

The station site shall be located so it may serve as much of the entire sewer drainage basin as possible. This may require that the station be located off-site of the development. When a station serves a larger area than the proposed development, the developer can request a pro-rata agreement with the City to be reimbursed the cost of excess capacity as other developments connect to the system.

5.4.4 Site Requirements

The lift station site shall conform to the requirements in these subsections and Typical Lift Station Site Layout - Figure 5.1.

5.4.4.1 Access

Access drive will be provided by a reinforced concrete pavement from a public street and/or dedicated access easement. Concrete shall be a minimum 8 inches thick, 3,600 psi (6.5 sack/CY) with #4 bars at 18” O.C.E.W. -reinforced concrete pavement with a minimum of 20 feet in width and 40 feet in length (within fenced area of lift station) to allow maintenance vehicles to park fully outside of the right-of-way.

When an access drive for the lift station connects to a City Thoroughfare or TxDOT designated highway a “T” shaped turnaround shall be provided with applicable turning radii. The alignment of the drive shall allow maintenance vehicles the ability to back up straight to the wet well.

Access shall be functional during a 100-year flood. All area within the lift station fencing and access drive shall be a minimum of 1 foot above the water level caused by a 100-year fully developed floodplain.

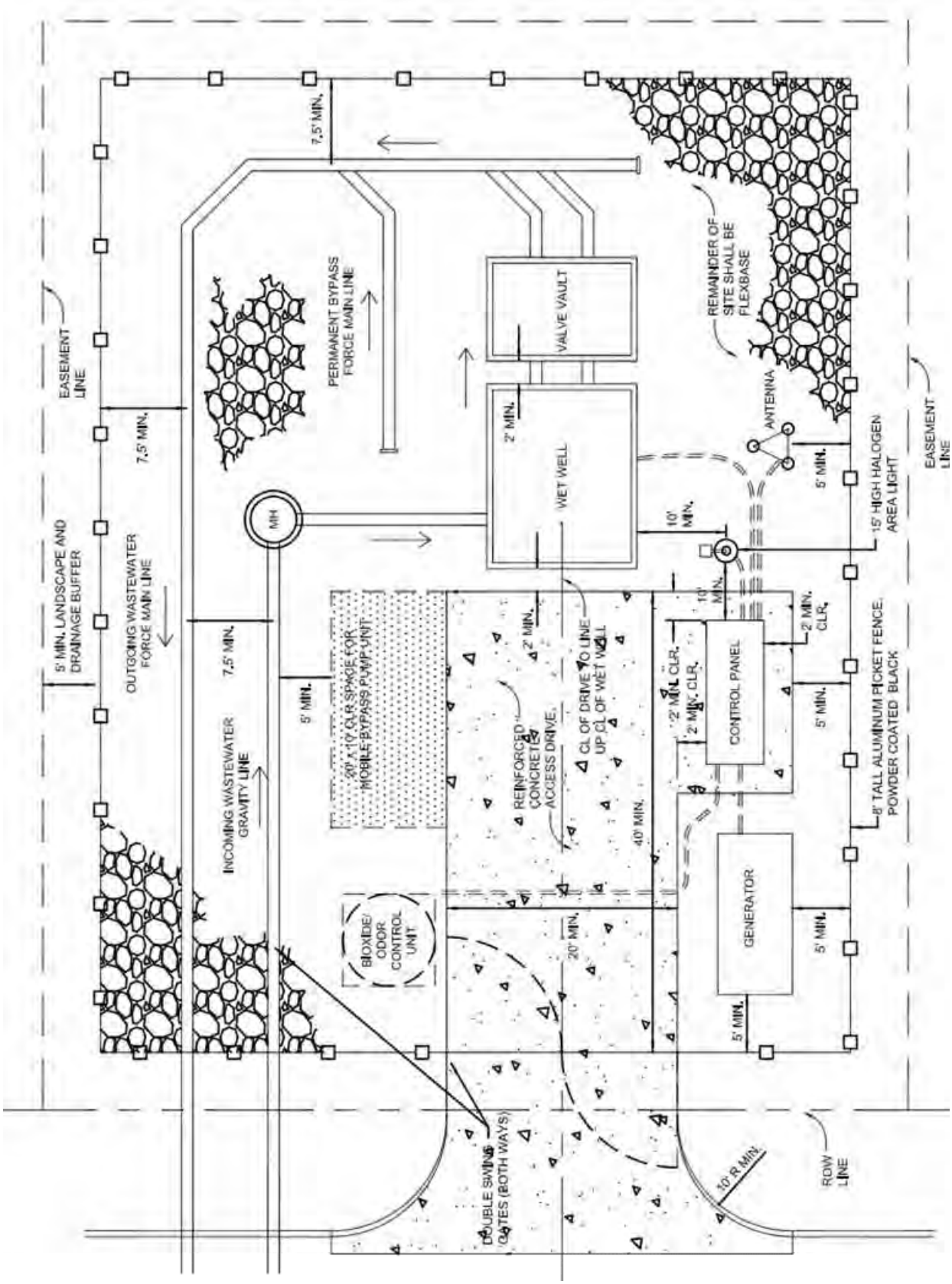


Figure 5.1: Typical Lift Station Site Layout

5.4.4.2 Security

At a minimum, security of the lift station site shall be provided by an intruder-resistant fence (IRF) to restrict access by an unauthorized person(s). The IRF shall be placed around the perimeter of the site encompassing all interior structures and appurtenances shall maintain a minimum 5 foot clearance from all lift station components and 7.5 foot off of lift station piping.

The IRF shall be a minimum of 8 feet aluminum picket fence with a 20 foot wide minimum double swing gate for access. All components shall be manufactured from aluminum extrusions having a minimum ultimate strength of 35,000 psi, using 6005 T5 alloy. The fence, post and gates shall be powder coated black with a minimum cure film thickness of 2.0 mils.

Technical Data

Pickets: The hollow pickets shall pass through the rails and are to be attached using stainless steel screws allowing the pickets to be always parallel to the terrain. Screws shall be on one side of rail only. Pickets shall be 1" square x 0.062" thick.

Horizontal Rails: Rails shall be C-Channels with ribbed reinforced side walls. Square holes shall be punched in the top of the rails to allow the pickets to pass through.

- Four rails are required.
- Heavy Industrial Rails shall be 1-5/8" x 1-5/8" with a side thickness of 0.100", top wall thickness 0.070" and bottom wall thickness of 0.062", which snaps into the top allowing all screws to be enclosed inside the rail.

Posts: Posts shall be hollow square extrusion with holes pre-punched to allow the rails from the fence sections to slide into them. All posts shall include aluminum post caps. Posts can be placed no more than 6 feet apart.

- Line Posts and End Posts are 3" square x 0.125" thick
- Gate Posts are 4" square x 0.125" thick weighing 9.00 pounds per foot

Gates: Gates shall be fabricated with 2" or 2½" square ends, 1-5/8" x 1-5/8" rails and 1" square pickets. The gate shall be a double swing gate. Gate shall match appearance of fence panel. The gate shall have a double rail that allows for hidden fasteners and no exposed cavities under the rail. Gate shall be designed and manufactured by the fence manufacturer.

- Each gate shall have a hasp for chain locking welded to the frame as detailed in the construction plans.
- Gates shall be designed and manufactured by the fence manufacturer.
- Assembled section shall be able to support 500-pounds of vertical load at the mid-point of any horizontal frame rail.

- Swing gates shall include cane-bolts for each gate panel. The cane-boll shall have a stop to hold it in the up position for operating the gate.
- Hinges shall have minimum 3/8" stainless steel pins.

Post Installation: The post shall be set 36" in the concrete footing. The gate post shall set a minimum of 48" into the concrete footing.

There should be a minimum of a 5ft landscape and drainage buffer from the easement line to the Lift Station fencing. The 5 ft buffer shall have red tip photinias place within the buffer to screen the lift station site.

5.4.4.3 Site Interior

Interior of the site that is not part of the access drive shall be a minimum 6 inches thick flex base. Site shall be graded to drain away from the station to prevent storm water inflow or infiltration into the wet well, valve vault and manholes. The wet well and valve vault top elevation shall be a minimum of 12 inches higher that interior concrete and flex base.

Control panel shall have a 2 foot minimum clear reinforced concrete working area away from face, sides and back of cabinet. Electrical and instrumentation panels shall be located where they do not obstruct vehicle access to the wet well or the dry well. They shall be placed at an elevation so that they are easily accessible.

A 15 foot high halogen area light with photometric cell on an aluminum pole shall be placed within 10 feet of wet well and control panel without obstructing daily operations.

5.4.5 Wet Well and Valve Vault Design

5.4.5.1 Wet Well Design

Wet well shall be cast in place or pre-cast watertight and gas tight walls with watertight joint meeting ASTM C478-90. Steel, HDPE and RCP are not acceptable materials. The tops may be pre-cast with the hatches built in. All wall penetrations through the wet well wall shall be gas tight. The wet well shall be hydrostatically tested to the top of the wet well for 48 hours prior to putting the lift station into service. Only losses due to evaporation will be tolerated.

Additional design requirements are as follows:

A. Orientation
- Orientation shall consider the routing of incoming sewer and force main for ease of maintenance and to minimize effluent turbulence.
- Orientation shall allow a 5 ton vehicle to pull in forwards or backwards directly to the wet well or the dry well.

- All influent gravity mains discharging into the wet well shall be located so that the invert/flowline is above the “on” setting liquid level of the pumps.

B. Level Sensors
- Level control system shall use a pressure transducer with built in surge protection for pump operation with Off and High Level Floats as back-up in case transducer fails.
- Sensors shall be provided for “All Pumps Off,” “Lead Pump On,” “Lag Pump On,” and “High Level Alarm” levels as well as additional “Lag-Lag Pump On” for lift stations with more than two pumps.
- Level Sensors shall be placed in the wet well.

C. Wet Well and Valve Vault Separation
- Wet wells and valve vaults shall be separated by a minimum of 2.0 feet.

D. Liner and Coatings
- Wet wells shall have a minimum of 10 percent sloped bottoms to thepump intakes and shall have a smooth finish to avoid excess sludge deposits.
- Wet wells shall be Con-sheild, Raven Lining or approved equal to protect against hydrogen sulfide gases.

E. Hatches
- The wet well shall have a lockable odor suppressing aluminum door with an aluminum frame and safety grate. The minimum opening size shall be 4 feet x 6 feet with 2 doors large enough to adequately maintain the wet well.
- All hatches shall have accommodations for locking above grade with 3/8” shaft padlocks provided by the City.

F. Ventilation
- The design of a wet well must reduce odor potential in a populated area or as directed by the City Engineer.
- Passive ventilation structures shall be provided and must include screening to prevent the entry of birds and insects to the wet well. An air vent pipe shall have a minimum diameter of 4 inches with outlet located 1 foot above wet well top.
- Continuous mechanical ventilation structures shall be provided with ventilation equipment providing a minimum capacity of 12 air exchanges per hour and be constructed of corrosion resistant material.

G. Cable Strain Relief – A stainless steel cable holder shall be provided for all cables in the wet well for cable strain relief purposes.

5.4.5.2 Wet Well Volume

A. Wet well volume for a submersible pump station is the volume contained above the top of the motor, or as specified by the pump manufacturer.

B. High level alarm elevation shall be a minimum of 60 inches below the top of the wet well or 48 inches below the flowline elevation of the lowest service tap, whichever elevation is lower.
   - Alarm shall be sent when both pumps are running on a duplex station or when the level is 6 inches to 12 inches over all pumps running. The City Engineer shall approve all situations and levels that need to trigger an alarm.
   - Wet well volume shall be calculated by the following method:

$$V = \frac{TQ}{4(7.48)}$$

where:
V = active volume, (cubic feet)
Q = pump capacity, (gallons per minute)
T = cycle time, (minutes)
7.48 = conversion factor, (gallons per cubic foot)

C. Pump cycle time, based on Peak Flow, must equal or exceed the criteria shown in Table 5.10.

Table 5.10: Minimum Pump Cycle Time

Pump Horsepower	Minimum Cycle Times
< 50 6 minutes	6 minutes
50-100 10 minutes	10 minutes
> 100 15 minutes	15 minutes

D. The operation cycle "T" shall not be less than 10 minutes for Average flow and not more than 60 minutes for minimum flow conditions. The operation cycle time must exceed the manufacturer's requirements.

5.4.5.3 Valve Vault

A. Valve vaults shall have sloped bottoms towards a floor drain to remove liquid build up. The floor drain line from the valve vault connecting to the wet well must prevent gas and liquids from entering valve vault.
B. The valve vault shall have a lockable aluminum door with an aluminum frame. The minimum opening size shall be 2 feet x 3 feet or large enough to adequately maintain the valve vault.

5.4.6 Pumps, Lift Station Piping, and Valves

5.4.6.1 Pumps

A. Stations shall contain a minimum of two pumps and shall be capable of handling peak flows with one pump out of service.

B. All pumps shall be explosion proof, non-clog, submersible type capable of passing a 2-1/2 inch diameter sphere or greater. Vortex impellers shall be used to prevent clogging.
C. Pumps shall be sized to operate at optimum efficiency. Minimum acceptable efficiency at the operating point will be 60 percent. The minimum required horsepower for the motor must be capable of handling the entire range as shown in the pump curve. Where necessary, a higher horsepower pump will be required to prevent any damage to the motor as a result of loss of hydraulic head situation.
D. All submersible pumps shall be equipped with an automatic flush valve attached to the pump volute using the hydraulic energy created by the pump operation to temporary suspend settled materials.
E. The pump rail system shall be MTM Sch 40 stainless steel with supports on 8 feet maximum spacing.

5.4.6.2 Pump Capacity

A. The firm pumping capacity shall be greater than the peak flow for the entire fully developed drainage basin. If the fully developed drainage basin is significantly larger than the proposed development and it is not feasible to design for this flow, the firm capacity may be designed to handle a portion of the basin with the ability to expand for the ultimate basin capacity with approval from the City Engineer.
B. The pump curves shall be selected so that during normal operating conditions the pumps will run near the best efficiency point. The curves shall not approach shut off head when the pumps are running together.
C. System head curves, pump curves, and head calculations shall be submitted. Calculations and pump curves at both minimum (all pumps off) and maximum (last normal operating pump on) static heads, and for a C value of both 100 and 140 must be provided for each pump and for the combination of pumps with modified pump curves. Head calculations shall be the sum of static head, friction head in force main and lift station piping, and a fittings head.
D. Flow calculations, system curves, and head calculations shall be shown in the construction drawings as well as in a final design report. Final design report shall include all of the preliminary design submittal requirements with the exception of the replacement of final design information.

5.4.6.3 Lift Station Piping

A. Piping inside the lift station shall be ductile iron Class 200 psi, AWWA C151-75, C171-76, or latest edition thereof. Pipe shall be centrifugally cast with rubber gasket type joint. All fittings shall be ductile iron Class 250 meeting AWWA C110-77 or latest revision for sizes 12 inches and smaller or Class150 on sizes 14 inches and larger. All pipe and fittings shall have a prime coat on the outside surface and shall have an interior lining of 40-mils nominal dry film thickness of Protecto 401

Ceramic Epoxy Lining or approved equal, applied in accordance to the manufacturer's recommendations.

B. All nut and bolt assemblies inside the wet well shall be ASTM 316 stainless steel.

C. Lift station piping shall be designed with an additional emergency by-pass pump connection, allowing the station to be operated with the primary pump(s) out of service for an extended period of time. The by-pass pump connection shall be fitted with a CamLock fitting and cap. Bypass piping shall be supported by a strut type pipe support set in a reinforced concrete pad. By-pass piping and valves shall maintain a minimum of a 24 inch clear from the ground.

5.4.6.4 Valves

(Isolation valves, check valves, and air release/vacuum valves shall be located in the valve vault)

A. Isolation Valves
- Each pump shall have one isolation valve downstream of the pump and check valve, including a discharge pressure gauge between the pump and isolation valve. Isolation valves shall be resilient seated gate valves meeting the City Standard Specifications. The discharge pressure gauge shall be a minimum of 4 inch diameter within the appropriate pressure ranges for the design.
- All external nuts and bolts shall be ASTM 316 stainless steel.

B. Check Valves
- Check valves shall be a controlled closing swing check valve with a lever and spring.
- Check valves shall be located upstream of the isolation valve.
- All external nuts and bolts shall be ASTM 316 stainless steel.

C. Air Release/Vacuum Valves
- Air release valves of a type suitable for wastewater service shall be installed along the force main where the force main would be prone to trapped air.
- The type of valve shall be air release or a combination of air release and vacuum breaker. Valves shall be fitted with blow off valves, quick disconnect coupling and hose to permit back flushing after installation without dismantling the valve.
- All external nuts and bolts shall be ASTM 316 stainless steel.
- The engineer shall determine the valve type and location. The calculations for valve type and valve sizing shall be provided to the City Engineer.
- Isolation valves for 3 inch and smaller air release valves shall be all bronze or brass. Isolation valves 4 inch and larger shall meet standard specifications for resilient wedge gate valve.
- Locations of the air release/vacuum valves shall be shown on the plan and profile sheets for the force main.

5.4.7 Force Main

5.4.7.1 General

A. Force main capacity shall be sized to meet the pump capacity. The force main shall be sized to handle the ultimate basin capacity. The force main may be designed to handle a portion of the basin with the ability to expand for the ultimate basin capacity if approved by the City Engineer. The minimum force main size shall be 4 inch diameter except for grinder pump lift stations. The minimum recommended velocity is 3 feet per second, and the velocity shall not be less than 2.5 feet per second when only the smallest pump is in operation.
B. Force main sewer pipe shall be designed to meet the working pressure requirements of the particular application. Design calculations and pipe selection shall be submitted to the City Engineer in report format.
C. A force main must be designed to abate any anticipated odor.
D. Force main pipe materials shall AWWA C900-16 PVC Pipe (green in color) for all sizes, DR 14 (PC 305) for pipeline sizes 12-inch and smaller, and DR 18 (PC 235) for 14-inch and larger wastewater pipelines.
E. For trench depths greater than 12 feet or other dead and/or live loading considerations, the engineer shall provide a pipe with the appropriate DR rating which shall exceed the minimum requirements.
F. All fittings shall be wrapped ductile iron in accordance with AWWA C110 or AWWA C153. Fittings shall have a prime coat on the outside surface and shall have an interior lining of 40-mils nominal dry film thickness of Protecto 401 Ceramic Epoxy Lining or approved equal, applied in accordance to the manufacturer's recommendations
G. All valves and fittings shall be restrained with Mega-lug or approved equal. Joint material for PVC shall conform to ASTM F471.
H. Plans shall include plan and profile for the force main.
I. Force main shall have a minimum of 4 feet of cover and be laid to standard specifications for potable waterline.
J. Force main separation and design criteria from water mains and all other utility lines shall meet the minimum requirements from TCEQ.
K. All force mains shall have green EMS locator pads at every two hundred fifty (250') feet, change in direction, valve, manhole, etc.

5.4.7.2 Embedment

A. All force main pipes shall be installed in embedment material as shown on the Standard Details and in conformance for the Standard Specification for Construction

5.4.8 Control Panel

5.4.8.1 General:

The control system shall be designed to operate the required number of pumps specified on the drawing at the power characteristics shown on the plans.

The control function shall provide for the operation of the pumps in Hand (manual) and Auto (controlled by PLC). See "24VAC Regulator System" for further information. The control shall function as described below. The equipment listed below is a guide and does not relieve the supplier from providing a system that will function as required.

5.4.8.2 Enclosure:

The enclosure shall be a NEMA 4x rated stainless steel. The enclosure shall be a wall mount type with a minimum depth of 8" sized to adequately house all the components. The door gasket shall be rubber composition with a retainer to assure a positive weatherproof seal. **The door shall operate with a single action handle that accepts a 3/8" shaft padlock** and opens a minimum of 180 degrees.

5.4.8.3 Inner Dead Front Door:

A polished aluminum dead front shall be mounted on a continuous aircraft type hinge, contain cutouts for mounted equipment, and provide protection of personnel from live internal wiring. Cutouts for breaker handles shall be provided to allow operation of breakers without entering the compartment. **No door mounted operating mechanisms allowed for breaker operation.** All control switches, indicator pilot lights, ONE general purpose GFI duplex receptacle and other operational devices shall be mounted on the external surface of the dead front. The dead front shall open a minimum of 150 degrees to allow access to equipment for maintenance. A ¾" break shall be formed around the perimeter of the dead front to provide rigidity.

5.4.8.4 Back Plate:

The back plate shall be manufactured of 12-gauge sheet steel and be finished with a primer coat and two (2) coats of baked on white enamel. All devices shall be permanently identified.

5.4.8.5 Power Distribution:

The panel power distribution shall include all necessary components and be wired with stranded copper conductors rated at a minimum of 90 degrees C.

System shall be equipped with an **Emergency Generator** with an automatic transfer switch **capable of programmable test dates and times. Inputs shall be provided to PLC to indicate Generator**

Running, Generator Alarm, and Generator Low Fuel Level OR a Stand Alone Manual Double Throw Safety Switch to allow hard wiring to a portable generator. Emergency Generator shall meet the requirements of the most recently adopted noise ordinance.

No door mounted operating mechanisms allowed for breaker operation in control panel. All conductor terminations shall be as recommended by the device manufacturer.

5.4.8.6 Circuit Breakers:

All circuit breakers shall be heavy-duty thermal magnetic or motor circuit protectors similar and equal to Square D type FAL. Each motor breaker shall be adequately sized to meet the pump motor operating characteristics and shall have a minimum of 10,000 amps interrupting capacity for 230 VAC and 14,000 amps at 480 VAC. The control circuit and the duplex receptacles shall be individually controlled by heavy-duty breakers.

Circuit breakers shall be indicating type, providing "ON-OFF-TRIP" positions of the operating handle. When the breaker is tripped automatically, the handle shall assume a middle position indicating "TRIP". Thermal magnetic breakers shall be quick-made and quick-break on both manual and automatic operation and have inverse time characteristics secured through the use of bimetallic tripping elements supplemented by a magnetic trip.

Breakers shall be designed so that an overload on one pole automatically trips and opens all legs. Field installed handled ties shall not be acceptable.

5.4.8.7 Motor Starters:

Motor starters shall be open frame, across the line; NEMA rated with individual overload protection in each leg. Motor starter contact and coil shall be replaceable from the front of the starter without being removed from its mounted position. **Overload heaters shall be solid state motor logic type** with the following features: 3 to 1 adjustment for trip current, phase loss and unbalance protection, LED power indication, ambient insensitive and self-powered, and shall have availability of electrical remote reset. Overloads shall be sized for the full load amperage draw of the pumps. Definite purpose contactors, fractional size starters and horsepower rated contactors or relays shall not be acceptable.

5.4.8.8 Transformers:

Control transformers shall provide the 120 VAC and/or 24 VAC for control circuits. Transformers shall be fused on the primary and secondary circuits. The secondary shall be grounded.

5.4.8.9 Lightning-Transient Protection:

A lightning-transient protector with tell-tale warning lights on each phase to indicate loss of protection on the individual phases shall be provided. The device shall be solid state with a response time of less than 5 nanoseconds withstanding surge capacity of 6500 amperes. Unit shall be instant recovery, long life and have no holdover currents.

5.4.8.10 Phase Monitor:

A line voltage rated, adjustable phase monitor shall be installed to sense low voltage, loss of power, reversed phasing and loss of a phase. Control circuit shall de-energize upon sensing any of the faults and shall automatically restore service upon return to normal power.

5.4.8.11 Alarm System:

The alarm light shall be a weatherproof, shatterproof, red light fixture with 500 lumens minimum to indicate alarm conditions. The alarm light shall be turned on by the alarm level.

The alarm light shall be mounted on the exterior of the cabinet. The alarm horn shall provide an audio signal of not less than 90 db at 10 feet. An **alarm silence switch** shall be **mounted on the exterior of the cabinet** and deactivate the alarm horn; however, the alarm light shall flash until the alarm condition ceases to exist. **An Input shall be provided to PLC to indicate High Wet Well Condition.**

5.4.8.12 24 VAC Regulator System:

SCADA:
Equipment for SCADA shall consisting of a **PLC, Radio, Antenna, etc**. to operate the system. Control cabinet **components shall be installed when the panel is built**.

Engineer shall contact the Pump Department at 972-771-7730 for current requirements for SCADA system and contact for Cities current SCADA supplier.

The control system shall provide for both automatic and manual control and alternation of the pumps to maintain a pumped down condition of the wet well.

Wet well levels shall be sensed by a pressure transducer. **Float regulators shall be installed as back up for HIGH and LOW levels only.** The transducer shall sense the “OFF”, “LEAD”, “LAG”, and “HIGH” levels as given on the plans. As the level in the wet well raises the lead pump, as determined by the alternator, shall start and pump the station to the “OFF” position. In the event the incoming flow exceeds the capacity of

the lead pump, the lag pump shall start and both pumps shall run to the off level. If the wet well level continues to rise, high well alarm functions shall be activated. The alternator shall switch when the off level is reached.

All inputs and outputs shall be wired to a terminal strip at bottom of cabinet.

5.4.8.13 Ancillary Equipment:

HOA Switches: A three position HOA switch shall be provided on the inner dead front for each pump. **Inputs shall be provided to PLC to indicate position of HOA.**

Run Indicators: A run pilot indicator shall be provided on the inner dead front. All indicator lights shall be push to test. **Inputs shall be provided to PLC to indicate pump running.**

Elapsed Time: Elapse time meter shall be mounted on the dead front door.

Cabinet Temperature Control: The cabinet shall be equipped with a panel heater controlled by a thermostat and a vent fan controlled by a thermostat.

Receptacles: One duplex receptacle located on inner dead front door for general purpose use. This receptacle shall be of the ground fault type, 120volt, and protected by a 20 amp breaker. A second single receptacle shall be located on the back panel to provide power for UPS back up system. This receptacle shall be 120 volt and protected by a separate 20 amp breaker.

UPS Back Up System: Will provided **120 Volt power** to SCADA communication equipment and all low voltage power transformers. This must be installed in the control panel. UPS shall be APC 650VA 120 Volt or equivalent.

The System must be able to transmit all alarms and wet well levels when on backup power.

Motor Protection: A control and status module shall sense either motor over temperature or seal leakage, and shall turn off the pump, lock out the pump, and send an alarm. **Inputs shall be provided to PLC to indicate Pump Fail, Seal Fail and Temp Fail individually for each pump.**

5.4.8.14 Miscellaneous:

Panel Racks:
Posts supporting racks shall be **3" minimum rigid conduit capped** and **bolted directly to channel framework supporting the panels.**

Panels shall have a **"rain shield" structure using ¼" minimum aluminum plating** providing a **solid back plate** behind panels **continuous to overhead plate** to protect panel from rain. Provide lighting mounted on structure with switch mounted on exterior of panel to light up panel area.
Contact City of Rockwall at 972-771-7730 for location of existing type structure.

Each pump must have its own conduit for power cord and a separate conduit for all float wires.

Drawings: Control panel schematic drawings shall be submitted for approval with the submittal plans.
Final control panel wire schematic drawings including a list of all legends (2 sets total) shall be provided. One set shall be encapsulated in Mylar and attached to the inside of the front door of the control cabinet. A second set shall be delivered to the City of Rockwall Wastewater Department.

Panel Markings: All component parts in the control panel shall be permanently marked and identified as they are indicated on the drawing. Marking shall be on the back plate adjacent to the component. All control conductors shall be identified with wire markers as close as practical to each end of conductors.

Panel Wiring: All wiring in panel shall maintain a **minimum of 1 1/2"** spacing between components and wire ways.

Testing: All panels shall be tested to the power requirements as shown on the plans to assure proper operation of all the components. Each control function shall be activated to check for proper operation and indication.

Guarantee: All equipment shall be guaranteed for a period of three (3) years from date of acceptance. The guarantee is effective against all defects in workmanship and/or defective components. The warranty is limited to replacement or repair of the defective equipment.

6. MISCELLANEOUS REQUIREMENTS

6.1 Grading

The backfill material shall be placed in layers not to exceed eight (8) inches loose thickness. The moisture content shall be uniform and near the optimum moisture content for the material. In cases, where the materials being placed do not have the proper moisture, the material shall be dried out or additional moisture shall be added by satisfactory methods such that the additional water is distributed uniformly throughout the material being placed. The layers of the backfill shall be reduced in thickness when satisfactory compaction cannot be obtained with the equipment being used. In all cases a density of not less than ninety-five (95) percent of the standard proctor density must be obtained. The contractor shall arrange for the necessary laboratory testing, at their expense, to determine the density of the material. All franchise utility companies (phone, gas, electrical, cable, internet, and any utility that isn't supplied by the City) working within the right-of-ways of streets or alleys shall also comply with the above noted specifications with laboratory testing results provided to the City of Rockwall. Easement locations under pavement shall also have a density control backfill to ninety-five (95) percent of the standard proctor density. All densities are to be within the acceptable moisture range of (-2 to +4) percent of optimum moisture unless otherwise approved by the City Engineer.

A sheeps-foot roller shall be utilized for compaction of all fill material. Mechanical tamping is allowed for trench backfill.

It shall be the responsibility of the Developer to adjust all City and franchise utilities the final grades of the development.

All slopes should be a maximum of 4:1 and a minimum of 1%. In locations where a 4:1 slope is not possible, retaining walls, gabion baskets, concrete slope protection or other approved retaining methods may be required. Retaining methods must be approved by the City Engineer.

At the beginning of the project the Developer will provide offset stakes at intervals of fifty (50) feet. The stakes will be offset from the back of the outside curb, a convenient distance to permit all operations, to be completed without disturbing these stakes. Information that shall be included on the stakes includes the station number, offset distance from back of curb, and elevations of hub. It will be the contractors responsibility to maintain these stakes, and use the information for all other horizontal and vertical control required. The contractor will set all forms using the data shown on the approved plans.

6.2 Grading, Fill, Excavation and Earthwork Permit

A grading, fill, excavation and earthwork permit shall be obtained prior to stockpiling or filling property within the City limits. No filling in drainage swales, creeks, wetlands, etc. is allowed without a flood study approval. Erosion protection shall be installed around stockpiled or stored material until grass is established. If fill is placed for use other than stockpiling or storage, a grading plan shall be prepared by a Professional Engineer and submitted with the grading, fill, excavation and earthwork permit. Temporary stockpiles have a maximum time limit of six (6) months. Densities shall be taken and proper compaction techniques used when placing the fill. In all cases a Professional Engineer shall certify that the proposed fill location is not within a stream or creek (flowing or not) flood plain. If the City Engineer determines the fill is to be placed near a creek or stream or possible drainage way, the 100-year floodplain shall be staked by a registered surveyor.

An early fill, excavation and earthwork permit will not be issued to any development or re-development projects that are in actively being reviewed by the Engineering Department. Grading for the parcels/development will only be released after final construction plan release by the Engineering Department.

The City of Rockwall requires that the design engineer provide a letter of concurrence. The letter is to verify that the drainage patterns, grade to drains locations, detention systems including outfall structures, detention pond volume, pad elevations, and drainage structures located within the project scope were installed to the general elevations as shown on the approved plans. The letter shall also verify that the project was constructed to meet the approved design requirements or is within acceptable design tolerances (max 0.2 feet for residential pad elevations). The design engineer or their designated representative shall direct all survey work necessary to verify elevations and design compliance. The letter of concurrence is to have the seal and signature of the design engineer.

6.3 Private Utility Construction

6.3.1 Trench Backfill – City Right-of-Way

1. No concrete streets shall be open cut by utility companies without City approval. Utilities crossing concrete streets shall be tunneled or bored.

2. Asphalt streets may be open cut. Backfill above utilities shall be concrete stabilized sand or cement. The asphalt pavement shall be repaired per City detail.

3. All trench backfill is to be compacted to 95% Standard Proctor Density within City rights-of-ways. The compaction may be obtained by mechanical tamping, rolling, etc. No water jetting is allowed. In the parkway, the backfill material may be from the excavated trench, except

no rocks larger than two inches (2") shall be used. Material from rock or shale excavation cannot be used. The contractor for the utility company or the utility company shall furnish density reports from a materials testing company verifying the densities. Densities shall be taken at each twelve-inch (12") lift at a maximum spacing of 150 feet. The moisture content shall be uniform and near the optimum moisture content for the material. In cases, where the materials being placed do not have the proper moisture, the material shall be dried out or additional moisture shall be added by satisfactory methods such that the additional water is distributed uniformly throughout the material being placed.

6.3.2 Parkway Cleanup

The contractor for the utility company or utility company shall remove any rocks or excess trench material from the parkway and replace any disturbed areas with grass sod.

6.4 Additional Permits or Approvals

Developer or developer's representative is responsible for obtaining any other approvals or permits needed for their development, for example: TCEQ, TXDOT, City of Dallas, FEMA, USACOE etc. prior to start of construction. Copies of the permits/approvals shall be furnished to the City.

6.5 Retaining Walls

A. Retaining walls or concrete slope protection shall be installed where lot slope is greater than 4:1.

B. No railroad tie retaining walls shall be constructed in public or private property.

C. No retaining walls including the footing shall be placed in the right-of-way, easements or overlapping property lines.

D. All retaining walls shall be stone, masonry or reinforced concrete with a stone face or form liner. No smooth concrete retaining walls to be installed.

E. Retaining walls three feet (3') and higher shall be designed and inspected by a professional licensed engineer in the State of Texas. Property lines and right-of-ways shall be noted on the wall plans. The City requires a verification letter (signed/sealed) from the design engineer stating that the retaining walls installed with the site/subdivision were inspected by the engineer or their designated representative and that the walls were installed to the engineered design and general construction standards. The

verification letter shall be delivered to the Engineering Department prior to the project acceptance by the City.

F. Retaining walls over 30" in height that have sidewalk, trail or other walking surface on the top side of the wall will require railing.

G. Traffic rated guard rail or barrier will be required when roadway, parking lot or alley is within 10 feet of a retaining wall that is over 30" in height.

H. Gabion retaining walls may be used only with City Engineer's approval for walls less than three feet (3') along drainage ways.

I. All retaining walls shall be placed according to offset hubs set by certified professional surveyors noting grade cuts, wall elevations and stop points for each wall end. Wall locations and elevations shall match those shown on the approved site grading plans.

6.6 Maintenance Bonds

The City requires ten (10%) percent-two (2) year maintenance bond for paving, paving improvements, water systems, wastewater systems, storm sewer systems including detention systems, and associated fixtures and structures which are located within the right-of-ways or defined easements. The two (2) year maintenance bond is to state "from date of City acceptance" as the starting time.

A review of the site shall be conducted at twenty (20) months into the two (2) year maintenance period. The design engineer or their designated representative shall be present to walk the site with the City of Rockwall Engineering Inspection personnel.

6.7 Construction

6.7.1 Preliminary Site Preparation

Site Preparation - The below noted site preparation items are to be in place, inspected and approved by the City, prior to the start of any clearing, grubbing or grading operations.

1. Protected trees which are designated to remain on site - are to be identified, tagged and banded with bright orange or red bands.

2. Protected trees which are designated to be removed from the site are to be identified tagged and banded with blue bands or blue paint markings.

3. Tree identification tags – are to consist of metal tags which have the tree identification number stenciled or stamped or engraved on the tag. The

numbers used to identify the protected trees shall correspond to the tree identification number noted on the approved treescape plans.

4. Protected Tree - Barrier Fencing:

   - o Chain link barrier fencing – shall be placed around the drip lines of the individual protected trees or groups of protected trees, which are designated to remain at the site if they are located within 10-feet of any cut/fill grading location.

   - o Plastic mesh barrier fencing - shall be placed around the drip lines of individual protected trees or groups of protected trees, which are located over 10-feet or more outside a cut/fill grading location.

5. Silt fence along with construction entrance and any other designated erosion BMP's must be installed and inspected. No silt fencing may be installed at the site until the trees have been identified, banded, tagged, fenced and inspected by the City.

6. Portable toilet facilities will be required on all construction sites or as otherwise deemed necessary by the City of Rockwall. It is essential that adequate on-site restroom facilities be available for all construction workers. It will be the responsibility of the contractor to install and maintain the facilities through the completion of the project. These facilities must be on site and verified prior to moving personnel on site and before construction can begin.

7. Portable trash receptacle is to remain on the job site through the course of construction. The site is to remain free of construction litter and debris. Construction workers shall place all lunch trash in the "trash containers" immediately after lunch. Trash receptacle must be on site and verified prior to moving personnel on site and before construction can begin.

8. Construction Site Working Hours and Noise Control Signage – Construction and construction related activities are limited to the hours of 7:00 am to 7:00 pm Monday through Friday and 8:00 am to 7:00 pm on Saturday. No Sunday construction allowed. The City of Rockwall requires that a sign be posted at each Commercial/Residential development construction site. The sign must be installed at the site and verified prior to moving personnel on site and before construction can begin. The construction related activities are to include but not be limited to the following:

   - o Maintenance, servicing and fueling of construction equipment.
   - o The delivery of construction related materials and/or construction equipment.

At locations where compliance to Ordinance 05-45 is not being observed, the City of Rockwall may issue written orders to stop work or further regulate the site construction work hours. The City may also issue citations if it is determined that a violation of the construction ordinance exist.

(Construction Site Sign - Example)

Ordinance # 05-45
Construction Site Working Hours and Noise Control

City Ordinance – No. 05-45 limits construction and construction related activities to the hours of 7:00 a.m. - 7:00 p.m. Monday through Friday, and 8:00 a.m. - 7:00 p.m. on Saturday. (No Sunday construction allowed).

ORDENANZA #05-45
HORAS DE TRABAJO EN EL SITIO DE CONSTRUCCION Y EL CONTROL DE RUIDO

La Ordenanza de la Ciudad – No. 05-45 limita la construcción y las actividades relacionadas con la construcción a las horas de 7:00 a.m. – 7:00 p.m. de Lunes a Viernes, y de 8:00 a.m. – 7:00 p.m. los Sábados. (No se permitirá construcción los Domingo).

Noise Ordinance Sign
(Sign Size – 3' wide x 2' tall)

6.7.2 Inspection Scheduling

It is the responsibility of the contractor to schedule inspections prior to construction. Inspections may be scheduled and coordinated in the field or by cell phone directly with the Engineering Department Construction Inspector. Inspection of construction and verification of compliance to plans and specifications shall be conducted by the City of Rockwall Engineering Construction Inspector. The general contractor shall notify all of his construction contractors of this requirement. Items to be inspected must be sufficiently ready for inspection at the time of your requested inspection appointment as inspector's time is limited. Failure to be ready for inspections may result in inspection rescheduling to the following day. No development will be accepted by the City of Rockwall until all construction has been approved by the City of Rockwall inspectors.

1. Saturday Inspections: The contractor will be charged a minimum 2 hours inspection charge for all Saturday inspections. All Saturday inspections must be scheduled in writing to the Engineering Department by noon on the Thursday before the inspection date. A signed Saturday Engineering Inspection Request form must be emailed to the City Engineer and

Construction Inspector Supervisor. Approval/disapproval will be emailed back to the requesting contractor with the Saturday inspector's information. All cancellations must be given verbally and in writing to the Saturday inspector no later than 8 am on day of inspection. Two hours of overtime inspection will be charged to the contractor if no cancellation is given prior to the inspector arriving at the project site. Contractor must sign Engineering Inspector's Report of Overtime form to finalize the inspection. No acceptance and/or certification of occupancy will be given until all overtime engineering inspection fees are paid in full.

2. Before/After Weekday Hours Inspections: Contractor will be charged on 15 minute intervals for any before/after hour's inspections. Contractor must sign Engineering Inspector's Report of Overtime form to finalize the inspection. No acceptance and/or certification of occupancy will be given until all overtime engineering inspection fees are paid in full.

6.7.3 Vertical Above Slab Construction Permit

No vertical (above slab) construction will be allowed until such time as the following minimum site requirements have been addressed at the site and a vertical above slab construction permit has been issued. Minimum requirements for vertical construction are subject to but not necessarily limited to the below noted items:

- Fire lane pavement is installed, tested, and approved for use
- Fire lane pavement is painted and marked to Fire Department specifications
- Water lines for the site are installed, tested, and approved for use
- All fire hydrants are installed and approved for use
- Fire hydrant nozzles and bonnets are painted as per line size color code
- Reflective fire hydrant locator buttons are in place at hydrant pavement locations
- Fire hydrants are flow tested to verify flow at designated hydrant locations
- Fire hydrant nozzle diameters, proper height above final grade, and clearance are verified and approved
- Silt fence is placed above the fire lane if it is deemed necessary at positive flow areas
- Exterior building materials are approved by the Planning and Zoning Department.

6.7.4 Disposal of Excess Materials

The contractor shall properly dispose of all excess material by removing from the job site all the brush, trash, debris, etc. upon completion of construction. All material shall be properly disposed.

6.7.5 Construction Site Safety

Construction site safety measures are to be in place at all construction projects located within the City of Rockwall. All necessary measures required to ensure that safe work zones exist for the protection of construction workers and general public living in or near such construction zones. Construction zones shall comply with work zone traffic control specifications and requirements. Occupational Health and Safety Administration requirements and regulations must be in compliance. Temporary construction fencing is to be places around open trenches, pits, or other locations deemed necessary by the City of Rockwall. Any miscellaneous items that may pose direct or potential hazard to workers or the general public that is known by the contractor or brought to the attention of the contractor shall be addressed immediately.

It is the responsibility of the contractor(s) to establish and maintain construction site safety measures. However, the City of Rockwall will temporarily suspend work at a construction site if it is deemed necessary due to unsafe or hazardous conditions until such conditions have been corrected.

In each circumstance where it is deemed that proper safety measures are not being followed, a warning will be issued by the engineering construction inspector. Construction may be temporarily suspended if deemed necessary until items responsible for issuance of the safety warning have been properly addressed. Issuance of three (3) or more safety warnings will require that the designated construction be suspended until such time that a safety meeting is scheduled with contractor personnel along with City of Rockwall representatives to discuss the appropriate measures to correct the identified problems and determine any further possible actions which may be necessary.

City of Rockwall
The New Horizon

7. Special Provisions to the NCTCOG's Standard Specifications for Public Works Construction Standards

All work included as a part of this contract shall be performed in accordance with the Standard Specifications for Public Works Construction, North Central Texas, November 2017, Fifth Edition, except where noted otherwise in the City of Rockwall's Supplemental Special Provisions, the Special Conditions included in the Specifications and Contract Documents.

The North Central Texas Standard Specifications shall be modified and clarified by the addition to the following requirements to the various items. Except when specifically stated, none of the requirements of the North Central Texas Standard Specifications shall be deleted.

7.1 Division 100 General Provisions

NOTE: The ***(1)*** symbol specifies that this item is also covered in the City of Rockwall's "Special Provisions" to the "Standard Specifications for Public Works Construction, North Central Texas". These Special Provisions are additional and modify the "Standard Specification"

Table 8.1: Revisions to NCTCOG's Division 100 General Provisions

Revised	Standard Specification Item No.	Description
	101	**DEFINITIONS AND ABBREVIATIONS**
	101.1	Definitions
	101.2	Abbreviations and Acronyms
	102	**PROPOSAL PROCEDURES**
	102.1	Proposal Form
	102.2	Quantities in Proposal Form
	102.3	Examination of Plans, Specifications and Site of the Work
	102.4	Preparation of Proposal
	102.5	Proposal Guaranty
	102.6	Filing of Proposals
	102.7	Withdrawing Proposals
	102.8	Opening Proposals
	102.9	Consideration of Proposal
	102.10	Irregular Proposals
	102.11	Rejection of Proposals

	102.12	Disqualification of Bidders
	102.13	Return of Proposal
	103.	**AWARD AND EXECUTION CONTRACT**
	103.1	Contractor's Warranties and Understanding
(1)	103.2	Award of Contract
	103.3	Surety Bonds
(1)	103.4	Insurance
	103.5	Execution of Contract
	103.6	Notice to Proceed and Commencement of Work
	103.7	Delay of Contract
	103.8	Order of Work to be Performed
	104.	**SCOPE OF WORK**
	104.1	Intent of contract Documents
	104.2	Change of Modification of Contract
	104.3	Disrupted Work and Claims for Additional Compensation
	104.4	Performance of Extra Disputed Work
	105.	**CONTROL OF WORK**
(1)	105.1	Contract of Documents
(1)	105.2	Workmanship, Warranties and Guarantees
(1)	105.3	Shop Drawings, Product Data and Samples
(1)	105.4	Construction Stakes
(1)	105.5	Means and Methods of Construction
	105.6	Supervision by Contractor
(1)	105.7	Owner's Representatives
	105.8	Service of Notices
	105.9	Inspection
(1)	105.10	Acceptance
	106	**CONTROL OF MATERIAL**
	106.1	Substitution of Materials
	106.2	Materials and Equipment
	106.3	Salvageable Material
	106.4	Off-Site Storage
	106.5	Samples and Tests of Materials
	106.6	Surplus Material
	107	**LEGAL RELATIONS AND CONTRACT RESPONSIBITIES**
	107.1	Contractor Independence
	107.2	No Third Party Contractual Rights
(1)	107.3	Indemnification

	107.4	Owner's Officers, Employees or Agents
	107.5	Venue and Governing Law
	107.6	No Waiver of Legal Rights
	107.7	Severability
	107.8	Headings
	107.9	Obligation to Perform Functions
(1)	107.10	Performance of the Work
	107.11	Successors and Assigns
	107.12	Supervision and Construction of Procedures
	107.13	Labor and Materials
(1)	107.14	Equal Employment Opportunity
(1)	107.15	State and Local Sales and Use Taxes
	107.16	Patents
(1)	107.17	Compliance with Laws
	107.18	Sanitary Provisions
	107.19	Public Convenience and Safety
(1)	107.20	Protection of Work and Persons and Property
	107.21	Project Signs
	107.22	Working Area
	107.23	Railway Crossings
	107.24	Existing Structures, Facilities and Appurtenances
	107.25	Project Clean-Up
	107.26	Disposal of Materials
	107.27	Restoration of Property
	107.28	Environmental Compliance
	108.	**PROSECTUTION AND PROGRESS**
	108.1	Progress Schedule
	108.2	Prosecution of the Work
	108.3	Other Contractors; Obligation to Cooperate
	108.4	Employees
	108.5	Subcontracts
	108.6	Assignments
	108.7	Owner's Right to Temporarily Suspend Work
	108.8	Delays; Extension of time; Liquidated Damages
	108.9	Contractor Default: Owner's Right to Suspend Work and Annul Contract
	108.10	Suspension by Court Order Against The Owner
	108.11	Termination For Convenience of the Owner
	108.12	Claims Against Owner and Action Theron
	108.13	Use of Completed Portions of Work
	109	**MEASUREMENT AND PAYMENT**

	109.1	Payment for Labor and Material; No Liens
	109.2	Payment for Materials
	109.3	Payment for Extra Work
	109.4	Payment Withheld
(1)	109.5	Monthly Estimate, Partial Payments, Retainage, Final Inspection, Acceptance and final Payment
	109.6	Wire Transfers
	110	**AIR QUALITY REQUIREMENTS FOR EQUIPMENT**
	110.1	Equipment Requirements
	110.2	Operational Requirements
	110.3	Reporting to Owner
	110.4	Enforcement

ITEM 103 AWARD AND EXECUTION CONTRACT

103.2 Award of Contract

Delete Item 103.2 in its entirety and substitute therefore the following:

It is the intention of the Owner to award a contract for the work included in this project on the basis of the lowest acceptable bid submitted by a qualified bidder, as determined by the Owner.

Within five (5) working days after the bid opening, the low bidder shall submit such evidence as the Owner may require establishing the bidder's qualifications to satisfactorily perform the work included in this project. Information that may be required shall include the following:

(1) Current Financial Statement.
(2) Letter of Auditor's opinion.
(3) Previous years Balance Sheet, Income Statement and Change of Financial Position.
(4) List of projects that have been satisfactorily completed by the Bidder that are of the same general type as included in this contract, together with names, addresses and phone numbers or persons familiar with this work.
(5) Other information that may be pertinent to the Bidder's Qualifications.

Should the bidder fail to produce evidence satisfactory to the Owner on any of the foregoing points he may be disqualified and the work awarded to the next bidder so qualifying.

The Owner will notify the successful bidder, in writing, within sixty (60) days after the date of receiving bids, of the acceptance of the proposal. The Contractor or Contractors shall complete execution of the required bonds and Contract within ten (10) days of such notice.

103.4 Insurance

Add the following sub-item:

103.4.6 Bonds and Insurance

103.4.6.1 Performance, Payment and Other Bonds

Contractor shall furnish Performance and Payment Bonds as security for the faithful performance and payment of all his obligations under the Contract Documents. These Bonds shall be, at all times, in amounts equal to the total Contract Price, and in such form as set forth in the Contract Documents and with such corporate sureties as are licensed to conduct business in the state where the Project is located and are named in the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Federal Register by the Audit Staff Bureau of Accounts, U.S. Treasury Department. The Performance and Payment Bonds shall be expanded to include any extension of the Contract Period of total Price.

If the surety on any Bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business in terminated in any state where any part of the Project is located in revoked, Contractor shall within five (5) days thereafter substitute another Bond and surety, both of which may be acceptable to the City.

103.4.6.2 Additional Bonds and Insurance

Prior to delivery of the executed Contract by City to the Contractor, City may require CONTRACTOR to furnish such other Bonds and such additional insurance in such form and with such sureties or insurers as the City may require.

ITEM 105 CONTROL OF WORK

105.1 Contract of Documents

105.1.1 Priority of Contract Documents

Change the first sentence of Item 105.1.1 to read:

In case of conflict between contract documents, priority of interpretation shall be in the following order: signed agreement, performance and payment bonds, addenda, special conditions, project (or contract) drawings and specifications, City of Rockwall Special Provisions to the Standard Specifications for Public Works Construction – North Central Texas, standard drawings, advertisement for bids, contractor's bid proposal and bid form.

105.1.3 Contract Drawings and Specifications

Add the following:

In general, the number of copies of the plans and specifications furnished to the Contractor shall be limited to five (5). Additional copies may be obtained at cost of reproduction.

105.2 Workmanship, Warranties and Guarantees

105.2.2 Special Warranty

Add the following:

The Contractor shall provide a Maintenance Bond in the amount of ten percent (10%) of the total amount of the contract guaranteeing the work in accordance with the plans and specifications for a period of two (2) years after acceptance by the City of Rockwall. This bond shall provide for repair and/or

replacement of all defects due to faulty material and workmanship that appear within a period of two (2) years from the date of completion and acceptance of the improvements by the City of Rockwall.

105.3 Shop Drawings, Product Data and Samples

Add the following:

Review of Shop Drawings by the Engineer shall be of the sole purpose of determining the sufficiency of the said drawings or schedules to result in finished improvements in conformance with the plans and specifications, and shall not relieve the Contractor of his duty as an independent contractor. It being understood and agreed that the Engineer does not assume any duty to pass upon the propriety or adequacy of such drawings or schedules or any means or methods reflected thereby in relation to the safety of either person or property during the contractors performance hereunder.

105.4 Construction Stakes

Add the following to the first paragraph:

The Contractor shall be required to utilize the control monuments provided in the plans to set horizontal and vertical control and construction staking with the contractor's own surveyor.

105.5 Means and Methods of Construction

Add the following:

105.5.1 Water for Construction

The Contactor shall make the necessary arrangements for securing and transporting all water required in the construction, including water required for mixing of concrete, sprinkling, testing, flushing, flooding or jetting. The Contactor shall provide water as required at his own expenses.

Any party requesting the use of a temporary meter on a fire hydrant in the City of Rockwall shall execute an agreement with the City of Rockwall and shall deposit with the City of Rockwall the amount required by ordinance. Such deposit shall be returned upon payment of all charges for water use, and upon return of the meter, fittings, and wrench in their original condition.

Stationary meters shall be locked to fire hydrants at all times. Installation, set up and service fees shall be in the amounts established by ordinance.

It shall be unlawful for any person to open or close any fire hydrant used to obtain water for any purpose with any tool or device other than a standard accepted fire hydrant wrench, which can be supplied by the City of Rockwall.

All stationary fire hydrant meters shall be read monthly at their location in the field. All mobile fire hydrant meters are to be brought to the Utility Maintenance Department, Rockwall, Texas, between the 1st and 10th of each month to be read.

Temporary fire hydrant meters shall be read monthly by representatives of the City of Rockwall, and bills rendered at the current rates for all consumption. Customers using such meters shall comply with the written procedures implemented by the City with regard to making the meters

available to be read by representatives of the Rockwall Water Department. It shall be unlawful for any person to fail to make such meter available to be read by representatives of the Rockwall Utilities Department, as required by written procedures issued by the City.

Upon conviction of violation of the above requirements punishment shall be by fine not to exceed Two Hundred Dollars ($200.00). Each day on which a violation exists shall constitute a separate offense.

105.7 Owner's Representatives

Add the following:

105.7.3 Observation of Work by Engineer

The Engineer shall make periodic visits to the site to familiarize himself/herself generally with the progress of the executed work and to determine if such work generally meets the essential performance and design features and the technical and functional engineering requirements of the Contract Documents; provided and except, however, that the Engineer shall not be responsible for making any detailed, exhaustive, comprehensive or continuous on-site inspection of the quality or quantity of the work or be in any way responsible, directly or indirectly, for the construction means, methods, techniques, sequences, quality, procedures, programs, safety precautions or lack of same incident thereto or in connection therewith. Notwithstanding any other provision of this agreement or any other Contract Document, the Engineer shall not be in any way responsible or liable for any acts, errors, omissions or negligence of the Contractor, any subcontractor or any of the Contractor's or subcontractor's agents, servants or employees or any other person, firm or corporation performing or attempting to perform any of the work.

105.10 Acceptance

Add the following:

Once the work is satisfactory to the City of Rockwall and in accordance with the plans, specifications, contract documents, and the City has received; the Contractor's Affidavit of Final Payment and Release, Maintenance Bond, and Contractor's redlines/markups plans of actual work performed by the Contractor will the City issue a certificate of acceptance.

ITEM 107 LEGAL RELATIONS AND CONTRACT RESPONSIBILITIES

107.3 Indemnification

Delete Item 107.2 in its entirety and substitute therefore the following:

The Contractor and his sureties shall indemnify, defend and save harmless the OWNER and all of its officers, agents and employees, ENGINEER and all of its officers and employees from all suits, actions or claims of any character, name and description brought for or on account of any injuries, including death or damages received or sustained by any person, persons or property on account of the operations of the Contractor, his agents, employees or subcontractors; or on account

of any negligent act or fault of the Contractor, his agents, employees or subcontractors in the execution of said contract; or on account of the failure of the Contractor to provide the necessary barricades, warning lights or signs; and shall be required to pay any judgment, with cost, which may be obtained against the Owner or Engineer growing out of such injury, including death or damage.

107.14 Equal Employment Opportunity
Delete Item 107.14.5 Reports in this item in its entirety.

107.15 State and Local Sales and use Taxes
Delete in its entirety and substitute therefore the following;

Recent legislation has removed the sales tax exemption previously provided by Section 151.311 of the Tax Code covering tangible personal property purchased by a contractor for use in the performance of a contract for the improvement of City–owned realty.

It is still possible, however, for a contractor to make tax-free purchases of tangible personal property that will be incorporated into and become part of a City construction project through the use of a “separated contract” with the City. A “separated contract” is one, which separates charges for materials from charges for labor. Under such a contract, the contractor becomes a “seller” of those materials, which are incorporated into the project, such as bricks, lumber, concrete, paint, etc. The contractor issues a resale certificate in lieu of paying the sales tax at the time such items are purchased. The contractor then receives an exemption certificate from the City for those materials. (This procedure may not be used, however, for materials, which do not become a part of the finished product. For example, equipment rentals, form materials, etc. are not considered as becoming “incorporated” into the project.)

Utilization of this “separated contract” approach eliminates the need for bidders to figure in sales tax for materials, which are to be incorporated into the project. Bid items, which contain non-taxable materials, are identified in the Bid Schedule or this project. The successful bidder will be required to complete a Contract Form provided by the Owner identifying and separating non-taxable materials from the labor and taxable materials which are not incorporated into the finished project. The completed contractor form will be used to develop the “separated contract” and will determine the extent of the tax exemption.

107.17 Compliance with Laws
Add the following sub item:

107.17.2 Antitrust

The Contractor hereby assigns to the Owner any and all claims for over-charges associated with this contract which arise under the Antitrust Laws of the United States, 15 U.S.C.A. Section 1, et seq., (1973).

Add the following sub item:

107.17.3 Wage Rate

All employees of the Contractor on the work to be performed under this contract shall be paid the prevailing wage scale in this locality for work of a

similar character, and in no event less than the rates shown in the Special conditions to the Specifications.

107.20 Protection of Work and Persons and Property

107.20.2 Protection of Persons and Property

Add the following:

The Contractor shall at all times exercise reasonable precautions for the safety of employees and others on or near the work and shall comply with all applicable provisions of Federal, State, and Municipal Safety laws and building and construction codes. All machinery equipment and other physical hazards shall be guarded in accordance with the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America except where incompatible with Federal, State and Municipal laws or regulations. The Contractor shall provide such machinery, guards, safe walkways, ladders, bridges, gangplanks and other safety devices. The safety precautions actually taken and their adequacy shall be the sole responsibility of the Contractor, acting at his discretion as an independent contractor.

Add the following sub item:

107.20.4 Small Claims for Damages or Injury

If any person files a claim against the OWNER or CONTRACTOR for personal injury or property damage resulting from, arising out of, or caused by the operations of the Contactor, or any work within the limits of the project, the Contractor must either submit to the Owner a duly executed full release within thirty (30) days from the date of written claim, or immediately report the claim to his liability insurance carrier for their action in adjusting the claim. If the Contractor fails to comply with this provision within the stipulated time limit, it will be Automatically deemed that the Contractor has appointed the Owner as its irrevocable Attorney in Fact authorizing the Owner to report the claim directly with the liability insurance carrier. This provision is in and of itself a Power of Attorney from the Contractor to the Owner which authorizes the Owner to take said action on behalf of the Contactor without the necessity of the execution of any other document. If the Contractor fails to comply with the provisions of this item the Owner, at its own discretion, may terminate this contract or take any other actions it deems appropriate. Any payment or portion thereof due the Contractor, whether it is a final payment, progress payment, payment out of retainage or refund payment may be withheld by the Owner as is authorized by item 109.4. Bankruptcy, insolvency or denial of liability by the insurance carrier shall not exonerate the Contractor from liability.

ITEM 109 MEASUREMENT AND PAYMENT

109.5 Monthly Estimate, Partial Payments, Retainage, Final Inspection, Acceptance and Final Payment

109.5.2 Retainage

Add the following:

(4) On projects where the contract price, at the time of execution, is greater than $400,000.00 the Owner may retain 10 percent of the amount due the Contractor, with the retainage above 5 percent deposited in an interest bearing account and interest earned on such 5 percent retained funds shall be paid to the Contractor upon completion of the contract.

109.5.3 Final Inspection and Acceptance

Add the following:

Within ten (10) days after the Contractor has given the Engineer written notice that the work has been completed, or substantially completed, the Engineer and the Owner shall inspect the work and within said time, if the work be found to be completed or substantially completed in accordance with the Contract Documents, the Engineer shall issue to the Owner and the Contractor his Certificate of Completion, and there upon it shall be the duty of the Owner within ten (10) days to insure a Certificate of acceptance of the work to the Contractor or to advise the Contractor in writing of the reason for non-acceptance.

Definition of Substantially Complete: The date of substantial completion of a project or specified area of a project is the date when the construction is sufficiently completed, in accordance with the contract documents, as modified by any change order agreed to by the parties, so that the Owner can occupy or utilize the project or specified area of the project for the use for which it was intended.

7.2 Division 200 Site Protection & Preparation

NOTE: The ***(1)*** symbol specifies that this item is also covered in the City of Rockwall's "Special Provisions" to the "Standard Specifications for Public Works Construction, North Central Texas". These Special Provisions are additional and modify the "Standard Specification"

Table 8.2: Revisions to NCTCOG's Division 200 Site Protection & Preparation

Revised	Standard Specification Item No.	Description
	201.	**SITE PROTECTION**
	201.1.	Removal, Protection, and Replacement of Trees, Shrubbery, Plants, Sod and Other Vegetation
	201.2.	Determining Location and Protection of Existing Structures and Utilities
	201.3.	Maintenance of Streets and Rights of Way During Construction
	202.	**TEMPORARY EROSION, SEDIMENTATION, AND WATER POLLUTION PREVENTION AND CONTROL**
	202.1.	Description
	202.2.	Items of Work and Materials
	202.3.	Pre-construction Submittals
	202.4.	Construction Requirements
(1)	202.5.	Silt Fence
	202.6.	Interceptor Swale
	202.7.	Diversion Dike
	202.8.	Triangular Sediment Filter Dike
	202.9.	Check Dam (Rock)
	202.10.	Check Dam (Filter Tube)
(1)	202.11.	Stabilized Construction Exit
	202.12.	Stop Outlet Sediment Trap
	202.13.	Pipe Slope Drain
	202.14.	Inlet Protection
	202.15.	Erosion Control Blankets
	202.16.	Section Held for Future Use
	202.17.	Section Held for Future Use
	202.18.	Filter Tubes
	202.19.	Measurement and Payment
	203.	**SITE PREPARATION**
	203.1.	General Site Preparation

(1)	203.2.	Unclassified Street Excavation
	203.3.	Section Held for Future Use
	203.4.	Borrow & Spoil
(1)	203.5.	Embankment
	203.6.	Dust Control
	204.	**LANDSCAPING**
	204.1.	Removal, Protection, and Replacement of Trees, Shrubbery, Plants, Sod and Other Vegetation
(1)	204.2.	Topsoil
	204.3.	Soil Amendments
	204.4.	Fertilizer
	204.5.	Sodding
(1)	204.6.	Seeding Turf-grass
	204.7.	Rejection

ITEM 201 TEMPORARY EROSION, SEDIMENTATION, AND WATER POLLUTION PREVENTION AND CONTROL

202.5. Silt Fence

202.5.2. Materials

202.5.2.2. Posts

Delete the last sentence in its entirety and replace with the following:

No wood stakes shall be allowed.

202.11. Stabilized Construction Exit

202.11.2. Materials

202.11.2.1 Stone

Delete the following subsection in its entirety and replace with the following:

Stone material shall consist of 4 to 6-inch minimum course aggregate riprap and shall be place in a layer 12-inch thick. No crushed concrete shall be allowed.

ITEM 203 SITE PREPERATION

203.2. Unclassified Street Excavation

203.2.3. General

Add to the following as the third paragraph:

Unless otherwise approved in writing by the City of Rockwall, where excavation to grade established in the field by the Owner terminates in loose or solid rock, the Contractor shall excavate 6 inches below the required subgrade elevations for the entire roadbed width and shall backfill with suitable selected materials as indicated on the plans. Suitable selected material shall include lime treated subgrade or a base material having a plasticity index not

greater than 12. Payment for such work will be made under the items of unclassified street excavation, lime treated subgrade and hydrated lime. The 6-inch lime treated subgrade or base shall be compacted to 95% standard proctor density.

ITEM 204 LANDSCAPING

204.2. Topsoil

204.2.3. Construction Methods

Add the following:

A minimum of four (4) inches of topsoil shall be provided on all major thoroughfare medians and rights-of-way and on all earthen channel slopes to the lines and grades established by the construction plans. This will be material imported from off site. The City will approve material prior to placement.

204.6 Seeding Turfgrass

204.6.1. General

Add the following:

The Contractor shall maintain the seeded areas including watering until a "Stand of Grass" is obtained. A "Permanent Stand of Grass" shall consist of **75% to 80%** coverage, a minimum of one (1) inch in height. Re-seeding will be required in washed areas.

204.6.3. Planting Season and Application Rate

Delete the mixture, rate, and planting dates in Table 204.6.3.(a) Seeding Turfgrass and substitute:

Type I: Bermuda Grass - Hulled
50 lbs/acre April - June

Type II: Annual Rye Grass
40 lbs/acre September - March

Type III Bermuda Grass - Unhulled
January - March/July - August - 50 lbs/acre

A mix of seed shall be used in overlapping seasons.

City of Rockwall
The New Horizon

7.3 Division 300 Roadway Construction

NOTE: The ***(1)*** symbol specifies that this item is also covered in the City of Rockwall's "Special Provisions" to the "Standard Specifications for Public Works Construction, North Central Texas". These Special Provisions are additional and modify the "Standard Specification"

Table 8.3: Revisions to NCTCOG's Division 300 Roadway Construction

Revised	Standard Specification Item No.	Description
	301.	**SUBGRADE, SUBBASE AND BASE PREPARATION**
	301.1.	General
(1)	301.2.	Lime Treatment
(1)	301.3.	Portland Cement Treatment
	301.4.	Asphalt Emulsion Treatment
(1)	301.5.	Flexible Sub-base or Base (Crushed Stone/Concrete)
	301.6.	Geo-textiles Used in Paving applications
	302.	**ASPHALT PAVEMENT**
	302.1.	Description
	302.2.	Aggregates for Hot-Mix Asphalt Pavement
	302.3.	Bituminous Materials
	302.4.	Section Held for Future Use
	302.5.	Storage, Heating and Application Temperature of Bituminous Materials
	302.6.	Emulsified Asphalt Treatment
	302.7.	Prime Coat
	302.8.	Asphalt Base Course
	302.9.	Hot-Mix Asphalt Pavement
	302.10.	Measurement and Payment
	303.	**PORTLAND CEMENT CONCRETE PAVEMENT**
	303.1.	Description
(1)	303.2.	Portland Cement Concrete Pavement Materials
(1)	303.3.	Mix Design and Mixing Concrete
	303.4.	Equipment
(1)	303.5.	Construction Methods
	303.6.	Alley Paving
	303.7.	Pavement Leave-outs
(1)	303.8.	Pavement Testing and Evaluation
	303.9.	Measurement and Payment

	304.	**PAVING UNITS**
(1)	304.1.	Solid Concrete Interlocking Paving Units
	305.	**MISCELLANEOUS ROADWAY CONSTRUCITON**
(1)	305.1.	Concrete Curb and Gutter
(1)	305.2.	Concrete Sidewalks, Driveway Approaches, and Barrier Free Ramps
(1)	305.3.	Concrete Medians
	305.4.	Reinforced Concrete Headers

ITEM 301. SUBGRADE, SUBBASE AND BASE PREPERATION

301.2 Lime Treatment

Add the following sentences:

Quick Lime shall not be used in the construction of roadway work in the City. Dry hydrated lime shall not be used for treating subgrade or base material unless specified on the plans

301.2.1. Materials

301.2.1.2. Quicklime

301.2.1.2.1. General

Add to the beginning of the first paragraph:

Quicklime (dry) shall not be used in the City without written approval from the City.

301.2.3. Lime Treatment Construction Methods

301.2.3.3. General Construction

301.2.3.3.1. Treatment for Materials in Place

Add the following:

Prior to final compaction of subgrade, samples of the subgrade material shall be collected by a testing laboratory approved by the City, and laboratory tests made to determine the amount of lime required.

The application rate for hydrated lime shall be selected to obtain at least the optimum lime percentage indicated by test method ASTM C977-83a, Appendix XI; however, not less than 27 lbs. per S.Y. shall be applied. A Geotechnical Engineer's report reflecting the recommended application rate and including supporting test data shall be submitted in writing to the City, for approval prior to beginning any lime treatment. Laboratory test may be waived provided a minimum of 36 lbs. per S.Y. is applied. Testing shall look for sulfates to see if Lime Treatment will cause and adverse effect on the subgrade.

301.2.3.7. Maintenance

Add the following to the first paragraph:

The lime treated subgrade shall be moist cured until covered by other base or pavement up to fourteen (14) days after final compaction.

After 14 days without covering an application of 0.10 to 0.20 gallons per square yard emulsified asphalt shall be applied at the Contractor's expense. Reapplication of emulsified asphalt may be required if lime treated subgrade is not covered shortly after first application. Lime treated subgrade may be covered by other base or pavement when density of 95% of maximum at optimum moisture content is obtained.

301.3 Portland Cement Treatment

Add the following:

Portland cement modification of subgrade soils is not approved in Rockwall. Subgrade soils means natural ground or embankment encountered in the construction.

301.5 Flexible Subbase or Base (Crushed Stone/Concrete)

301.5.1. Material

301.5.1.1. General

Add the sentence:

No local limestone material shall be used as flexible base (crushed limestone) on Rockwall paving projects, unless otherwise shown on the plans.

301.5.1.2 Tests and Physical Requirements

After the first sentence add the sentence:

Samples of crushed limestone shall be submitted to the engineer testing laboratory employed by the City for testing and conformance with the specifications.

ITEM 303 PORTLAND CEMENT PAVEMENT

303.2. Portland Cement Concrete Pavement Materials

303.2.1. Aggregates for Portland Cement Concrete

303.2.1.3. Coarse Aggregates

Gradation: Add the sentence: For Rockwall paving projects, the coarse aggregate's gradation shall meet the requirements of Size No. 4 shown in the table.

303.3 Mix Design and Mixing Concrete for Pavement

303.3.5. Mixing and Delivery

303.3.5.3. Central Mixing Plant

Add the following:

When a fly ash admixture is used with Type I cement in the production of portland cement concrete, separate silos shall be provided for fly ash and cement and provisions shall be made for individual measurements.

303.5 Construction Methods

303.5.6.Finishing

Delete 303.5.6. and add the following:

The finished concrete pavement construction under these specifications is expected to meet certain quality standards for surface of the concrete including the durability, texture, riding surface and appearance. The surface must be durable, firm, dense and well bonded to the aggregate to maintain an appearance and texture which is satisfactory to the Owner. Concrete pavement having a poor surface which has spalled (exposed aggregate) due to poor quality paste, high water-cement ratio, over-vibration, improper curing, extreme weather or any other reason, or does not have a satisfactory riding surface shall be removed and replaced at the Contractor's expense. It is extremely important that the pavement have a good rideable surface, free from undulations and rough joints. The City Engineer shall determine the acceptability of the pavement.

303.5.6.1. Machine Finishing

Machine finishing of pavement shall include the use of power-driven spreaders, reciprocating type power-driven vibrators, power-driven transverse strike-off, and screed.

The concrete pavement shall be consolidated by a reciprocating type mechanical vibrator. As soon as the concrete has been spread between the forms, the mechanical vibrator shall be operated to consolidate the concrete and remove all voids. Hand manipulated vibrators shall be used for areas not covered by the mechanical vibratory unit.

The transverse finishing machine shall first be operated to compact and finish the pavement to the required section and grade, without surface voids. The machine shall be operated over each area as many times and at such intervals as directed. At least two trips will be required and the last trip over a given area shall be a continuous run of not less than 40 feet. After completion of finishing with the transverse finishing machine a transverse drag float may be used.

After the floating has been completed and the excess water removed, but while the concrete is still plastic, the surface of the concrete shall be tested for trueness with an approved 10-foot steel straightedge furnished by the Contractor. The straightedge shall be operated from the side of the pavement, placed parallel to the pavement centerline and passed across the slab to reveal any high sports or depressions. The straightedge shall be advanced along the pavement in successive stages of not more than one-half its length. Practically perfect contact of the straightedge with surface will be required, and the pavement shall be leveled to this condition, in order to insure conformity with the surface test required below after the pavement has fully hardened and to insure a smooth rideable surface. Any correction of the surface required shall be accomplished by adding

concrete if required and by operating the longitudinal float over the area. The surface test with the straightedge shall then be repeated.

After completion of the straightedge testing and surface correction the surface of the pavement shall be finished by an approved method. Methods available for pavement surface finish including a burlap drag finish, a broom finish or a belt finish. Unless otherwise shown on the plans, the pavement surface shall be finished with the burlap drag.

303.5.6.1.1. Burlap Drag Finish

If the surface texture is to be a drag finish, a drag shall be used; it shall consist of a seamless strip of damp burlap or cotton fabric, and it shall produce a uniform surface of gritty texture after dragging it longitudinally along the full width of pavement. For pavement 16 feet or more in width, the drag shall be mounted on a bridge which travels on the forms. The diameter of the drag shall be such that a strip of burlap or fabric at least 3 feet wide is in contact with the full width of pavement surface while the drag is used. The drag shall consist of not less than two layers of burlap with the bottom layer approximately 6 inches wider than the upper layer. The drag shall be maintained in such a condition that the resultant surface is of uniform appearance and reasonably free from gravels over 1/16-inch in depth. Drags shall be maintained clean and free from encrusted mortar. Drags that cannot be cleaned shall be discarded and new drags substituted.

303.5.6.1.2. Broom Finish

If the surface texture is to be broom finished, it shall be applied when the water sheen has practically disappeared. The broom shall be drawn from the center to the edge of the pavement with adjacent strokes slightly overlapping. The broom operation shall be so executed that the corrugation produced in the surface shall be uniform in appearance and not more than 1/16-inch in depth. Brooming shall be completed before the concrete is in such condition that the surface will be torn or unduly roughened by the operation. The surface thus finished shall be free from rough and porous areas, irregularities, and depressions resulting from improper handling of the broom. Brooms shall be of the quality, size, and construction and shall be operated to produce a surface finish meeting the approval of the Owner. Subject to the approval of the Owner, the Contractor may be permitted to substitute mechanical brooming in lieu of the manual brooming as herein described.

303.5.6.1.3. Belt Finish

If the surface texture is to be belt finish, when straightedging is completed and after sheen has practically disappeared and just before the concrete becomes non-plastic,

the surface shall be belted with a 2-ply canvas belt not less than 8 inches wide and at least 3 feet longer than the pavement width. Hand belts shall have suitable handles to permit controlled, uniform manipulation. The belt shall be operated with short strokes transverse to the centerline and with a rapid advance parallel to the centerline.

303.5.6.2. Hand Finishing

Hand finishing of concrete pavement will be permitted in areas where it is not practical or possible to construct with finishing machines. These areas include, but are not limited to, intersections, left turn lanes, crossovers, transition areas and where the pavement width is not uniform. In all hand finished areas, one-half (1/2) extra sack of cement per cubic yard of concrete shall be used in the mix. In hand finished areas, the concrete shall be struck off with an approved strike-off screed to such elevation that when consolidated and finished the surface of the pavement shall conform to the required section and grade. The strike template shall be moved forward with a combined transverse and longitudinal motion in the direction the work is progressing, maintaining a slight excess of material in front of the cutting edge. The concrete shall then be tamped with an approved tamping template to compact the concrete thoroughly and eliminate surface voids and the surface screeded to required section. After completion of a strike-off, consolidation and transverse screeding, a hand-operated longitudinal float shall be operated to test and level the surface to the required grade.

Workmen shall operate the float from approved bridges riding on the forms and spanning the pavement. The longitudinal float shall be held in contact with the surface and parallel to the centerline and operated with short longitudinal strokes while being passed from one side of the pavement to the other. If contact with the pavement is not made at all points, additional concrete shall be placed, if required, and screeded, and the float shall be used to produce a satisfactory surface. Care shall be exercised to keep the ends of the float from digging into the surface of the pavement. After a section has been smoothed so that the float maintains contact with the surface at all points in being passed from one side to the other, the bridges may be moved forward half the length of the float and the operation repeated. Other operations and surfaces tests shall be as required for machine finishing.

303.5.6.3. Edging at Forms and Joints

After the final finish, but before the concrete has taken its initial set, the edges of the pavement along each side of each slab, and on each side of transverse expansion joints, formed joints, transverse construction joints, and emergency construction joints shall be worked with an approved tool and rounded to the radius required by the plans. A well-defined and continuous radius shall be produced and a smooth,

dense mortar finish obtained. The surface of the slab shall not be unduly disturbed by tilting of the tool during use.

At all joints, any tool marks appearing on the slap adjacent to the joints shall be eliminated by brooming the surface. In doing this, the rounding of the edge shall not be disturbed. All concrete on top of the joint filler shall be completely removed.

All joints shall be tested with a straightedge before the concrete has set, and correction shall be made if one side of the joint is higher than the other or if they are higher or lower than the adjacent slabs.

303.8 Pavement Testing and Elevation

303.8.2. Pavement Thickness Test

Delete in its entirety and substitute therefore the following:

Upon completion of the work and before final acceptance and final payment shall be made, pavement thickness tests shall be made by the Contractor. Tests shall be made at 400-foot spacings along the length of the pavement. In the event a deficiency in the thickness of pavement is revealed, two (2) subsequent sets necessary to isolate the deficiency shall be made - one at a jointed section prior to the deficient station and one at a jointed section following the deficient station. Additional tests shall be obtained as necessary, at jointed section intervals to isolate the deficient area. Removal and replacement of concrete shall extend to joint boundaries, the full width of pavement section. If the average thickness of pavement in a particular section is less than called for on the plans, the pavement section shall be removed and replaced with the correct thickness, extending to joint boundaries, the full width of the pavement section, at the Contractor's entire expense. No additional payment over the contract unit price shall be made for any pavement of a thickness exceeding that required on the plans.

303.8.3. Pavement Strength Test

303.8.3.1 For Standard Classes of Concrete

Revise the first paragraph to read:

During the progress of the work, the Inspector or a commercial laboratory shall cast test cylinders or beams to maintain a check on the strengths of the concrete being placed. Add the following sentence and table: A table titled "PAVEMENT STRENGTH REQUIREMENTS", is provided showing the required pavement thickness, 7-day strength, 28-day strength, minimum cement factor and maximum slump for each street type to be constructed in Rockwall.

Add to the 5th paragraph:

Test cores shall be obtained within ten (10) working days after the 28-day test results have been provided by the commercial laboratory. All test cores shall be obtained by a commercial laboratory, at the Contractors expense. One (1) core shall be obtained in the immediate area of the deficiency and two (2) additional cores shall be obtained - one at a jointed section prior to the deficient station and one

at a jointed section following the deficient station. Additional cores shall be obtained as necessary, at jointed section intervals to isolate the deficient area. Removal and replacement of concrete shall extend to joint boundaries, the full width of pavement section.

Amend the second sentence of the 7th paragraph to read:

"Pavement not meeting the minimum specified 28-day strength after cores have been tested shall be removed and replaced at the Contractor's expense."

Delete the table 303.8.3.1.(a) and the paragraph below it.

Add the following table:

Pavement Strength Requirements

Street Type	Minimum Thick-ness (inches)	Compr. 7-Day (psi)	Strength 28-Day (psi)	Minimum Cement (sacks / CY)		Slump (inches)
				Machine placed	Hand Placed	
* Arterial	10”	2,500	3,600	6.0	6.5	3” to 5”
* Collector	8”	2,500	3,600	6.0	6.5	3” to 5”
Residential	6”	2,500	3,600	6.0	6.5	3” to 5”
Alley	7”-5”-7”	2,500	3,600	6.0	6.5	3” to 5”
Fire Lane	6”	2,500	3,600	6.0	6.5	3” to 5”
Driveways	6”	2,500	3,600	6.0	6.5	3” to 5”
Barrier Free Ramps	5”	2,500	3,600	N/A	6.5	3” to 5”
Sidewalks	4”	2,100	3,000	N/A	5.5	3” to 5”
Parking Lot/ Drive Aisles	5”	2,100	3,000	5.0	5.5	3” to 5”
Dumpster Pads	7”	2,500	3,600	6.0	6.5	3” to 5”

* Paving section designs for arterials and collectors shall be based off 30 year projected traffic volumes and geotechnical analysis/report. (Paving section design shall include but not limited to the following: pavement thickness, reinforcing size and spacing, pavement strength, subgrade thickness, subgrade treatment type (lime or cement))

ITEM 304 PAVING UNITS

304.1. Solid Concrete Interlocking Paving Units

304.1.2. Materials

304.1.2.2. Base

Delete in its entirety and replace with the following:

The base shall be constructed of 3,600 psi reinforced concrete meeting the requirements of Item 303 of the Standard Specifications.

#4 reinforcing bars shall be placed 18 inches on center, both ways, in all concrete.

304.1.3. Construction Methods

304.1.3.3. Construction Procedures

304.1.3.3.3 Paving Units and Joints

Delete paragraph two in its entirety and replace with the following:

Joints between paving units shall have a spacing of (1/8”).

304.1.4. Measurement and Payment

Delete in its entirety and replace with the following:

Interlocking Concrete Paving Stone shall be measured and paid for by the square foot of stone, sand and concrete base furnished and installed, which price shall include all labor, including excavation, materials, equipment, tools and incidentals necessary to complete the work. No separate payment shall be made for 6" concrete base or washed sand. Payment for removal and disposal of existing concrete median pavement, if required, shall be made by the square foot. Payment shall include all labor, equipment, materials, tools, and incidentals necessary to complete the work.

ITEM 305. MISCELLANEOUS ROADWAY CONSTRUCTION

305.1. Concrete Curb and Gutter

305.1.3. Construction Methods

305.1.3.2. Reinforcing Steel

The third sentence, first paragraph shall be revised to read:

All bars at splices shall be lapped a minimum of 30 diameters of the bar or 12-inches, whichever is greater.

305.2 Concrete Sidewalks, Driveway Approaches, and Barrier Free Ramps

305.2.2. Materials

305.2.2.2. Reinforcement

Revise the first sentence to read:

Driveway approaches and walk reinforcing shall be No. 3 bars on 24-inch centers.

305.2.3. Construction Methods

305.2.3.1. General

Add to end of first paragraph:

The drive approach shall have a minimum thickness equal to the thickness of the adjacent street or 6 inches, whichever is greater.

305.2.3.7. Joints

Revise second sentence to read:

Expansion joints shall be placed in the sidewalk at 20-foot intervals or as otherwise specified by the Owner.

305.3. Concrete Medians

Delete in entirety.

7.4 Division 400 Roadway Maintenance & Rehabilitation

NOTE: The ***(1)*** symbol specifies that this item is also covered in the City of Rockwall's "Special Provisions" to the "Standard Specifications for Public Works Construction, North Central Texas". These Special Provisions are additional and modify the "Standard Specification"

Table 8.4: Revisions to NCTCOG's Division 400 Roadway Maintenance & Rehabilitation

Revised	Standard Specification Item No.	Description
	401.	**CRACK SEALING**
	401.1.	General
	401.2.	Materials
	401.3.	Methods
	401.4	Measurement and Payment
	402.	**PAVEMENT CUT, EXCAVATION AND REPAIR**
	402.1.	General Requirements
	402.2.	Minimum Size of Repair
(1)	402.3.	Sawing
	402.4.	Replacing Paved Surfaces
	403.	**ASPHALTIC PAVEMENT REPAIR**
	403.1.	Description
	403.2.	Materials and Mixing
	403.3.	Methods
	403.4.	Measurement and Payment
	404.	**SURFACE TREATMENT**
	404.1.	Description
	404.2.	General
	404.3.	Slurry Seals and Micro-(Re)Surfacing
	404.4.	Bituminous Surface Treatment (Chip Seal)
	405.	**ULTRA THIN CONCRETE PAVING (WHITETOPPING)**
	405.1.	Description
	405.2.	Materials
	405.3.	Construction Methods
	405.4.	Measurements
	405.5.	Payment

City of Rockwall
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ITEM 402 PAVEMENT CUT, EXCAVATION AND REPAIR

402.3 Sawing

402.3.2. Equipment

Revise second paragraph to read:

Saw blades shall make a clean, smooth cut, producing a grove a minimum of 3/8-inch wide and to the full depth required by these specifications or as shown on the plans.

7.5 Division 500 Underground Construction & Appurtenances

NOTE: The ***(1)*** symbol specifies that this item is also covered in the City of Rockwall's "Special Provisions" to the "Standard Specifications for Public Works Construction, North Central Texas". These Special Provisions are additional and modify the "Standard Specification"

Table 8.5: Revisions to NCTCOG's Division 500 Underground Construction & Appurtenances

Revised	Standard Specification Item No.	Description
	501.	**UNDERGROUND CONDUIT MATERIALS**
	501.1.	General
	501.2.	Clay Wastewater Pipe
	501.3.	Vitrified Clay Pipe for Micro-tunneling, Slip-lining, Pipe Bursting and Tunnels
(1)	501.4.	Concrete Pressure Pipe and Fittings
(1)	501.5.	Reinforced Concrete Wastewater Pipe With Rubber Gasket Joints
	501.6.	Reinforced Concrete Culvert, Storm Drain, Pipe and Box Section
(1)	501.7.	Ductile-Iron Pressure Pipe and Fittings
	501.8.	Ductile-Iron Pipe for Pipe Rehabilitation
(1)	501.9.	Steel Pipe and Fittings
	501.10.	Seamless Copper Tubing
	501.11.	Corrugated Metal Pipe or Arch Shapes
	501.12.	Structural Plate Structures
	501.13.	Tunnel Liner Plates
(1)	501.14.	Polyvinyl Chloride (PVC) Water Pipe
	501.15.	Polyvinyl Chloride (PVC) Pressure-Rated (SDR Series)
	501.16.	Molecularly Oriented Polyvinyl Chloride (PVCO) Water Pipe
	501.17.	Polyvinyl Chloride (PVC) Wastewater Pipe & Fittings with Dimension Control
	501.18.	Polyvinyl Chloride (PVC) Profile Gravity Wastewater Pipe and Fittings-For Direct Bury and Slip-lining Applications
	501.19.	PVC Composite Pipe for Wastewater Conduits
	501.20.	Polyvinyl Chloride (PVC) Corrugated Storm Water Pipe with Smooth Interior and Fittings
	501.21.	Solid Wall Polyethylene Plastic Pipe for Water, Wastewater and Pipe Rehabilitation
	501.22.	Polyethylene (PE) Large Diameter Wastewater Pipe with

		Modified Wall Profiles and Performance Standards
	501.23.	Polyethylene (PE) Corrugated Drainage Tubing and Corrugated Smooth Lined Storm Water Pipe and Fittings
	501.24.	Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Wastewater Pipe
	501.25.	Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Water Pipe
	502.	**APPURTENANCES**
(1)	502.1.	Manholes
	502.2.	Wastewater Main Cleanouts
(1)	502.3.	Fire Hydrants
	502.4.	Thrust Restraint
(1)	502.5.	Fittings
(1)	502.6.	Valves
	502.7.	Performed Flexible Conduit Joint Sealant
	502.8.	Polyethylene Wrap for Metal Pipe Fittings
	502.9.	Corrosion-Resistant Coatings and Liners for Wastewater Conduit and Appurtenances
	502.10.	Connections to Conduit for Service
	502.11.	Miscellaneous Conduit Connections
	502.12.	Structures
	503.	**TRENCHLESS INSTALLATION**
	503.1.	Conduit Materials
	503.2.	Tunnel/Chasing Pipe Spacers
	503.3.	Methods of Jacking, Boring or Tunneling
	503.4.	Measurement and Payment
	504.	**OPEN CUT - BACKFILL**
	504.1.	General
(1)	504.2.	Materials
(1)	504.3.	Excavation and Foundation
(1)	504.4.	Backfill-General Requirements
(1)	504.5.	Embedment
(1)	504.6.	Final Backfill
	504.7.	Measurement and Payment of Backfill
	505.	**OPEN CUT – GENERAL CONDUIT INSTALLATION**
	505.1.	General
	505.2.	General Installation Requirements for Pipe Types
	506.	**OPEN CUT – WATER CONDUIT INSTALLATION**

	506.1.	Description
	506.2.	Materials
(1)	506.3.	Laying Water Conduit
	506.4.	Pipe Joints
(1)	506.5.	Hydrostatic Test
	506.6.	Connections to Existing Water Conduits
	506.7.	Purging and Disinfection of Water Conduits
	506.8.	Plugs
	506.9.	Measurements and Payments
	507.	**OPEN CUT- WASTEWATER CONDUIT INSTALLATION**
	507.1.	Description
	507.2	Materials
	507.3.	Laying Wastewater Conduit
	507.4.	Wastewater Conduit Joints
(1)	507.5.	Test and Inspections
	507.6.	Measurement and Payment for Wastewater Conduit Installation
	508.	**OPEN CUT – STORM WATER CONDUIT INSTALLATION**
	508.1.	Description
	508.2.	General
	508.3.	Reinforced Concrete Pipe for Storm Water
	508.4.	Corrugated Metal Pipe
	508.5.	Structural Plate Conduit
	508.6	Measurement and Payment for Strom Water Conduit Installation
(1)	508.7	Storm Sewer Conduit Inspection
	509.	**CROSSINGS**
	509.1.	General
	509.2.	State Highway Crossings
	509.3.	Street and Alley Crossings
	509.4.	Railroad Crossing
(1)	509.5.	Creek and River Crossings
	509.6.	Measurement and Payment of Crossings

ITEM 501.UNDERGROUND CONDUIT MATERIALS

501.4 Concrete Pressure Pipe and Fittings

Add the following:

C302 Reinforced Concrete Pressure Pipe, Non Cylinder Type, for Water and Other Liquids, and C300 Reinforced Concrete Pressure Pipe, Steel Cylinder Type, for

Water and Other Liquids are not approved for use in the City, unless otherwise shown in the plans or approved in writing. Reinforced concrete cylinder pipe in sizes 16 inches through 21 inches shall be Bar-Wrapped Concrete Cylinder Pipe AWWA Type C303. For pipe 42 inches in diameter and above the pipe shall be Prestressed Concrete Pressure Pipe, Steel Cylinder Type, AWWA Type C301. Between 24 inches and 36 inches the pipe furnished may be either type. All pipe shall be designed to withstand the working pressure and external load as shown in the plans.

501.5 Reinforced Concrete Wastewater Pipe With Rubber Gasket Joints

501.5.1. General

Add the following:

All reinforced concrete pipe used in the sanitary sewer system shall conform to ASTM Designation C76 and shall be of the Thick Wall Pipe design with aggregates consisting of limestone aggregate in the proportion of at least 75 percent by weight of the total aggregates, unless otherwise provided in the Special Conditions to the Specifications.

501.7 Ductile-Iron Pressure Pipe and Fittings

501.7.1. General

Add the following:

Minimum design thickness for all Ductile-Iron Pipe installed shall be Class 51 on sizes 12 inches and smaller, and Class 52 on sizes 14 inches and larger.

501.9 Steel Pipe and Fittings

501.9.3. Pipe and Fitting Requirements

Substitute the second to last sentence with the following:

All steel pipe to be furnished for this project shall be designed in accordance with AWWA M11 for the most critical application of internal pressures and external loads. The following design conditions shall apply:

Internal Pressure (Design to account for working and surge together)

1) Working Pressure of 200 psi
2) Surge allowance of 250 psi

External Loading for Buried Pipe

1) External loads shall be comprised of the weight of the backfill together with live and impact loads. Earth loads shall be calculated based on ditch and positive projecting conduit. The earth load for the pipe design shall be the greater of the above two conditions.
2) External live loads shall be at least equivalent to AASHTO HS-20 loading.
3) Modulus of soil reaction (E') < 1000 psi
4) Unit weight of fill (w) > 120 pcf
5) Deflection lag factor (D1) (1.0)
6) Bedding constant (K) = 0.100
7) hw = h = depth of cover above top of pipe

8) Maximum deflection in percent of pipe diameter shall be as determined by AWWA M11, latest edition, as calculated using moment of inertia of steel cross section of pipe wall. Moment of inertia of cement mortar shall not be included in calculation of maximum deflection.

Available Deflections

Mortar-lined and coated = 2 percent of pipe diameter

Maximum Working Stress

The maximum combined stress based on working pressure shall be no greater than 50 percent of the minimum yield strength or 18,000 psi, whichever is less.

The maximum combined stress based on test pressure shall be no greater than 75 percent of the minimum yield strength or 24,000 psi, whichever is less.

501.9.4. Joints

Add the following:

In general, pipe joints shall be as follows, as indicated on the Drawings or as specified.

1) Flanged joints shall be provided as a minimum at all flanged valves, meters and other equipment.
   a. Flanges: Unless otherwise noted, flanges shall conform to the requirements of AWWA C207, Table D, E or F as required.
   b. Flange Bolts and Nuts: Shall be furnished in size and numbers stipulated in AWWA C207. Unless otherwise indicated, bolts shall be carbon steel to meet the requirements of ASTM Designation A307, Grade B for regular joints.
2) Restrained Lap-Welded slip joints (expanded bell) with a single fillet weld.
3) Carnegie-Shape Rubber Gasket Joint: Bell and spigot rubber gasket joint will be furnished with the bell end of the pipe mechanically expanded to the required internal diameter and the spigot end furnished as a sized Carnegie shape welded to the opposite end of the pipe. The expanded bell and Carnegie spigot shall be designed such that when the pipe is laid and jointed, it will be self centered, and the O-ring rubber gasket will be enclosed tightly on all four sides and confined under compression adequate to ensure watertightness. Gaskets to be full-face for use with flat face flanges and ring type for use with raised face flanges. Gasket material for water service pipe shall be cloth inserted rubber sheet, 1/8-inch thick or red rubber, ASTM D1330, Grade 1. Gasket material for air piping shall be as above, but of EPDM.
4) Mechanical Couplings: Mechanical couplings designed to provide a stress relieving flexible joint shall consist of a cylindrical sleeve, two gaskets, two follower rings and a set of bolts and nuts.
   a. Sleeves: Manufactured of ASTM A53 steel for sizes 10-inches and smaller. ASTM A36 steel for sizes 12-inches and larger. Minimum sleeve length shall be five inches for pipe 12-inches and smaller,

7-inches for pipe 14-inches through 24-inches, and 10-inches for pipe larger than 24-inches.

b. Follower Rings: Ductile Iron ASTM A536 or AISI C1020 Steel.
c. Bolts and Nuts: High strength low alloy steel with heavy semi-finished hexagon nuts.
d. Gaskets: Shall be of synthetic rubber suitable for operating conditions.
e. Shop Finish: Manufacturer's standard unless otherwise noted.
f. Manufacturer: Baker 200, Dresser Style 39, Rockwell Series 411 or approved equal.

501.14 Polyvinyl Chlorine (PVC) Water Pipe

Add the following:

All PVC water pipelines shall be AWWA C900-16 PVC Pipe (blue in color), DR 14 (PC 305) for pipeline sizes 12-inch and smaller, and DR 18 (PC 235) for 14-inch and larger water pipelines. All PVC water pipe shall be extruded PVC pipe of the rubber gasket type joint and shall be furnished in 20-foot nominal laying lengths.

All fittings shall be ductile-iron of bell and spigot or mechanical joint, Class 250, in accordance with AWWA Specification C 110, C 111 or C 153 (Compact), and shall be tar coated on the outside surface and shall have an interior cement lining with seal coat per AWWA Specification C104, unless otherwise shown in the plans.

502 APPURTENANCES

502.1 Manholes

502.1.1. Manhole Materials

502.1.1.1. Precast Reinforced Manhole Sections

502.1.1.1.1. Joints

Add the following:

All sanitary sewer manholes installed in the City of Rockwall, shall have "O" ring joints conforming with ASTM Designation C443

502.1.4. Manhole Construction

502.1.4.1. Manhole Types and Requirements

502.1.4.1.1. Cast-In-Place Concrete Manholes

Add the following:

502.1.4.1.1.1. Forms

Manholes shall be constructed in place in accordance with the details shown in the plans and using forms as market by Improved Construction Methods, Inc., Jacksonville, Arkansas or Symons Corp., DePlaines, Illinois, or an approved equal.

502.1.4.1.1.2. Base

The base shall be cast monolithically with the rest of the manhole. The invert and flow channel shall be formed during or immediately after the placing of the

concrete and trowel-finished as soon as the concrete has set sufficiently. The concrete must set for 24 hours before any pipe inside the manhole is trimmed. Concrete shall be minimum 4200 psi.

The base concrete shall be 4200 psi, maximum slump 4 inches vibrated or tamped on undisturbed bearing. The base shall have a minimum diameter or width of at least 1'-0" greater than the outside diameter of the manhole, and a minimum thickness including the area under the pipe as follows:

0' to 12' manhole…….	12"
12' to 20' manhole……..	15"
20' and above…….	18"

502.1.4.1.1.3. Invert

All invert channels shall be smooth and accurately shaped to a semi-circular bottom conforming to the inside of the adjacent sewer section. Inverts shall be formed directly in the concrete of the manhole base or may be constructed by laying full section sewer pipe through the manhole and breaking out the top half after the base is constructed. Inverts shall extend up at least half of the diameter of the pipe. Changes in the direction of the sewer and entering branches shall have a true curve of as large a radius as the size of the manhole will permit. Where the pipe is laid through the manhole, the invert shall be finished to 1/4-inch below the center of the pipe. The pipe shall be trimmed down to 1/4-inch below the surface of the invert, and the edges of the pipe along the invert and at the walls of the manhole shall be plastered and brush-finished. Plaster shall be 2-parts of masonry sand to 1-part of Portland cement, or an approved non-shrink grout.

502.1.4.1.1.4. Manhole Barrel Section

The vertical forms, wall spaces, and placing cone must be carefully positioned and firmly clamped in place before any placement is made. The wall spacers must be located 90 degrees from each other. The manhole shall be cast of 4200 psi concrete with a maximum slump of 4 inches. The first placement shall consist of approximately 1/2 yard of concrete evenly around the walls and vibrated until there is a minimum slump of 60 degrees from the bottom of the forms to the bearing surface both inside and outside of the manhole. When this is complete and before additional concrete is added, the concrete must be carefully vibrated on each side of each pipe. Additional concrete must be deposited in evenly distributed layers of

about 18 inches with each layer vibrated to bond it to the preceding layer. The wall spacers must be raised as the placements are made with the area from which the spacer is withdrawn being carefully vibrated. Excessive vibration is to be avoided. A maximum of 2% calcium chloride may be added to the concrete, at the Contractor's option, to speed the set. The forms may be removed as soon as the concrete has sufficiently set (approximately 2 hours after placement depending on field conditions).

Form marks and offsets up to 1-inch will be permitted on the outside surface of the manhole. Form marks and offsets up to 1/2-inch will be permitted inside the manhole. All offsets on the inside surface of the manhole will be smoothed and plastered so there is no projection or irregularity capable of scratching a worker or catching and holding water or solid materials. Honeycomb will be plastered with a mortar consisting of 3 parts of masonry sand and 1-part Portland cement upon removal of the forms. Manholes deemed to be structurally unsound shall be replaced.

502.1.4.1.1.5. Backfilling

Will be performed evenly and carefully around the manhole 24 hours or more after the placement of concrete is completed and shall conform to these specifications.

502.1.4.1.1.6. Cold Joints:

Should circumstances make a cold joint necessary, a formed groove or reinforcing dowels will be required in the top of the first placement for shear protection. Immediately before the second placement is made, the surface of the cold joint shall be thoroughly cleaned and wetted with a 1-1/2 inch layer of mortar (2 parts sand and 1-part cement) being deposited on the surface. Cold joints below the natural water table or in the bottom 4 feet of the manhole shall include an approved waterstop material. Waterstops shall be heavy duty polyvinyl conforming to Corps of Engineers Specification CRD-572, latest edition, as manufactured by Servicised Products Division of W.R. Grace and Co.; B.F. Goodrich Company; Electrovert, Inc.; W.R. Meadows, Inc.; or approved equal.

502.3 Fire Hydrants

302.3.1. Materials

Delete all parts of Item 502.3.1 in its entirety except sub items 502.3.1.3, 502.3.1.4., 502.3.1.10, and 502.3.1.14.

Add the following:

All fire hydrants furnished shall conform strictly with the latest specification C-502 of the American Water Works Association Standards for dry barrel fire hydrants and must comply with the following supplementary details and changes or addition.

a) Inlet Connection:

Unless otherwise specified the inlet connection shall be a six (6) inch standard mechanical joint complete with all joint accessories. The inlet shoe shall be cast of the same or stronger metal than the lower barrel to prevent impact damage of the shoe. The interior of the shoe, including the lower valve plate and/or cap nut shall have a protective epoxy coating of at least 4 mils applied in the shop. If a cap nut is utilized it must be locked in place with a stainless steel lock washer or similar non-corrosive device and all machined surfaces must be protected from water intrusion to prevent corrosion and assure ease of field teardown or maintenance.

b) Main Valve:

The main valve shall be reversible compression type, closing with the pressure and shall be not less than 5-1/4" in diameter. Composition of the main valve shall be molded rubber or neoprene having a durometer hardness of 90 ± 5 and shall be not less than 1" thick to protect against hydrant chatter and give long term durability.

c) Outlet Nozzles:

All hydrants shall be "three way", equipped with two hose nozzles and one pumper nozzle.

d) Diameter Outlet Nozzles:

The hydrant shall have two hose nozzles, two and one-half (2-1/2") inches nominal I.D., and one pumper nozzle four and one-half (4-1/2") inches nominal I.D. with Natural Standard Hose Threads.

e) Nozzle Attachment:

All nozzles shall be mechanically connected into the barrel and have "O" Ring pressure seals to provide a positive seal between nozzles and hydrant barrel. A suitable nozzle lock shall be provided and shall be stainless steel or bronze. Nozzles shall not be caulked in.

Nozzle caps shall be furnished with pentagon nut the same size as the operating nut. They shall be furnished with interior rubber gaskets that will seat against bronze nozzles. All caps shall be secured to hydrant barrel by heavy duty non-kinking chains with a chain loop on each cap that permits free turning of the cap, for speed and ease of removal by fire fighters.

f) Operating Nut:

The operating nut shall be non-rising, pentagonal shape, measuring 1-1/4" at the top and 1-1/2" at the base from point to flat. Pentagon shall have a depth of at least one and one-quarter inch (1-1/4"). The hydrant shall be constructed in such a manner that the operating nut, "O" Rings and washers can be removed and replaced

without removing the bonnet. All bearing surfaces of the operating nut shall be bronze.

g) Holddown Nut:

Holddown nut must have integral weather seal. Resilient seal between holddown nut and operating nut shall prevent debris entry to protect operating nut from damage.

h) Lubrication Reservoir:

The hydrant shall have a completely "O" Ring sealed oil reservoir with a minimum of two (2) "O" Ring pressure seals to prevent contamination of the oil around the operating parts of the hydrant. The oil reservoir shall be cast in such a manner that all operating parts shall be repairable without removal of the bonnet to facilitate repairs and shall be of a design that all bearing surfaces and threaded parts will be automatically lubricated upon each operation of the hydrant. If bearing surfaces are not lubricated, the design shall keep operating friction to a minimum. A high wear resistant thermoset plastic anti-friction washer shall be in place above the thrust collar to minimize operation torque and facilitate long term ease of operation. The operating threads must be sealed against contact with water to all times regardless of open or closed position of main valve. The hydrant shall have the capability of field personnel to visually check oil level and add additional oil if needed. Filler and inspection plug shall be recessed or flush type.

i) Traffic Feature:

Hydrants shall be "traffic model" having upper and lower barrel joined approximately two inches (2") above the ground line by a breakable "swivel" flange providing 360 degree rotation of the upper barrel for nozzle positioning and must be capable of rotating barrel with line pressure on. The ground line shall not be less than eighteen inches (18") below the centerline of the lowest nozzle and shall be clearly marked in a permanent manner on the lower barrel. A breakable stainless steel stem coupling shall join the two-piece stem adjacent to the ground line flange. Screws, clevis pins, fasteners or bolts used in the coupling shall be Series 300 stainless steel. The weakened portion of the stem coupling shall be located to divert pressure from the stem coupling directly to the upper and lower stems when torque is applied in seat ring removal.

Design of the coupling shall be such that when the coupling is broken, no part of the coupling will shatter or come loose and fall into hydrant and the break will not occur through the pins or bolts holding the coupling to the stem.

j) Drain Valve Assembly:

Hydrants shall be equipped with two drain valves which drain the barrel when the hydrant is closed and seal shut when the hydrant is in the open position. The upper valve plate, seat ring and drain ring (shoe bushing) must be bronze and work in conjunction to form an all bronze drainway. Upper valve plate if not bronze, must be epoxy coated.

The bronze seat ring shall be a minimum 5-1/4" inside diameter and shall thread into a bronze drain ring forming an all bronze drainway with two (2) drain outlets for double protection against drain clogging and corrosive damage. All bronze components shall have less than 16% zinc alloy, Grade A to give high corrosion resistance as recommended in Section 2.1, Table I of American Water Works Association Standard C-502. Seat ring seals shall be "O" Rings. Hydrant shall be designed so that during opening and closing operation(s), water pressure force flushes the drain valve and drain openings to prevent clogging, thus allowing barrel drainage.

k) Repair:

All internal operating parts shall be removable from above ground level with a lightweight stem wrench.

l) Provisions for Extension:

All hydrants shall be capable of being extended to accommodate future grade changes without excavation. Extension of the hydrant shall be made by adding at the groundline flange a new coupling and stem section equal to the length of the extension. This must facilitate easy field grade adjustment.

Stem extensions made by adding new section of stem to the threaded section of the stem at the top of the hydrant will not be accepted.

Extension kits must be available from manufacturer in six-inch (6") increments.

m) Pressure Loss and Working Pressure

Pressure loss through one (1) four and one-half inch (4-1/2") nozzle at 1000 GPM shall not be more than 5.0 psi.

n) Nuts and Bolts

Body Bolts, studs and nuts shall be 316 stainless steel.

Add the following:

502.3.4. Paint and Protective Coatings

All fire hydrants furnished under these specifications shall have paint and protective coatings applied at the factory or in the field as specified herein.

a) Factory Coating:

All hydrants shall be cleaned at the factory by shot blasting and shall be painted above the groundline (at the factory) with two (2) coats of neutral orange rust-prohibitive primer which shall be compatible with the finished coating.

All continuously wetted ferrous metal surfaces in the hydrant shoe shall be protected with a two-part thermoset epoxy coating to a nominal thickness of 4 mils of corrosion protection and shall be of a color that is easily identified as an epoxy coating. All other exposed exterior surfaces below ground level shall be coated with asphalt varnish as specified in American Water Works Association Standard C-502, Section 4.2 or as otherwise outlined in these specifications. All

remaining interior surfaces above the main valve, except machined surfaces such as the threaded portion of the operating stem or nut, shall be coated with asphalt varnish.

The thermoset epoxy coating shall be a two-part epoxy and shall function as a physical, chemical and electrical barrier between the base metal to which it is applied and the surroundings. The coating shall be non-toxic and shall not impart taste to water. The coating must be formulated from materials deemed acceptable per the Food & Drug Administration Document Title 21 of the Federal Regulations of Food Additives, Section 121.2514 entitled Resins & Polymeric Coatings. The coating shall have a satin finish and shall be suitable for field overcoating and touch-up with the same coating material without sanding or special surface preparation, or application of heat in excess of room temperatures.

b) Field Coatings:

All hydrants shall be field painted at the time the Contractor is instructed by the Public Works Inspector and shall be painted above ground with two (2) coats of aluminum paint, Mobil 11-A-19 or Tnemec 2-color, Tnemec-Gloss or approved equal according to the following color schedule:

Water Main Size	Bonnet and Caps Color
6”	Silver
8”	Blue
10” & Larger	Yellow

Add the following:

502.3.5. Experience and Certification

Fire hydrants, furnished under these specifications, shall be manufactured by a firm that has been producing hydrants of this general type continuously for the past five (5) years. Each company or manufacturer supplying hydrants under these specifications shall have on file, at the City of Rockwall, approved records of experience and detailed drawings of the proposed hydrants. Drawings shall cover the specific hydrant to be furnished for installation in the City and shall show all dimensions including metal thickness, construction details and materials used in all parts of the hydrant together with ASTM Designation and structural properties of these materials.

For ease of identification, all hydrants shall have "City of Rockwall, Texas" stenciled on the lower barrel. This stencil shall be applied at the factory. The manufacturer shall furnish to the City of Rockwall, a Certification that the fire hydrant complies with the specifications without any exceptions. This certification shall apply to specific hydrants being installed within the City water distribution system. The certification shall state (1) the number of hydrants covered by the certification, (2) the Addition where hydrants are being installed or the Project Name and (3) name of Contractor installing hydrants.

The City may require the Manufacturer, Supplier or Contractor to dismantle hydrants at any time to determine compliance with these specifications. Location of any hydrant within the City system, installed after adoption of these specifications, that does not meet the specifications completely shall be cause for prohibiting the future use of any hydrants from the same manufacturer.

502.5 Fittings

502.5.1. Brass Stops, Cocks and Fittings for Water Works Service

Add the following:

502.5.1.2. Physicals

All pressure holding components of brass stops or fittings shall be certifiably pressure tested before assembly as specified herein, including meter coupling tailpieces, flared nuts, compression nuts, etc.

502.5.1.3. Design Features of Stop and Cocks

The stem end of the key, prestaked key nut and the "D" washer shall be so designed that they turn in unison and if tightened to the failure point, the stem will not break causing the key to blow out.

Corporation, curb and angle stop bodies shall be of one-piece construction to provide optimum resistance to installation, operating and earth-load stresses. The operating head and checks of these stops shall be integrally cast with the plug or cap of the stop for maximum resistance to torque feature.

Angle valves shall have a lockwing and shall be "O" ring sealed at the top of the key to prevent leakage during operation and to act as a secondary protection against external top leakage. Meter swivel nuts shall be of the saddle nut construction to support the meter during installation. Inlet flare and compression parts for angle valves shall be field interchangeable on 3/4-inch and 1-inch sizes to make repairs easier and more economical.

502.5.1.4. Design Features of Fittings

Add the following to the third paragraph of this item:

Flare joints shall have curved metal to metal seating surfaces and flare nuts shall meet the following overall minimum length to insure that the flare nut will give adequate pipe support to this type of joint.

Flare Nut - Minimum	Overall Length
¾”……	1-1/2"
1"……..	2"
1-1/2"……..	3"
2"……..	3-1/2"

Add the following to the sixth paragraph of this item:

All stops and fitting joints shall be of the compression type for copper pipe unless otherwise noted. Compression coupling nuts shall be designed to "bottom out" on a machined shoulder on the fitting to

provide a visual check for proper assembly and eliminate field judgment errors of the installation. The coupling nut shall house the compression gasket in a smooth machined area and shall be internally coated with a fluorocarbon (Teflon) lubricant to prevent gasket damage and reduce installation torques. The compression gasket shall be a heavy armored gasket to provide electrical continuity through the fitting and prevent gasket cold flow and shall house a concave hardened stainless steel overlapping gripper band that is automatically activated and set by shouldering out the fitting properly.

Minimum pullout (or tensile strength) required of these fittings after installation to protect against earthloads are as follows:

3/4 "	2,000 lbs.
1"	3,000 lbs.
1-1/2"	3,500 lbs.
2"	4,000 lbs.

All outlet threads on compression connections shall be compatible with the City's present drilling and tapping machine equipment.

502.6 Valves

502.6.1. Metal-Seated Gate Valves for Ordinary Water Works Service

502.6.1.2. Bonnet Bolting

Delete in its entirety and replace with the following:

Body Bolts, studs and nuts shall be 316 stainless steel.

502.6.2. Resilient-Seated Gate Valves for Ordinary Water Works Service

502.6.2.1. General Description

Add the following:

Unless otherwise approved in writing, all Gate Valves for direct buried service in the City's distribution system, 6 inches through 12 inches in diameter, shall be Resilient Seated Gate Valves that conform strictly with the latest specification C-509 of the American Water Works Association Standards and must comply with the following supplementary details, changes or additions. Gate valves shall be iron body designed for a working pressure of 250 psi. All valves shall be hydrostatically tested at 200 psi and shell tested at 500 psi. Any leakage during testing shall be cause for rejection. For ease of repair the body, bonnet and stuffing box shall be flanged together with ASTM Grade B bolts and nuts. Each valve shall have the maker's initials, pressure rating, and year in which manufactured cast in the body.

502.6.2.2. Bonnet Bolting

Delete in its entirety and replace with the following:

Body Bolts, studs and nuts shall be 316 stainless steel.

502.6.2.5. Valve Stem and Nuts

Add the following:

Stems shall be machined from manganese bronze rod with an integral forged thrust collar machined to size. The stems shall be non-rising and equipped for nut operation, which shall be opened by turning to the left. The seals shall consist of two "O" rings above and one "O" ring below the thrust collar. An anti-friction washer shall be located above and below the thrust collar for operating torque. The stem nut shall be ASTM B-62 bronze.

502.6.2.17. Resilient Wedge

Add the following:

The wedge shall be cast iron, fully encapsulated in molded rubber complying with ASTM D2000. Wedge must have molded wedge guides preventing the disc from tilting downstream during operation. Protective guide cap bearings made of polymer bearing material to provide a bearing interface between the wedge guide and valve interior.

502.6.2.18. Paint and Protective Coatings:

Add the following:

All valves furnished under these specifications shall be painted on the exterior as specified in AWWA C-509 with asphalt varnish.

All ferrous metal surfaces in the internal part of the valve shall be protected with a fusion epoxy coating to a nominal thickness of 10 mils for corrosion protection and shall be of a color that is easily identified as an epoxy coating.

The proguard fusion epoxy coating shall fully comply with AWWA C550 and certified NSF 61. The coating shall be non-toxic and shall not impart taste to water. The coating must be formulated from materials deemed acceptable per the Food & Drug Administration Document Title 21 of the Federal Regulations of Food Additives, Section 121.2514 entitled Resins and Polymeric Coatings. The coating shall have a satin finish and shall be suitable for field overcoating and touchup with the same coating material without sanding or special surface preparation, or application of heat in excess of room temperature.

502.6.2.19. Experience and Certification

Add the following:

Valves, furnished under these specifications, shall be manufactured by a firm that has been producing valves of this general type continuously for the past five (5) years. Each company or manufacturer supplying valves under these specifications shall have on file, with the City of Rockwall, approved records of experience and detailed drawings of the proposed valves. Drawings shall cover the specific valve to be furnished for installation and shall show all dimensions including metal thickness, construction details and materials used in all parts of the valve together with ASTM Designation and Structural properties of these materials.

The manufacturer shall furnish to the City of Rockwall, a Certification that the valve complies with the specifications without any

exceptions. This certification shall apply to specific valves being installed within the City water distribution system. The certification shall state (1) the number of valves covered by the certifications, (2) the Addition where valves are being installed or the Project Name, and (3) name of Contractor installing valves.

The City may require the Manufacturer, Supplier or Contractor to dismantle valves at any time to determine compliance with these specifications. Location of any valve within the City system, installed after adoption of these specifications, that does not meet the specifications completely shall be cause for prohibiting the future use of any valves from the same manufacturer.

502.6.2.20. Tapping Sleeves:

Add the following:

The materials for tapping sleeve bodies shall be cast-iron or ductile-iron in accordance with AWWA Standard C110 (ANSI 21.10), in two sections, or halves to be bolted together with high-strength, corrosion resistant, low alloy steel bolts conforming to AWWA Standard C111 (ANSI 21.11).

Cast iron and ductile-iron sleeve shall be mechanical joint, or as specified, or dimensions to secure proper fit on the type and class of pipe on which they are to be used. Each sleeve shall be furnished with a 3/8-inch test opening so that tests can be made prior to tapping. Opening shall be provided with a 3/8-inch bronze plug.

502.6.5. Butterfly Valves

Add the following:

All Butterfly Valves for installation underground in the City's distribution system 16 inches through 48 inches shall be in accordance with this specification.

All butterfly valves furnished shall conform strictly with the latest specification C-504 of the American Water Works Association Standard for rubber-seated butterfly valves and must comply with the following supplementary details and changes or addition.

a) Body:

The body shall be cast-iron ASTM A126, Class B and shall have face to face dimensions in accordance with AWWA Standards for short body, Class 150-B. All butterfly valves shall have a floating body seat ring to compensate for change in direction of flow to assure bottle-tight seal in either direction.

b) Shaft:

Valve shafts shall be an 18-8, Type 316 stainless steel. Valve disc and shaft shall be standard self adjusting Chevron “V” type packing. Shaft seals shall be of a design allowing replacement without removing the valve shaft.

c) Disc and Seat:

The valve disc shall be cast iron ASTM A126, Class B. The valve seat shall be Buna-N located on the valve body. Valves 20” and smaller

shall have a bonded seat that meets test procedures in ASTM D429, Method B. Valves 24" and larger shall be retained in the valve body by mechanical means without the use of metal retainers or other devices located in the flow stream.

d) Operator:

Butterfly valve operators shall be of the traveling nut design. All operators shall have adjustable mechanical stop limiting devices to prevent over travel of the disc. The operator shall have a mechanical stop which will withstand an input torque of 450 Ft. lbs. against the stop. The traveling nut shall engage alignment grooves in the housing.

e) Operation:

Unless otherwise shown in the plans, all valves shall open counter clockwise.

f) Valve Ends:

Valve ends shall be Mechanical Joint End, or Flanged Ends. Mechanical joint valves shall come complete with bolts, nuts, gaskets and glands. It shall be the responsibility of the Contractor to coordinate the ends of the adjoining pipe with the type valve end he/she proposes to use.

g) Testing:

All valves seats shall be tested at 150 psi as described in AWWA C-504 and in addition shall have a shell test of 300 psi. Any leakage shall be cause for rejection.

h) Paint and Protective Coatings:

All butterfly valves furnished under these specifications shall be painted on exterior as specified in AWWA C-504, with asphalt varnish.

All ferrous metal surfaces in the internal part of the valve shall be protected with a two-part thermoset epoxy coating to a nominal thickness of 4 mils for corrosion protection and shall be of a color that is easily identified as an epoxy coating. This shall be applied in shop.

The thermoset epoxy coating shall be a two-part epoxy and shall function as a physical, chemical and electrical barrier between the base metal to which it is applied and the surroundings. The coating shall be non-toxic and shall not impart taste to water. The coating must be formulated from materials deemed acceptable per the Food & Drug Administration Document Title 21 of the Federal Regulations of Food Additives, Section 121.2514 entitled Resins & Polymeric Coatings. The coating shall have a satin finish and shall be suitable for field overcoating and touchup with the same coating material without sanding or special surface preparation, or application of heat in excess of room temperatures.

i) Experience and Certification:

Butterfly valves, furnished under these specifications, shall be manufactured by a firm that has been producing valves of this general type continuously for the past five (5) years. Each company or manufacturer supplying valves under these specifications shall have on

file, at the City of Rockwall, approved records of experience and detailed drawings of the proposed valves. Drawings shall cover the specific valve to be furnished for installation in the City of Rockwall and shall show all dimensions including metal thickness, construction details and materials used in all parts of the valve together with ASTM Designation and structural properties of these materials.

The manufacturer shall furnish to the City, a Certification that the valve complies with the specifications without any exceptions. This certification shall apply to specific valve being installed with the City water distribution system. The certification shall state (1) the number of valves covered by the certification, (2) the Addition where valves are being installed or the Project Name and (3) name of Contractor installing valves.

The City may require the Manufacturer, Supplier or Contractor to dismantle valves at any time to determine compliance with these specifications. Location of any valve with the City system, installed after adoption of these specifications, that does not meet the specifications completely shall be cause for prohibiting the future use of any valves from the same manufacturer.

ITEM 504. OPEN CUT – BACKFILL

504.2 Materials

504.2.2. Pipe Bedding Material for Storm, Water and Sanitary Sewer Mains

Add the following:

Unless otherwise indicated, storm sewer pipe shall be bedded with Class "C" bedding in accordance with the details shown on the plans.

504.2.2.1. Crushed Stone Embedment

Add the following:

Where stone is called out for pipe embedment, Standard Crushed Rock-Aggregate, Grade 4, shall be used unless otherwise approved in writing.

504.3. Excavation and Foundation

Add the Following:

504.3.1 Excavation

Add the following:

Prior to start of excavation the Contractor shall remove and stockpile the Topsoil and protect the Topsoil from contamination during construction.

504.5 Embedment

Add the following:

Rock Cuttings or Sand will not be permitted in the pipe bedding for sanitary sewer or water lines in the City of Rockwall.

504.5.2. Embedment Classes

504.5.2.9. Class "C" Embedment

Replace the last sentence in its entirety with the following sentence:

Density shall be at least 95% of maximum density under paving, 90% of maximum density elsewhere, as determined by ASTM D698.

504.5.2.15. Class "H" Embedment

Class "H" Embedment shall be used on the P.V.C. Sanitary Sewer Pipe installed within the City of Rockwall.

On PVC Pipe 18 inches through 27 inches in diameter the crushed stone shall be brought up in uniform layers to a point nine inches over the top of the pipe when compacted.

504.6. Final Backfill

Add the following:

After the trench has been refilled, topsoil shall be replaced to the extent that rock, excavated from the trench, will be completely covered and the area is returned to its original condition, except that in cultivated areas a minimum of 12 inches of top soil shall be replaced.

504.6.1. Excavated Material

Add the following:

The material used in the backfill shall be pulverized to the extent necessary to produce a free flowing material free of clay balls larger than 6-inch diameter.

506. OPEN CUT - WATER CONDUIT INSTALLATION

506.3. Laying Water Conduit

Add the following:

Valves for installation in the City's distribution system shall be installed by direct burial as shown on the standard detail sheets and shall be provided with valve boxes for operation of the valve.

506.5 Hydrostatic Test

Delete first paragraph and table and replace with:

All hydrostatic tests shall be maintained over a period of not less than four hours.

"Before being accepted, all ductile iron, C-900 PVC or concrete cylinder water mains shall be tested with a hydraulic test pressure of not less than four hours. Concrete pressure pipe shall be tested with a hydraulic test pressure of 120 percent of the design pressure. Steel pressure pipe shall be tested with a hydraulic test pressure not to exceed 150 percent and not less than 120 percent of the designed working pressure. The rate of leakage of all pipe tested shall not exceed the amounts shown in the tables titled "Hydrostatic Test-C-900 PVC, Steel or Ductile Iron Water Mains" or "Hydrostatic Test-Concrete Cylinder Water Mains". Water lines of material in combination shall be tested for the type of pipe (material) with the least stringent hydraulic test pressure and maintained over a period of not less than four hours."

City of Rockwall
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HYDROSTATIC TEST
C900-16 PVC, STEEL OR DUCTILE-IRON WATER MAINS

GALLONS ALLOWED									
L.F. PIPE	Pipe Diameter								
	4"	6"	8"	10"	12"	14"	16"	18"	20"
5	0.016	0.024	0.032	0.039	0.047	0.055	0.063	0.071	0.079
10	0.032	0.047	0.063	0.079	0.095	0.110	0.126	0.142	0.158
20	0.063	0.095	0.126	0.158	0.189	0.221	0.253	0.284	0.316
30	0.095	0.142	0.189	0.237	0.284	0.331	0.379	0.426	0.473
40	0.126	0.189	0.253	0.316	0.379	0.442	0.505	0.568	0.631
50	0.158	0.239	0.316	0.395	0.473	0.552	0.631	0.710	0.789
60	0.189	0.284	0.379	0.473	0.568	0.663	0.758	0.852	0.947
70	0.221	0.331	0.442	0.552	0.663	0.773	0.884	0.994	1.105
80	0.253	0.379	0.505	0.631	0.756	0.884	1.010	1.136	1.263
90	0.284	0.426	0.568	0.710	0.852	0.994	1.136	1.278	1.420
100	0.316	0.473	0.631	0.789	0.947	1.105	1.263	1.420	1.578
200	0.631	0.947	1.263	1.578	1.894	2.210	2.525	2.841	3.157
300	0.947	1.420	1.894	2.367	2.841	3.314	3.788	4.261	4.735
400	1.263	1.894	2.525	3.157	3.788	4.419	5.051	5.682	6.313
500	1.578	2.367	3.157	3.946	4.735	5.524	6.313	7.102	7.891
600	1.894	2.841	3.788	4.735	5.682	6.629	7.576	8.523	9.470
700	2.210	3.314	4.419	5.524	6.629	7.734	8.838	9.943	11.048
800	2.525	3.788	5.051	6.313	7.576	8.838	10.101	11.364	12.626
900	2.841	4.261	5.682	7.102	8.523	9.943	11.364	12.784	14.205
1000	3.157	4.735	6.313	7.891	9.470	11.048	12.626	14.205	15.783

Maximum allowable water loss in 4 hours at 180 pounds per square inch of pressure for a rate of 25 gallons per inch diameter of pipe per mile over a 24-hour period

EQUATION THE ABOVE CHART IS BASED ON:

$$Maximum\ Loss\ (Gal.) = 25\ \times Diameter\ of\ Pipe\ (inches) \times \frac{L.F.\ of\ Pipe}{5280\ Pipe} \times \frac{4}{24}$$

City of Rockwall
The New Horizon

HYDROSTATIC TEST
CONCRETE CYLINDER WATER MAINS

GALLONS ALLOWED									
L.F. PIPE	Pipe Diameter								
	4"	6"	8"	10"	12"	14"	16"	18"	20"
5	0.031	0.047	0.063	0.078	0.095	0.110	0.126	0.142	0.158
10	0.063	0.095	0.126	0.158	0.189	0.221	0.253	0.284	0.315
20	0.126	0.189	0.253	0.316	0.379	0.442	0.505	0.568	0.631
30	0.188	0.284	0.379	0.473	0.568	0.663	0.758	0.852	0.947
40	0.253	0.379	0.505	0.631	0.758	0.884	1.010	1.136	1.263
50	0.316	0.473	0.631	0.789	0.947	1.105	1.263	1.420	1.578
60	0.379	0.568	0.758	0.947	1.136	1.326	1.515	1.704	1.894
70	0.442	0.663	0.884	1.105	1.326	1.547	1.768	1.989	2.210
80	0.505	0.758	1.010	1.263	1.515	1.768	2.020	2.273	2.525
90	0.568	0.852	1.136	1.420	1.704	1.989	2.273	2.557	2.841
100	0.631	0.947	1.263	1.578	1.894	2.209	2.525	2.841	3.156
200	1.263	1.894	2.525	3.156	3.788	4.419	5.050	5.682	6.313
300	1.894	2.841	3.788	4.735	5.682	6.628	7.575	8.522	9.470
400	2.525	3.788	5.050	6.313	7.575	8.838	10.100	11.363	12.626
500	3.158	4.735	6.313	7.891	9.470	11.047	12.626	14.204	15.782
600	3.788	5.682	7.575	9.469	11.363	13.257	15.151	17.045	18.938
700	4.419	6.628	8.838	11.047	13.257	15.468	17.676	19.885	22.095
800	5.050	7.575	10.100	12.626	15.152	17.676	20.201	22.726	25.251
900	5.682	8.522	11.363	14.204	17.044	19.886	22.726	25.567	28.405
1000	6.313	9.469	12.626	15.782	18.939	22.096	25.253	28.408	31.564

Maximum allowable water loss in 4 hours at 180 pounds per square inch of pressure for a rate of 50 gallons per inch diameter of pipe per mile over a 24-hour period

EQUATION THE ABOVE CHART IS BASED ON:

$$Maximum\ Loss\ (Gal.) = 50\ \times Diameter\ of\ Pipe\ (inches) \times \frac{L.F.\ of\ Pipe}{5280\ Pipe} \times \frac{4}{24}$$

507 OPEN CUT – WASTEWATER CONDUIT INSTALLATION

507.5. Tests and Inspections

507.5.2. Television Inspection

Add the following to this section:

All sanitary sewer pipe construction in this contract shall be visually inspected by photographic means (television and video taped) prior to final acceptance by the Owner. No separate measurement or payment shall be provided for the video inspection. All labor, materials and equipment required are subsidiary to the appropriate bid items as established in the Proposal and Bid Schedule.

ITEM 508 OPEN CUT – STORM WATER CONDUIT INSTALLATION

Add the following:

508.8 Inspection

All storm sewers shall be visually inspected by photographic means (television and video taped) , at Contractor's expense, prior to final acceptance by the City. Any sags, open joints, cracked pipes, etc. shall be repaired or removed by the Contractor at Contractor's expense. Pipes will be cleaned prior to televising the pipe. The contractor shall furnish a DVD formatted video to the City.

ITEM 509 CROSSINGS

509.5. Creek and River Crossings

Add the following:

509.5.1. Aerial Crossings

509.5.1.1. General

Piers for aerial crossings will be drilled piers and columns of the diameter shown on the plans. Piers shall be founded at least 6'-0" into firm gray limestone and 8'-0" into undisturbed material, unless otherwise directed by the Owner.

Materials and workmanship required to construct piers and cap shall conform to Reinforced Concrete Structures, of the specifications. Concrete of piers shall be Class A, 3000 psi.

Anchor straps and bolts shall be installed as shown on the plans, and shall be hot dipped galvanized after fabrication.

After installing the aerial crossing, including the junction collars with the main sewer pipe, an approved coal tar mastic jointing compound shall be installed the full inside circumference of the pipe at each joint to produce a smooth surface with no sharp flow transitions.

509.5.1.2. Steel Pipe

Steel pipe used of Aerial Crossings shall be of the diameter and wall thickness shown on the plans and shall be line pipe manufactured in accordance with the following specifications:

1) AWWA C200-75 Mill Type Steel Water Pipe, Grade B
2) ASTM A139, Grade B

Pipe shall be designed for a clear span as shown on the plans. Couplings shall be Dresser Type 38, or approved equal and shall be located as shown on the plans. Bolts shall be stainless steel or galvanized.

The steel pipe sizes shown on the plans are the nominal diameters of the minimum size steel pipe which may be furnished and installed. Pipe of a larger size may be furnished at the Contractor's option, but no extra payment will be allowed. If larger pipe is utilized, it shall be set so as to retain the flow lines designated on the plans.

All steel pipe shall receive an interior shop-applied Liquid Epoxy Coating System in conformance with AWWA C-210, latest revision.

509.5.1.3. Exterior Painting

Exterior painting for aerial crossings shall conform to Item 804.2.

All surface prepared in the field shall be inspected by the City of Rockwall for adequate surface preparation as defined above prior to application of paint coating. All surfaces to be painted in the field shall have their readiness for painting approved by the City of Rockwall before work is started.

Paint shall be applied to all ferrous material part of the aerial crossing including but not limited to pipe, couplings, straps, nuts, bolts, etc.

509.5.1.3.1. Paints

Paints for aerial crossings shall be:

1) TNEMEC Series 66, or Mobile 78 Series, or Koppers 200 HB, 5.0 mil dry film thickness each coat.
2) TNEMEC Series 66, or Mobile 78 Series, or Koppers 200 HB, 6.0 mil dry film thickness each coat.

Approved material of other manufacturers which are equivalent in all respects to the brands named above, may be substituted upon approval. All paint applied must be by the same manufacturer. The color on the final coat shall be selected by the City of Rockwall.

509.5.1.4. Measurement of Payment

Aerial crossings will be measured for payment per each between the limits shown on the plans and will be paid for at the lump sum bid price for each crossing in the Bid Schedule.

Concrete piers and collars to the elevations shown in the plans will be measured and paid for in the lump sum price for aerial crossings. Payment in vertical feet for additional depth of reinforced concrete piers as approved by the City of Rockwall, shall be as provided in the Proposal and Bid Schedule.

Payment of the unit or lump sum prices shall be full compensation for furnishing all labor, supervisions, materials, tools, equipment, and incidentals, and for performing all work necessary in construction the aerial crossings and piers, including excavation, dewatering, backfilling, disposal of surplus material, painting, testing,

concrete encasement, hauling, transportation costs, disposal costs, salvaging, and any other work required in accordance with the Plans and Specifications.

City of Rockwall
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7.6 Division 600 Conduit & Appurtenance Rehabilitation

NOTE: The ***(1)*** symbol specifies that this item is also covered in the City of Rockwall's "Special Provisions" to the "Standard Specifications for Public Works Construction, North Central Texas". These Special Provisions are additional and modify the "Standard Specification"

Table 8.6: Revisions to NCTCOG's Division 600 Conduit & Appurtenance Rehabilitation

Revised	Standard Specification Item No.	Description
	601.	**PIPELINE REHABILITATION**
	601.1.	Description
	601.2.	General
	601.3.	General Materials
	601.4.	General Methods
	601.5.	Section Held for Future Use
	601.6.	Section Held for Future Use
	601.7.	Cured-In-Place Pipe Liner (CIPP Liner)
	601.8.	Pipe Bursting With Polyethylene
	601.9.	Pipe Bursting With Rigid Place
	601.10.	Polyvinyl Chloride (PVC) Profile Gravity Liner Pipe (Segmental Sliplining)
	601.11.	Measurement and Payment
	602.	**REHABILITATION OF MANHOLES OR UNDERGROUND VAULTS**
	602.1	General
	602.2.	Submittals
	602.3.	Quality Assurance
	602.4.	Delivery, Storage and Handling
	602.5.	Rehabilitation
	602.7.	Inspection and Testing
	602.8.	Measurement and Payment
	603.	**ABATEMENT OF COATINGS CONTAINING HEAVY METALS**
	603.1.	General
	603.2.	Job Plan
	603.3.	Testing
	603.4.	Monitoring
	603.5.	Protection

	603.6.	Lead-Based Coating Removal
	603.7.	Lead-Based Coating Encapsulation
	603.8.	Clean-Up and Disposal
	603.9.	Payment
	604.	**REMOVAL OF ASBESTOS-CEMENT PIPE (ACP)**
	604.1	General
	604.2	Job Plan
	604.3	Procedures
	604.4	Disposal
	604.5	Payment

7.7 Division 700 Structures

NOTE: The ***(1)*** symbol specifies that this item is also covered in the City of Rockwall's "Special Provisions" to the "Standard Specifications for Public Works Construction, North Central Texas". These Special Provisions are additional and modify the "Standard Specification"

Table 8.7: Revisions to NCTCOG's Division 700 Structures

Revised	Standard Specification Item No.	Description
	701.	**GENERAL STRUCTURES**
	701.1.	Structural Wood Products
	701.2.	Structural Excavation
	701.3.	Structural Bolting
	702.	**CONCRETE STRUCTURES**
	702.1.	Description
	702.2.	Concrete Structure Materials
(1)	702.3.	Mix Design and Mixing Concrete for Structures
	702.4.	Mix Design and Mixing Lightweight Concrete for Structures
	702.5.	Constructing Concrete Structures
	702.6.	Pre-stressed Concrete for Structures
	702.7.	Pneumatically Placed Concrete (Gunite)
	702.8.	Drilled Shaft Foundations
	702.9.	Pre-cast and Cast-In-Place Concrete Units
	703.	**STEEL STRUCTURES**
	703.1.	Description
	703.2.	Materials for Steal Structures
	703.3.	Steel Structure Construction
	703.4.	Painting Metal Structures
	703.5.	Measurement and Payment
	704.	**PILING**
	704.1.	Piling Materials
	704.2.	Driving Piling
	704.3.	Penetration
	704.4.	Bearing Resistance
	704.5.	Constructing Cast-In-Place, Pre-stressed Concrete Piling
	704.6.	Measurement and Payment

ITEM 702 CONCRETE STRUCTURES

702.3. Mix Design and Mixing Concrete for Structures

702.3.4. Quality of Concrete

702.3.4.2. Standard Classes

Add the following:

Type "G" Concrete: Min.- Sacks Cement per C.Y. – 7.0; min. 28-day Comp. Strength - 5,000 psi; Min. 7-day Strength 3600 psi; Max. Water Cement Ratio - 5.0; Course Aggregate 1-1/2”.

7.8 Division 800 Miscellaneous Construction & Materials

NOTE: The ***(1)*** symbol specifies that this item is also covered in the City of Rockwall's "Special Provisions" to the "Standard Specifications for Public Works Construction, North Central Texas". These Special Provisions are additional and modify the "Standard Specification"

Table 8.8: Revisions to NCTCOG's Division 800 Miscellaneous Construction & Materials

Revised	Standard Specification Item No.	Description
	801.	**BARRIERS, WARNING & DEOUR SIGNS AND FENCES**
	801.1.	Barriers and Warning and Detour Signs
(1)	801.2.	Metal Beam Guard Fence
	801.3.	Railing
	801.4.	Chain Link Fence
(1)	801.5.	Wire Fence
	802.	**STEPS AND RETAINING WALLS**
	802.1.	Concrete Steps
	802.2.	Concrete Retaining Walls
	802.3.	Segmental Retaining Wall Systems
	802.4.	Cofferdams
	803.	**SLOPE AND CHANNEL PROTECTION**
	803.1.	Articulating Concrete Block
(1)	803.2.	Gabion Structures
(1)	803.3.	Riprap
	803.4.	Geotextiles Used in Drainage and Stabilization Applications
	804.	**PAINTING AND OTHER PROTECTIVE TREATMENTS; PAVEMENT MARKING**
	804.1.	Description
(2)	804.2.	Painting and Marking
	804.3.	Galvanizing
	804.4.	Measurement and Payment
	804.5.	Specialty Coatings
	805.	**ELECTRICAL COMPONENTS AND CONDUIT**
	805.1.	Description
	805.2.	General Requirements for Electrical Components

(1)	805.3.	Conduit Construction Methods
(1)	805.4.	Measurement and Payment
	806.	**METALS MATERIALS**
	806.1.	General
	806.2.	Structural Steel
	806.3.	Forgings
	806.4.	Castings
	806.5.	Copper
	806.6.	Bolts, Nuts and Washers
	806.7.	Measurement and Payment

801 BARRIERS, WARNING & DETOUR SIGNS, AND FENCES

801.1. Barriers and Warning And Detour Signs

Add the Following

Reflectorized marking for guard rail and other traffic control used shall meet the requirements of 3M Scotchlite Brand Reflective Sheeting Grade, Series 2800, 3800 or 5800, or equal. The marking shall conform to U.S. Department of Transportation, Federal Highway Administration, STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS, 1979 FP-79, Type III A, Sections 633.36 and 718.01 and Federal Supply Service, General Services Administration, LS-300 C, SHEETING AND TAPE REFLECTIVE NON-EXPOSED LENS, Reflectivity 2, Class 4.

801.2. Metal Beam Guard Fence

Add the following:

Reflectorized Marking shall be applied to metal beam guardrail at locations shown on the plans. To apply properly, the following equipment and accessories are recommended:

a. Heat Activated Adhesive

(1) Heat lamp vacuum applicator with temperature control.

(2) Remove protective liner from adhesive and place glossy side of liner over the sign face. Sheeting and liner may require perforation to aid in air evaluation.

b. Pressure Sensitive Adhesive

(1) 48" Interstate Squeeze Roll Applicator.

(2) Hand application. To obtain maximum initial adhesion use firm pressure with 2" (5 cm) rubber roller or plastic squeeze. Multiple, heavy overlapping strokes should be used. Resqueeze all edges.

801.5. Wire Fencing

801.5.2. Material

Add the following:

801.5.2.1. Wire Fencing Fabric:

All chain link fencing shall be No. 9 gage copper bearing open-hearth steel wire.

801.5.2.2. Posts

801.5.2.2.1 Metal Posts

All posts shall be heavily galvanized by the hot-dip process after fabrication and shall be fitted with watertight malleable iron caps. All posts shall be of the following size and shape:

801.5.2.2.2. Line Posts

"H" Section hot rolled weighing not less than 4.10 pounds per linear foot or 3-1/2-inch O.D. pipe weighing not less than 3.65 pounds per linear foot.

801.5.2.2.3. Terminal Posts

Three inch (3") steel pipe weighing not less than 5.79 pounds per linear foot.

801.5.2.2.4. Gate Posts

Four inch (4") O.D. steel pipe weighing not less than 9.11 pounds per linear foot.

801.5.2.3. Rails, Gates, Braces and Fittings

Shall be 1-5/8 inch steel pipe weighing not less than 2.27 pounds per linear foot.

ITEM 803 SLOPE AND CHANNEL PROTECTION

803.2. Gabion Structures

803.2.2. Materials

803.2.2.1. Baskets

Add the sentence:

All wire used, including tie and connecting wire, shall be certified by Mill Test Reports showing compliance with specification requirements.

803.2.2.2. Stone

Add the following:

Facing stone shall be hand selected, large stone and shall be selected for best appearance. Facing stone shall be an off-white color and prior to laying the stone, samples shall be delivered to the site and shall be approved by the Engineer for gradation and appearance.

803.2.3. Gabion Construction

803.2.3.1. Geotextile Filter Layer

Add the following:

High strength permeable barrier fabric for use as a filter media, shall be placed along the earth side of the Gabion Structures. The permeable barrier fabric to be used shall be TREVIRA S1115 as manufactured by Hoechst Fibers Industries, Spartenburg, South Carolina; MIRAFI 140 Fabric, produced by Fiber Industries, Inc.; Bidim

U-14 as distributed by Quline Corporation, Houston, Texas, or approved equal.

803.3. Riprap

803.3.2. Riprap Materials

803.3.2.2. Stone

803.3.2.2.1. Types

Broken Concrete.

Delete this sub-section and replace with the following wording:

Broken concrete shall not be used for riprap.

ITEM 804 PAINTING AND OTHER PROTECTIVE TREATMENTS, PAVEMENT MARKINGS

804.2 Painting and Marking

804.2.3. Preparing Structures for Paint

804.2.3.1.Descaling, Cleaning and Preparation of Surfaces

Add the following:

Prior to painting concrete or masonry screening walls the concrete must be thoroughly cured and dry for proper adhesion of paint. Preparation of work shall include either of the following:

(1) The concert surface shall be thoroughly washed with a solution of one (1) gallon Muriatic Acid to ten (10) gallons H_2O (Caution: Always add acid to H_2O rather than H_2O to acid). Rinse thoroughly with clear water and paint while damp.

(2) Treatment of surface with masonry conditioner such as a clear alkali-resistant soya alkyd binder type sealer or as recommended by paint manufacturer.

804.2.5. Painting New Structures

804.2.5.5. Finish Coats

Add the following:

On masonry walls which are painted, the total dry film thickness shall be 6 mils (2 coats applied at 8 mils wet and spreading rate = 200 square feet per gallon based on 36% $\pm$ 2% Volume Solids). The thickness shall be tested using a Wet Film Thickness Gage.

804.2.6. Cleaning and Painting Existing Structures

Add the following:

Masonry walls which require repainting shall be sand blasted or cleaned with a power brush, removing all mastic, powdery, thick layered, peeling or heavily chalked old paint. Spot prime all bare areas with Masonry Conditioner. If old paint is a cement-based paint, apply Masonry Conditioner to entire surface and apply 2 coats of paint in accordance with 8.9.3 (k) above.

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ITEM 805 ELECTRICAL COMPONENTS AND CONDUIT

805.3. Material

Add the following:

In the City of Rockwall, conduit for street lighting shall be 2 inch PVC pipe and for traffic control shall be 3-inch PVC pipe, meeting the requirements of Item 2.10, Electrical Components.

Add the following:

805.3.7. Pull Box.

All pull boxes shall be #36 supplied by Traffic Signal Equipment Company, Fort Worth, Texas or approved equal. Boxes shall be approximately 10 1/2"x17"x12" and shall be furnished with a concrete cover.

805.4 Conduit Construction Methods

Revise first sentence, third paragraph to read as follows:

All conduit shall be placed a minimum of thirty-six (36) inches below finish grade. Conduit in median shall be placed a minimum of thirty-six (36) inches below inside of curb as shown on plans.

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8. Special Provisions to the NCTCOG's Standard Drawings for Public Works Construction Standards

All work within the City of Rockwall shall conform to the standard drawings called out within this section. The City of Rockwall's Standard Drawing for Construction shall conform to Section II – Standard Drawings for North Central Texas Council of Governments Standard Specifications and Standard Drawings, November 2004, Fifth Edition.

The North Central Texas Standard Drawings shall be modified and clarified by the deletion, revision, and/or addition of the following drawings. Except when specifically stated, none of the standard drawings of the North Central Texas Standard Specifications shall be deleted.

8.1 Division 1000 Erosion and Sediment Control

NOTE: *(1) Deleted NCTCOG Drawing*
(2) Revised NCTGOG Drawing (see revisions below)
(3) Added Rockwall Standard Drawing (see drawing below)
(4) Added Current TxDOT Standards

Table 9.1: Revisions to NCTCOG's Division 1000 Erosion and Sediment Control

Revised	Drawing No.	Subject
	1010	RESERVED
(1)	~~1020A~~	~~Silt Fence~~
(3)	**R-1020A**	**Silt Fence**
(1)	~~1020B~~	~~Silt Fence – General Notes~~
(3)	**R-1020B**	**Silt Fence – General Notes**
	1030A	Interceptor Swale
	1030B	Interceptor Swale
	1040A	Diversion Dike
	1040B	Diversion Dike
	1050A	Triangular Sediment Filter Dike
	1050B	Triangular Sediment Filter Dike
	1060A	Rock Check Dam
(1)	~~1060B~~	~~Rock Check Dam~~
(3)	**R-1060B**	**Rock Check Dam**
(1)	~~1070A~~	~~Stabilized Construction Entrance~~
(3)	**R-1070A**	**Stabilized Construction Entrance**
(1)	~~1070B~~	~~Stabilized Construction Entrance~~
(3)	**R-1070B**	**Stabilized Construction Entrance**

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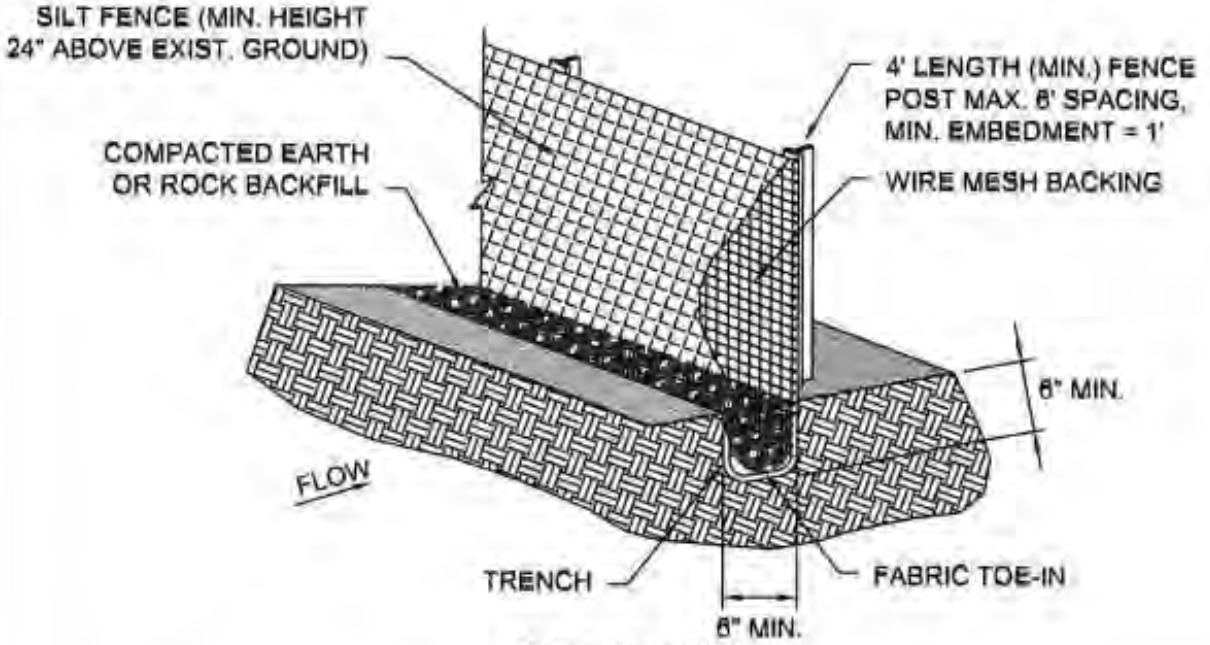
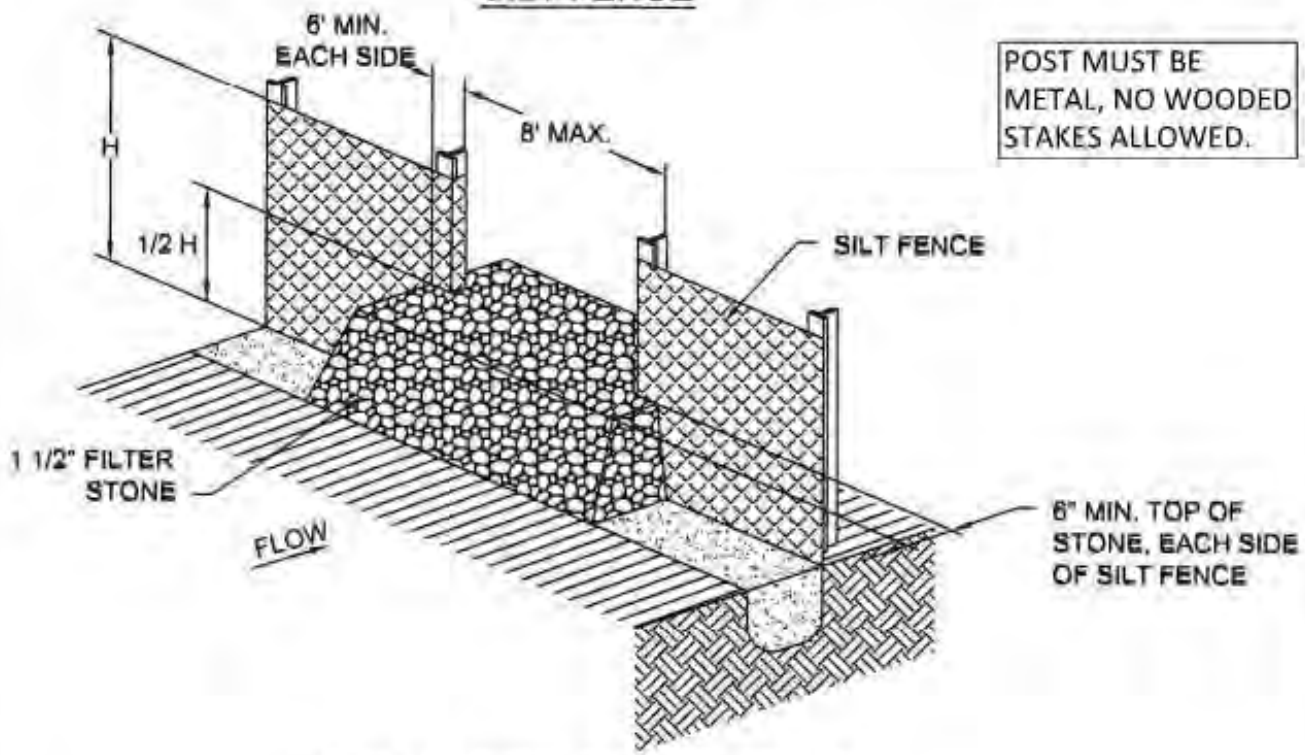
Revised	Drawing No.	Subject
	1080A	Sandbag Check Dam
	1080B	Sandbag Check Dam
(1)	~~1090~~	~~Stone Outlet – Sediment Trap~~
(3)	**R-1090**	**Stone Outlet – Sediment Trap**
	1100	Pipe Outlet – Sediment Basin
	1110	Pipe Slope Drain
	1120	Inlet Protection – Filter Barrier
(1)	~~1130~~	~~Inlet Protection-Drop – Block and Gravel~~
(1)	~~1140~~	~~Inlet Protection-Curb – Block and Gravel~~
	1150	Inlet Protection – Excavated Impoundment
	1160A	Erosion Control Blankets
	1160B	Erosion Control Blankets



SILT FENCE



POST MUST BE METAL, NO WOODED STAKES ALLOWED.

STONE OVERFLOW STRUCTURE

SILT FENCE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE: 202.5 *	
		DATE: Mar. 2018	STANDARD DRAWING NO.: R-1020A

SILT FENCE GENERAL NOTES:

1. POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF ONE FOOT.

2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CANNOT BE TRENCHED IN (e.g. PAVEMENT), WEIGHT FABRIC FLAP WITH ROCK ON UPHILL SIDE TO PREVENT FLOW FROM SEEPING UNDER FENCE.

3. THE TRENCH MUST BE A MINIMUM OF 6 INCHES DEEP AND 6 INCHES WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.

4. SILT FENCE SHOULD BE SECURELY FASTENED TO EACH SUPPORT POST OR TO WIRE BACKING, WHICH IN TURN IS ATTACHED TO THE FENCE POST. THERE SHALL BE A 3 FOOT OVERLAP, SECURELY FASTENED WHERE ENDS OF FABRIC MEET.

5. INSPECTION SHALL BE AS SPECIFIED IN THE SWPPP. REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.

6. SILT FENCE SHALL BE REMOVED WHEN FINAL STABILIZATION IS ACHIEVED OR ANOTHER EROSION OR SEDIMENT CONTROL DEVICE IS EMPLOYED.

7. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF HALF THE HEIGHT OF THE FENCE. THE SILT SHALL BE DISPOSED OF AT AN APPROVED SITE AND IN SUCH A MANNER AS TO NOT CONTRIBUTE TO ADDITIONAL SILTATION.

8. FILTER STONE SHALL BE WRAPPED IN FILTER FABRIC AND BURIED SIX (6") INCHES MINIMUM.

SILT FENCE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE: 202.5 *	
		DATE: Mar. 2018	STANDARD DRAWING NO.: R-1020B

ROCK CHECK DAM GENERAL NOTES:

1. STONE SHALL BE WELL GRADED WITH SIZE RANGE FROM 1½ TO 3½ INCHES IN DIAMETER DEPENDING ON EXPECTED FLOWS.

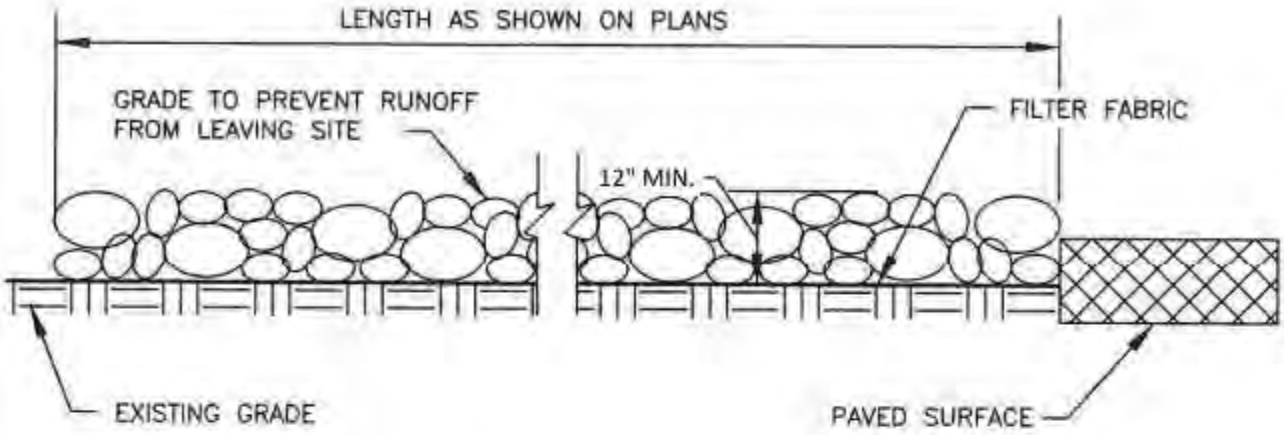
2. THE CHECK DAM SHALL BE INSPECTED AS SPECIFIED IN THE SWPPP AND SHALL BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED DUE TO SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.

3. WHEN SILT REACHES A DEPTH EQUAL TO ONE-THIRD OF THE HEIGHT OF THE CHECK DAM OR ONE FOOT, WHICHEVER IS LESS, THE SILT SHALL BE REMOVED AND DISPOSED OF PROPERLY.

4. WHEN THE SITE HAS ACHIEVED FINAL STABILIZATION OR ANOTHER EROSION OR SEDIMENT CONTROL DEVICE IS EMPLOYED, THE CHECK DAM AND ACCUMULATED SILT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED MANNER.

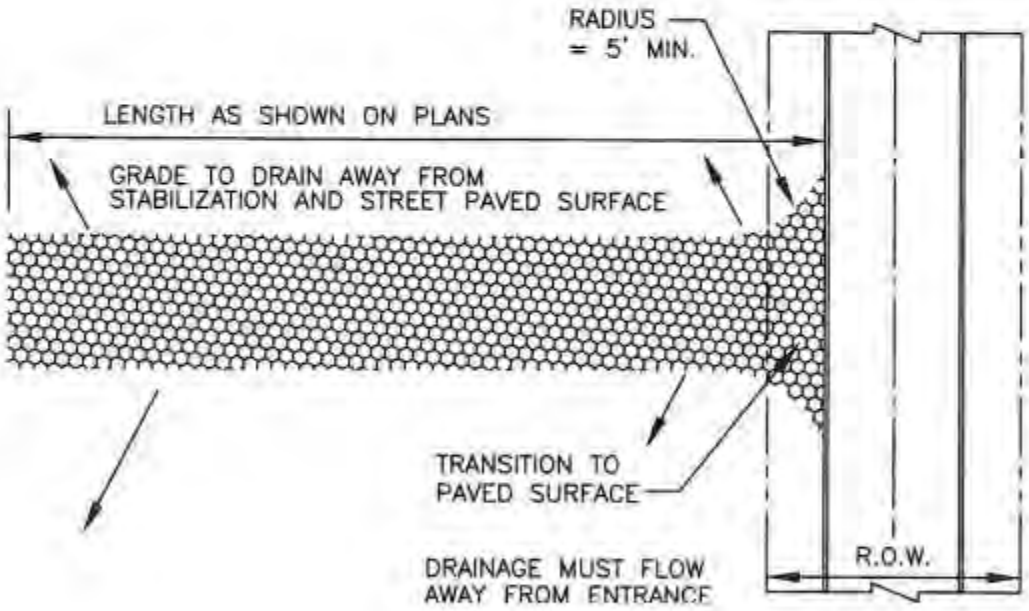
5. FILTER STONE SHALL BE WRAPPED IN APPROPRIATE SIZED WIRE MESH TO CONTAIN STONE AND BURIED SIX (6") INCHES MINIMUM.

ROCK CHECK DAM	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 202.9*	
		DATE Mar. 2018	STANDARD DRAWING NO. R-1060B



PROFILE VIEW

N.T.S.



PLAN VIEW

N.T.S.

Note: No crushed concrete or recycled concrete allowed.

STABILIZED CONSTRUCTION ENTRANCE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 202.II*	
		DATE Mar. 2018	STANDARD DRAWING NO. R-1070A

STABILIZED CONSTRUCTION ENTRANCE GENERAL NOTES:

1. STONE SHALL BE 4 TO 6 INCH DIAMETER COARSE AGGREGATE.

2. MINIMUM LENGTH SHALL BE 50 FEET AND WIDITH SHALL BE 20 FEET.

3. THE THICKNESS SHALL NOT BE LESS THAN 12 INCHES.

4. THE WIDTH SHALL BE NO LESS THAN THE FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.

5. WHEN NECESSARY, VEHICLES SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO A PUBLIC ROADWAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WITH DRAINAGE FLOWING AWAY FROM BOTH THE STREET AND THE STABILIZED ENTRANCE. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.

6. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PAVED SURFACES. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PAVED SURFACES MUST BE REMOVED IMMEDIATELY.

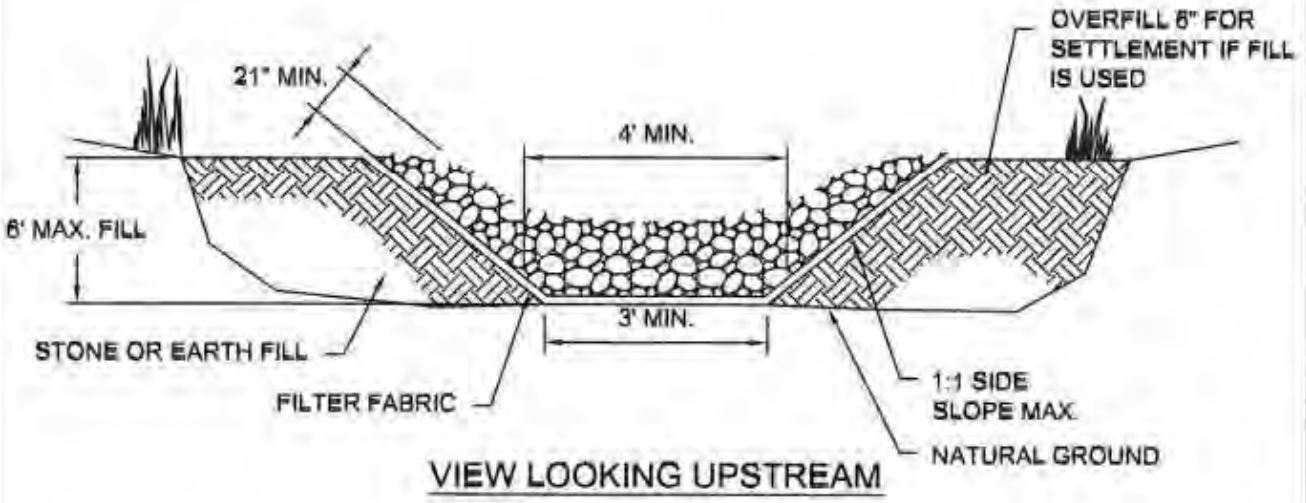
7. THE ENTRANCE MUST BE PROPERLY GRADED OR INCORPORATE A DRAINAGE SWALE TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.

8. PREVENT SHORTCUTTING OF THE FULL LENGTH OF THE CONSTRUCTION ENTRANCE BY INSTALLING BARRIERS AS NECESSARY.

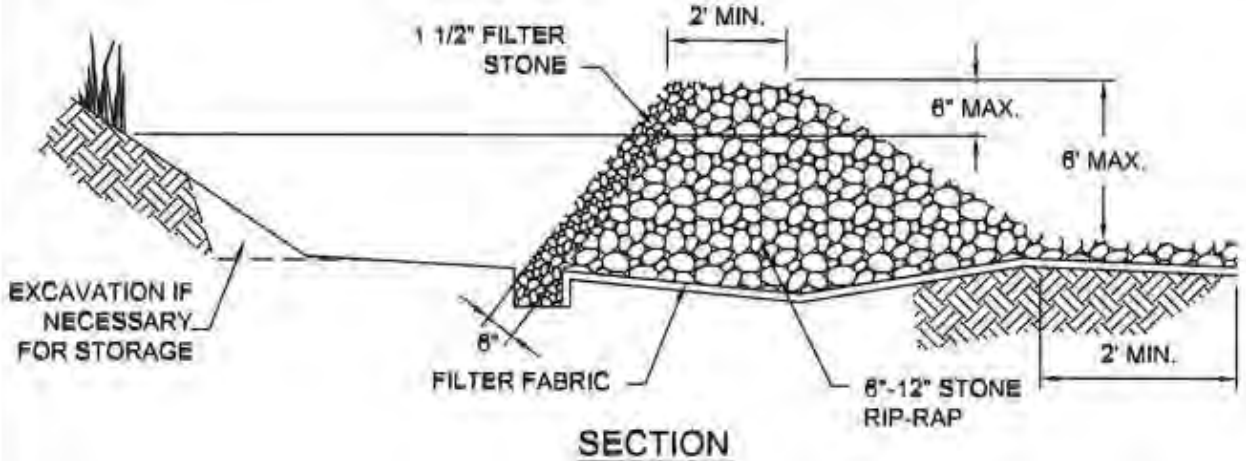
9. INSPECTION SHALL BE AS SPECIFIED IN THE SWPPP.

10. NO CRUSHED OR RECYCLED CONCRETE ALLOWED.

STABILIZED CONSTRUCTION ENTRANCE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 202.II *	
		DATE Mar. 2018	STANDARD DRAWING NO. R-1070B



VIEW LOOKING UPSTREAM



SECTION

NOTE: FILTER STONE SHALL BE WRAPPED IN APPROPRIATE SIZED WIRE MESH TO CONTAIN STONE.

STONE OUTLET SEDIMENT TRAP	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 202.12 *	
		DATE Mar. 2018	STANDARD DRAWING NO. R-1090

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8.2 Division 2000 Pavement Systems

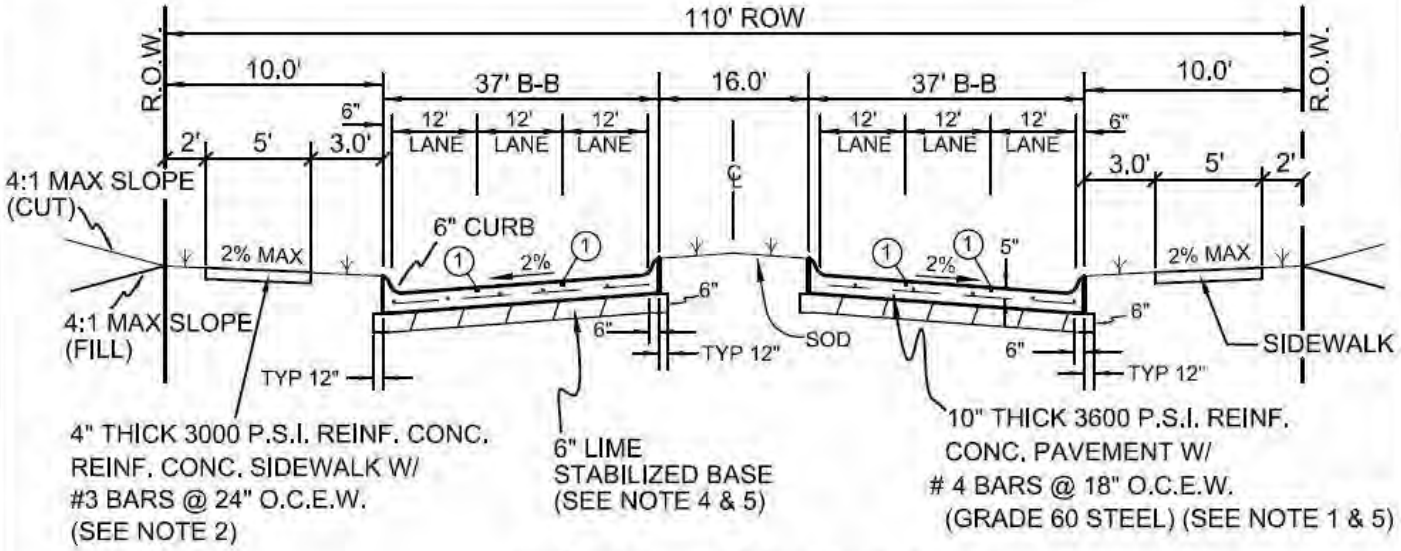
NOTE: *(1) Deleted NCTCOG Drawing*
(2) Revised NCTGOG Drawing (see revisions below)
(3) Added Rockwall Standard Drawing (see drawing below)
(4) Added Current TxDOT Standards

Table 9.2: Revisions to NCTCOG's Division 2000 Pavement Systems

Revised	Drawing No.	Subject
(1)	~~*2010*~~	~~*Reinforced Concrete Pavement – Six Lane Divided Thoroughfare*~~
(3)	**R-2010**	**Reinforced Concrete Pavement – (P6D) Principal Arterial Divided 6-Lane**
(1)	~~*2020*~~	~~*Reinforced Concrete Pavement – Four Lane Divided Thoroughfare*~~
(3)	**R-2020**	**Reinforced Concrete Pavement – (M4D) Minor Arterial Divided 4-Lane**
(1)	~~*2030*~~	~~*Reinforced Concrete Pavement – 2- & 4- Undivided Thoroughfare*~~
(3)	**R-2030**	**Reinforced Concrete Pavement – (M4U) Major Collector Undivided 4-Lane**
(3)	**R-2031**	**Reinforced Concrete Pavement – Minor Collector/Local Commercial**
(3)	**R-2032**	**Reinforced Concrete Pavement – (M3U) Minor Collector – 2 Lane with Continuous Left Turn Lane**
(3)	**R-2033**	**Reinforced Concrete Pavement – Local Residential Street**
(1)	~~*2040*~~	~~*Reinforced Concrete Pavement - Alleys*~~
(3)	**R-2040**	**Reinforced Concrete Pavement – Alleys**
(3)	**R-2041**	**Reinforced Concrete Pavement – Fire Lane**
(1)	~~2050~~	~~Reinforced Concrete Pavement - Joints~~
(3)	**R-2050**	**Reinforced Concrete Pavement - Joints**
(3)	**R-2051**	**Reinforced Concrete Pavement – Longitudinal Butt Joint**
	2060	Reinforced Concrete Pavement – Transverse Joint Spacing
(1)	~~2070~~	~~Reinforced Concrete Pavement – Street Headers~~
(3)	**R-2070**	**Reinforced Concrete Pavement – Street Headers**
	2080	Reinforced Concrete Pavement – Bridge Approach Slab
(1)	~~2090~~	~~Hot Mix Asphalt Pavement – Six Lane Divided Thoroughfare~~
(1)	~~2100~~	~~Hot Mix Asphalt Pavement – Four Lane Divided Thoroughfare~~
(1)	~~2110~~	~~Hot Mix Asphalt Pavement – 2- & 4- Undivided Thoroughfare~~

Revised	Drawing No.	Subject
	2120	Concrete Curb and Gutter – Integral, Separate, and Doweled
(1)	~~*2125A-2125B*~~	~~*Curb Ramps*~~
(3)	**R-2125A-R-2125D**	**Directional Curb Ramp**
(4)		**TxDOT: PED-18: Pedestrian Facilities – Curb Ramps**
(1)	~~2130~~	~~Median Island Pavement – Nose & Left Turn Lane~~
(3)	**R-2130**	**Median Island Pavement – Nose & Left Turn Lane**
(1)	~~2140~~	~~Median Island Pavement – Monolithic Concrete Nose~~
(3)	**R-2140**	**Median Island Pavement – Monolithic Concrete Nose**
(1)	~~*2150A-2150B*~~	~~*Driveway Approach – Flared Return Type*~~
(1)	~~*2155*~~	~~*Driveway Approach – Radius Return Type*~~
(3)	**R-2150**	**Driveway Detail – Residential Driveway**
(1)	~~2160~~	~~Alley Approach – Radius Return Type~~
(3)	**R-2160**	**Alley Approach – Radius Return Type**
(1)	~~2170~~	~~Reinforced Concrete Sidewalks – Joints and Spacing~~
(3)	**R-2170**	**Reinforced Concrete Sidewalks – Joints and Spacing**
(1)	~~2180~~	~~Reinforced Concrete Retaining Wall - Integral With Sidewalk~~
(3)	**R-2180**	**Reinforced Concrete Retaining Wall - Integral With Sidewalk**
(1)	~~2190~~	~~Pavement Systems – General Notes~~
(3)	**R-2190**	**Pavement Systems – General Notes**
	2200	Subdrains – Pavement Subgrade
(1)	~~2210~~	~~Alley Geometrics – Type "A": & Type "B"~~
(3)	**R-2210**	**Alley Geometrics – Type "A": & Type "B"**
(1)	~~2220~~	~~Alley Geometrics - Type "C": & Type "D"~~
(3)	**R-2220**	**Alley Geometrics - Type "C": & Type "D"**
(1)	~~2230~~	~~Alley Geometrics - Type "E": & Type "F"~~
(3)	**R-2230**	**Alley Geometrics - Type "E": & Type "F"**
(1)	~~2240~~	~~Alley Geometrics - Type "G": & Type "H"~~
(3)	**R-2240**	**Alley Geometrics - Type "G": & Type "H"**
(1)	~~2250~~	~~Alley Geometrics - Type "J"~~
(3)	**R-2250**	**Alley Geometrics - Type "J"**
(3)	**R-2251**	**Alley Geometrics – Alley Warping at Inlet**
	2260	Alley Intersection – Proposed to Existing
(3)	**R-2270**	**Left Turn Lane – Concrete Removal & Replacement**
(1)	~~*2270A*~~	~~*Metal Beam Guard Fence – Roadside Placement & Beam Elements*~~
(1)	~~*2270B*~~	~~*Metal Beam Guard Fence – Line Post & Connections*~~
(1)	~~*2270C*~~	~~*Metal Beam Guard Fence – End Section & Angle Anchor Post*~~
(1)	~~*2270D*~~	~~*Metal Beam Guard Fence – Special End Shoe & Anchor*~~

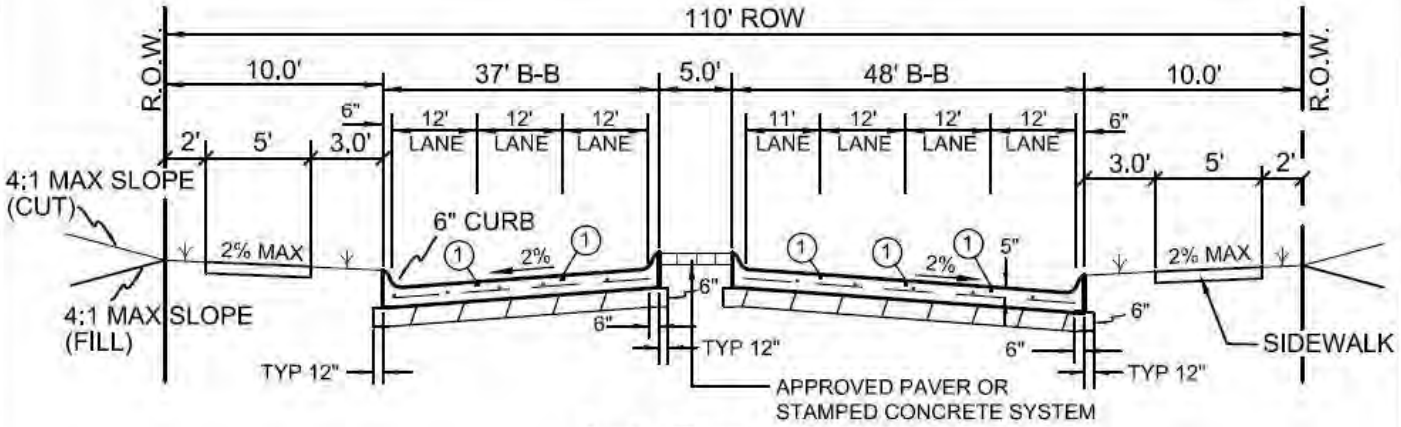
Revised	Drawing No.	Subject
		~~*Post*~~
(1)	~~*2270E*~~	~~*Metal Beam Guard Fence – General Notes*~~
(1)	~~*2280A*~~	~~*Metal Beam Guard Fence – Two-Way Traffic Bridge End*~~
(1)	~~*2280B*~~	~~*Metal Beam Guard Fence – Two-Way Traffic Bridge End*~~
(4)		**TxDOT: Metal Beam Guard Fence**
	2290	Metal Beam Guard Fence – End of Road
(3)	**R-2300**	**Street Regulatory Sign - Street Name Blades**
(3)	**R-2310**	**Illuminated Street Name Sign – ILSN Sign Detail**
(3)	**R-2320**	**Raised Pavement Markings – Lane Lines**
(3)	**R-2330**	**Raised Pavement Markings – Chevron and Crosshatch**
(3)	**R-2340**	**Raised Pavement Markings – Intersection Approach**
(3)	**R-2350**	**Type C Intersection – Right Lane Drop Markings**
(3)	**R-2360**	**Typical Thoroughfare Layouts**
(3)	**R-2370**	**Typical Crosswalk Layouts**
(3)	**R-2380**	**Typical Crosswalk and Dashed Markings**
(3)	**R-2390**	**Chevron Striping**
(3)	**R-2400**	**Diagonal Crosshatch Striping**



110' ROW – Principal 6 Lane Divided Arterial Regular Section

(Not to Scale)

① SAWED LONGITUDINAL CONTRACTION, OR CONSTRUCTION JOINT



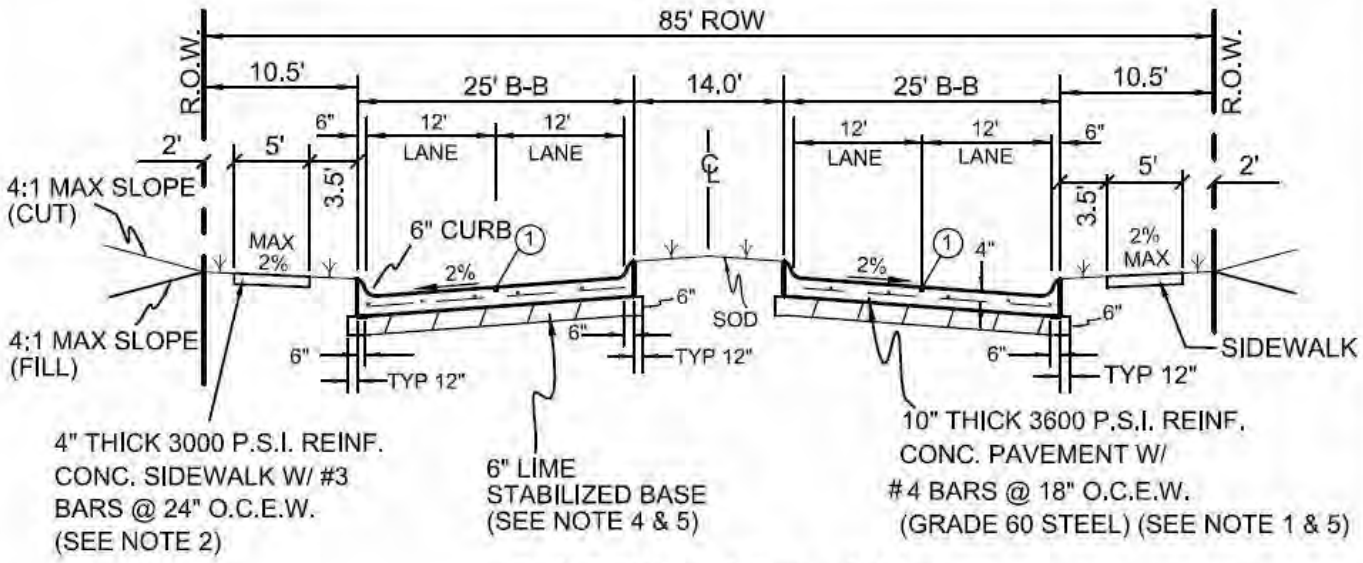
Left Turn Section

(Not to Scale)

NOTES:

1. Street pavement cement content to be no less than 6.0 sacks per cubic yard for machine placed and not less than 6.5 sacks per cubic yard for hand placed.
2. Sidewalk Cement content of not less than 5.5 sack per cubic yard.
3. No sand allowed under pavement or sidewalks.
4. Minimum lime content shall be 6% of dry weight of material (at least 27 lbs/SY) compact to 95% standard density.
5. Paving Section design shall be based off the 30 year projected traffic volumes and geotechnical analysis/report.

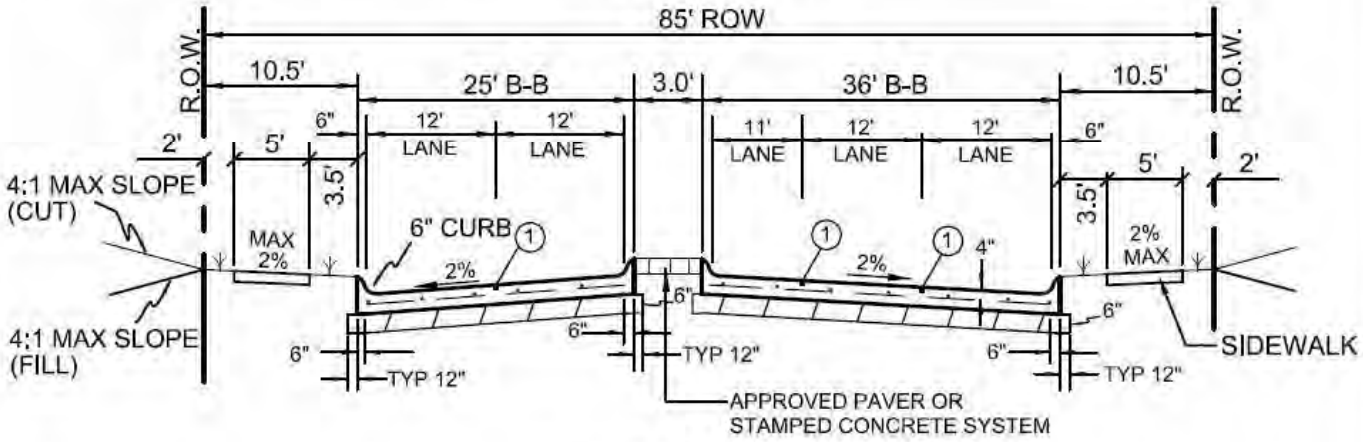
REINFORCED CONCRETE PAVEMENT	CITY OF ROCKWALL	
(P6D) PRINCIPAL ARTERIAL DIVIDED 6-LANE		DATE AUG. '15 / DRAWING NO. R-2010



85' ROW – Minor 4 Lane Divided Arterial Regular Section

(Not to Scale)

(1) SAWED LONGITUDINAL CONTRACTION, OR CONSTRUCTION JOINT



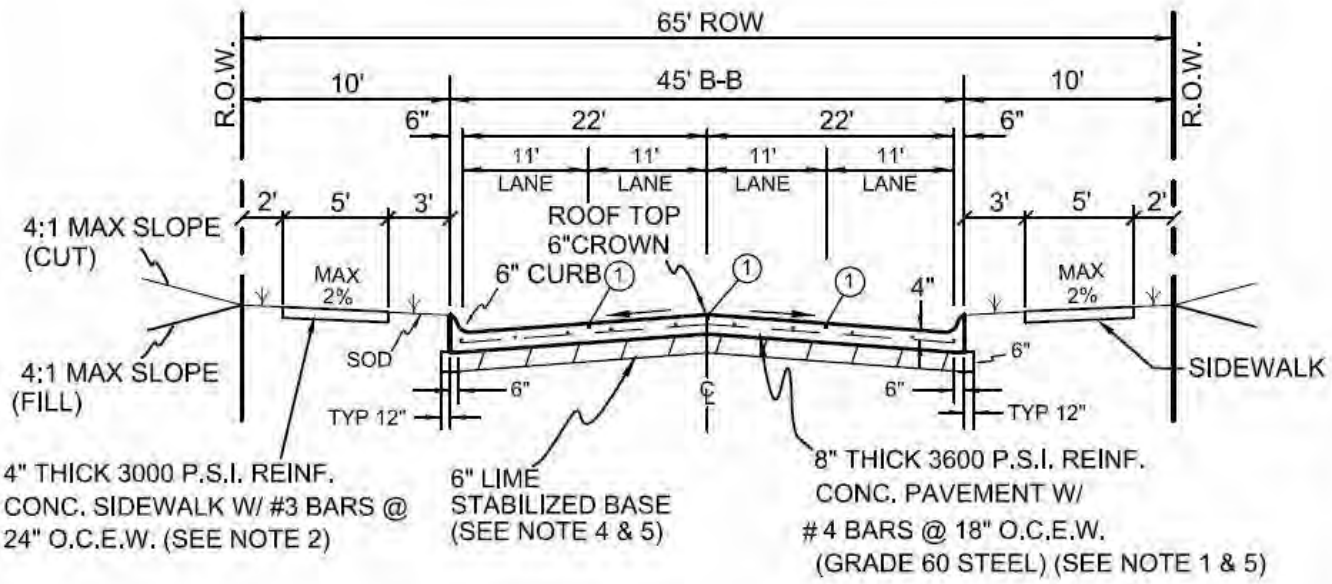
Left Turn Section

(Not to Scale)

NOTES:

1. Street pavement cement content to be no less than 6 sacks per cubic yard for machine placed and not less than 6.5 sacks per cubic yard for hand placed.
2. Sidewalk Cement content of not less than 5.5 sack per cubic yard.
3. No sand allowed under pavement or sidewalks.
4. Minimum lime content shall be 6% of dry weight of material (at least 27 lbs/SY) compacted to 95% standard density.
5. Paving Section design shall be based off the 30 year projected traffic volumes and geotechnical analysis/report.

REINFORCED CONCRETE PAVEMENT	CITY OF ROCKWALL	
(M4D) MINOR ARTERIAL DIVIDED 4–LANE		DATE AUG. '15 / DRAWING NO. R–2020



① SAWED LONGITUDINAL CONTRACTION, OR CONSTRUCTION JOINT

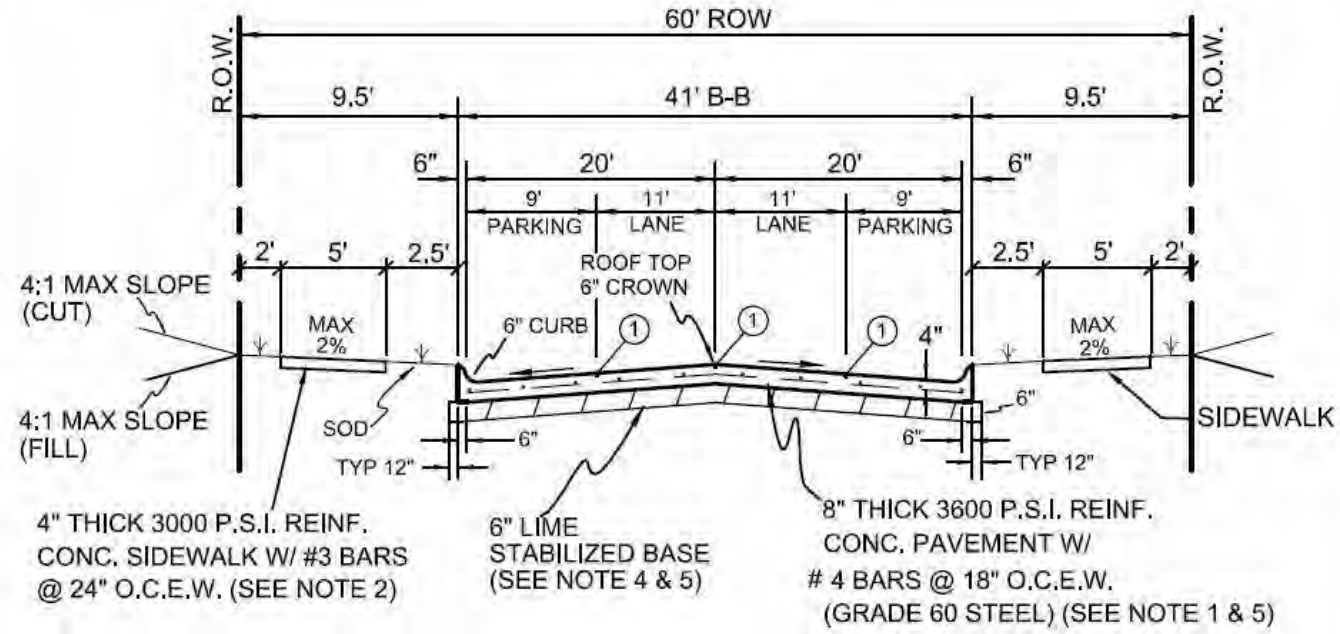
65' ROW – Major 4 Lane Undivided Collector

(Not to Scale)

NOTES:

1. Street pavement cement content to be no less than 6 sacks per cubic yard for machine placed and not less than 6.5 sacks per cubic yard for hand placed.
2. Sidewalk Cement content of not less than 5.5 sack per cubic yard.
3. No sand allowed under pavement or sidewalks.
4. Minimum lime content shall be 6% of dry weight of material (at least 27 lbs/SY) compacted to 95% standard density.
5. Paving Section design shall be based off 30 year projected traffic volumes and geotechnical analysis/report.

REINFORCED CONCRETE PAVEMENT	CITY OF ROCKWALL	
(M4U) MAJOR COLLECTOR UNDIVIDED 4–LANE		DATE AUG. '15 / DRAWING NO. R–2030



(1) SAWED LONGITUDINAL CONTRACTION, OR CONSTRUCTION JOINT

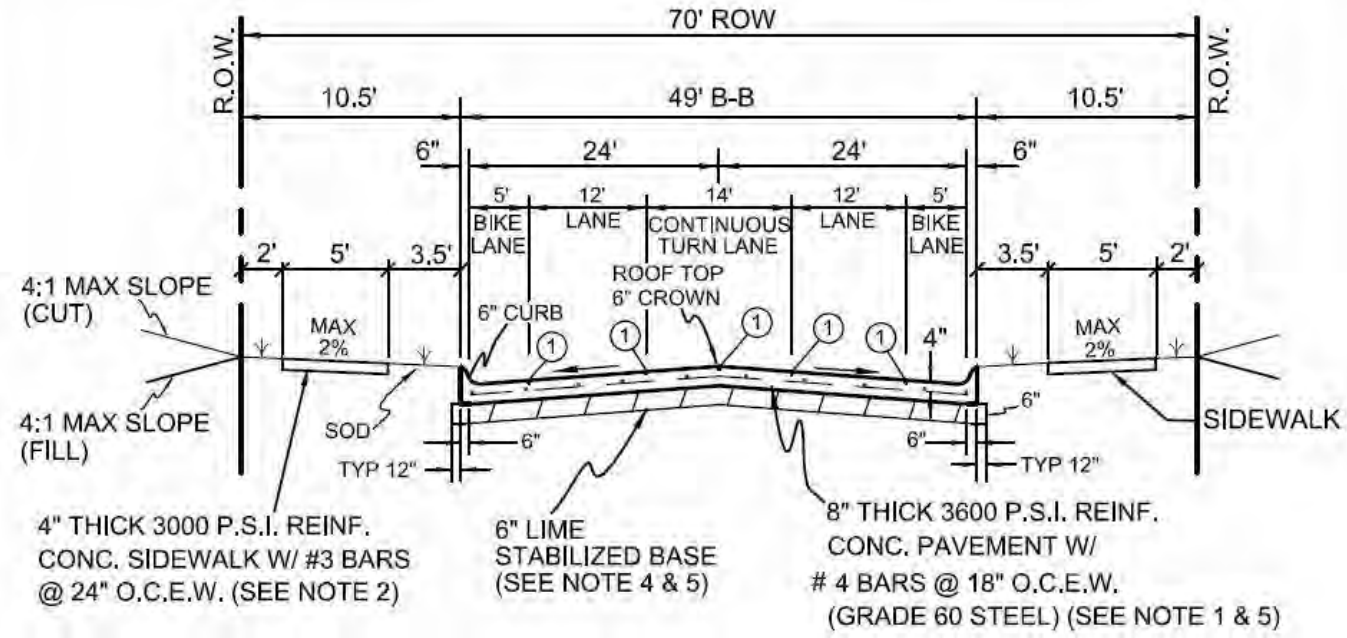
60' ROW – Minor Collector and or Local Commercial

(Not to Scale)

NOTES:

1. Street pavement cement content to be no less than 6 sacks per cubic yard for machine placed and not less than 6.5 sacks per cubic yard for hand placed.
2. Sidewalk Cement content of not less than 5.5 sack per cubic yard.
3. No sand allowed under pavement or sidewalks.
4. Minimum lime content shall be 6% of dry weight of material (at least 27 lbs/SY) compacted to 95% standard density.
5. Paving Section design shall be based off the 30 year traffic volumes and geotechnical analysis/report.

REINFORCED CONCRETE PAVEMENT	CITY OF ROCKWALL	
MINOR COLLECTOR/LOCAL COMMERCIAL		DATE AUG. '15 / DRAWING NO. R-2031

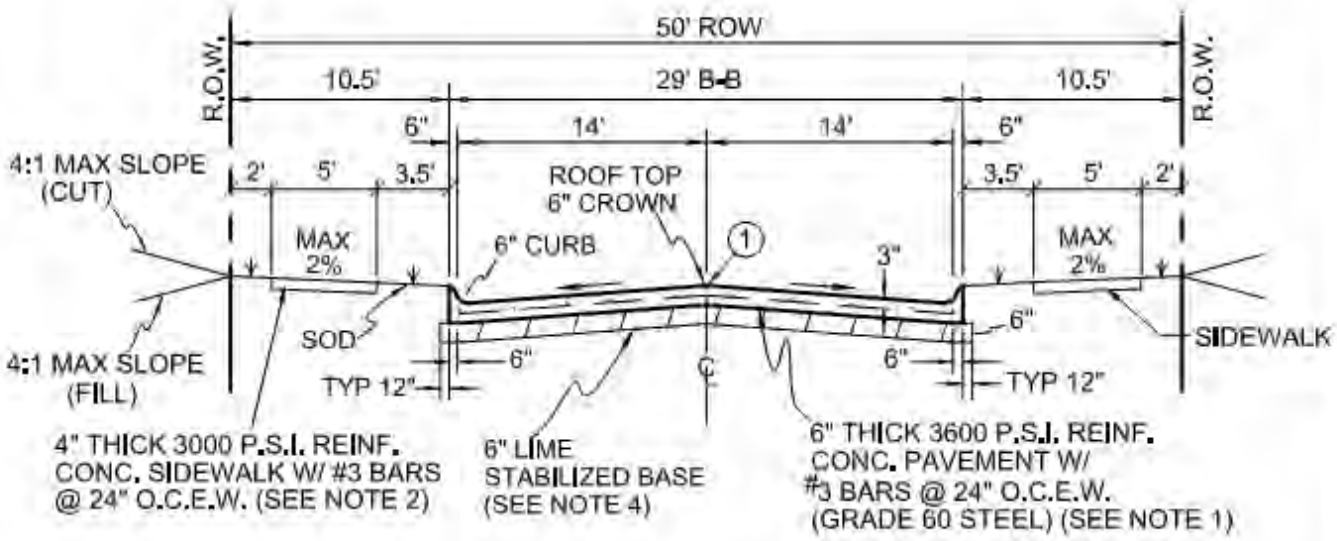


70' ROW – Minor Collector
2 Lane with Continuous Left Turn Lane
(Not to Scale)

NOTES:

1. Street pavement cement content to be no less than 6 sacks per cubic yard for machine placed and not less than 6.5 sacks per cubic yard for hand placed.
2. Sidewalk Cement content of not less than 5.5 sack per cubic yard.
3. No sand allowed under pavement or sidewalks.
4. Minimum lime content shall be 6% of dry weight of material (at least 27 lbs/SY) compacted to 95% standard density.
5. Paving Section design shall be based off the 30 year projected traffic volumes and geotechnical analysis/report.

REINFORCED CONCRETE PAVEMENT	CITY OF ROCKWALL	
(M3U) MINOR COLLECTOR – 2 LANE WITH CONTINUOUS LEFT TURN LANE		DATE AUG. '15 / DRAWING NO. R–2032



(1) SAWED LONGITUDINAL CONTRACTION, OR CONSTRUCTION JOINT

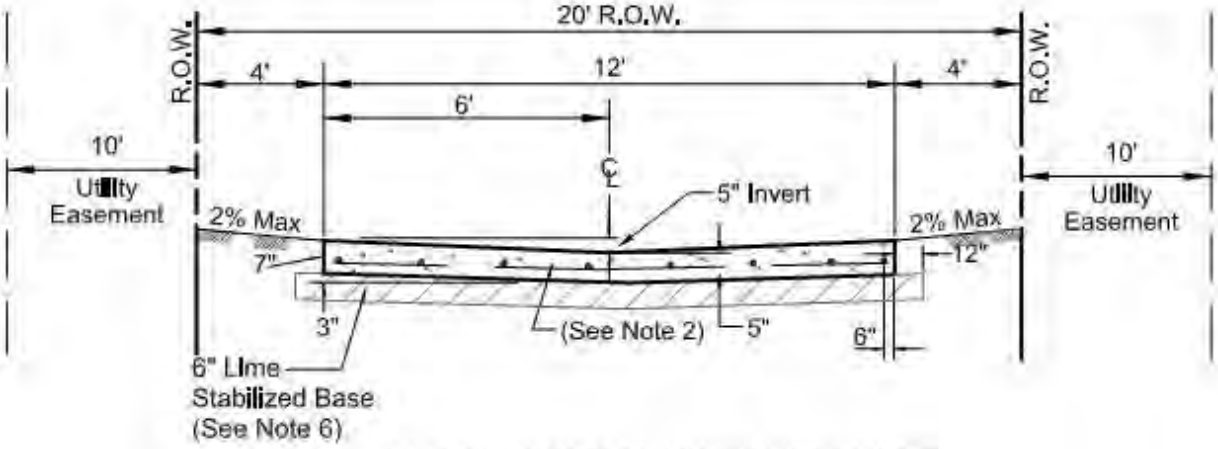
50' R.O.W. Residential Street

(Not to Scale)

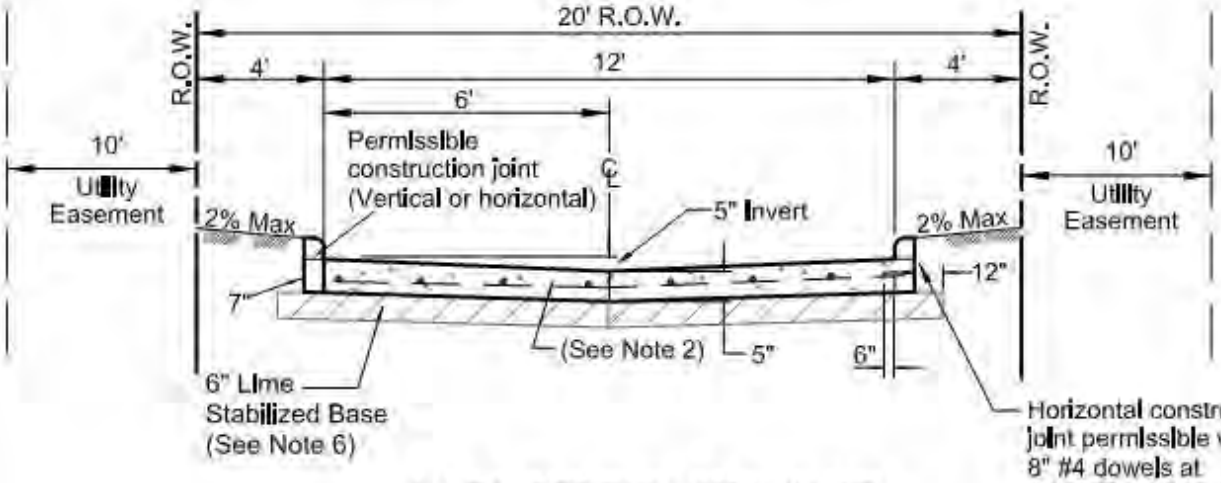
NOTES:

1. Street pavement cement content to be no less than 6 sacks per cubic yard for machine placed and not less than 6.5 sacks per cubic yard for hand placed.
2. Sidewalk Cement content of not less than 5.5 sack per cubic yard.
3. No sand allowed under pavement or sidewalks.
4. Minimum lime content shall be 6% of dry weight of material (at least 27 lbs/SY) compacted to 95% standard density.

REINFORCED CONCRETE PAVEMENT	CITY OF ROCKWALL	
LOCAL RESIDENTIAL STREET		DATE: AUG. '19 / DRAWING NO: R-2033



ALLEY SECTION WITHOUT CURB
(Not to Scale)

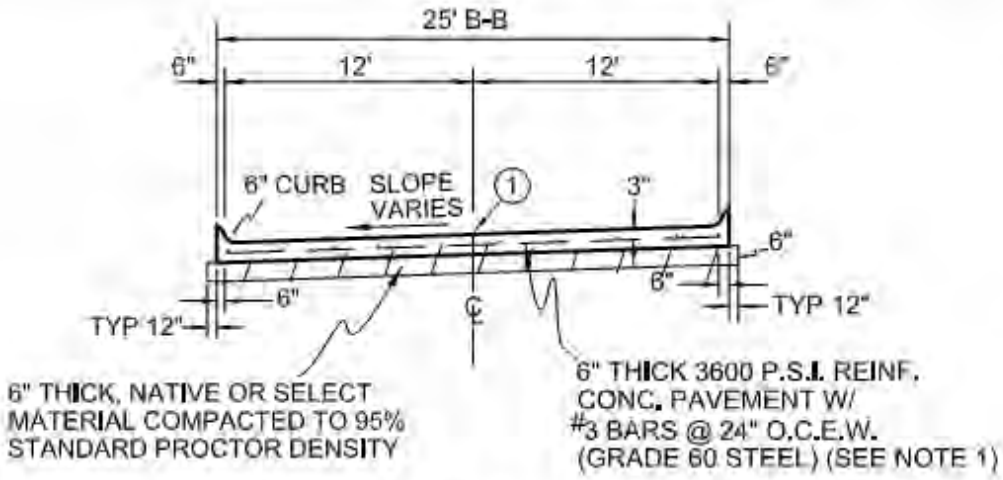


ALLEY SECTION WITH CURB
(Not to Scale)

NOTES:

1. Provide sawed transverse contraction joints not more than 20' C-C.
2. Reinforced with no. 3 bars at 24" C-C both ways.
3. Expansion joints to be placed at all intersections and not to exceed 600' between joints.
4. Concrete shall be 7"-5"-7" Thick 3,600 P.S.I., Alley cement content shall be min. 6.0 sack for machine placed and 6.5 sack mix for hand placed.
5. No sand allowed under pavement.
6. Minimum lime content shall be 6% of dry weight of material (at least 27 lbs/SY) compacted to 95% standard density.

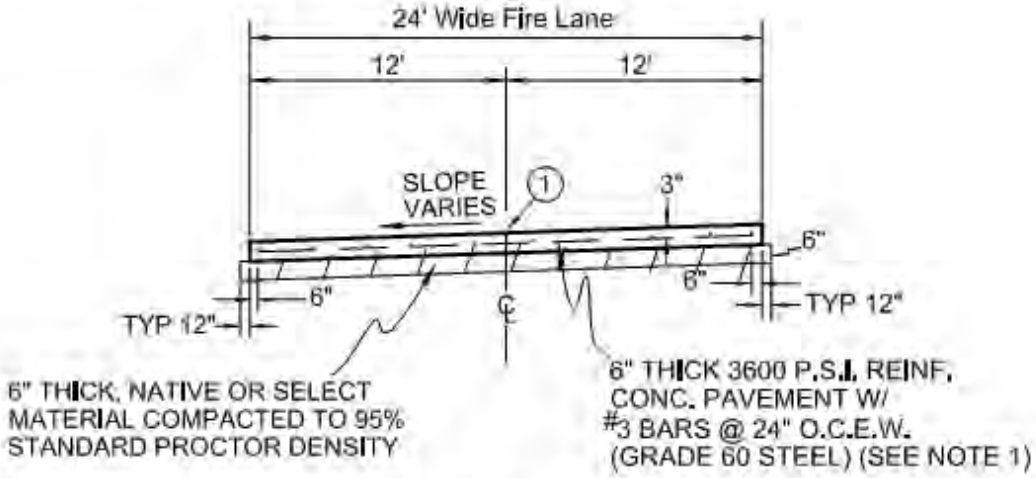
REINFORCED CONCRETE PAVEMENT	CITY OF ROCKWALL	
ALLEYS		DATE: AUG '19 / DRAWING NO.: R-2040



24' Wide Fire Lane with Curbs

(Not to Scale)

(1) SAWED LONGITUDINAL CONTRACTION OR CONSTRUCTION JOINT



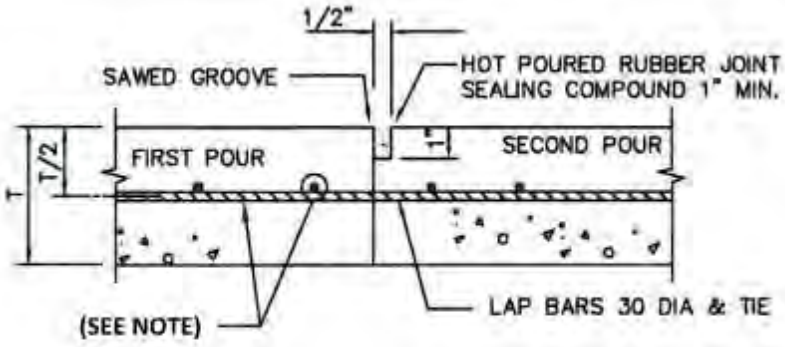
24' Wide Fire Lane

(Not to Scale)

NOTES:

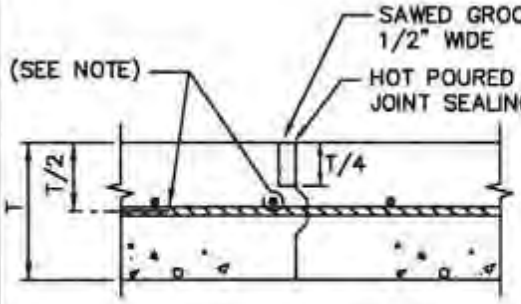
1. Street pavement cement content to be no less than 6 sacks per cubic yard for machine placed and not less than 6.5 sacks per cubic yard for hand placed.
2. Sidewalk Cement content of not less than 5.5 sack per cubic yard.
3. No sand allowed under pavement or sidewalks.

REINFORCED CONCRETE PAVEMENT	CITY OF ROCKWALL	
FIRE LANE		DATE: AUG. '19 / DRAWING NO.: R-2041



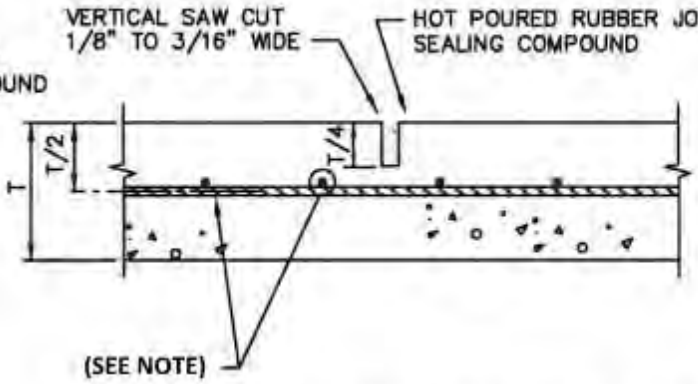
CONSTRUCTION JOINT

N.T.S.



KEYWAY JOINT

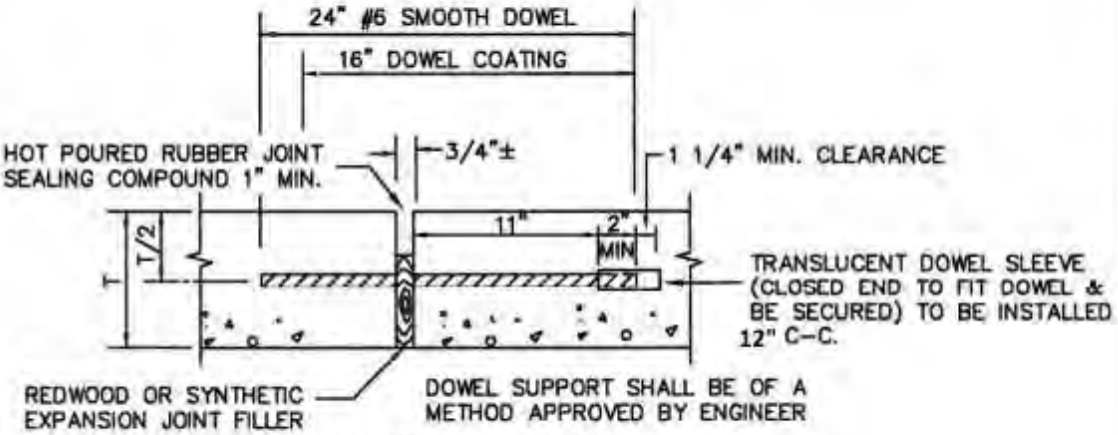
(FOR PAVEMENT THICKNESS > 6")
N.T.S.



SAWED CONTRACTION JOINT

N.T.S.

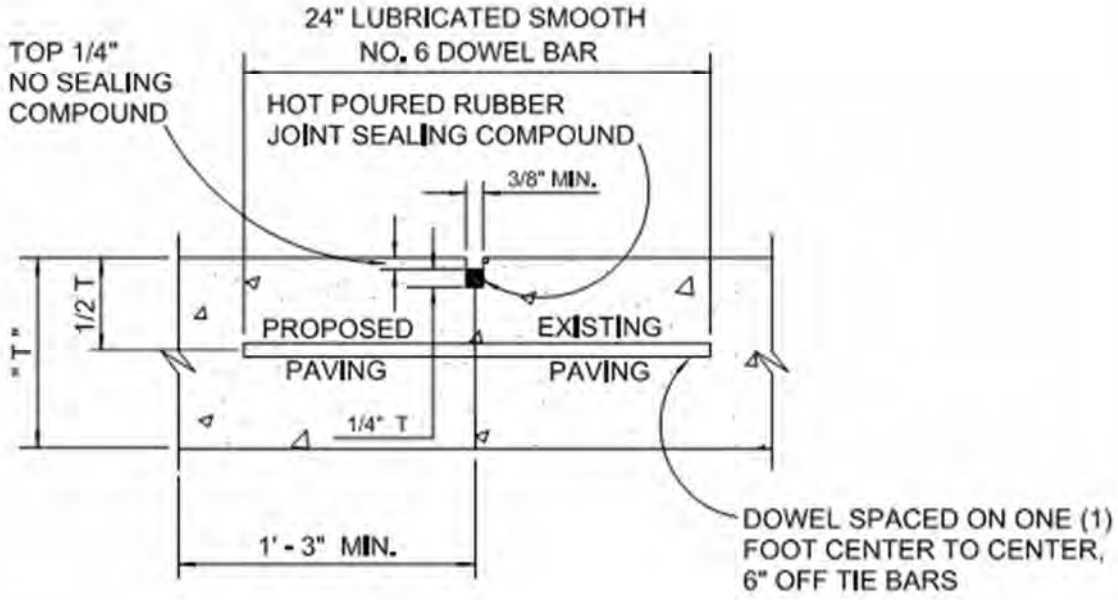
NOTE:
REINFORCING SHALL BE - #3 BARS AT 24" FOR 6" THICK PAVEMENT AND LESS. #4 BARS AT 18" FOR 8" THICK PAVEMENT AND GREATER.



EXPANSION JOINT

(SPACED 600 FT. MAXIMUM; LOCATE AT STRUCTURES AND AT INTERSECTION P.C.'S & P.T.'S)
N.T.S.

REINFORCED CONCRETE PAVEMENT	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 303.5.4.	
JOINTS		DATE Mar. 2018	STANDARD DRAWING NO. R-2050

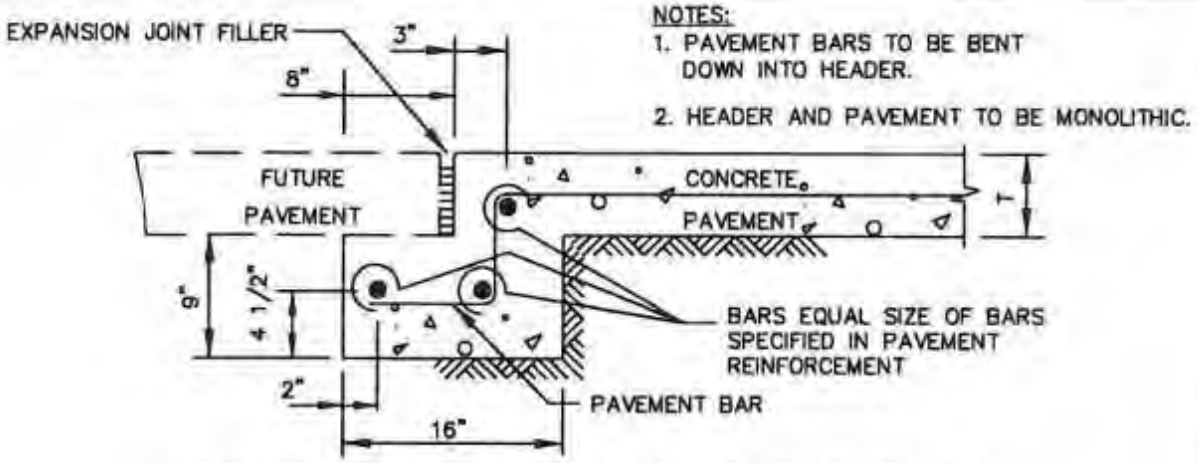


NOTES: T = PAVEMENT

1. LONGITUDINAL BUTT CONSTRUCTION MAY BE UTILIZED IN PLACE OF LONGITUDINAL HINGED (KEYWAY) JOINT AT CONTRACTORS OPTION.
2. DOWEL BARS SHALL BE DRILLED INTO PAVEMENT HORIZONTALLY BY USE OF A MECHANICAL RIG.
3. DRILLING BY HAND IS NOT ACCEPTABLE, PUSHING DOWEL BARS INTO GREEN CONCRETE NOT ACCEPTABLE.

LONGITUDINAL BUTT JOINT
NOT TO SCALE

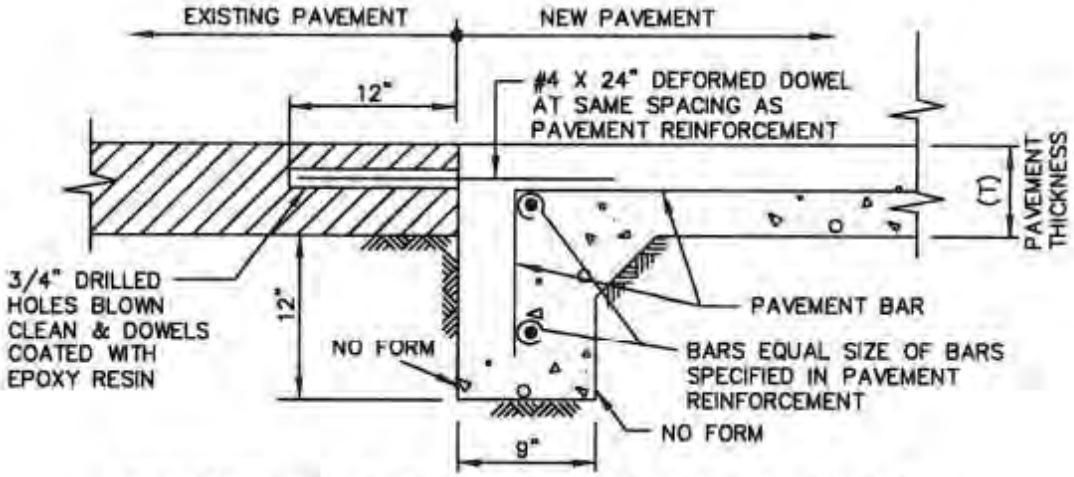
REINFORCED CONCRETE PAVEMENT	CITY OF ROCKWALL	
LONGITUDINAL BUTT JOINT		DATE: OCT. '17 / DRAWING NO.: R-2051



NOTES:
1. PAVEMENT BARS TO BE BENT DOWN INTO HEADER.
2. HEADER AND PAVEMENT TO BE MONOLITHIC.

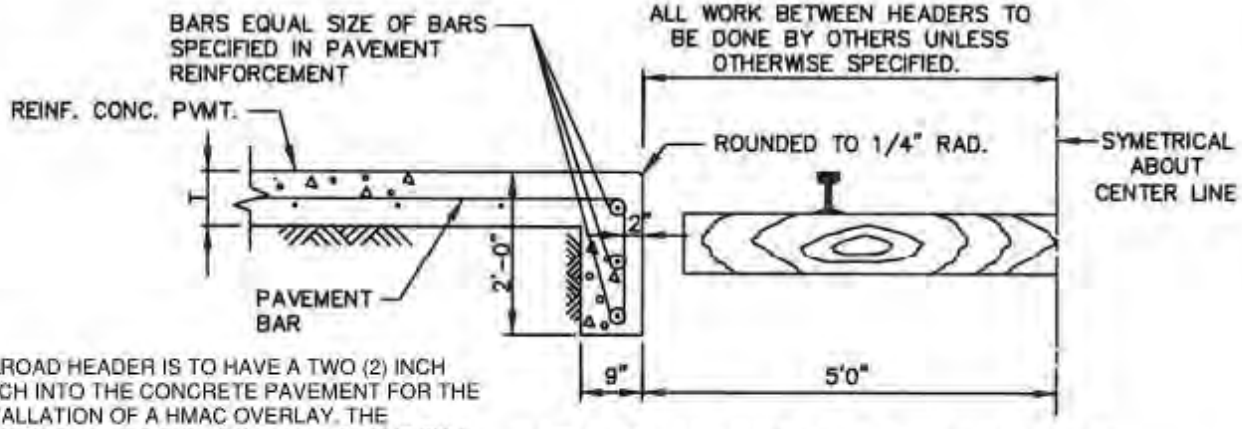
STREET HEADER FOR FUTURE PAVEMENT

N.T.S.



STREET HEADER AT EXISTING PAVEMENT

N.T.S.



RAILROAD HEADER IS TO HAVE A TWO (2) INCH NOTCH INTO THE CONCRETE PAVEMENT FOR THE INSTALLATION OF A HMAC OVERLAY. THE CONCRETE UNDER THE HMAC IS TO BE THE FULL STREET THICKNESS. THE NOTCH SHOULD START AT THE END OF THE PAVEMETN AND GO TWENTY (20) FEET UP THE ROAD AWAY FROM THE CROSSING.

STREET HEADER AT RAILROAD

N.T.S.

REINFORCED CONCRETE PAVEMENT	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 305.4	
STREET HEADERS		DATE Mar. 2018	STANDARD DRAWING NO. R-2070

EJ – Expansion Joint *(See 2170MA for more details)*

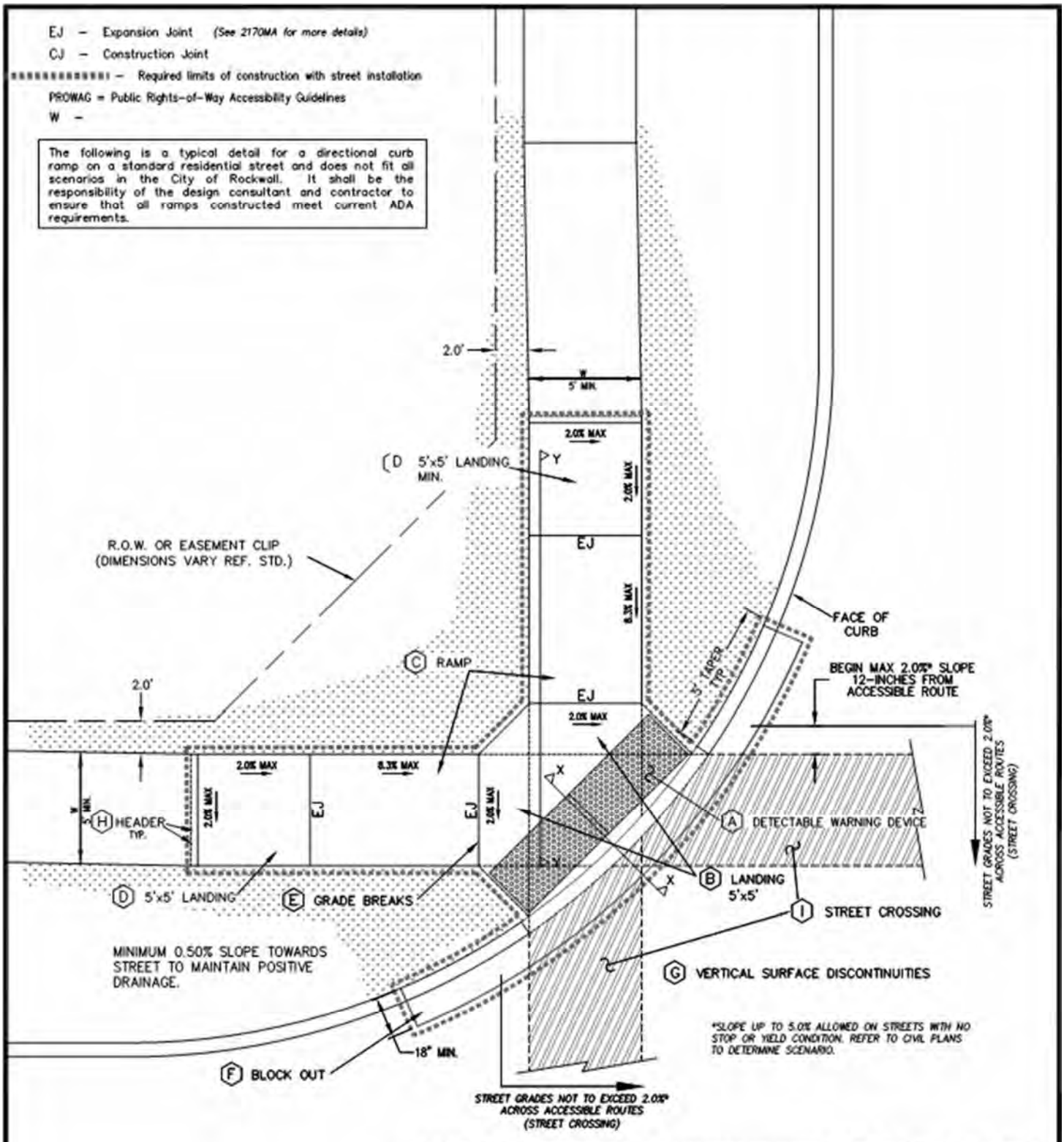
CJ – Construction Joint

▪▪▪▪▪▪▪▪▪▪▪▪▪▪ – Required limits of construction with street installation

PROWAG = Public Rights-of-Way Accessibility Guidelines

W –

The following is a typical detail for a directional curb ramp on a standard residential street and does not fit all scenarios in the City of Rockwall. It shall be the responsibility of the design consultant and contractor to ensure that all ramps constructed meet current ADA requirements.



NOTES: All newly constructed sidewalks, curb ramps and crosswalks installed within City of Rockwall public rights-of-way shall be considered a pedestrian access route and shall conform to the most current "Draft" Guidelines for Public Rights-of-Way created by the United States Access Board.

1. SEE DETAIL R-2125B FOR RAMP FEATURE DESCRIPTIONS
2. SEE DETAIL R-2125C FOR SECTIONS X-X AND Y-Y
3. SEE DETAIL R-2125D FOR ADDITIONAL NOTES

DIRECTIONAL CURB RAMP	CITY OF ROCKWALL	
		DATE: MAR. '17 / DRAWING NO.: R-2125A

A. Detectable Warning Devices (DWD) shall be pre-manufactured cast-in-place truncated dome plates installed to the manufacturer's specifications, and shall meet all ADA requirements. No Brick Pavers allowed. Color to be approved by the City. DWD shall be 24 inches in length for the full width of the street connection starting at the back of curb. A maximum 2-inch border shall be allowed on the sides of the DWD for proper installation.

B. Also known as "Clear Space" per ADA PROWAG, the City requires a minimum landing space of 5-foot by 5-foot at the bottom of every ramp. This landing space shall have a cross slope in both directions that does not exceed 2.0% and shall be wholly outside the parallel vehicular travel path.

C. The ramp component of the directional curb ramp shall have a continuous longitudinal slope more than 5% and less than 8.3%. The ramp shall also have a cross slope of no more than 2.0%. Length of ramp can vary, but shall not exceed 15 feet to achieve desired elevation change.

D. Also known as "Turning Space" per ADA PROWAG, a minimum landing space of 5-foot by 5-foot shall be at the top of every ramp. This landing (turning) space shall have a cross slope in both directions that does not exceed 2.0%. Landing must match width of sidewalk and length shall be the same distance ("Squared" Landing).

E. All curb ramps shall have grade breaks at the top and bottom that are perpendicular to the direction of the ramp run. Where the ends of the bottom grade break are less than or equal to 5 feet, the DWD shall be placed within the ramp at the bottom grade break. Where either end of the bottom grade break is greater than 5 feet, the DWD shall be placed behind the back of the curb.

F. Paving contractor shall leave block out with a keyway joint installed, minimum of 18 inches measured from back of curb. Block out shall be poured monolithically with Curb Ramp. Concrete shall tie to street paving with a keyway joint per NCTCOG detail 2050. No curb shall be constructed where a DWD is provided. The curb on either side shall have a typical 5 foot taper to transition from the standard 6-inch curb height to be flush with ramp.

G. All work associated with accessible routes shall be installed flush with all features to minimize vertical surface discontinuities. Each segment along accessible route shall be flush with no more (zero tolerance) than a ¼-inch grade separation (elevation difference), or ½-inch grade separation if beveled (bevel slope shall not be steeper than 50%).

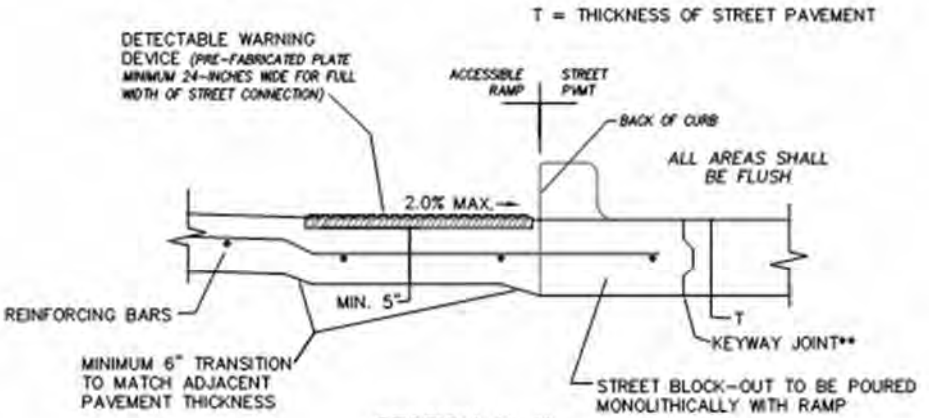
H. A sidewalk header shall be constructed at ends of all work performed.

I. Street crossings shall adhere to same guidelines as other accessible routes within public right-of-way, and shall be for the full width of the in-line accessible route. Cross slope shall not exceed 2%*. New street construction shall incorporate all ADA design requirements. It shall be the responsibility of the Design Professional and Contractor to ensure all street crossings meet the requirements of PROWAG. Street alterations on existing streets to bring to compliance shall be at the City Engineer's discretion.

J. All curbs constructed as part of an ADA Ramp shall match City curb standards.

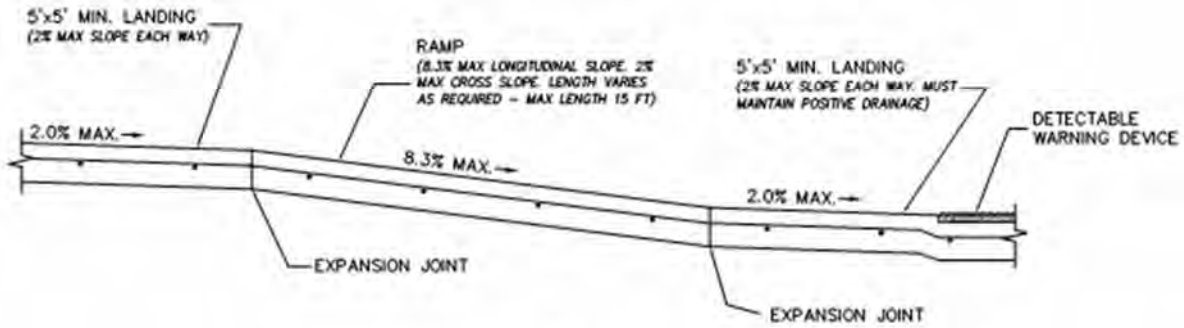
** See PROWAG special design considerations when street crossing has no stop or yield condition.*

DIRECTIONAL CURB RAMP	CITY OF ROCKWALL	
		DATE: MAR. '17 / DRAWING NO.: R-2125B



SECTION X-X
N.T.S.

**KEYWAY JOINT FOR NEW CONSTRUCTION. STREET CONNECTION SHALL BE LONGITUDINAL BUTT JOINT FOR CONNECTIONS TO EXISTING ROADWAYS.



SECTION Y-Y
N.T.S.

NOTE: ALL SIDEWALK CURB RAMPS WILL BE 3,600 PSI (6.5 SACK/CY) CONCRETE.

DIRECTIONAL CURB RAMP	CITY OF ROCKWALL	
		DATE: MAR. '17 / DRAWING NO.: R-2125C

PEDESTRIAN ACCESSIBILITY (WITHIN PUBLIC R.O.W.)

All newly constructed sidewalks, curb ramps and crosswalks installed within City of Rockwall public rights-of-way shall be considered a pedestrian access route and shall conform to the most current Guidelines for Public Rights-of-Way created by the United States Access Board.

CURB RAMPS

1. All slopes shown are MAXIMUM ALLOWABLE. Lesser slopes that will still drain properly should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
2. Landings shall be 5'x 5' minimum with a maximum 2% slope in the transverse and longitudinal directions..
3. Clear space at the bottom of curb ramps shall be a minimum of 5'x 5' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
4. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
5. Additional information on curb ramp location, design, light reflective value and texture may be found in the most current edition of the Texas Accessibility Standards (TAS) and 16 TAC 68.102. Federal guidelines shall supersede any conflicts.
6. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps and accessible routes shall align with theoretical crosswalks unless otherwise directed.
7. Handrails are not required on curb ramps.
8. Provide a flush transition where the curb ramps connect to the street.
9. Accessible routes are considered "ramps" when longitudinal slopes are between 5% and 8.3% (maximum allowable). Sidewalks under 5% longitudinal slope are deemed accessible routes and must follow all applicable guidelines.

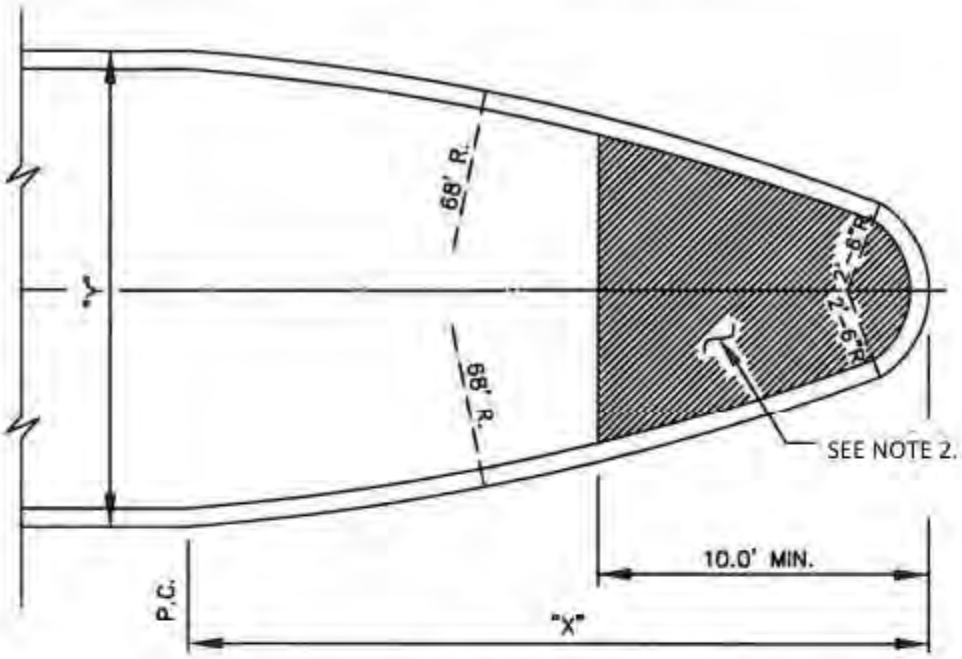
DETECTABLE WARNING DEVICE

10. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with Section 705 of the TAS. The surface must contrast visually with adjoining surfaces. Furnish and install an approved cast-in-place dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
11. Detectable Warning Materials shall be truncated dome plates in the color approved by the City. Install products in accordance with manufacturer's specifications.
12. Detectable warning surfaces must be slip resistant and not allow water to accumulate.
13. Detectable warning surfaces shall be a minimum of 24" in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
14. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb. When placed on the ramp, align the rows of domes to be perpendicular to the grade break between the ramp run and the street. Where detectable warning surfaces are provided on a surface with a slope that is less than 5 percent, dome orientation is less critical. Detectable warning surfaces may be curved along the corner radius.

SIDEWALKS

15. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within one or more reach ranges specified in TAS 308.
16. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
17. Street grades and cross slopes shall be as shown elsewhere in the plans.
18. Changes in level greater than 1/4 inch are not permitted (1/2 inch with bevel).
19. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than 5% must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with TAS 505.
20. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.

DIRECTIONAL CURB RAMP	CITY OF ROCKWALL	
		DATE: MAR. '17 / DRAWING NO.: R-2125D



DIMENSIONS OF MEDIAN NOSE

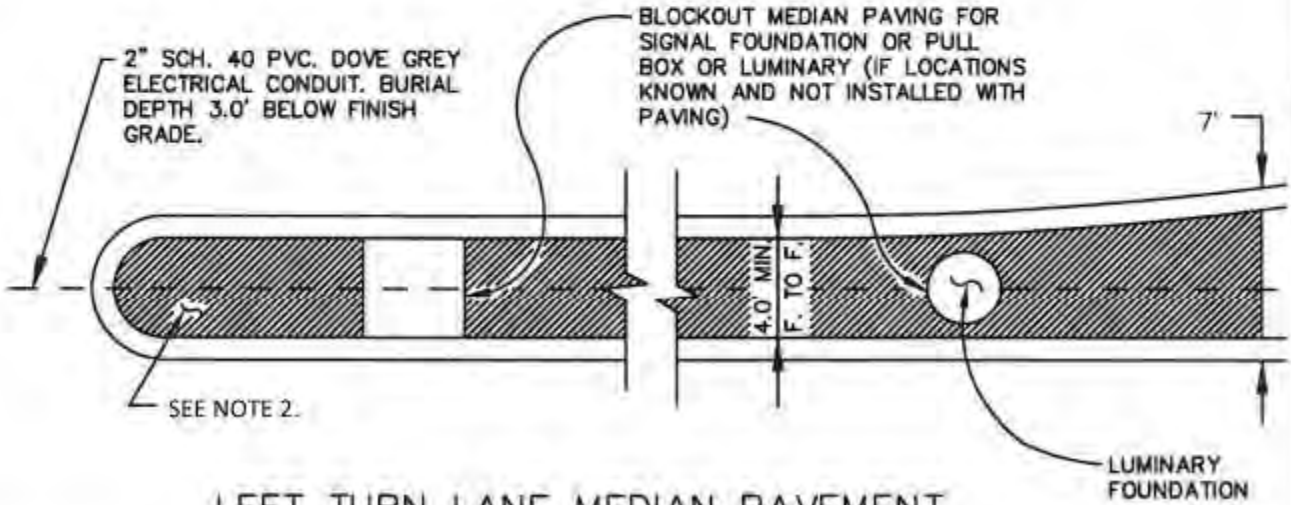
Y = 15'	X = 27.6'
Y = 16'	X = 28.8'
Y = 17'	X = 29.9'
Y = 18'	X = 30.9'

CONCRETE NOSE FOR MEDIAN ISLAND

N.T.S.

NOTES

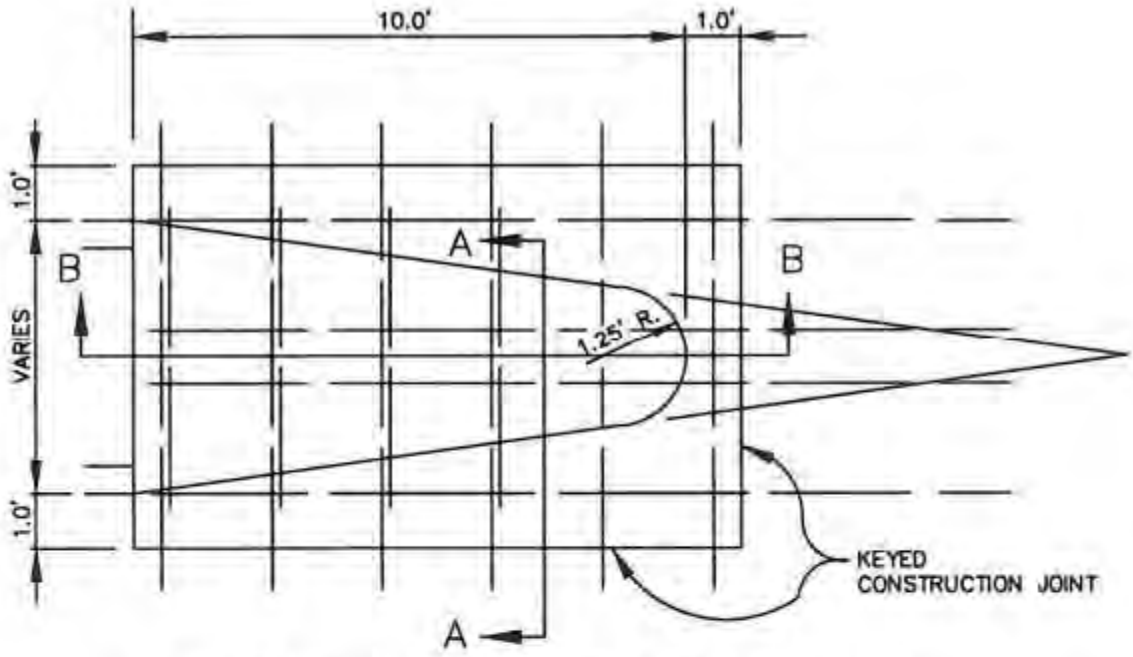
1. LEFT TURN LANE SHALL HAVE A MOWER ACCESS RAMP.
2. MEDIAN PAVING TO BE CONSTRUCTED OF INEGRAL STAMPED & STAINED REINFORCED CONCRETE, COLOR AND PATTERN TO BE APPROVED BY THE CITY. CONCRETE TO BE MINIMUM SIX (6") INCH 3600PSI (6.5 SACK/CY) WITH #4 BARS ON 18" CENTERS.
3. STREET LIGHT POLE BASES IN MEDIAN ARE TO HAVE THIRTY-SIX (36") INCH BY THIRTY-SIX (36") INCH, FOUR (4") INCH THICK, 3000PSI REINFORCED CONCRETE MOW STRIP.



LEFT TURN LANE MEDIAN PAVEMENT

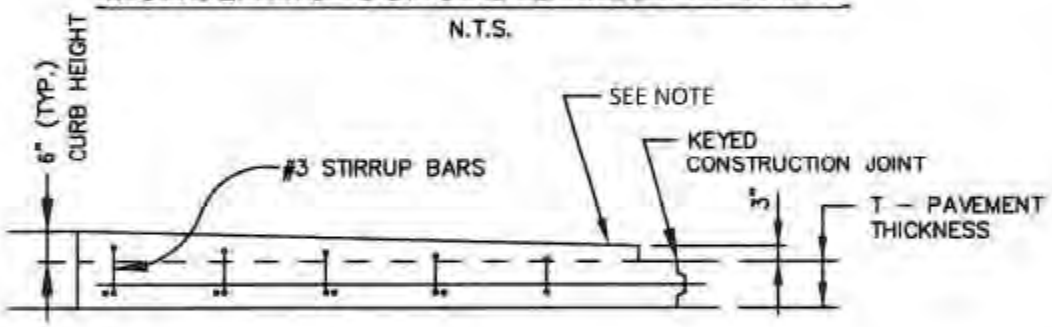
N.T.S.

MEDIAN ISLAND PAVEMENT	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 305.3	
NOSE & LEFT TURN LANE		DATE AUG. '19	STANDARD DRAWING NO. R-2130



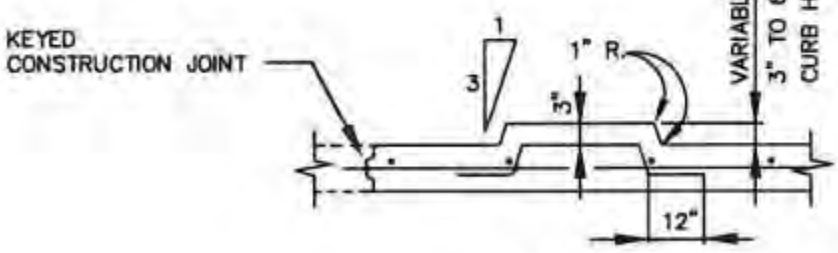
MONOLITHIC CONCRETE MEDIAN NOSE

N.T.S.



SECTION B–B

N.T.S.

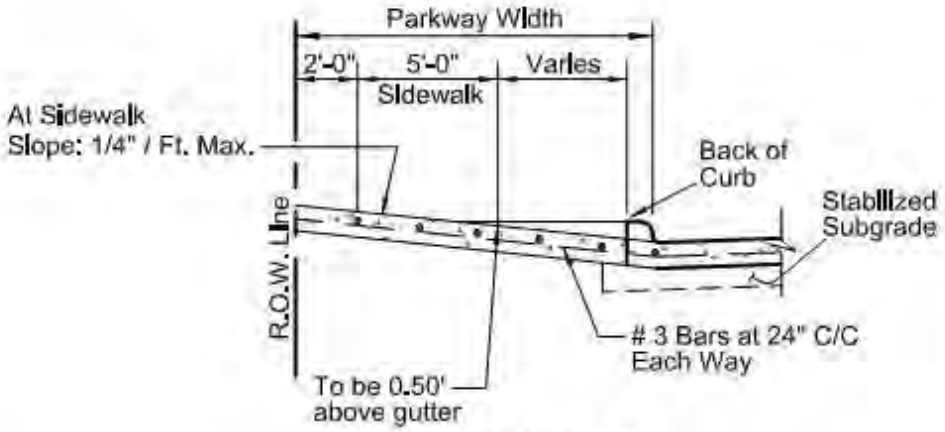


SECTION A–A

N.T.S.

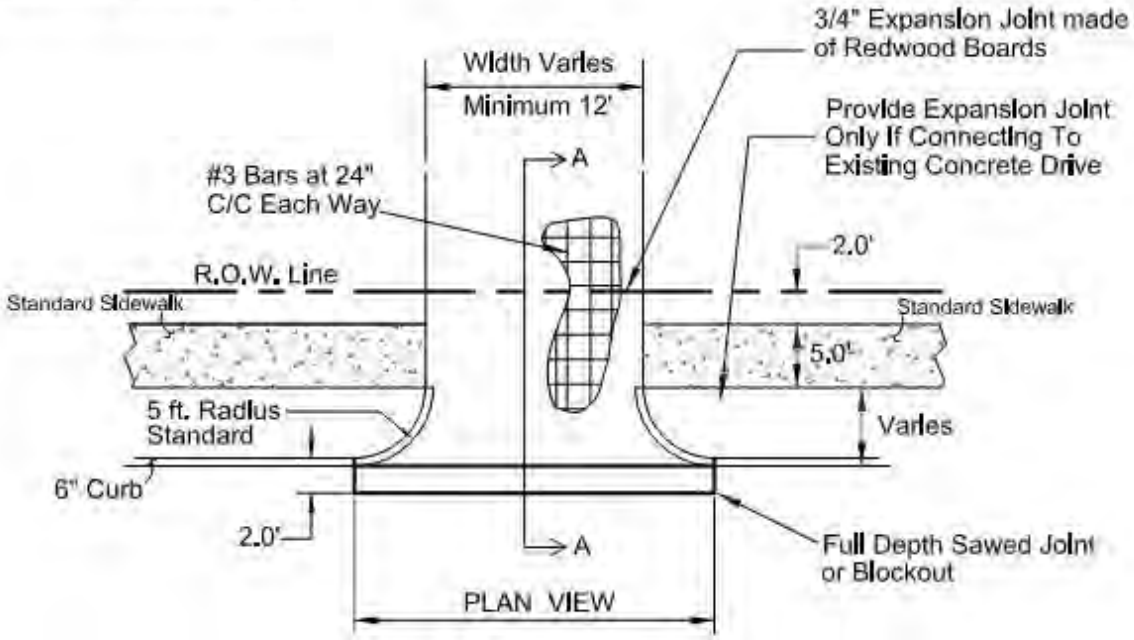
NOTE
1. MEDIAN NOSE PAVEMENT STRENGTH SHALL MATCH THAT OF STREET PAVING.
2. MONOLITHIC NOSE REQUIRED WHEN LESS THAN 6.0' FACE TO FACE.
3. REINFORCEMENT BARS SHALL MATCH THOSE IN PAVEMENT.

MEDIAN ISLAND PAVEMENT	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 305.3	
MONOLITHIC CONCRETE NOSE		DATE AUG. '19	STANDARD DRAWING NO. R-2140



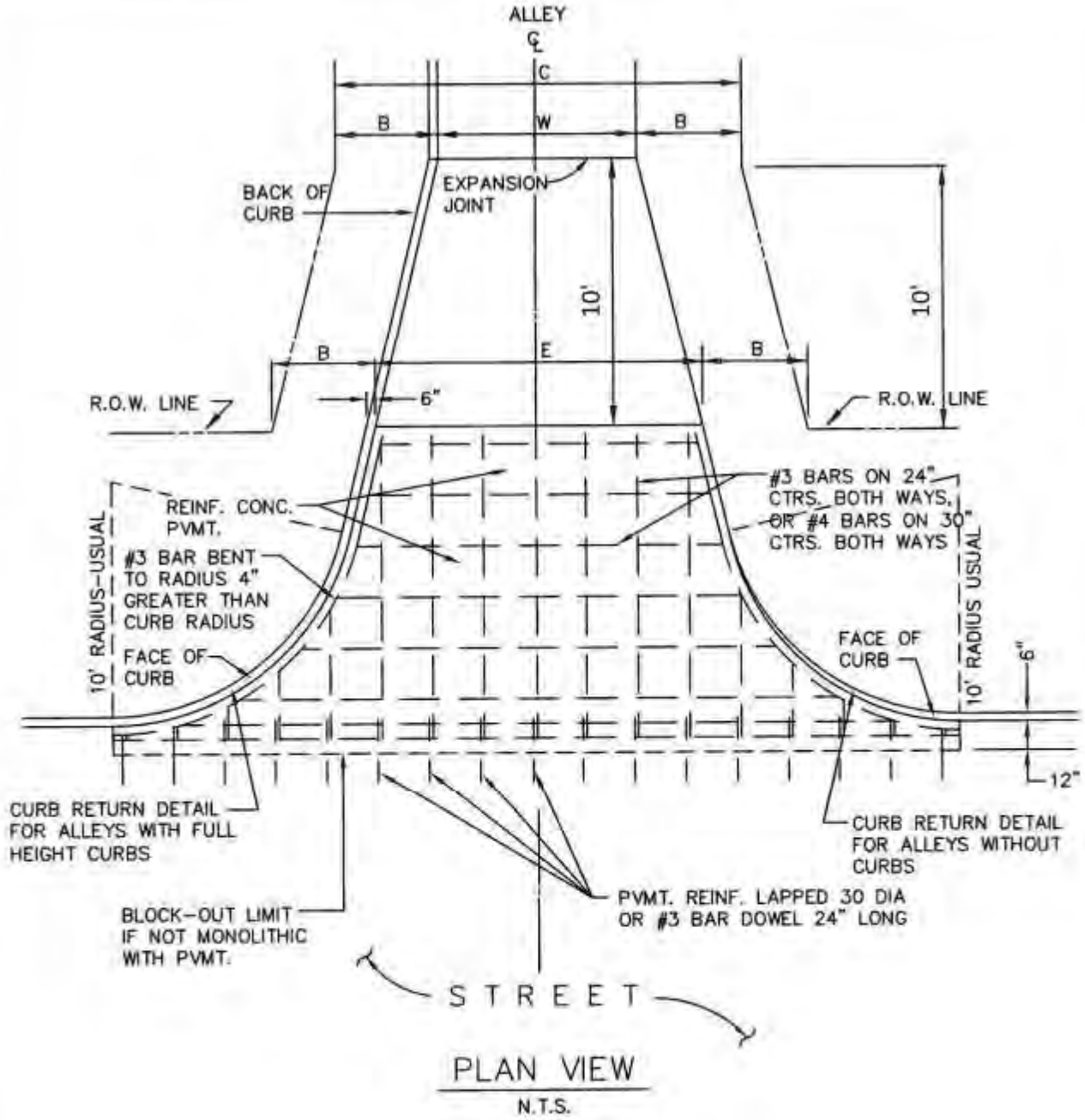
SECTION A-A

NOTE:
Sidewalk section thru driveway to be poured same thickness as driveway - 6" Thick 3,600 P.S.I. Reinf. Conc. Pvmt. w/ #3 Bars @ 24" O.C.E.W. (Grade 60 Steel)



DRIVEWAY DETAILS
(Not to Scale)

DRIVEWAY DETAIL	CITY OF ROCKWALL		
RESIDENTIAL DRIVEWAY		DATE AUG '19	DRAWING NO. R-2150

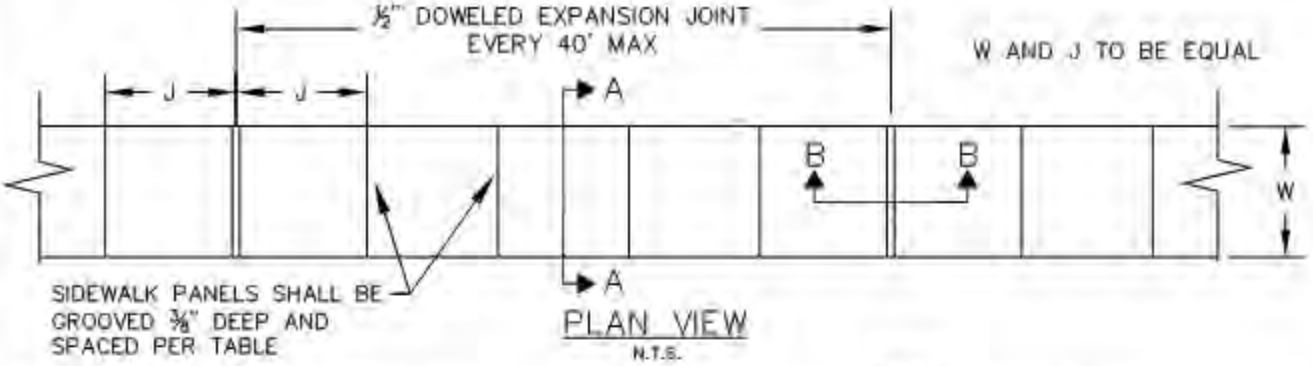


PLAN VIEW

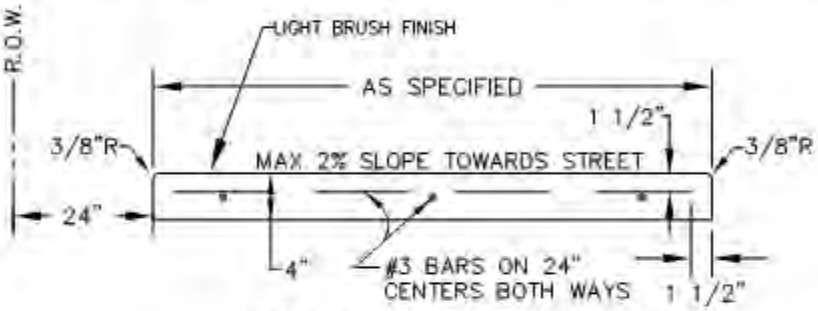
N.T.S.

ALLEY WIDTH (W)	R.O.W. WIDTH (C)	B	E
12'	20'	4'	14'

ALLEY APPROACH RADIUS RETURN TYPE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 305.2	
		DATE Mar. 2018	STANDARD DRAWING NO. R-2160

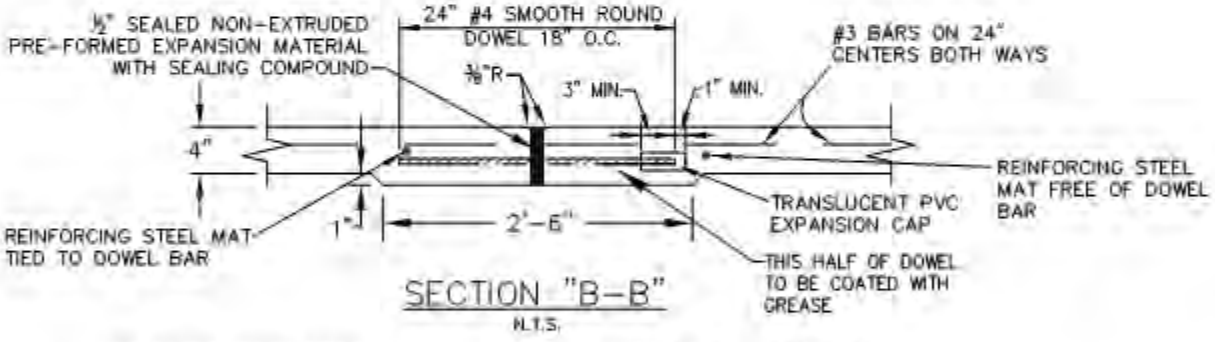


PLAN VIEW
N.T.S.

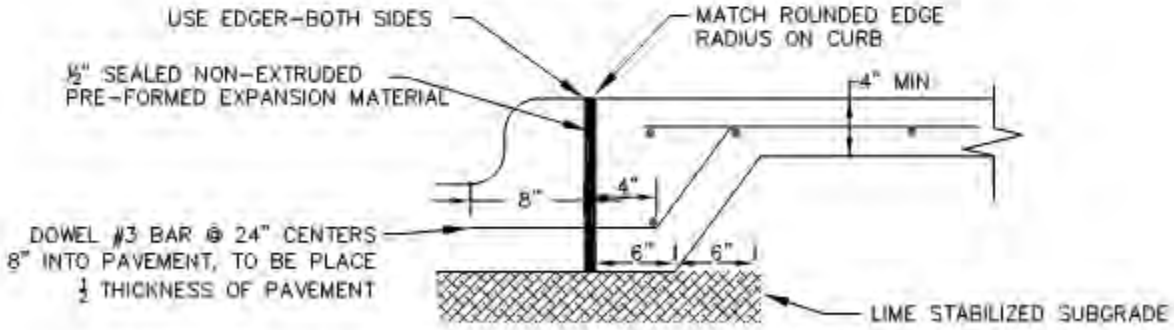


SECTION "A–A"
N.T.S.

NOTES:
1. CROSS SLOPE OF SIDEWALK SHALL BE NO GREATER THAN 2%
2. SIDEWALK CONCRETE WITHIN CITY R.O.W. SHALL BE MINIMUM 3,000 PSI (5.5 SACK/C.Y.) CONCRETE.
3. ALL SIDEWALKS SHALL MAINTAIN POSITIVE DRAINAGE.
4. ALL HONEYCOMB IN BACK OD CURB TO BE TROWEL–PLASTERED BEFORE POURING SIDEWALK.
5. MINIMUM WIDTH OF 6' IF SIDEWALK ADJACENT TO CURB A LUGGED INTO THE CURB.
6. STEEL WIRE MESH IS NOT ACCEPTABLE.

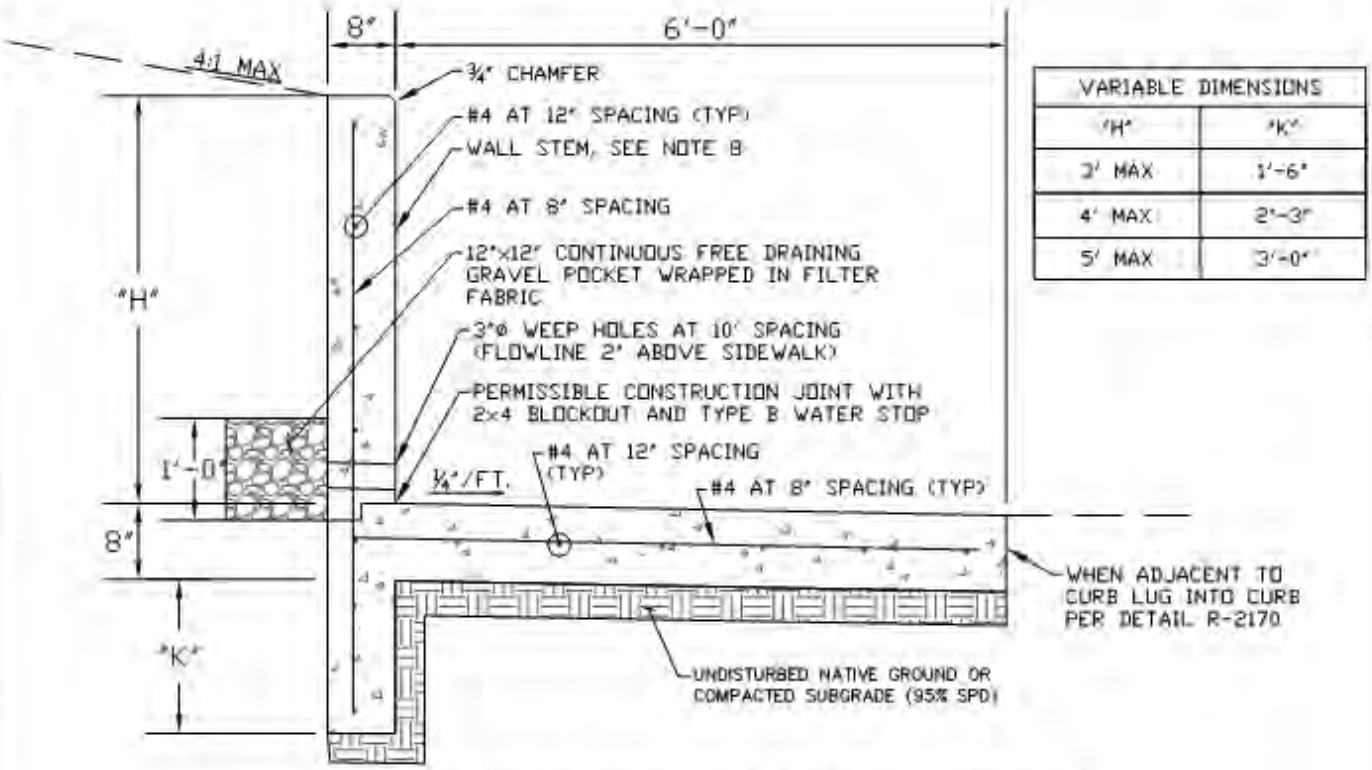


SECTION "B–B"
N.T.S.



JOINT LUG DETAIL FOR MEDIAN PAVEMENT
LEAD WALK CONNECTIONS OR SIDEWALK ADJACENT TO CURB
N.T.S.

REINFORCED CONCRETE SIDEWALKS	CITY OF ROCKWALL		
JOINTS AND SPACING		DATE AUG '19	DRAWING NO. R–2170



VARIABLE DIMENSIONS	
"H"	"K"
3' MAX	1'-6"
4' MAX	2'-3"
5' MAX	3'-0"

RETAINING WALL WITH INTEGRAL SIDEWALK

N.T.S.

NOTES:

1. FOR USE OF THIS STANDARD DETAIL, THE FOLLOWING GEOTECHNICAL SITE CONDITIONS MUST BE MET:
   - -MINIMUM ALLOWABLE BEARING PRESSURE: 1,500 PSF
   - -MINIMUM COEFFICIENT OF FRICTION: 0.3
   - -MAXIMUM ACTIVE PRESSURE COEFFICIENT (Ka): 0.65
2. ALL MATERIALS SHALL BE SUBMITTED FOR APPROVAL PRIOR TO CONSTRUCTION.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI.
4. ALL REINFORCING STEEL SHALL BE GRADE 60.
5. ALL CLEAR COVER SHALL BE 2" WHERE FORMED AND 3" WHERE CAST AGAINST EARTH.
6. IF ANY SURCHARGE LOAD IS ANTICIPATED AN ENGINEERING DESIGN IS REQUIRED, SEALED BY A REGISTERED ENGINEER IN THE STATE OF TEXAS. THIS INCLUDES DEAD LOAD SURCHARGES AND LIVE LOAD SURCHARGES SUCH AS TRAFFIC LOADS.
7. JOINT LOCATIONS SHALL MATCH ON SIDEWALK AND WALL. JOINT SPACING SHALL BE EVERY 30 FEET FOR CONTROL JOINTS AND EVERY 90 FEET FOR EXPANSION JOINTS. TYPE B WATERSTOP SHALL BE APPLIED ON THE FILL SIDE OF ALL EXPANSION AND CONSTRUCTION JOINTS.
8. WALL FACE SHALL BE FORM LINER OR STONE VENEER WITH RANDOM ROCK ASHLAR PATTERN, NO SMOOTH CONCRETE SURFACE ALLOWED

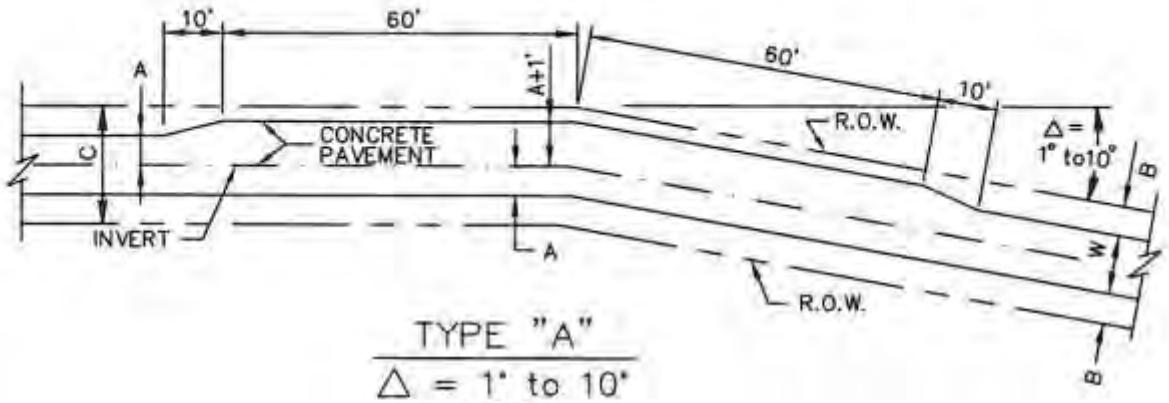
REINFORCED CONCRETE RETAINING WALL	CITY OF ROCKWALL	
INTEGRAL WITH SIDEWALK		DATE: AUG '19 / DRAWING NO.: R-2180

GENERAL NOTES:

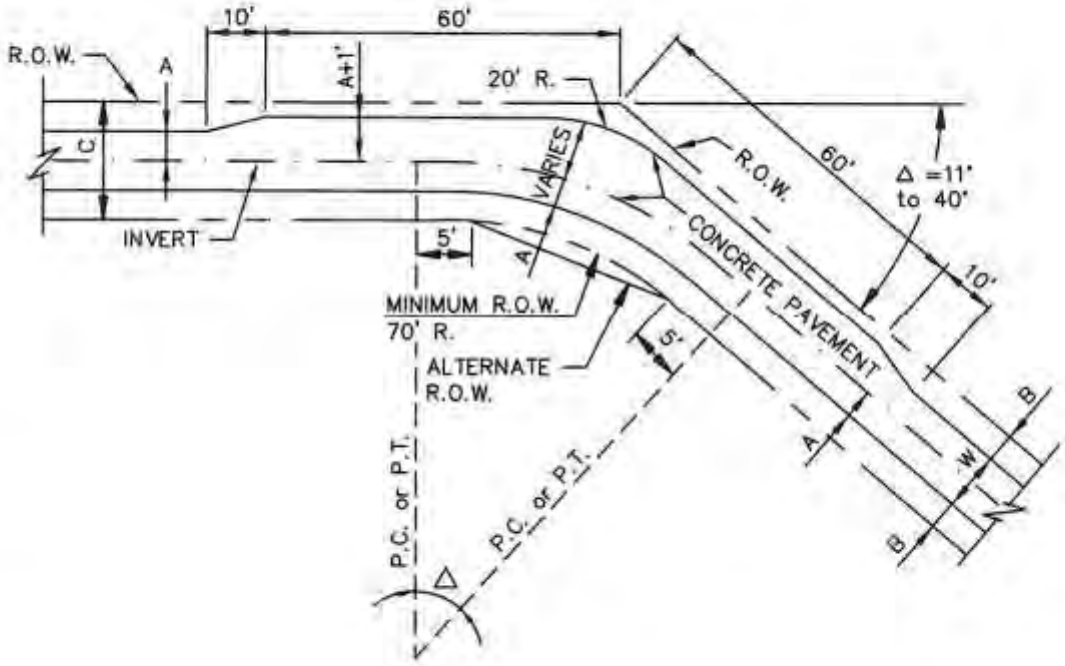
1. REINFORCED CONCRETE PAVEMENT:
   A. ALL CURBS SHALL BE PLACED INTEGRAL WITH PAVEMENT UNLESS OTHERWISE APPROVED BY THE OWNER.
   B. CURBS SHALL MEET THE SAME COMPRESSIVE STRENGTH AS SPECIFIED FOR THE PAVEMENT.
   C. BAR LAPS SHALL BE 30 DIAMETERS.
   D. REINFORCING BARS SHALL BE SUPPORTED BY CHAIRS OR OTHER DEVICES APPROVED BY THE OWNER.

2. SUBGRADE: (UNLESS OTHERWISE SPECIFIED BY OWNER)
   A. SUBGRADE UNDER ALL PAVEMENTS SHALL BE STABILIZED TO A MINIMUM DEPTH OF SIX (6") INCHES WITH HYDRATEDLIME CEMENT. LABORATORY TESTS WILL BE PERFORMED TO DETERMINE THE AMOUNT OF LIME OR CEMENT TO USE.

PAVEMENT SYSTEMS	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 302,303	
GENERAL NOTES		DATE Mar. 2018	STANDARD DRAWING NO. R-2190



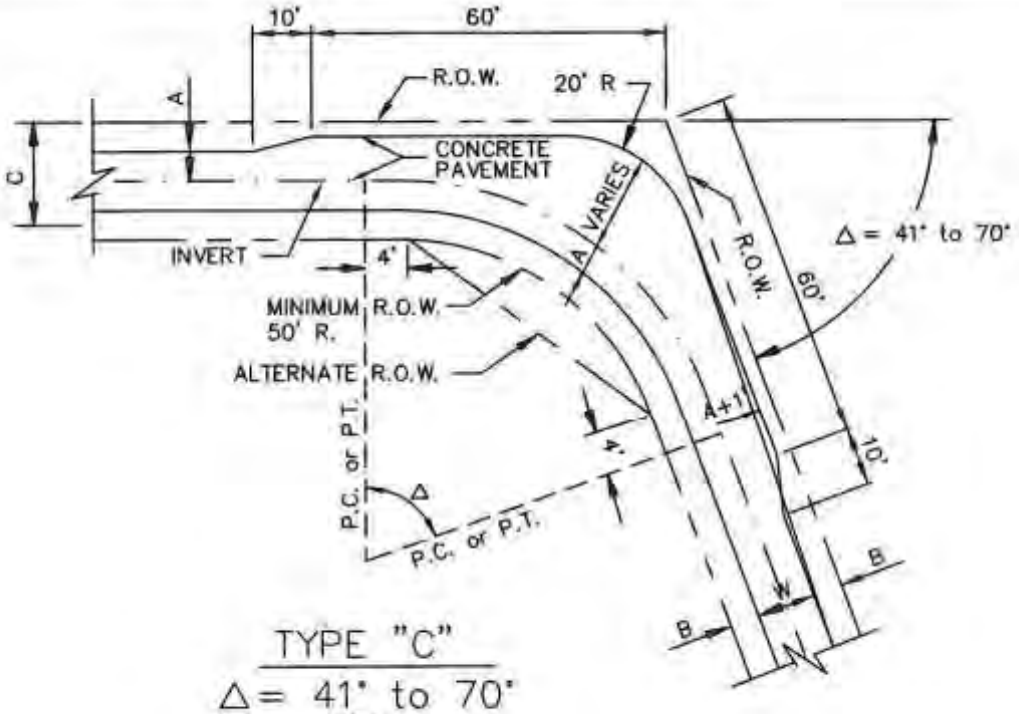
TYPE "A"
Δ = 1° to 10°
N.T.S.



TYPE "B"
Δ = 11° to 40°
N.T.S.

NOTES:
1. ALLEY WIDTH SHALL BE TWELVE (12') FEET MINIMUM.
2. ALLEY R.O.W. SHALL BE TWENTY (20') FEET MINIMIM.
3. DIMENSION A= SIX (6') FEET.
4. DIMENSION B= FOUR (4') FEET.

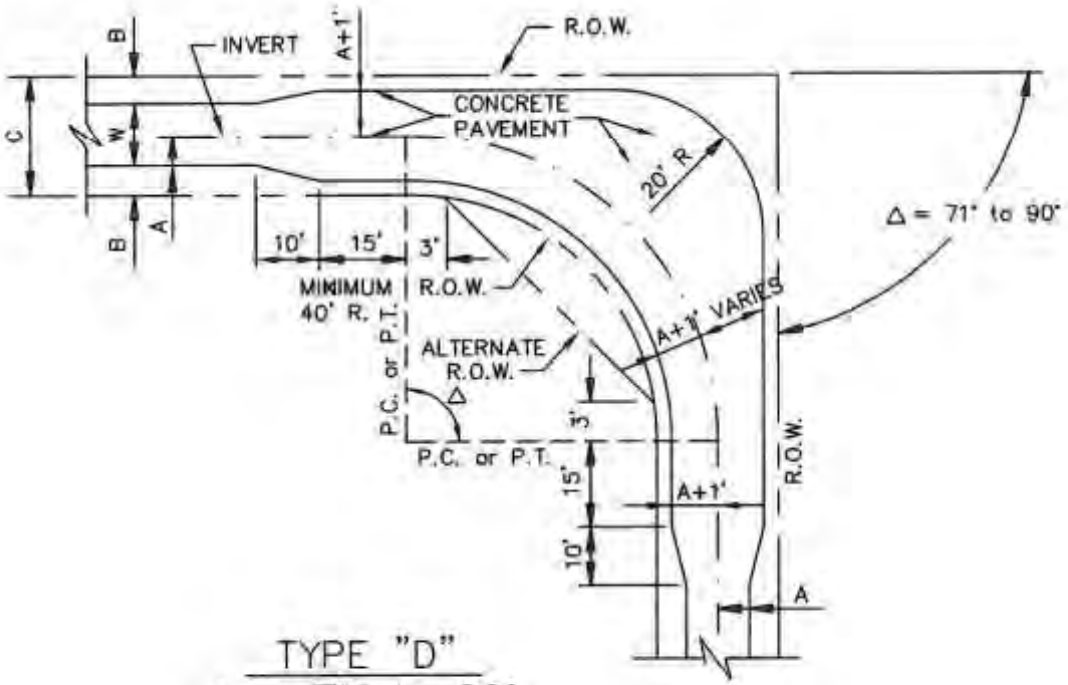
ALLEY GEOMETRICS	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 303.5	
TYPE "A" & TYPE "B"		DATE Mar. 2018	STANDARD DRAWING NO. R-2210



TYPE "C"

Δ = 41° to 70°

N.T.S.



TYPE "D"

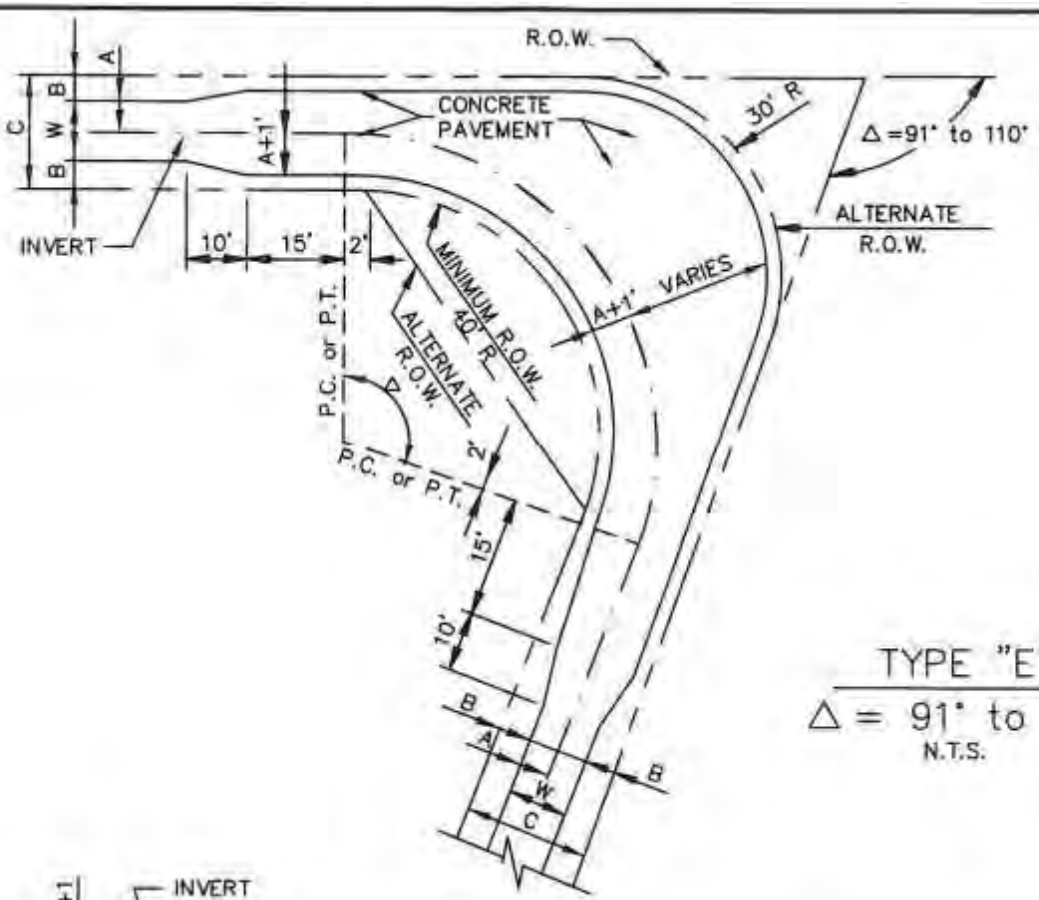
Δ = 71° to 90°

N.T.S.

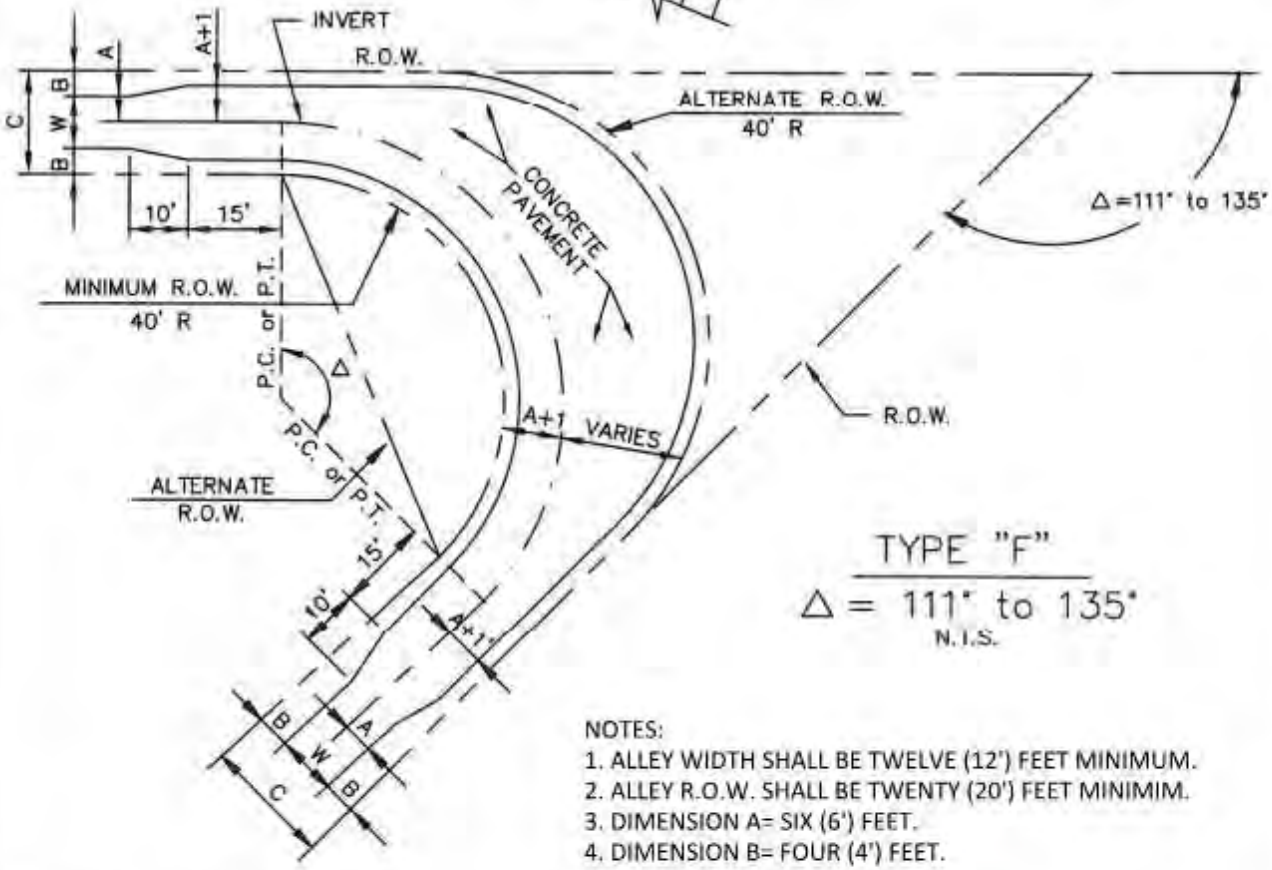
NOTES:

1. ALLEY WIDTH SHALL BE TWELVE (12') FEET MINIMUM.
2. ALLEY R.O.W. SHALL BE TWENTY (20') FEET MINIMIM.
3. DIMENSION A= SIX (6') FEET.
4. DIMENSION B= FOUR (4') FEET.

ALLEY GEOMETRICS	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 303.5	
TYPE "C" & TYPE "D"		DATE Mar. 2018	STANDARD DRAWING NO. R-2220



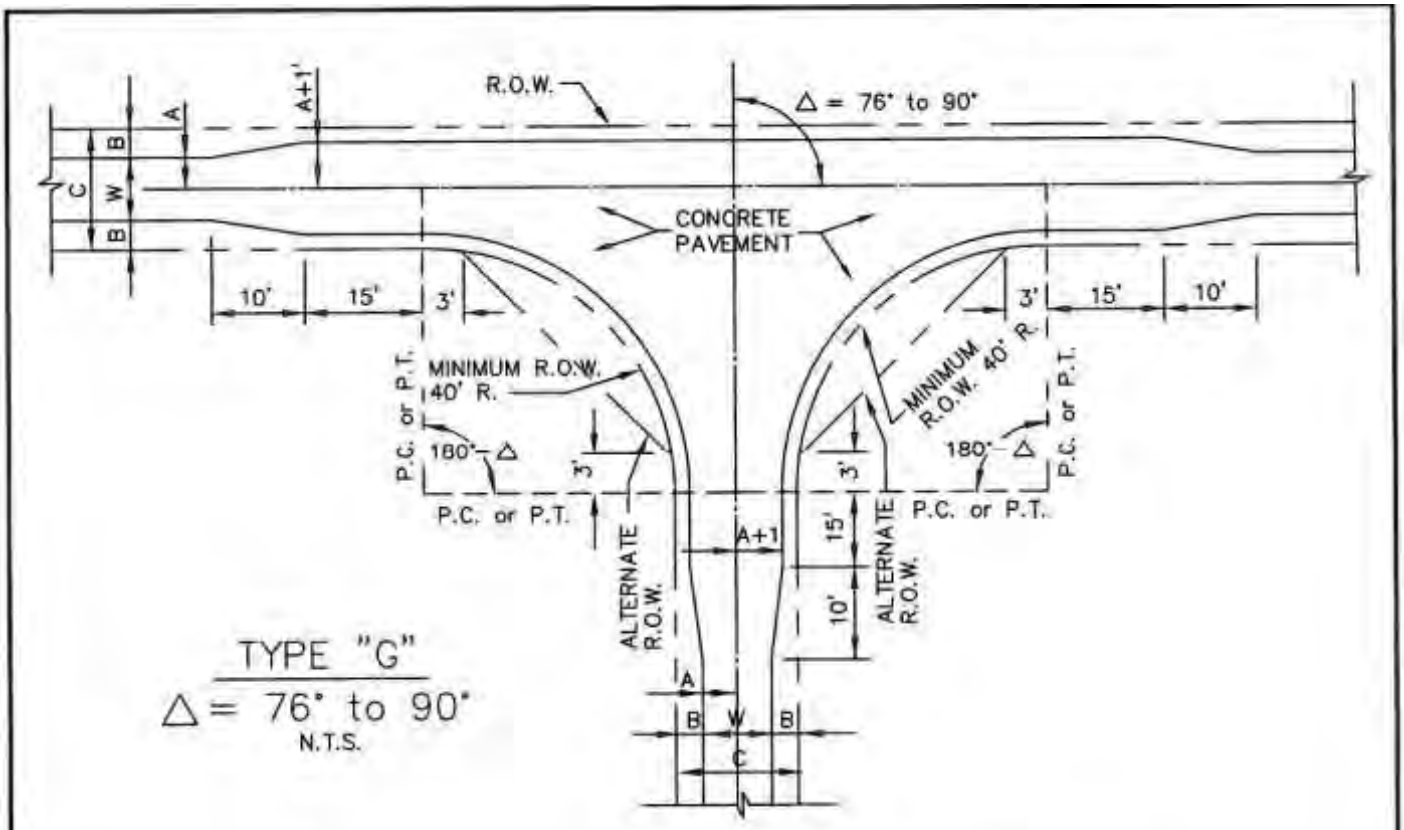
TYPE "E"
Δ = 91° to 110°
N.T.S.



TYPE "F"
Δ = 111° to 135°
N.T.S.

NOTES:
1. ALLEY WIDTH SHALL BE TWELVE (12') FEET MINIMUM.
2. ALLEY R.O.W. SHALL BE TWENTY (20') FEET MINIMIM.
3. DIMENSION A= SIX (6') FEET.
4. DIMENSION B= FOUR (4') FEET.

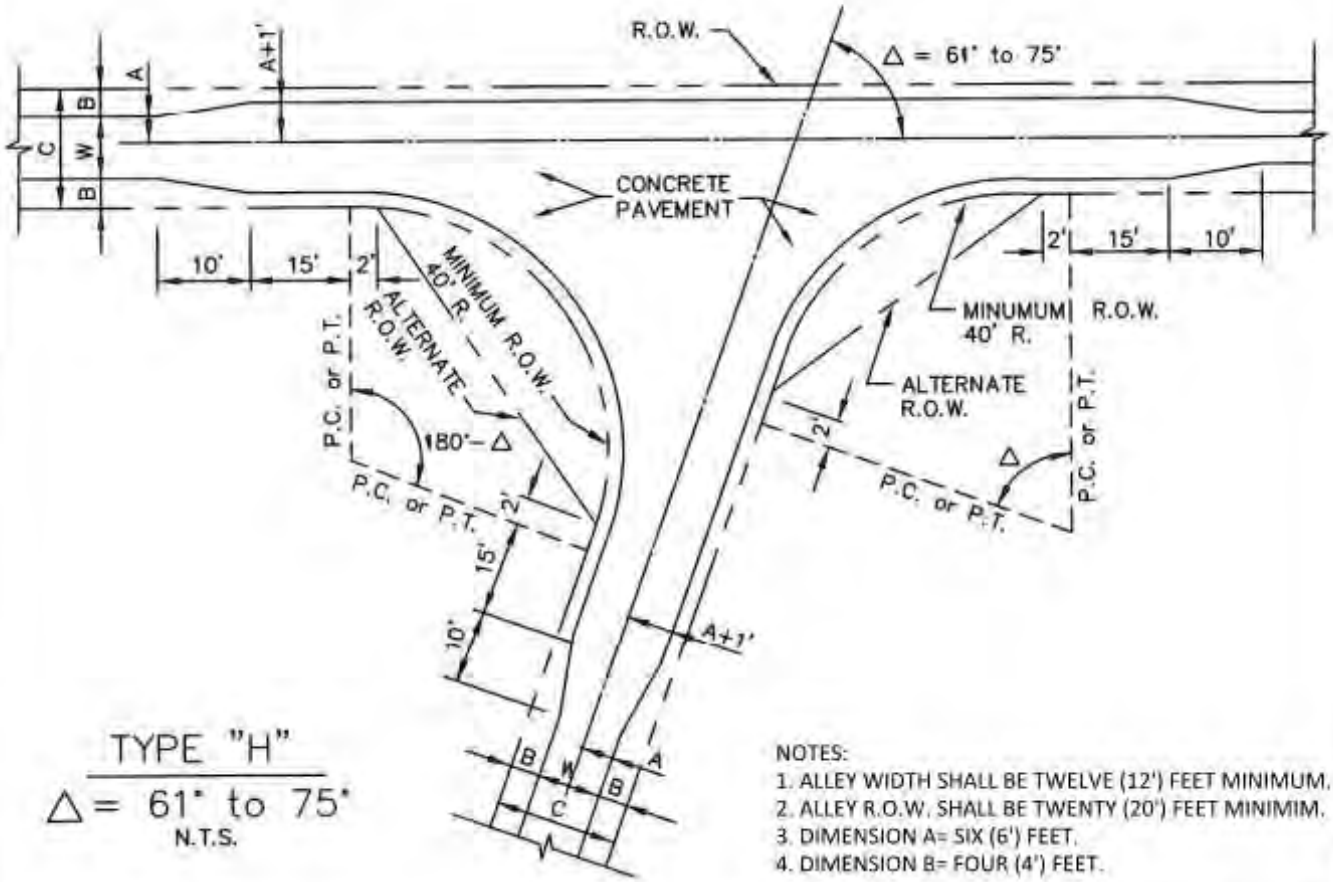
ALLEY GEOMETRICS	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 303.5	
TYPE "E" & TYPE "F"		DATE Mar. 2018	STANDARD DRAWING NO. R-2230



TYPE "G"

Δ = 76° to 90°

N.T.S.



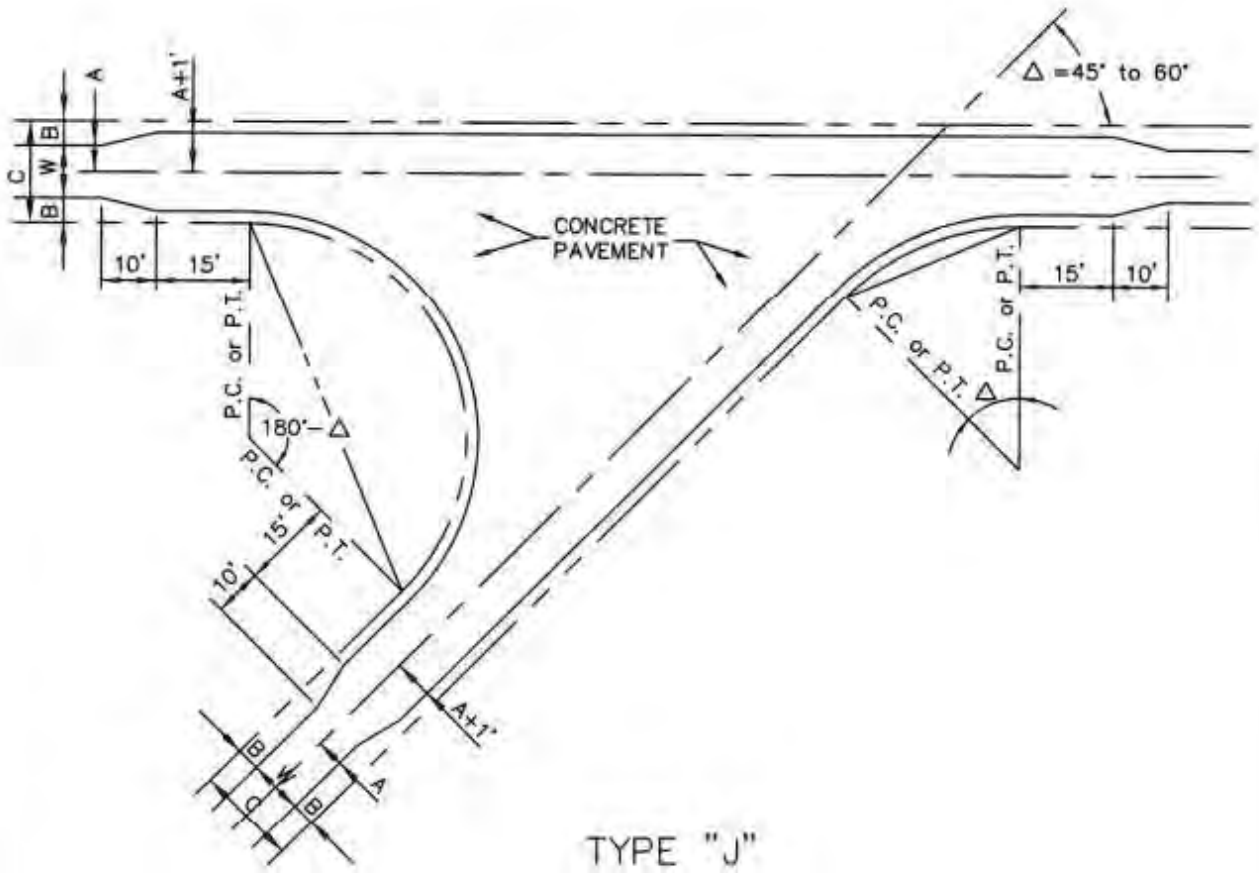
TYPE "H"

Δ = 61° to 75°

N.T.S.

NOTES:
1. ALLEY WIDTH SHALL BE TWELVE (12') FEET MINIMUM.
2. ALLEY R.O.W. SHALL BE TWENTY (20') FEET MINIMIM.
3. DIMENSION A= SIX (6') FEET.
4. DIMENSION B= FOUR (4') FEET.

ALLEY GEOMETRICS	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 303.5	
TYPE "G" & TYPE "H"		DATE Mar. 2018	STANDARD DRAWING NO. R-2240



TYPE "J"

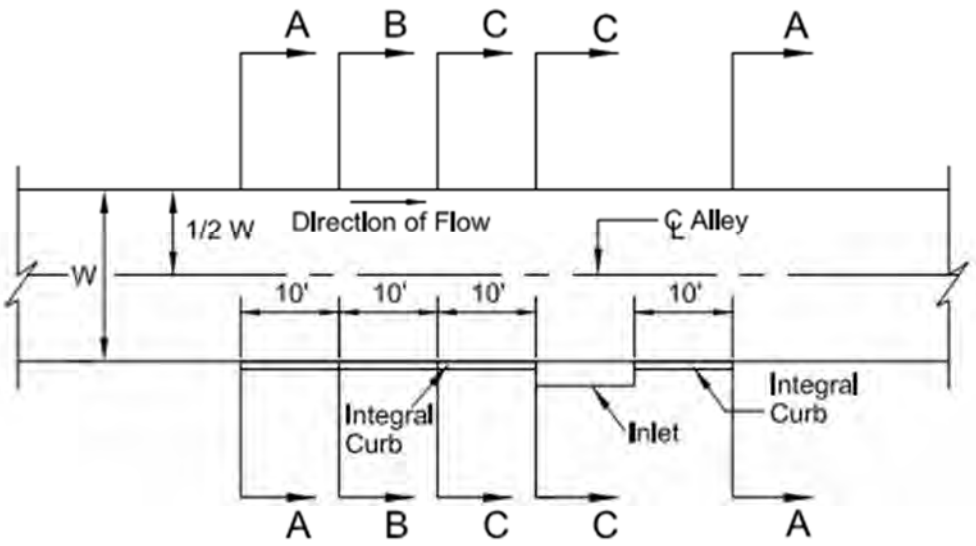
Δ = 45° to 60°

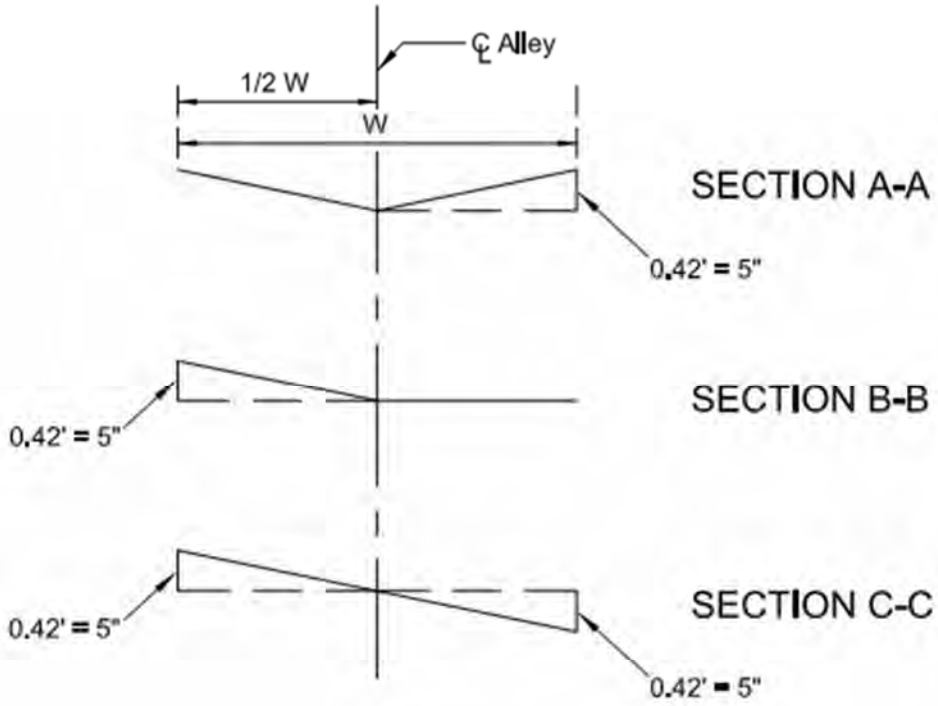
N.T.S.

NOTES:

1. ALLEY WIDTH SHALL BE TWELVE (12') FEET MINIMUM.
2. ALLEY R.O.W. SHALL BE TWENTY (20') FEET MINIMIM.
3. DIMENSION A= SIX (6') FEET.
4. DIMENSION B= FOUR (4') FEET.

ALLEY GEOMETRICS	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 303.5	
TYPE "J"		DATE Mar. 2018	STANDARD DRAWING NO. R-2250

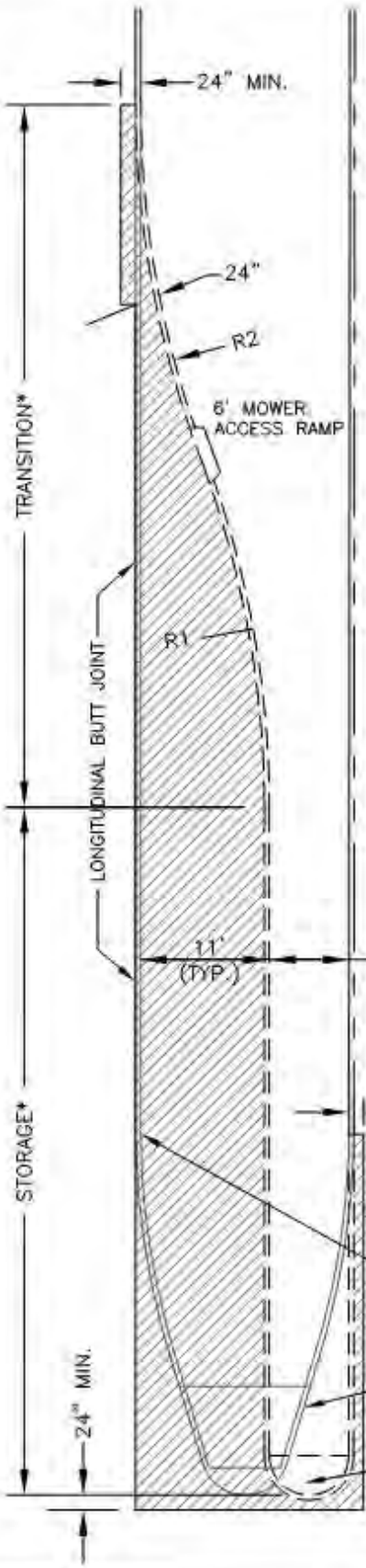




TYPICAL ALLEY WARPING AT INLET

(Not to Scale)

ALLEY GEOMETRICS	CITY OF ROCKWALL		
ALLEY WARPING AT INLET		DATE OCT. '17	DRAWING NO. R-2251

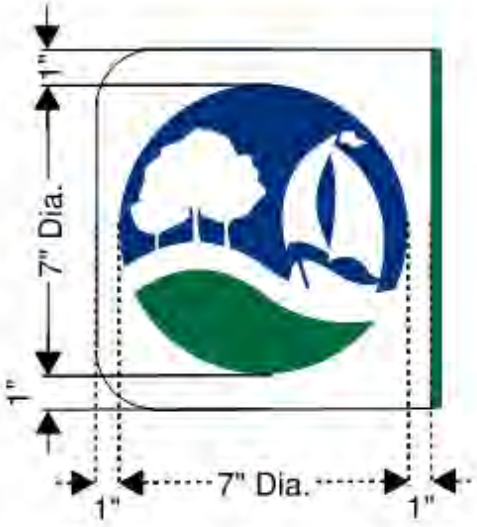


NOTES:

1. ALL DIMENSIONS ARE TO BACK OF CURB UNLESS OTHERWISE NOTED.
2. NO CONCRETE REPLACEMENT WIDTH SHALL BE LESS THAN 24".
3. PAVEMENT SECTION SHALL MATCH THAT OF EXISTING STREET.
4. ALL TIEBARS FOR LONGITUDINAL CONSTRUCTION JOINTS SHALL BE MACHINE DRILLED. NO HAND DRILLING ALLOWED.
5. IF MEDIAN WIDTH <= 7' (FACE TO FACE) THEN 6" THICK REINFORCED INTEGRAL STAINED AND STAMPED COLOR CONCRETE MEDIAN PAVEMENT SHALL BE INSTALLED.
6. ALL SAWCUTS TO BE FULL DEPTH AND EITHER PERPENDICULAR AND/OR PARALLEL WITH STREET CENTERLINE. NO ANGLED OR CURVED SAWCUTS ALLOWED.
7. WHEN SAWCUT EXCEEDS HALF OF CONSTRUCTION JOINT PANEL WIDTH, FULL PANEL REMOVAL AND REPLACEMENT SHALL BE REQUIRED.
8. TYPICAL R1/R2 VALUES:
   250' TYP. FOR SINGLE TURN LANE
   250' TYP. FOR DUAL TURN LANE
9. MUST MATCH JOINTS OF ADJACENT TRAFFIC LANES

* REFER TO CONSTRUCTION DRAWINGS FOR STORAGE, TRANSITION AND RADII DIMENSIONS.

LEFT TURN LANE	CITY OF ROCKWALL	
CONCRETE REMOVAL & REPLACEMENT		DATE: AUG. '19 / DRAWING NO.: R-2270



Rockwall Logo Detail

NOT TO SCALE

Notes:
1. Street name blades shall consist of white SCOTCHLITE 3930 High Intensity Prismatic Material, digitally printed using HP Latex 360 or higher.
Green: Pantone 335C with overlay CMYK 100-0-20-0 set to darken.
Blue: Pantone 287C.

2. Lettering to be composed of a combination of upper and lowercase letters, with initial uppercase letters. Font to be Clearview TCAD-1w with uppercase to be 6" Min. height and lowercase to be 4.5" Min. height. No more than 65% compression on font width.

3. Lettering for street designations and block numbers to be composed of initial uppercase letters at least 3" Min. height and lower-case letters at least 2.25" Min. height.

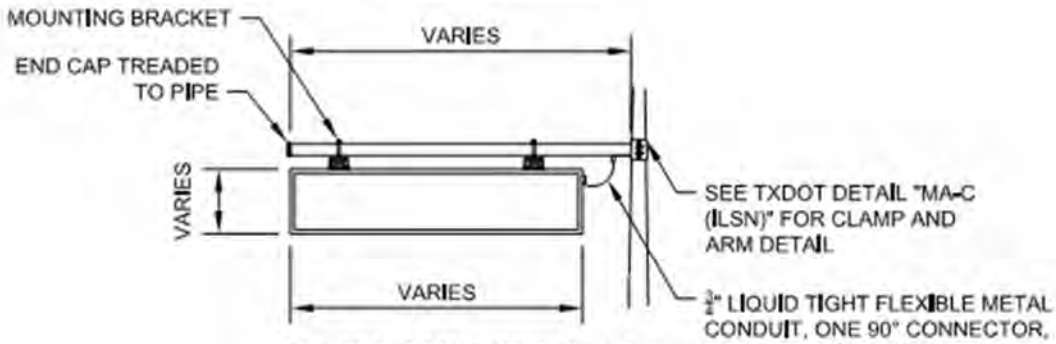
4. Sign post to be 2 3/8" O.D. galvanized steel tube sign pole.

STREET SIGN DETAIL

NOT TO SCALE

STREET REGULATORY SIGNAGE	CITY OF ROCKWALL	
TYPICAL STREET SIGN DETAIL		DATE: May 2018 / DRAWING NO.: R-2300

EXAMPLE SINGLE STREET NAME DETAIL



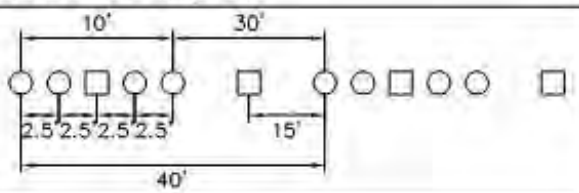
ILSN MOUNTING DETAIL

NOTES:

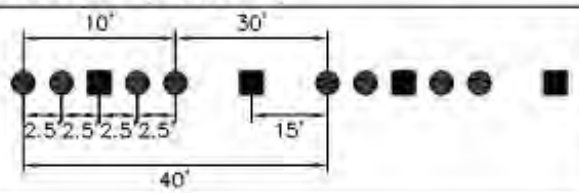
1. UNLESS OTHERWISE SPECIFIED, ALL LETTER SPACING AND WIDTH SHALL BE 100% OF THE US DOT MINIMUM RECOMMENDATION.
   A. LEGENDS REQUIRING LENGTHS GREATER THAN THE 96" WIDTH OF THE SIGN USING STANDARD SPACING, MAY BE ADJUSTED TO FIT.
2. ILSNS UP TO 6' IN LENGTH MAY BE PLACED ON A 7' ILSN CLAMP-ON ARM. ILSNS UP TO 8' IN LENGTH MAY BE PLACED ON A 9' ILSN CAMP-ON ARM.
3. LETTERING SIZE AND SPACING BETWEEN THE VARIOUS SIGN ELEMENTS SHALL FOLLOW THE CURRENT VERSION OF THE *STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS* MANUAL FOR D3-1.
   A. DESIRED LETTER HEIGHT FOR STREET NAME SIGNS SHALL BE 12" FOR UPPER CASE LETTERS. STREET NAME LETTER HEIGHT MAY BE REDUCED TO 10" TO REDUCE THE SIZE OF THE SIGN AS NEEDED.
4. THE CITY LOGO HEIGHT SHALL MATCH MAXIMUM TEXT SIZE HEIGHT ON SIGN LEGEND. THE LOGO SHALL BE PLACED ON THE LEFT SIDE OF EACH SIDE OF THE SIGN ON A WHITE BACKGROUND.
5. THE ILSN LEGEND MAY BE COMPOSED OF ONE LINE OR TWO LINES OF TEXT. CONTRACTOR TO VERIFY WITH CITY BEFORE SUBMITTING SHOP DRAWINGS FOR SIGNS WITH TWO LINES OF TEXT.
6. SIGNS SHALL BE EDGELIT LED ILLUMINATED
7. FACE COLOR/MATERIAL: GREEN EC FILM OVER HIGH-INTENSITY TRANSLUCENT REFLECTIVE WHITE SHEETING ON UV LEXAN.
8. FRAME WIDTH TO BE PROVIDED BY MANUFACTURER.
9. SIGN BODIES AND DOORS ARE TO BE POWDER COATED GLOSSY BLACK.
10. SIGNS SHALL BE SINGLE SIDED EXCEPT UNDER THE FOLLOWING CONDITION:
    SIGN SHALL BE DOUBLE SIDED IF BOTH APPROACHES FACING THE SIGN ARE UNDIVIDED(NO MEDIAN).
11. SIGNS SHALL BE TOP MOUNTED USING STANDARD TXDOT DETAILS.
12. ILSN SHALL BE MOUNTED ON A STANDARD TXDOT ILSN CLAMP-ON ARM UNLESS OTHERWISE DIRECTED IN THE PLANS
13. ILSN SHALL BE FULLY GASKETED AND WATERTIGHT.
14. TRAFFIC SIGNAL POLE SHALL BE AT LEAST 24' HEIGHT. (SEE TXDOT TRAFFIC SIGNAL POLE STANDARDS)
15. A SEPARATE PHOTOCELL FOR ILSN/120 VOLT CIRCUIT WILL BE REQUIRED.
16. TWO #8 XHHW CONDUCTORS SHALL BE INSTALLED FROM SERVICE TO TERMINAL BLOCK OF EACH POLE WITH ILSN UNLESS OTHERWISE SHOWN IN THE PLANS. (CONDUCTORS FROM SERVICE TO TERMINAL BLOCK OF EACH POLE SHALL BE PAID FOR SEPARATELY FROM THE ILSN PAY ITEM.)
    A. DAISY CHAIN ALL ILSNS UNLESS OTHERWISE DIRECTED IN THE PLANS.
17. TWO # 12 XHHW CONDUCTORS SHALL BE INSTALLED FROM TERMINAL BLOCK OF POLE TO ILSN UNLESS OTHERWISE SHOWN IN THE PLANS. (CONDUCTORS FROM THE TERMINAL BLOCK OF EACH POLE TO ILSN SHALL BE PAID FOR SEPARATELY FROM THE ILSN PAY ITEM.)
18. CONTRACTOR TO SUBMIT SHOP DRAWINGS OF THE LED ILSNS TO CITY OF ROCKWALL FOR APPROVAL PRIOR TO FABRICATION.
19. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EQUIPMENT NECESSARY TO INSTALL THE ILSN SIGN.
20. ALL ISLNS SHALL FOLLOW ALL RULES AND GUIDELINES AS SPECIFIED IN THE MOST RECENT EDITIONS OF THE *STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS* AND THE *TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES*. SHOULD ANY CONFLICTS BETWEEN THE ABOVE NOTES AND THESE DOCUMENTS, THESE DOCUMENTS SHALL GOVERN.

ILLUMINATED STREET NAME SIGN	CITY OF ROCKWALL	
ILSN SIGN DETAIL		DATE: JUN '17 / DRAWING NO.: R-2310

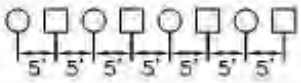
BROKEN WHITE LANE LINE



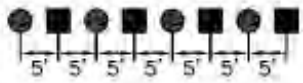
BROKEN YELLOW LANE LINE



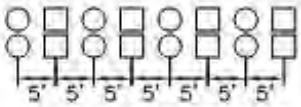
SINGLE WHITE LINE



SINGLE YELLOW LINE



TURN LANE LINE/WIDE WHITE LINE

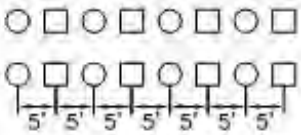


(NO SPACE BETWEEN ADJACENT BUTTONS)

WIDE YELLOW LINE

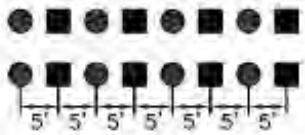
(NO SPACE BETWEEN ADJACENT BUTTONS)

DOUBLE WHITE LINE



(4" SPACE BETWEEN ADJACENT BUTTONS)

DOUBLE YELLOW CENTERLINE



(4" SPACE BETWEEN ADJACENT BUTTONS)

NOTES:

UNLESS OTHERWISE NOTED, THE FOLLOWING BUTTON TYPES SHALL BE USED:

- ● = 4" ROUND YELLOW CERAMIC NON-REFLECTIVE BUTTON
- ■ = 4" SQUARE YELLOW/YELLOW ACRYLIC REFLECTIVE BUTTON
- ○ = 4" ROUND WHITE CERAMIC NON-REFLECTIVE BUTTON
- □ = 4" SQUARE CLEAR/RED ACRYLIC REFLECTIVE BUTTON

RAISED PAVEMENT MARKINGS	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE	
LANE LINES		DATE: Mar. 2018	STANDARD DRAWING NO.: R-2320

RAISED PAVEMENT MARKINGS

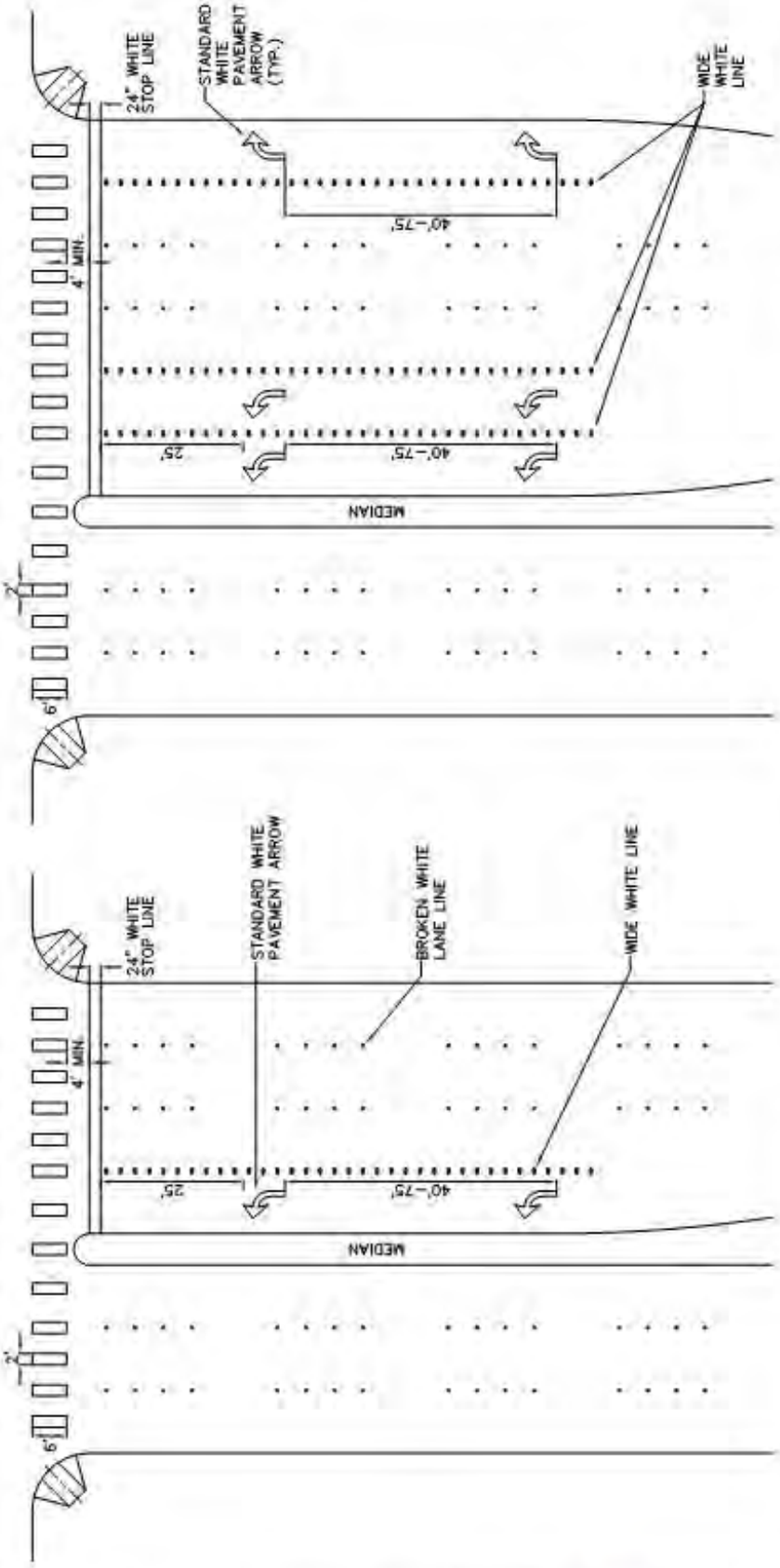
CHEVRON AND CROSSHATCH

CITY OF ROCKWALL

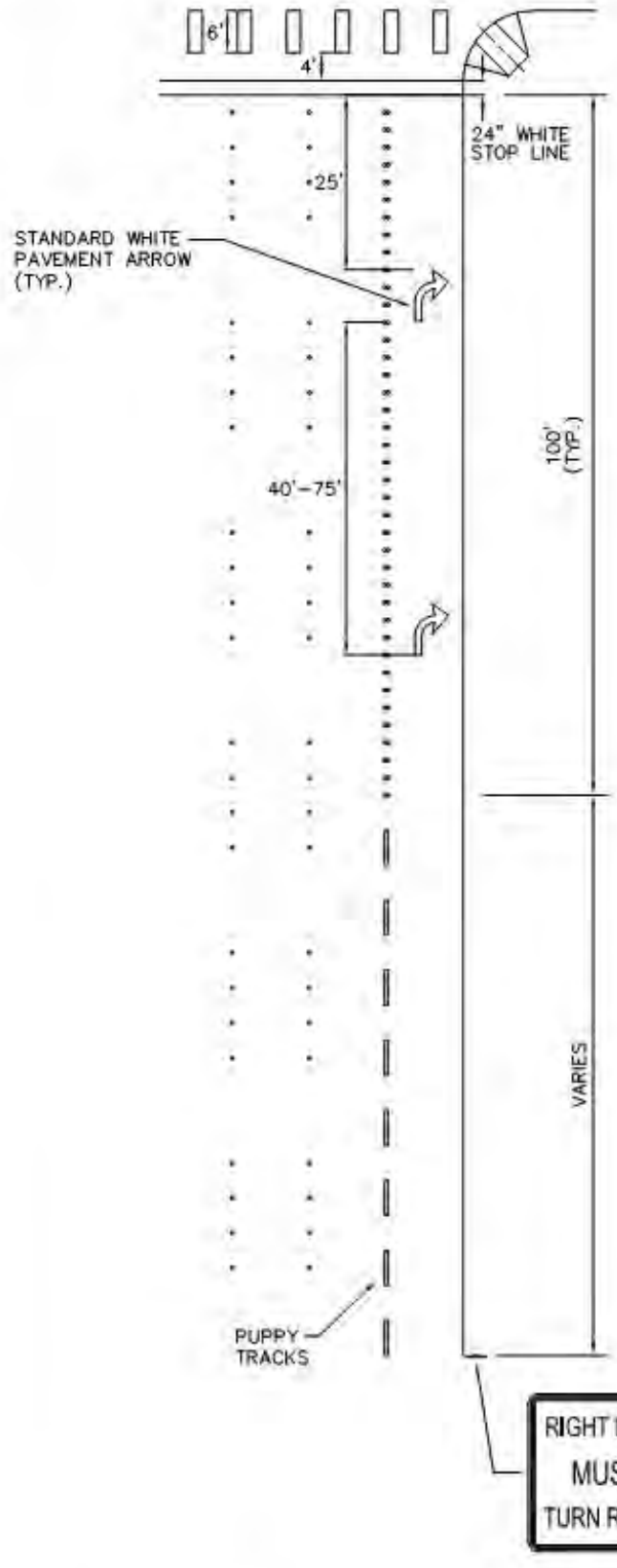
STANDARD SPECIFICATION REFERENCE

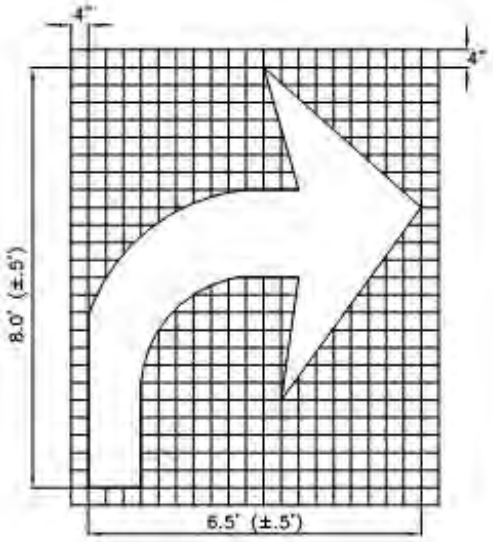
DATE: Mar. 2018

STANDARD DRAWING NO.: R-2330



RAISED PAVEMENT MARKINGS	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE	
INTERSECTION APPROACH		DATE Mar. 2018	STANDARD DRAWING NO. R-2340





TURN ARROW

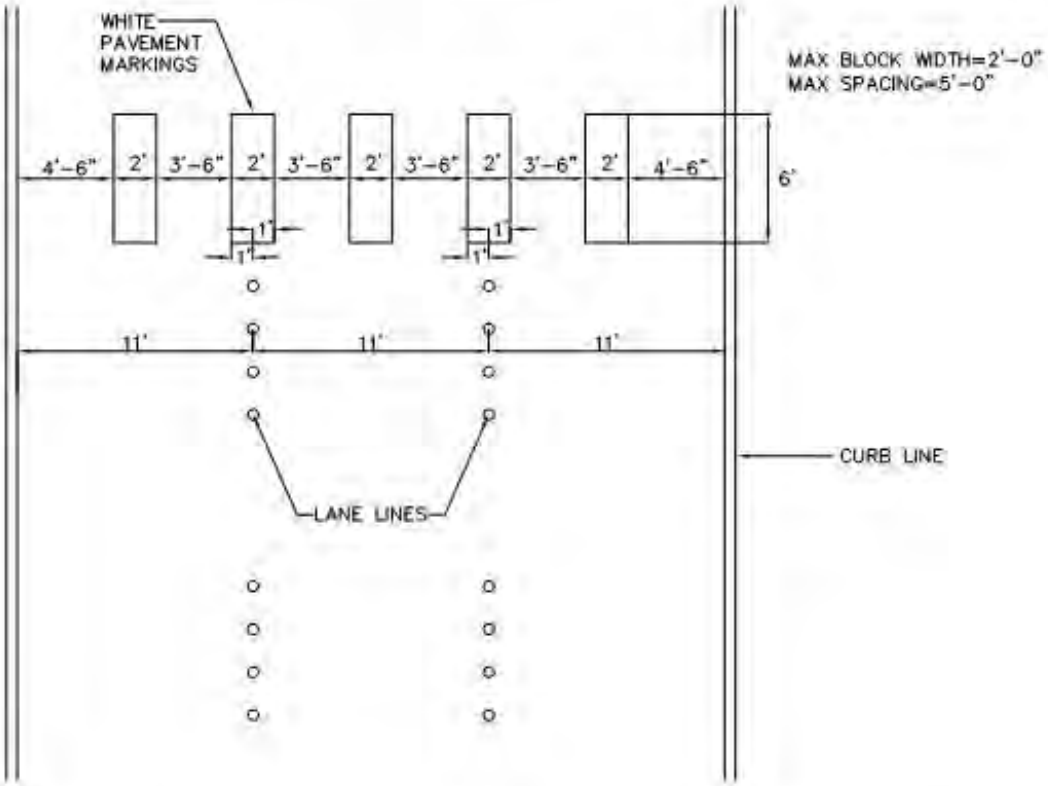
TYPE C INTERSECTION	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE	
RIGHT LANE DROP MARKINGS		DATE Mar. 2018	STANDARD DRAWING NO. R-2350

TYPICAL LAYOUT
TYPE D THOROUGHFARE
STOP LINE WITH CROSSWALK

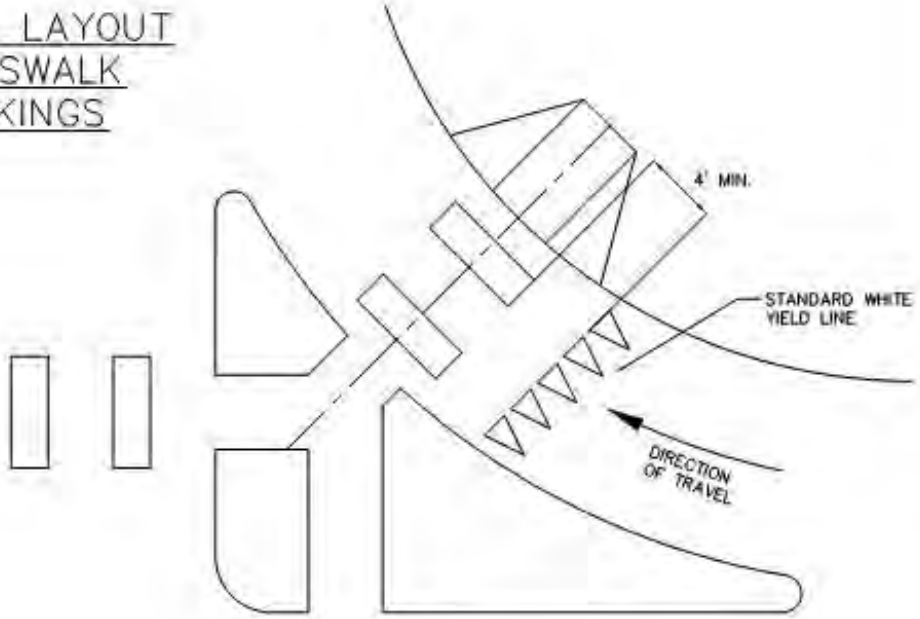
TYPICAL LAYOUT
TYPE F&G THOROUGHFARE
STOP LINE WITHOUT CROSSWALK

TYPICAL LAYOUT
TYPE F&G THOROUGHFARE
CROSSWALK WITH STOP LINE

TYPICAL THOROUGHFARE LAYOUTS	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE	
		DATE: Mar. 2018	STANDARD DRAWING NO.: R-2360

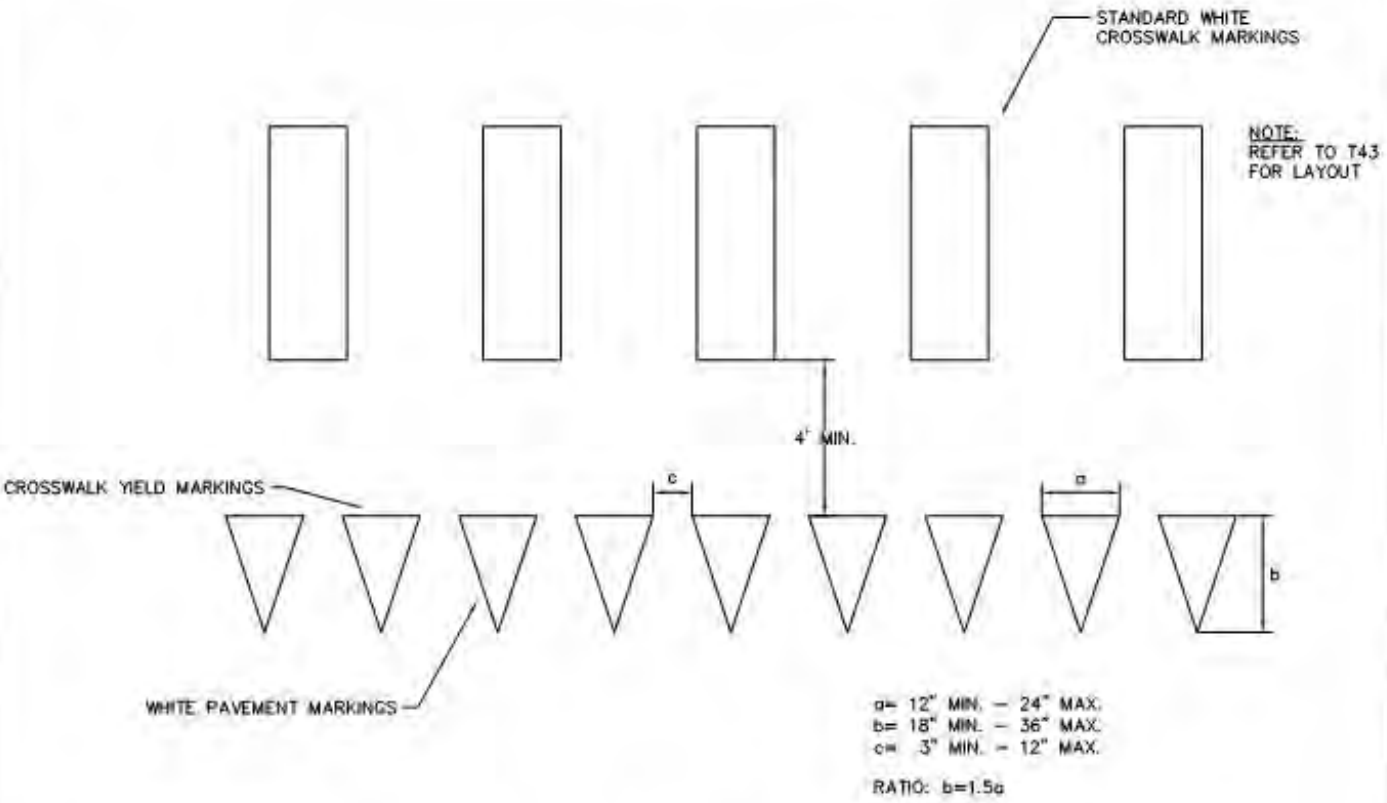


TYPICAL LAYOUT CROSSWALK MARKINGS

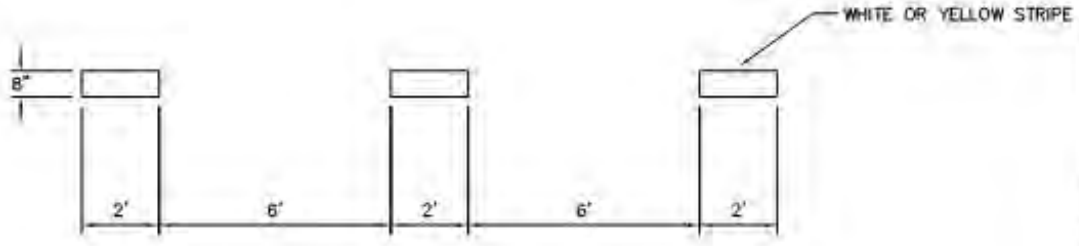


TYPICAL LAYOUT CHANNELIZING ISLAND YIELD LINE WITH CROSSWALK

TYPICAL CROSSWALK LAYOUTS	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE	
		DATE: Mar. 2018	STANDARD DRAWING NO.: R-2370

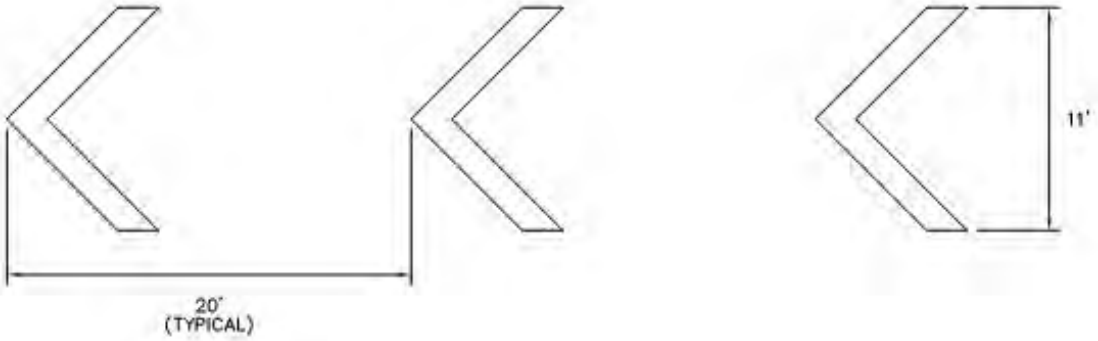


CROSSWALK MARKINGS

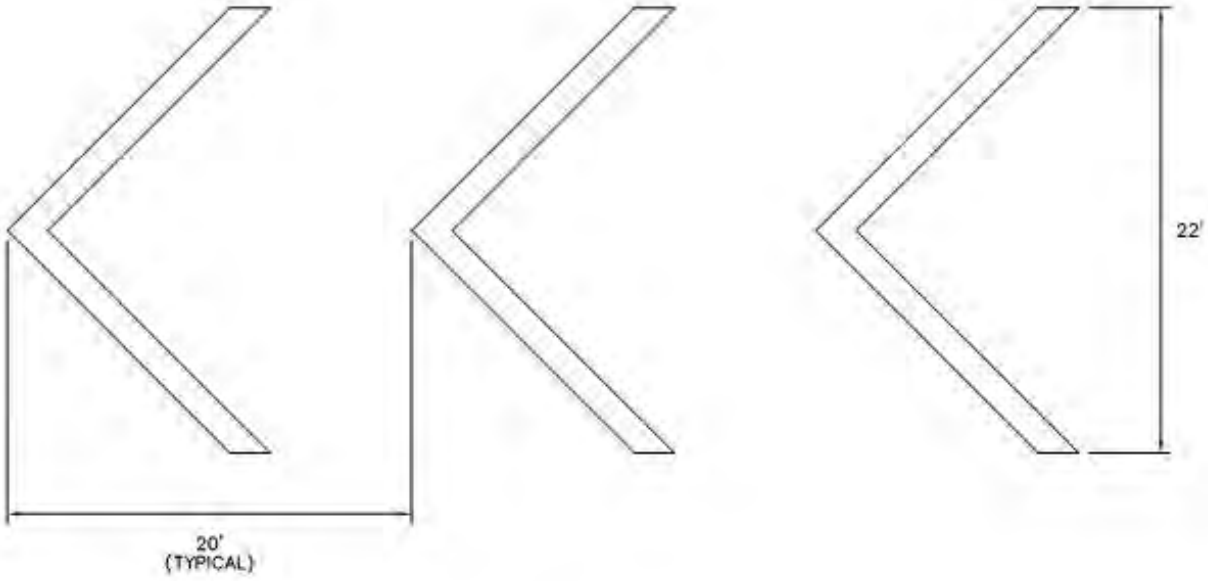


DASH LINE ("PUPPY TRACK") MARKINGS

TYPICAL CROSSWALK AND DASHED MARKINGS	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE	
		DATE: Mar. 2018	STANDARD DRAWING NO.: R-2380

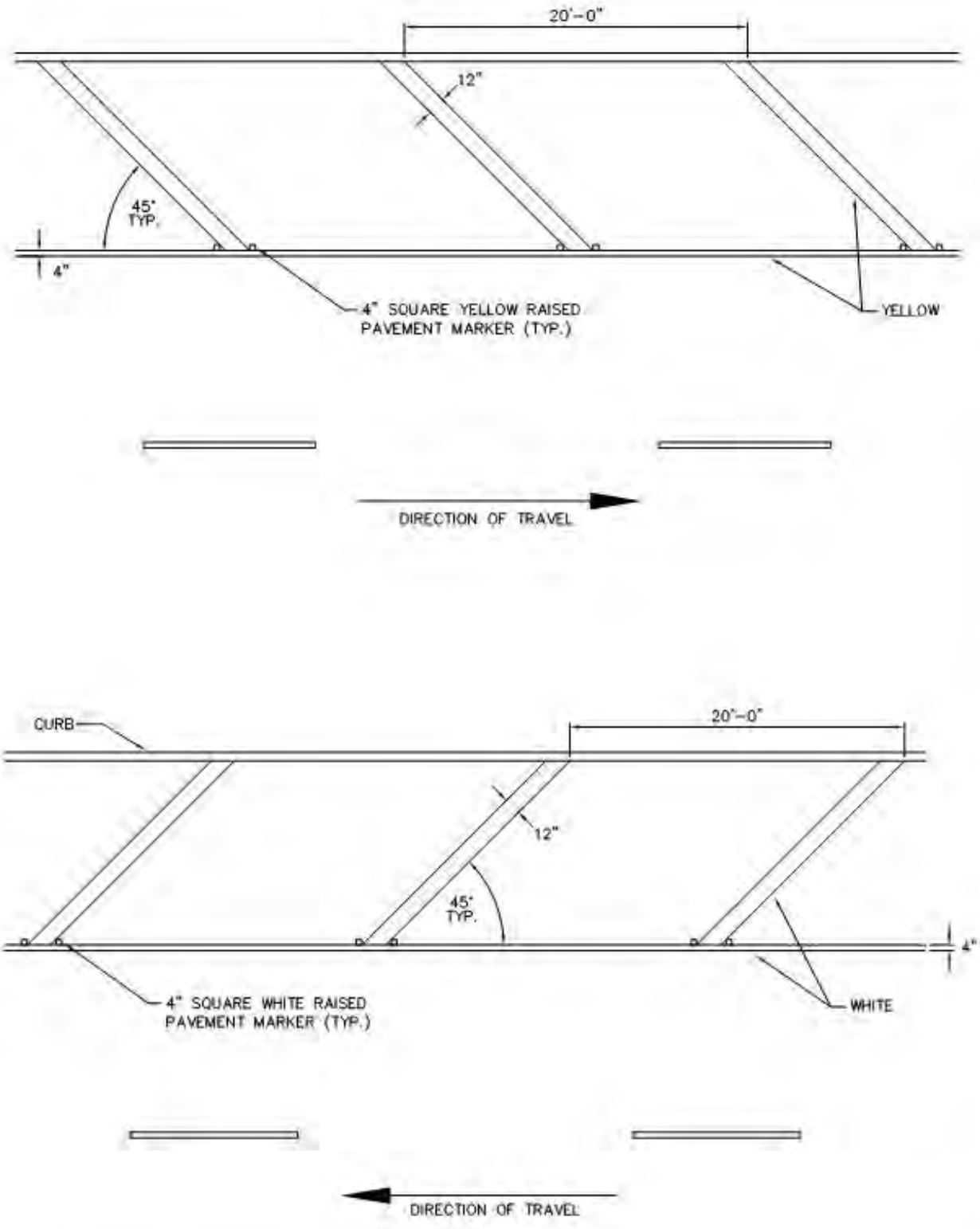


11' WIDE CHEVRON STRIPE



22' WIDE CHEVRON STRIPE

CHEVRON STRIPING	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE	
		DATE Mar. 2018	STANDARD DRAWING NO. R-2390



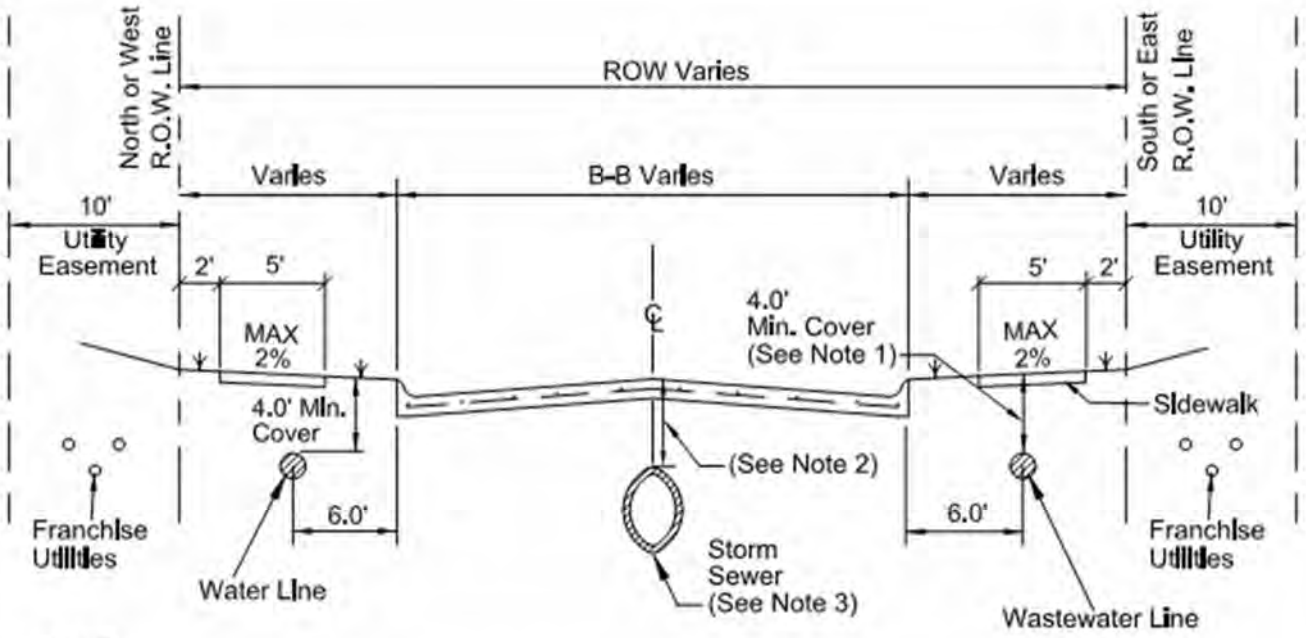
DIAGONAL CROSSHATCH STRIPING	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE	
		DATE Mar. 2018	STANDARD DRAWING NO. R-2400

8.3 Division 3000 General Underground Conduit

NOTE: *(1) Deleted NCTCOG Drawing*
(2) Revised NCTGOG Drawing (see revisions below)
(3) Added Rockwall Standard Drawing (see drawing below)
(4) Added Current TxDOT Standards

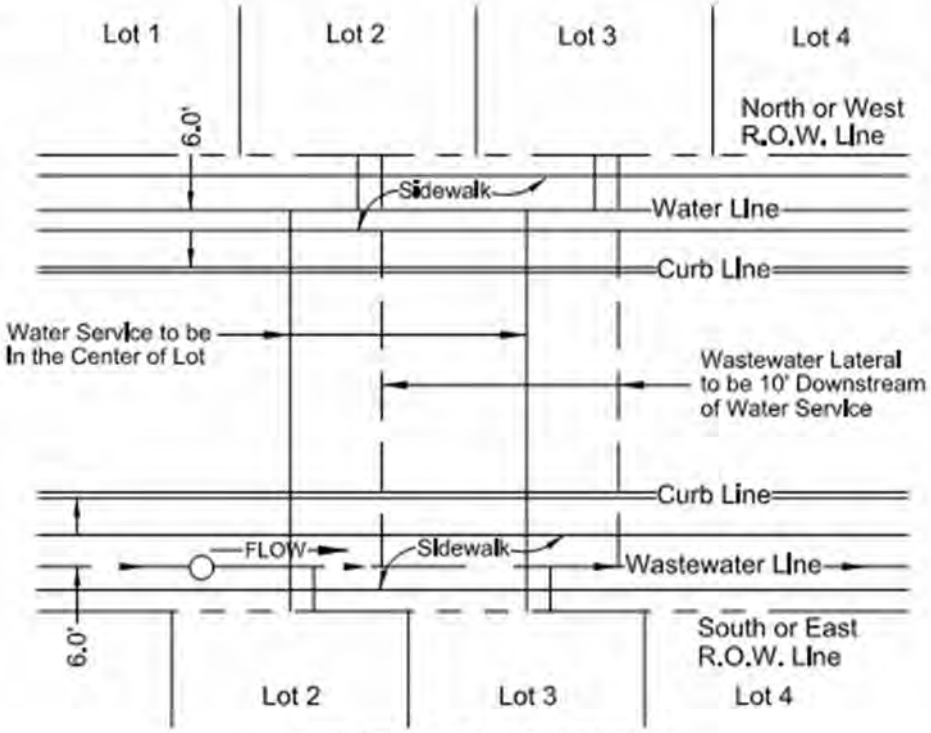
Table 9.3: Revisions to NCTCOG's Division 3000 General Underground Conduit

Revised	Drawing No.	Subject
(3)	**R-3000**	**Utilities Location Detail**
(1)	~~3010~~	~~Embedment – Class "A" & "A-1"~~
(3)	**R-3010**	**Embedment – Class "A" & "A-1"**
(1)	~~3020~~	~~Embedment – Class "B", "B+" & "B-1"~~
(3)	**R-3020**	**Embedment – Class "B", "B+" & "B-1"**
(1)	~~3030~~	~~Embedment – Class "B-2", "B-3" & "B-4"~~
(3)	**R-3030**	**Embedment – Class "B-2", "B-3" & "B-4"**
(1)	~~3040~~	~~Embedment – Class "C", "C+" & "C-1"~~
(3)	**R-3040**	**Embedment – Class "C", "C+" & "C-1"**
(1)	~~3050~~	~~Embedment – Class "D+" & "G"~~
(3)	**R-3050**	**Embedment – Class "D+" & "G"**
(1)	~~3060~~	~~Embedment – Class "G-1" & "H"~~
(3)	**R-3060**	**Embedment – Class "G-1" & "H"**
(1)	~~3070A~~	~~Pavement Cut and Repair – Concrete and Parkway~~
(3)	**R-3070A**	**Pavement Cut and Repair – Concrete and Parkway**
(1)	~~3070B~~	~~Pavement Cut and Repair – Asphalt~~
(3)	**R-3070B**	**Pavement Cut and Repair – Asphalt**
(1)	~~3070C~~	~~Pavement Cut and Repair – Extent - Residential~~
(1)	~~3070D~~	~~Pavement Cut and Repair – Extent - Multiple Lanes~~
(1)	~~*3080*~~	~~*Infiltration Protection – Conduit Under Channel*~~
(3)	*R-3090*	*Underground Conduit – Steel Encased Bore*



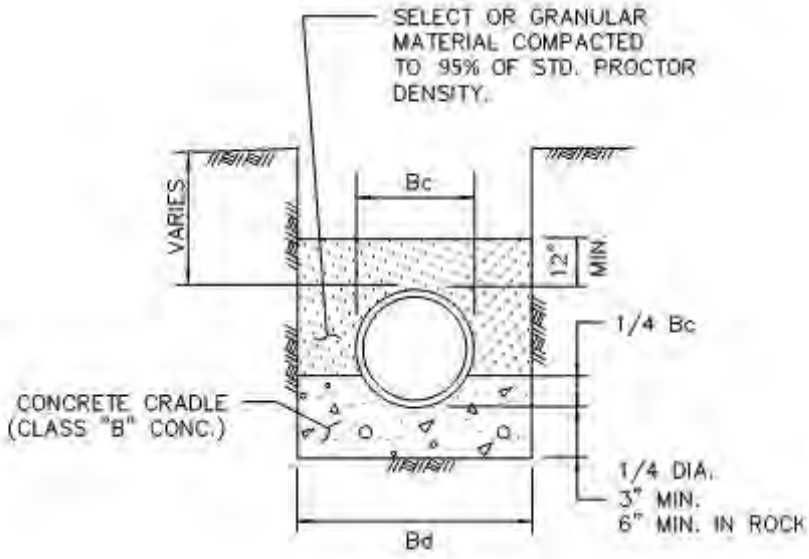
NOTE:

1. If wastewater line has a cover greater than ten feet (10') than pipe shall be minimum SDR 26 and no services allowed.
2. If cover is two (2) feet or less than Class IV RCP is required.
3. Horizontal location of storm sewer for divided roads to be determined by design engineer. Not to be placed in the parkway.



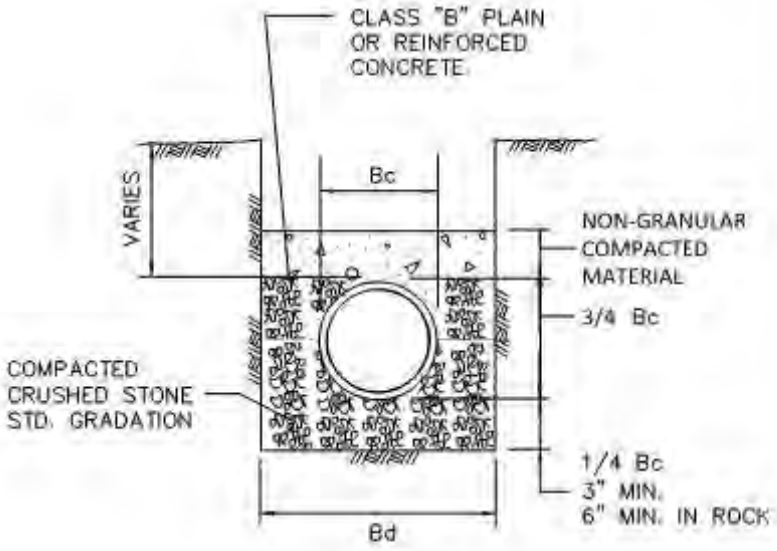
UTILITY SERVICE DETAIL

GENERAL UNDERGROUND CONDUIT	CITY OF ROCKWALL	
UTILITIES LOCATION DETAIL		DATE: OCT. '17 / DRAWING NO.: R-3000



CLASS "A"

CLASS "B" CONCRETE CRADLE N.T.S.
PLAIN CONC. LF 2.8
REINF. CONC. LF 3.4 P=0.4%



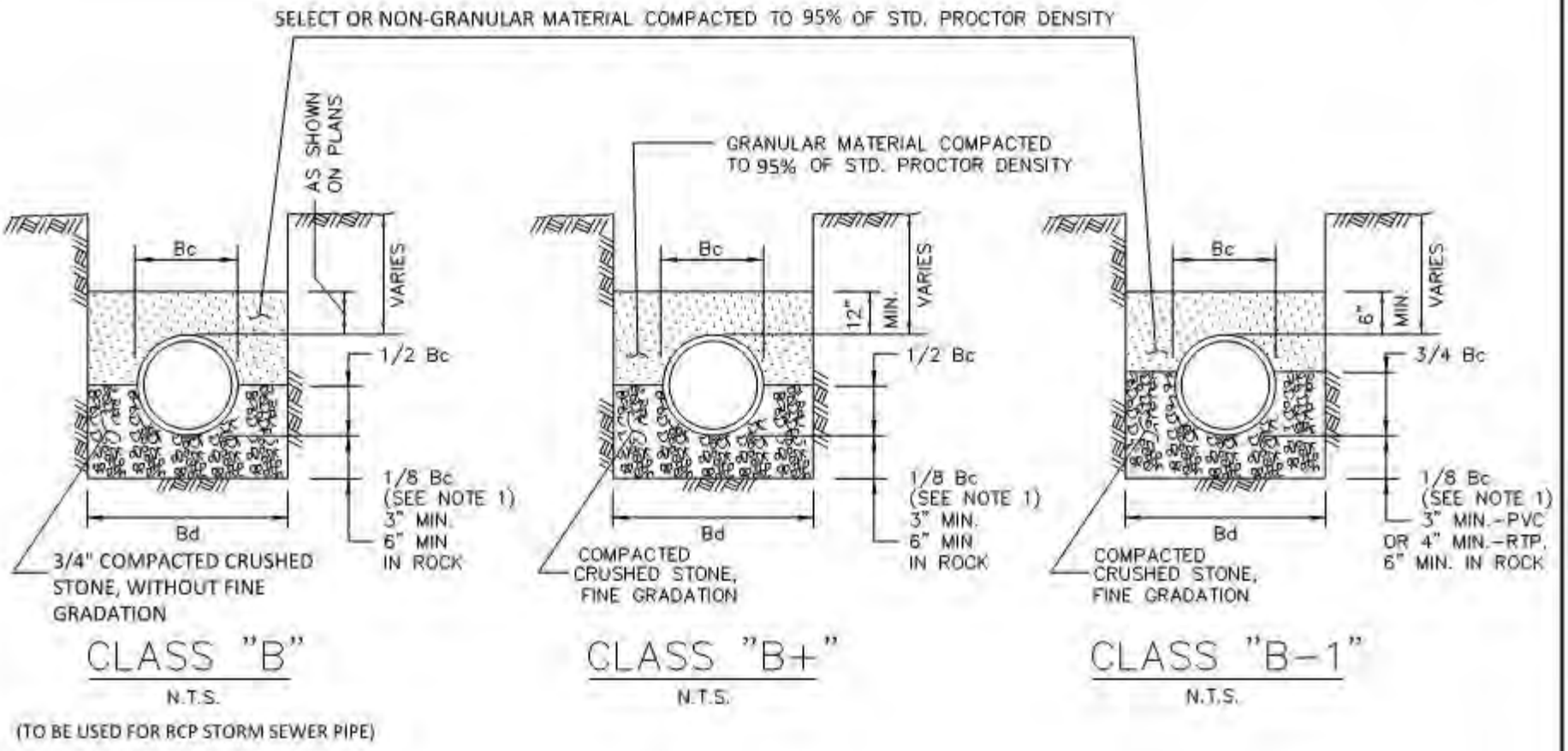
CLASS "A-1"

CLASS "B" CONCRETE CAP N.T.S.
PLAIN CONC. LF 2.8
REINF. CONC. LF 3.4 P=0.4%
REINF. CONC. LF 4.8 P=1.0%

NOTES:

1. LF. = LOAD FACTOR TO BE USED TO DETERMINE 3 EDGE BEARING BASED ON TYPE OF EMBEDMENT.
2. FREE-FALL OF CONCRETE NOT TO EXCEED 5 FT. MAXIMUM.
3. P = Rho FOR STEEL %
4. Bc = OUTSIDE DIAMETER OF PIPE
5. Bd = TRENCH WIDTH

STANDARD DRAWING NO. 3010	EMBEDMENT CLASS "A" & "A-1"	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 504.5	
			DATE Mar. 2018	STANDARD DRAWING NO. R-3010



NOTES:

1. FOR MAINS 42" DIAMETER AND LARGER LARGER, 1/8 Bc SHALL BE TAKEN AS 6".
2. Bc = OUTSIDE DIAMETER OF PIPE
3. Bd = TRENCH WIDTH

STANDARD DRAWING NO. R-3020

EMBEDMENT

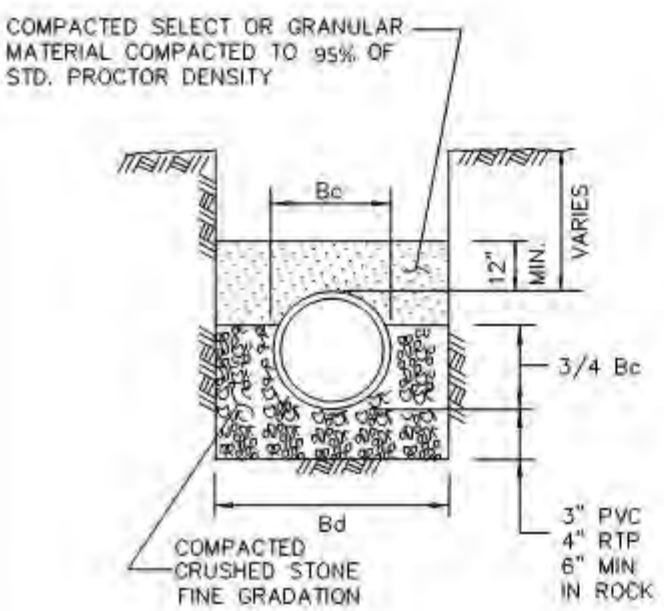
CLASS "B", "B+", & "B-1"

CITY OF ROCKWALL

STANDARD SPECIFICATION REFERENCE 504.5

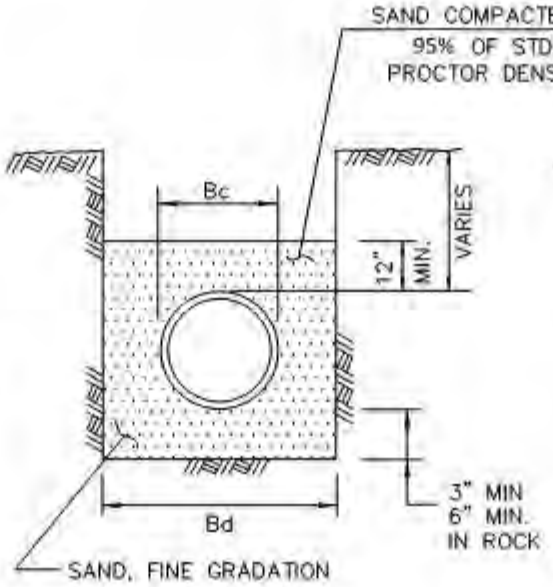
DATE Mar. 2018

STANDARD DRAWING NO. R-3020



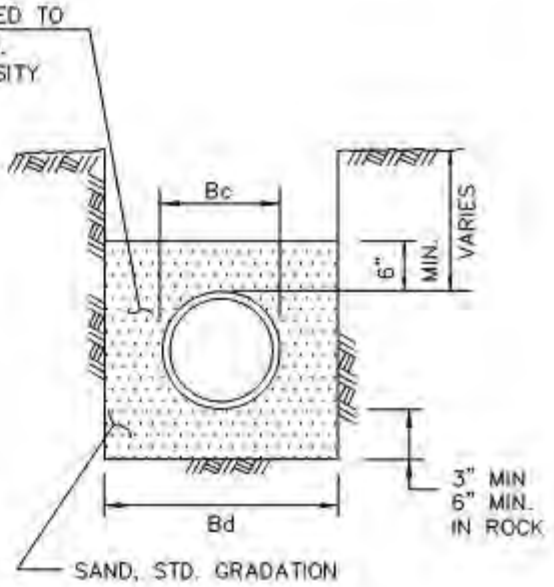
CLASS "B-2"

N.T.S.



CLASS "B-3"

N.T.S.



CLASS "B-4"

N.T.S.

(TO BE USED FOR PVC WATER PIPE AND PVC WASTE WATER FORCE MAIN PIPE)

NOTES:

1. Bc = OUTSIDE DIAMETER OF PIPE
2. Bd = TRENCH WIDTH
3. NO GRANULAR MATERIAL ABOVE ROCK OR STONE EMBEDMENT

STANDARD DRAWING NO. 3030

EMBEDMENT

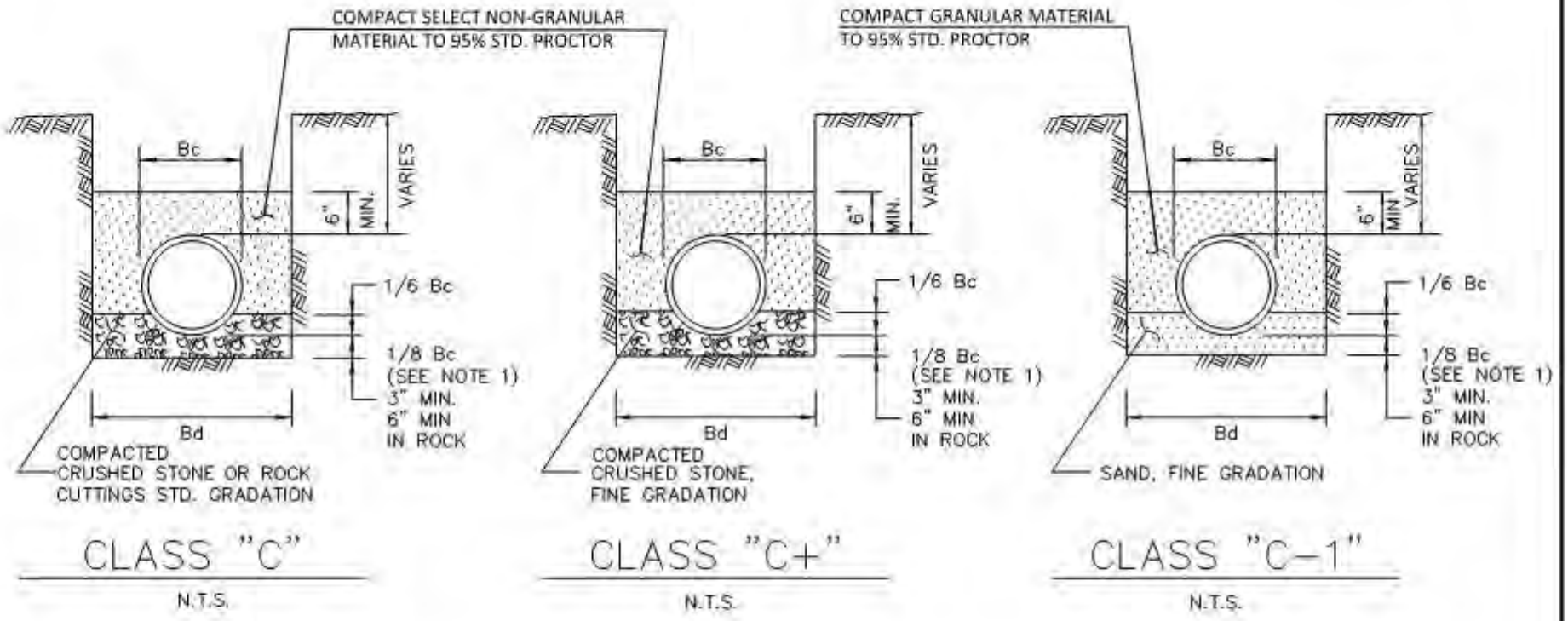
CLASS "B-2","B-3", & "B-4"

CITY OF ROCKWALL

STANDARD SPECIFICATION REFERENCE 504.5

DATE AUG. '19

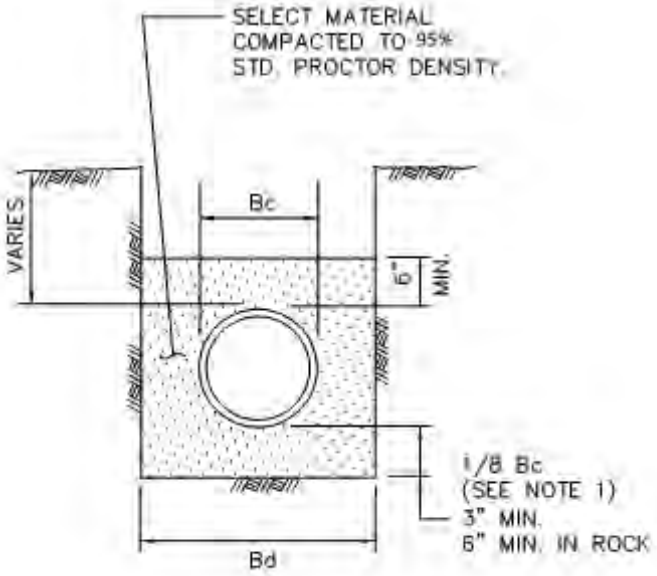
STANDARD DRAWING NO. R-3030



NOTES:

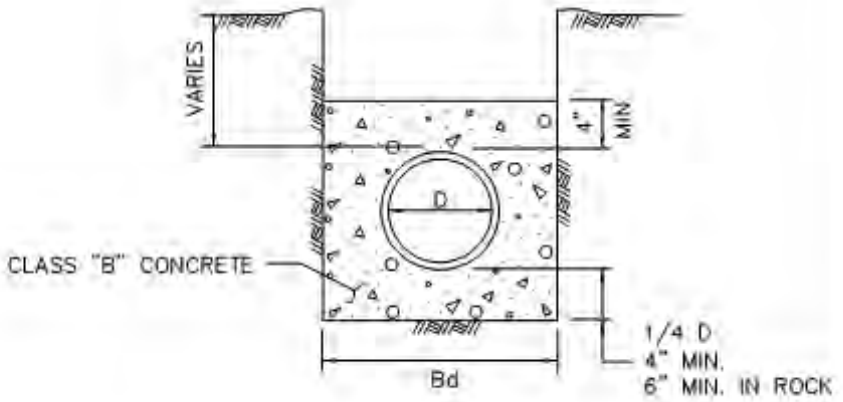
1. FOR MAINS 42" DIAMETER AND LARGER, 1/8 Bc SHALL BE TAKEN AS 6".
2. Bc = OUTSIDE DIAMETER OF PIPE
3. Bd = TRENCH WIDTH

STANDARD DRAWING NO.	EMBEDMENT	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE
R-3040	CLASS "C", "C+", & "C-1"		504.5
			DATE: Mar. 2018 / STANDARD DRAWING NO.: R-3040



CLASS "D+"

N.T.S.



CLASS "G"

N.T.S.

NOTES:

1. FOR MAINS 42" DIAMETER AND LARGER, 1/8 Bc SHALL BE TAKEN AS 6".
2. Bc = OUTSIDE DIAMETER OF PIPE
3. Bd = TRENCH WIDTH
4. D = INSIDE DIAMETER OF PIPE

STANDARD DRAWING NO. R-3050

EMBEDMENT

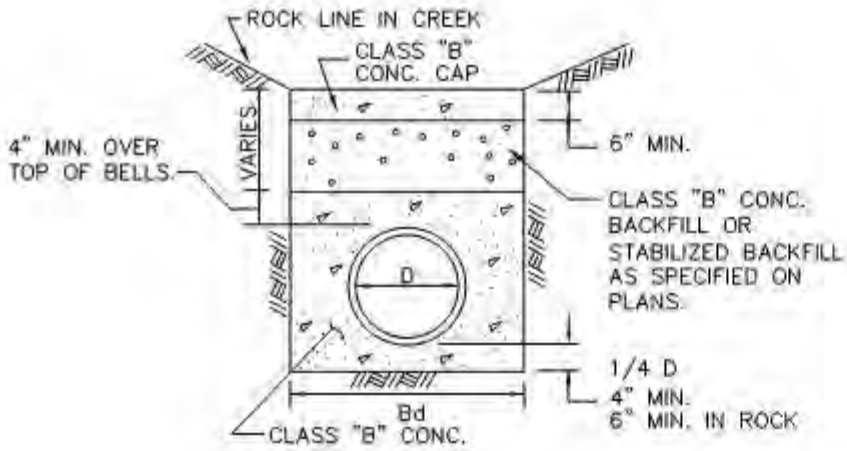
CLASS "D+" & "G"

CITY OF ROCKWALL

STANDARD SPECIFICATION REFERENCE 504.5

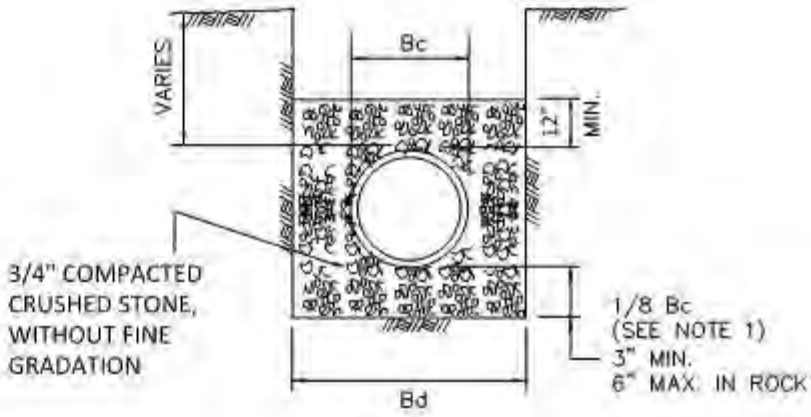
DATE Mar. 2018

STANDARD DRAWING NO. R-3050



CLASS "G-1"

(FOR ROCK DITCHES IN CREEKS)
N.T.S.



CLASS "H"

N.T.S.

(TO BE USED FOR PVC WASTEWATER PIPE)

NOTES:

1. FOR MAINS 42" DIAMETER AND LARGER, 1/8 Bc SHALL BE TAKEN AS 6".
2. Bd = TRENCH WIDTH
3. Bc = OUTSIDE DIAMETER OF PIPE
4. D = INSIDE DIAMETER OF PIPE

STANDARD DRAWING NO. R-3060

EMBEDMENT

CLASS "G-1" & "H"

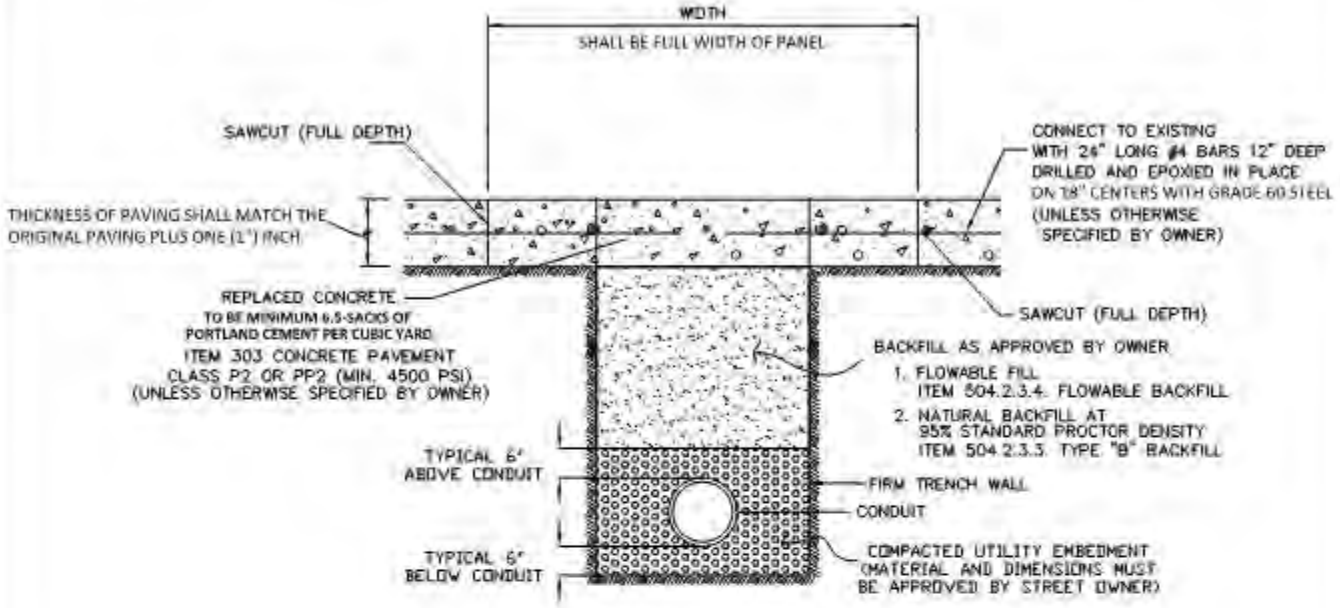
CITY OF ROCKWALL

STANDARD SPECIFICATION REFERENCE 504.5

DATE AUG. '19

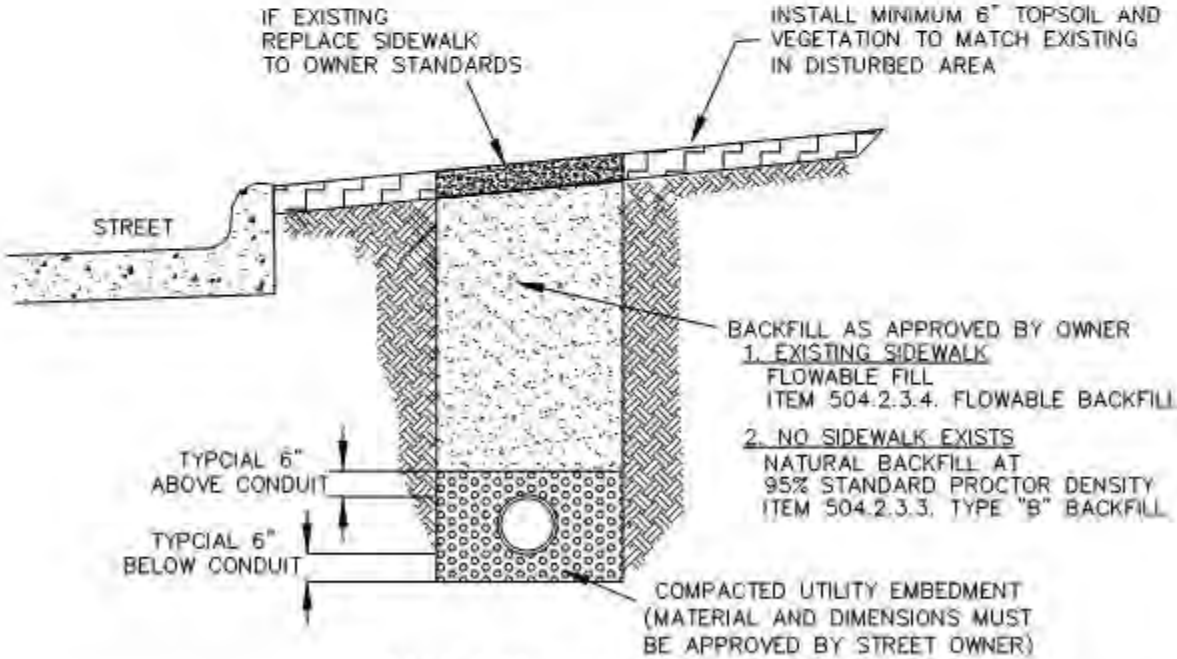
STANDARD DRAWING NO. R-3060

GENERAL NOTE: CHECK WITH STREET OWNER FOR SPECIFIC REQUIREMENTS NOT CONTAINED HEREIN



CONCRETE PAVEMENT

N.T.S.

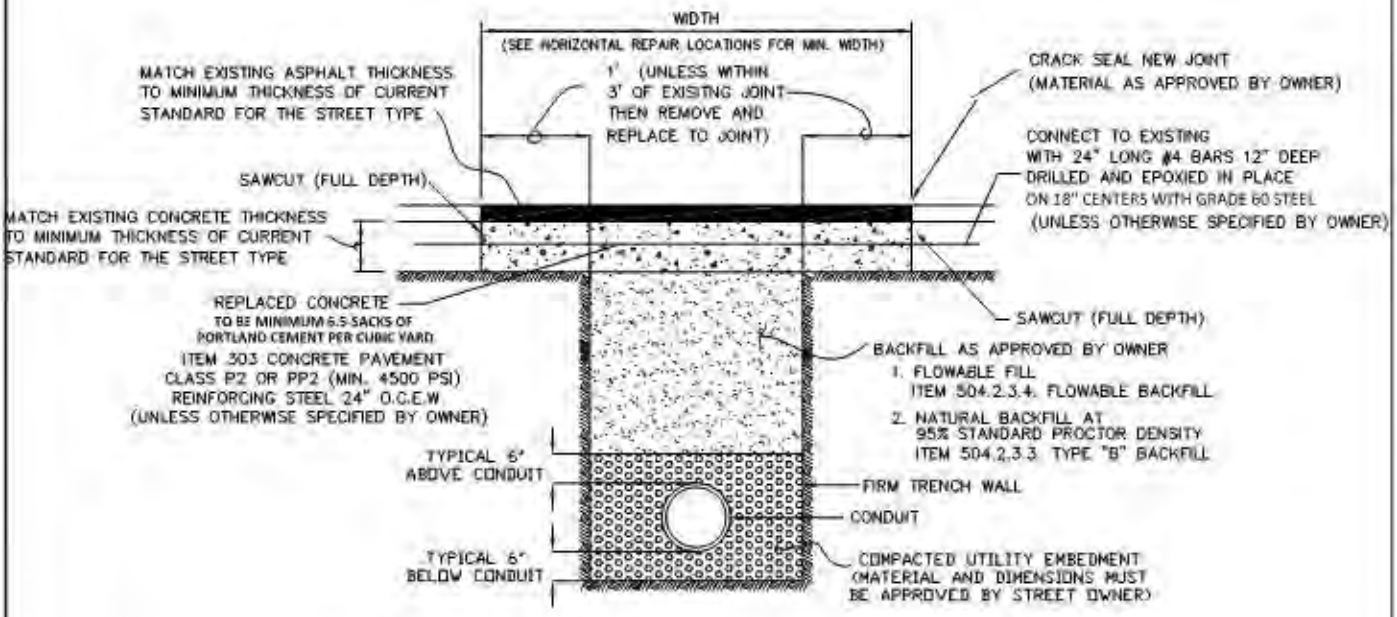


STREET PARKWAY

N.T.S.

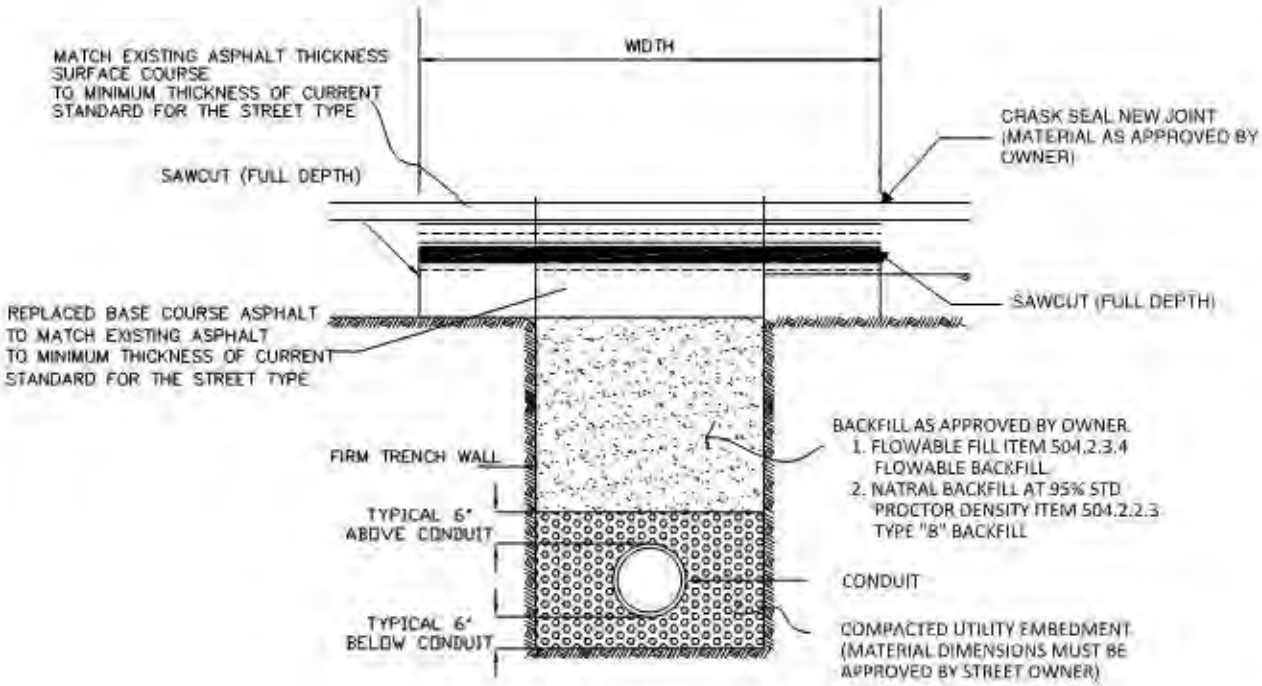
PAVEMENT CUT AND REPAIR	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 402	
CONCRETE AND PARKWAY		DATE Mar. 2018	STANDARD DRAWING NO. R-3070A

GENERAL NOTE: CHECK WITH STREET OWNER FOR SPECIFIC REQUIREMENTS NOT CONTAINED HEREIN



CONCRETE PAVEMENT WITH ASPHALT OVERLAY

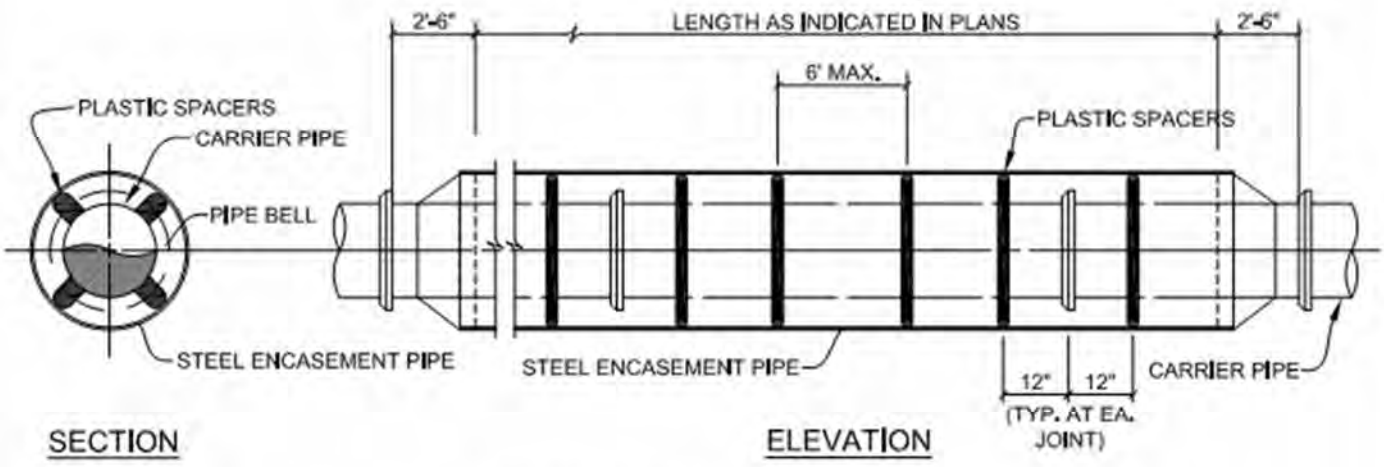
N.T.S.



FULL DEPTH ASPHALT PAVEMENT

N.T.S.

PAVEMENT CUT AND REPAIR	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 402	
ASPHALT		DATE Mar. 2018	STANDARD DRAWING NO. R-3070B



ENCASED ROAD BORE

NO SCALE

NOTES:

1) ALL BORES BY CONTRACTOR SHALL BE DRY BORES.
2) PREFABRICATED PLASTIC SPACERS SHALL BE RACI NORTH AMERICA OR APPROVED EQUAL. FOR THE SPECIFIC APPLICATION AS RECOMMENDED BY THE MANUFACTURER.
3) CONTRACTOR SHALL PROVIDE SUPPORT UNDER CARRIER PIPE TO HAVE A MIN. 1" CLEARANCE BETWEEN PIPE BELL AND ENCASEMENT PIPE.
4) ENDS OF ENCASEMENT PIPE SHALL HAVE END SEALS INSTALLED PER MANUFACTURER'S REQUIREMENTS. END SEALS SHALL BE CCI MODEL ESW WRAP-AROUND BY CCI PIPELINE SYSTEMS OR APPROVED EQUAL.
5) THE DESIGN ENGINEER SHALL DESIGN THE MINIMUM THICKNESS OF THE ENCASEMENT PIPE. DESIGN WILL NEED TO INCLUDE DEAD LOADING BASED ON THE HEIGHT OF COVER AND HS-20 LOADINGS FOR ROADWAY CROSSINGS AND E-80 LOADINGS FOR RAILROAD CROSSINGS.
6) STEEL ENCASEMENT PIPE SHALL CONFORM TO AWWA C-200. PIPE SHALL BE FABRICATED IN ACCORDANCE WITH ASTM A-570 FROM STEEL PLATES HAVING MINIMUM YIELD STRENGTH 36,000 PSI.
7) STEEL ENCASEMENT PIPE SHALL BE PAINTED INSIDE AND OUTSIDE WITH TWO COATS OF TNEMEC, HB TNEMECOL, SERIES 46+465 COAL TAR, OR CITY APPROVED EQUIVALENT PRIOR TO DELIVERY TO THE JOB SITE. MINIMUM COATING INSIDE AND OUTSIDE SHALL BE 12+MILS DRY FILM THICKNESS (DFT) PER EACH COAT.
8) ENCASEMENT PIPE SHALL BE FEILD WELDED IN ACCORDANCE WITH AWWA C-206. WELDED JOINTS SHALL BE WIRE BRUSHED AND PAINTED WITH ONE COAT OF TNEMEC, OMNITHANE SERIES 530, 2.5-MILS DRY FILM THICKNESS 9DFT) OR CITY APPROVED EQUIVALENT.

UNDERGROUND CONDUIT	CITY OF ROCKWALL	
STEEL ENCASED BORE		DATE: OCT. '17 / DRAWING NO.: R-3090

City of Rockwall
The New Horizon

8.4 Division 4000 Water Distribution

NOTE: *(1) Deleted NCTCOG Drawing*
(2) Revised NCTGOG Drawing (see revisions below)
(3) Added Rockwall Standard Drawing (see drawing below)
(4) Added Current TxDOT Standards

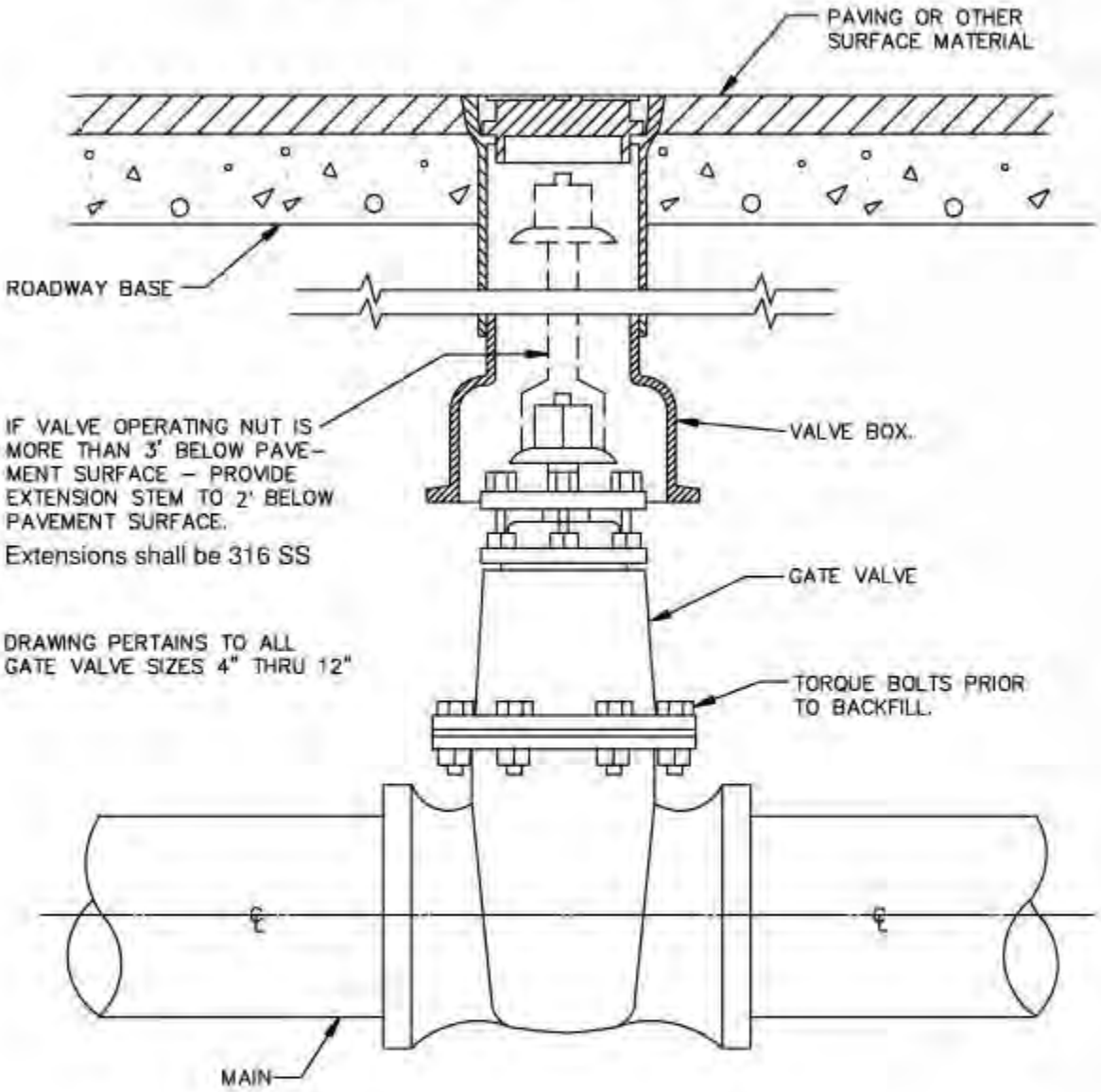
Table 9.4: Revisions to NCTCOG's Division 4000 Water Distribution

Revised	Drawing No.	Subject
	4010A	Horizontal Thrust Blocking – At Pipe Bend
	4010B	Horizontal Thrust Blocking – At Pipe Bend
	4010C	Horizontal Thrust Blocking – At Pipe Bend
	4020	Horizontal Thrust Blocking – At Tees and Plugs
	4030	Vertical Thrust Blocking – At Pipe Bend
	4040	Thrust Block – General Notes
(1)	~~4050~~	~~Gate Valve 4" to 12" – Box & Extension Stem~~
(3)	**R-4050**	**Gate Valve 4" to 12" – Box & Extension Stem**
(1)	~~4060A~~	~~Vault Construction – Horizontal Gate Valve ≥ 16"~~
(1)	~~4060B~~	~~Vault Construction – Horizontal Gate Valve ≥ 16"~~
(3)	**R-4060**	**16" Thru 21" – Horizontal Butterfly Valves**
(1)	~~4070A~~	~~Vault Construction – Vertical Gate Valve ≥ 16"~~
(1)	~~4070B~~	~~Vault Construction – Vertical Gate Valve ≥ 16"~~
	4080A	Vault Construction – Butterfly Valve ≥ 48"
	4080B	Vault Construction – Butterfly Valve ≥ 48"
(1)	~~4090~~	~~Combination Air Vacuum Valve – Type "1"~~
(3)	**R-4090**	**Combination Air Vacuum Valve – Type "1"**
	4100A	Combination Air Vacuum Valve – Type "2"
	4100B	Air Release Valve – Type "2"
(1)	~~4110~~	~~Flush Point Installation – Type "1"~~
(3)	**R-4110**	**Flush Point Installation – Type "1"**
(1)	~~4120~~	~~Fire Hydrant - Installation~~
(3)	**R-4120**	**Fire Hydrant - Installation**
(1)	~~4130~~	~~Water Service Installation – ¾" or 1" Line~~
(3)	**R-4130**	**Water Service Installation – ¾" or 1" Line**
(1)	~~4140~~	~~Water Service Installation – 1 ½" or 2" Line~~
(3)	**R-4140**	**Water Service Installation – 1 ½" or 2" Line**
(3)	**R-4145**	**Single Service Meter Tail Connection**
(1)	~~4150~~	~~4" Combination Service – With 4" Meter~~
(3)	**R-4150**	**4" Combination Service – With 4" Meter**
(1)	~~4160~~	~~8" Detector Check – Service with 8" Meter~~
(3)	**R-4060**	**Domestic Meter Vault – 3", 4" or 6" Line**
(3)	~~4170~~	~~8" Fire Line Standpipe – Service with 8" Meter~~
(3)	**R-4070**	**Irrigation Meter Vault – 3", 4" or 6" Line**
(1)	~~4180~~	~~4" Domestic Service – With 3" Meter~~
(1)	~~4190A~~	~~Large Service Meter – Vault Installation~~

Revised	Drawing No.	Subject
(1)	~~4190B~~	~~Large Service Meter – Precast Vault~~
(1)	~~4200~~	~~Water Main Lowering – Below Wastewater Main~~
(3)	**R-4200**	**Water Main Lowering – Below Wastewater Main**

NOTE:

IN UNPAVED AREAS, INSTALL 2' x 2' x 6" CONCRETE VALVE PAD FLUSH WITH THE TOP OF VALVE BOX. REINFORCE WITH #3 BARS ON 6" CENTERS BOTH WAYS.



GATE VALVE BOX AND EXTENSION STEM

N.T.S.

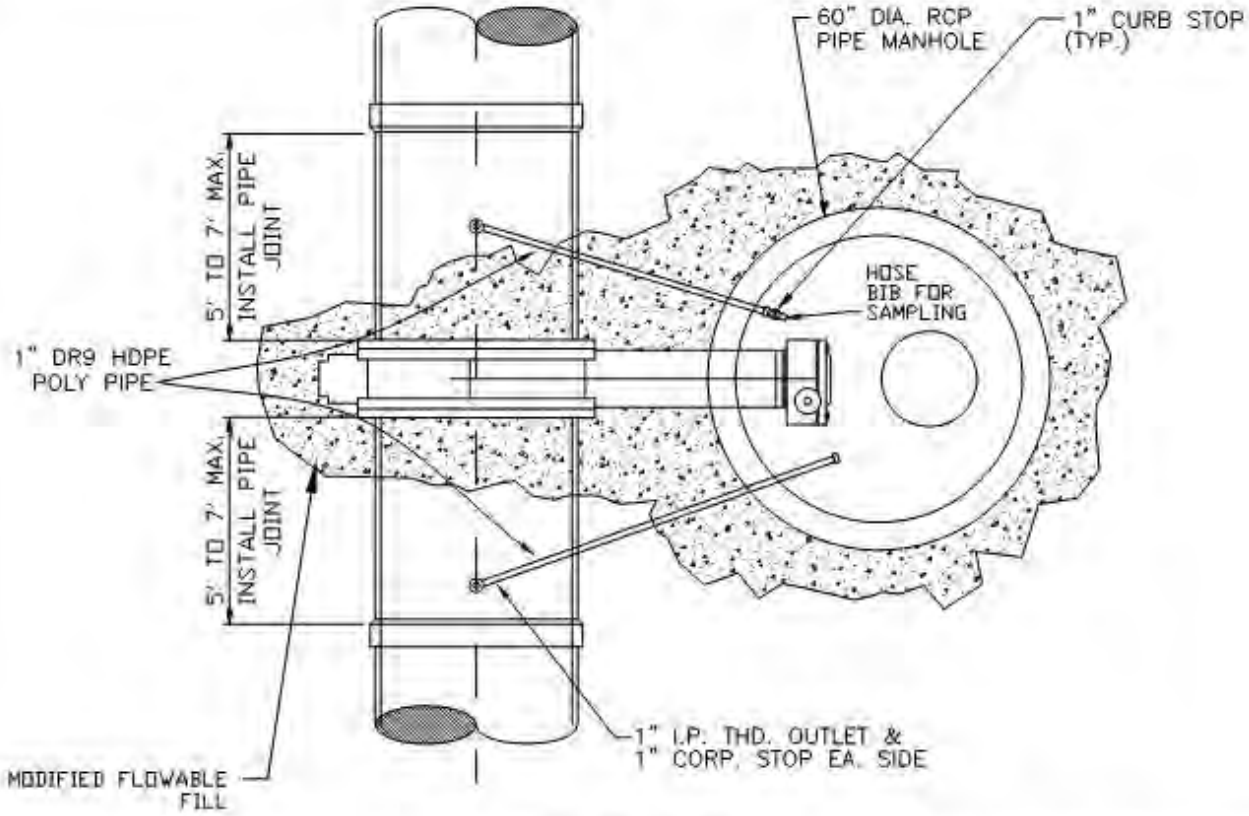
GATE VALVE 4" TO 12" BOX & EXTENSION STEM	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 502.6.6*	
		DATE AUG. '19	STANDARD DRAWING NO. R-4050

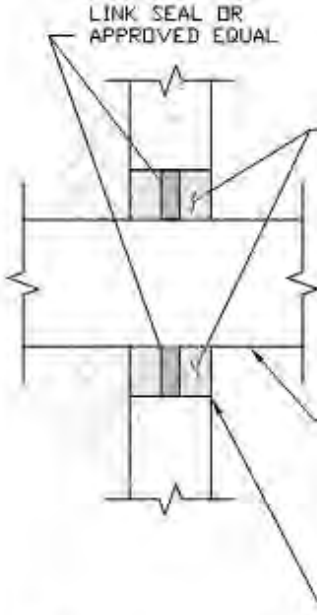
NOTES:

1. VALVE OPERATOR EXTENSION STEM SHALL BE 1" SOLID STEEL WITH WELDED CONNECTIONS. EXTENSION STEM SHALL NOT UTILIZE CLIPS AND SHALL NOT BE PERMANENTLY CONNECTED TO ACTUATOR.
2. WAX TAPE ALL BURIED FLANGES, BOLTS, AND MECHANICAL JOINTS.
3. WRAP VALVE IN 8 MIL POLYETHYLENE SHEET FOR BOND BREAKER PRIOR TO PLACEMENT OF MODIFIED FLOWABLE FILL.
4. DURING THE WATER LINE TESTING PROCESS, THE 1" HDPE DR9 POLY PIPE SHALL BE EXTENDED AND SUPPORTED TO 3 FEET ABOVE THE RIM ELEVATION OF THE VAULT FOR USE AS A WATER SAMPLING TEST STATION.
5. POLY PIPE SHALL BE SEAMLESS 250 PSI BLUE COLORED POLYETHYLENE ASTM D2737, DR 9, CTS WATER PIPE.
6. CONTRACTOR SHALL VERIFY VALVE BONNET, ACTUATOR, AND STEM EXTENSION DIMENSIONS WITH VALVE MANUFACTURER. COORDINATE LOCATION OF THE 2-INCH SQUARE NUT WITH VALVE BOX CAST IN MANHOLE ROOF SLAB. SUBMIT SHOP DRAWINGS CLEARLY SHOWING DIMENSIONS AND LOCATION OF THE ALL SLAB OPENINGS. ENSURE ADEQUATE CLEARANCE FOR ACTUATOR AND HATCH OPENING.
7. FOR SIZES ABOVE 20-INCH, THE ENGINEER OF RECORD SHALL SUBMIT A STRUCTURAL DESIGN TO THE CITY FOR REVIEW AND APPROVAL FOR CONSTRUCTION. THE STRUCTURAL DESIGN AND DETAIL SHALL FOLLOW THE GENERAL CONFIGURATION AND LAYOUT ILLUSTRATED IN STD. DWG. NO. R-4060

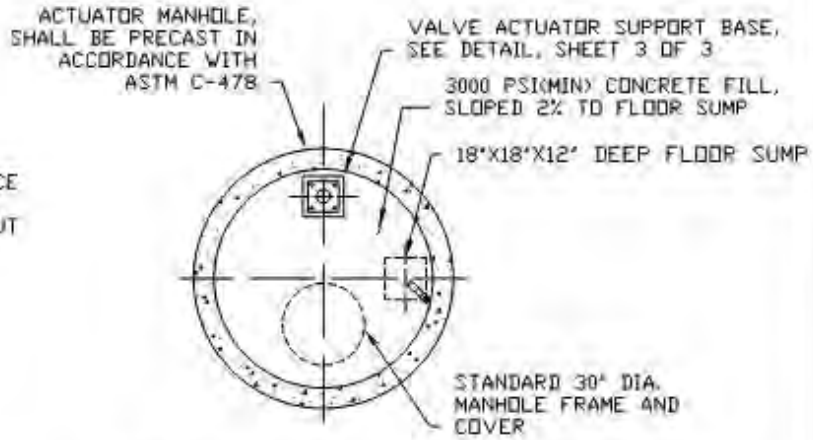
SHEET 1 OF 3

16" THRU 21"	CITY OF ROCKWALL	
HORIZONTAL BUTTERFLY VALVES		DATE: AUG '19 / DRAWING NO.: R-4060





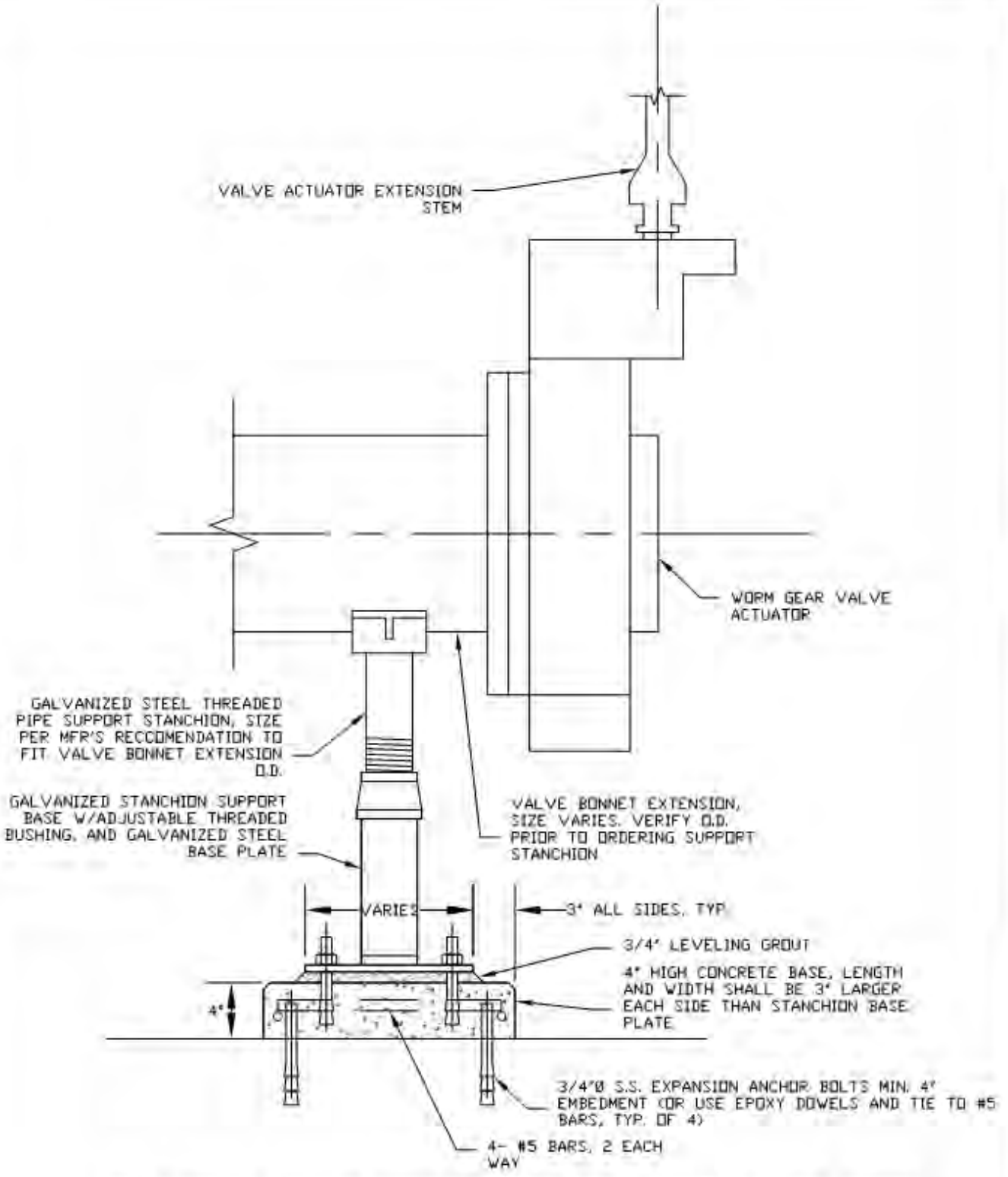
MANHOLE WALL PENETRATION DETAIL
N.T.S.



BFV SUPPORT & ACTUATOR MANHOLE
STANDARD DETAIL-MANHOLE INTERIOR PLAN
N.T.S.

SHEET 2 OF 3

16" THRU 21"	CITY OF ROCKWALL	
HORIZONTAL BUTTERFLY VALVES		DATE: AUG '19 / DRAWING NO.: R-4060



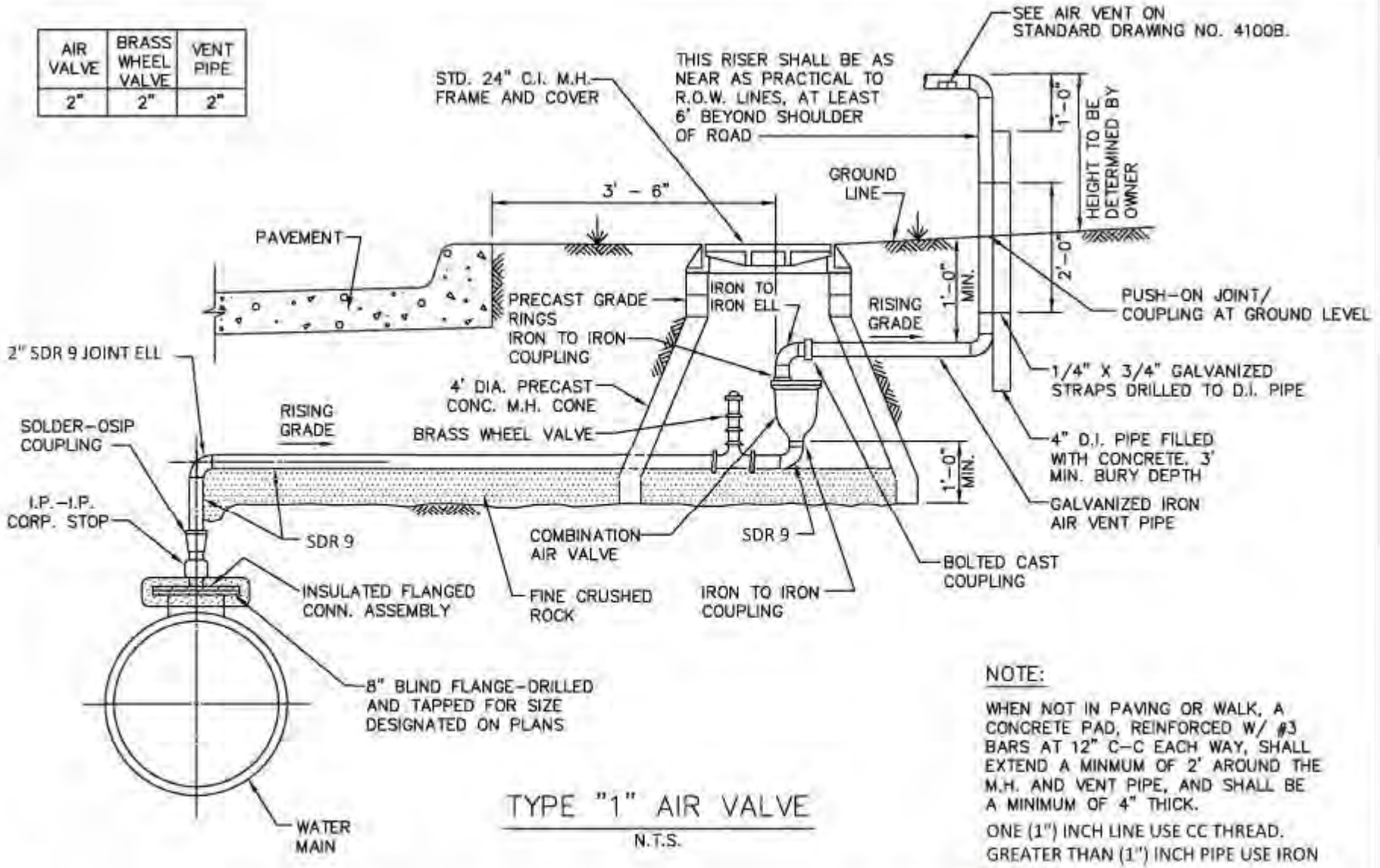
BFV SUPPORT & ACTUATOR MANHOLE STANDARD DETAIL - VALVE ACTUATOR SUPPORT

N.T.S.

SHEET 3 OF 3

16" THRU 21"	CITY OF ROCKWALL		
HORIZONTAL BUTTERFLY VALVES		DATE AUG '19	DRAWING NO R-4060

AIR VALVE	BRASS WHEEL VALVE	VENT PIPE
2"	2"	2"



TYPE "1" AIR VALVE

N.T.S.

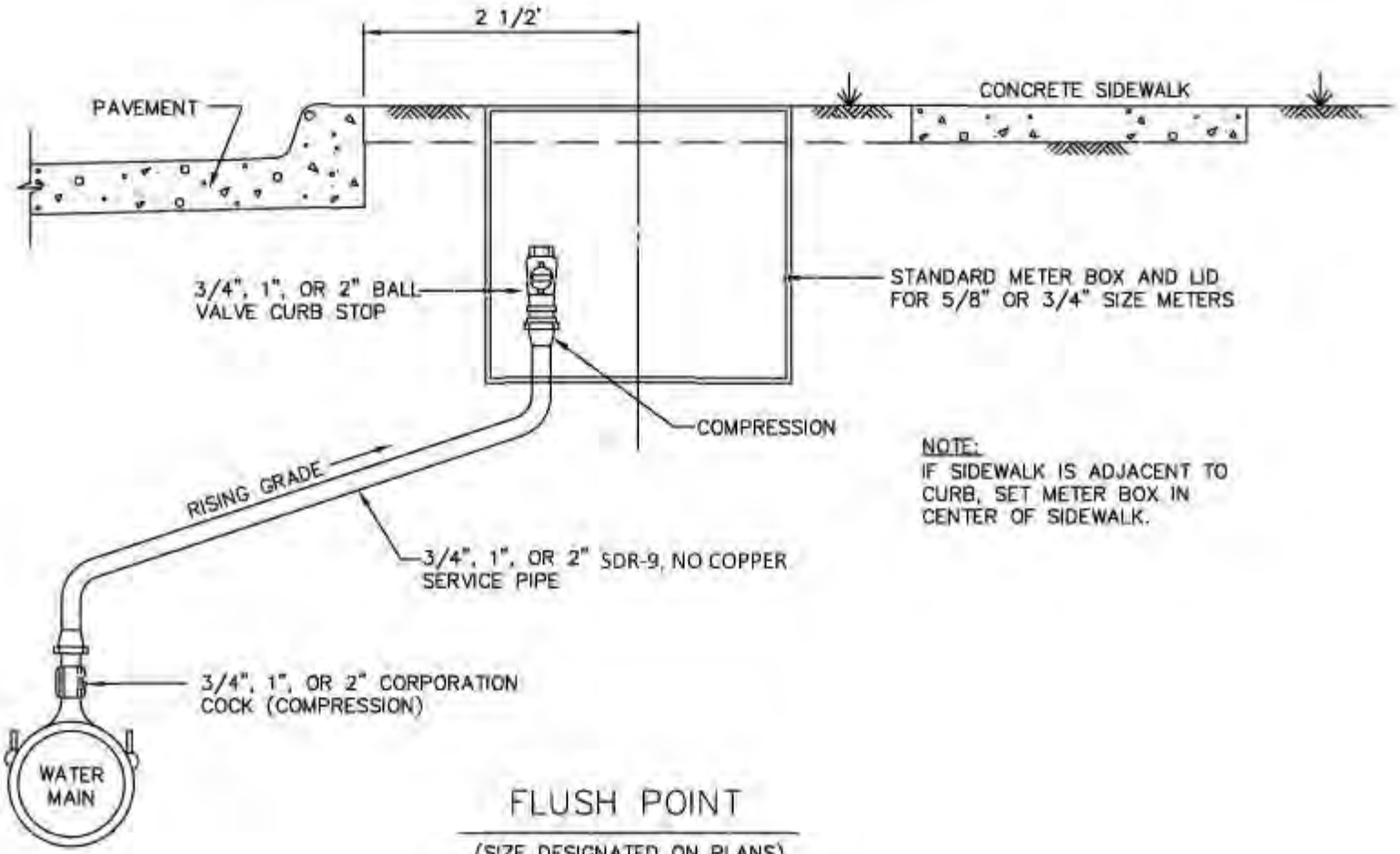
NOTE:

WHEN NOT IN PAVING OR WALK, A CONCRETE PAD, REINFORCED W/ #3 BARS AT 12" C-C EACH WAY, SHALL EXTEND A MINMUM OF 2' AROUND THE M.H. AND VENT PIPE, AND SHALL BE A MINIMUM OF 4" THICK.

ONE (1") INCH LINE USE CC THREAD. GREATER THAN (1") INCH PIPE USE IRON THREAD.

STANDARD DRAWING NO. R-4090

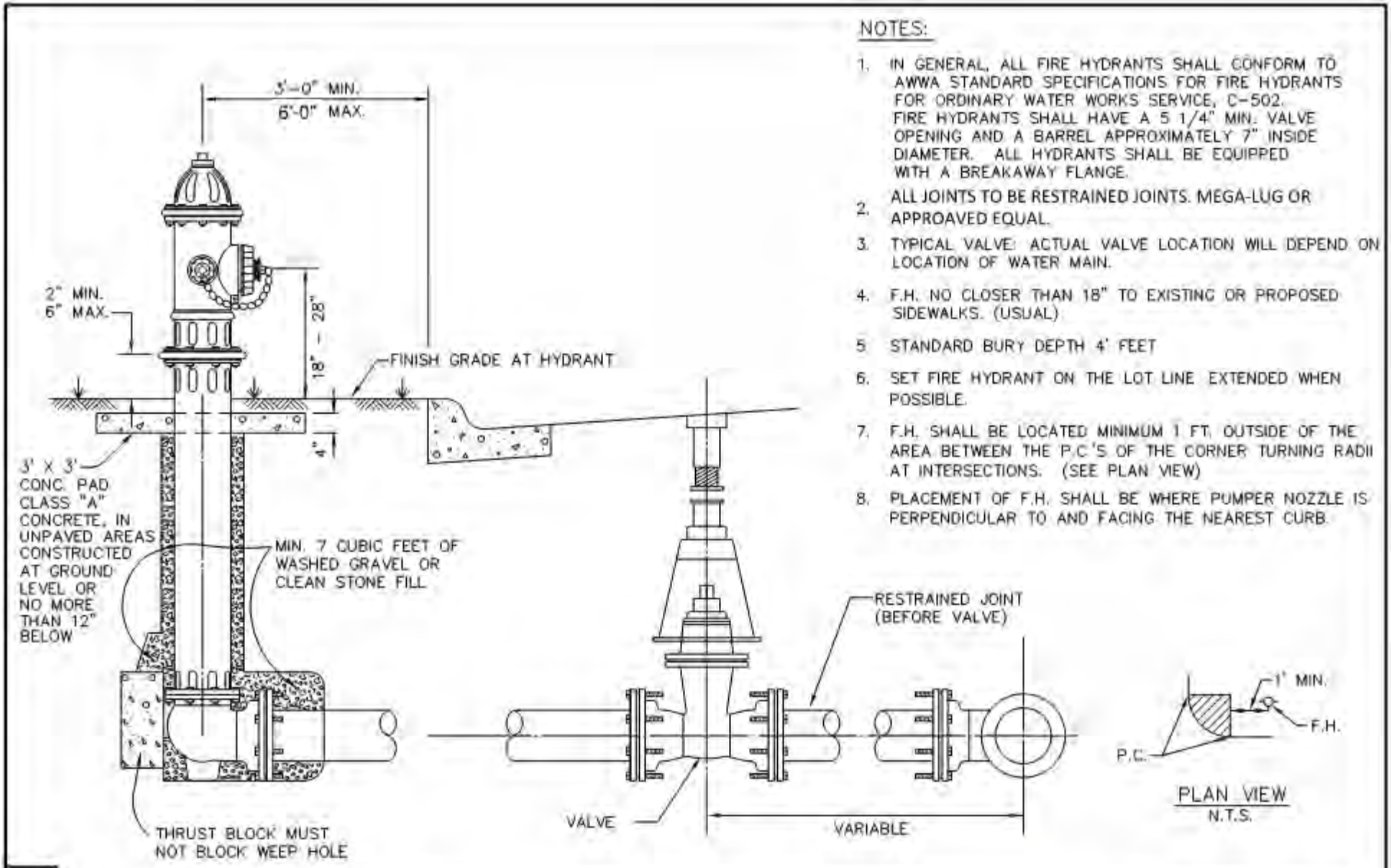
COMBINATION AIR VACUUM VALVE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 502.6.6*
TYPE "1"		DATE Mar. 2018 / STANDARD DRAWING NO. R-4090



FLUSH POINT

(SIZE DESIGNATED ON PLANS)
N.T.S.

STANDARD DRAWING NO.	FLUSH POINT INSTALLATION	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE
R-4110	TYPE "1"		502.10.3*
			DATE: Mar. 2018 / STANDARD DRAWING NO.: R-4110



NOTES:

1. IN GENERAL, ALL FIRE HYDRANTS SHALL CONFORM TO AWWA STANDARD SPECIFICATIONS FOR FIRE HYDRANTS FOR ORDINARY WATER WORKS SERVICE, C-502. FIRE HYDRANTS SHALL HAVE A 5 1/4" MIN. VALVE OPENING AND A BARREL APPROXIMATELY 7" INSIDE DIAMETER. ALL HYDRANTS SHALL BE EQUIPPED WITH A BREAKAWAY FLANGE.
2. ALL JOINTS TO BE RESTRAINED JOINTS. MEGA-LUG OR APPROAVED EQUAL.
3. TYPICAL VALVE: ACTUAL VALVE LOCATION WILL DEPEND ON LOCATION OF WATER MAIN.
4. F.H. NO CLOSER THAN 18" TO EXISTING OR PROPOSED SIDEWALKS. (USUAL)
5. STANDARD BURY DEPTH 4' FEET
6. SET FIRE HYDRANT ON THE LOT LINE EXTENDED WHEN POSSIBLE.
7. F.H. SHALL BE LOCATED MINIMUM 1 FT. OUTSIDE OF THE AREA BETWEEN THE P.C.'S OF THE CORNER TURNING RADII AT INTERSECTIONS. (SEE PLAN VIEW)
8. PLACEMENT OF F.H. SHALL BE WHERE PUMPER NOZZLE IS PERPENDICULAR TO AND FACING THE NEAREST CURB.

STANDARD DRAWING NO. R-4120

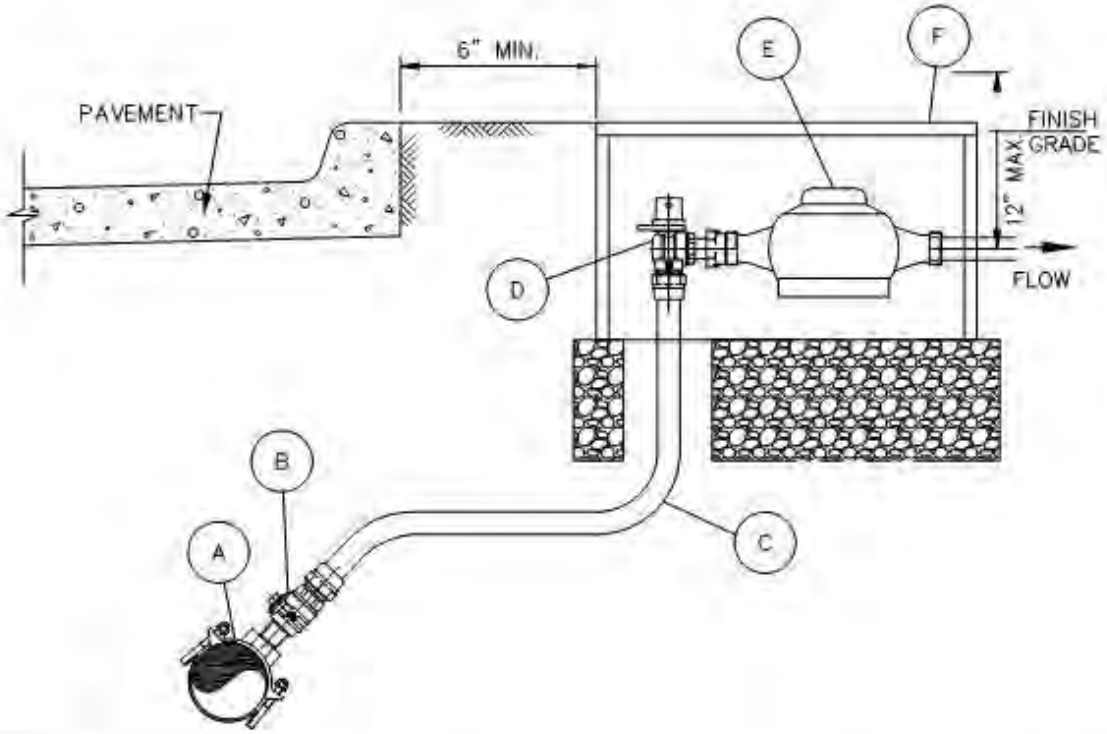
FIRE HYDRANT INSTALLATION

CITY OF ROCKWALL

STANDARD SPECIFICATION REFERENCE: 502.3

DATE: Aug. 2019

STANDARD DRAWING NO: R-4120



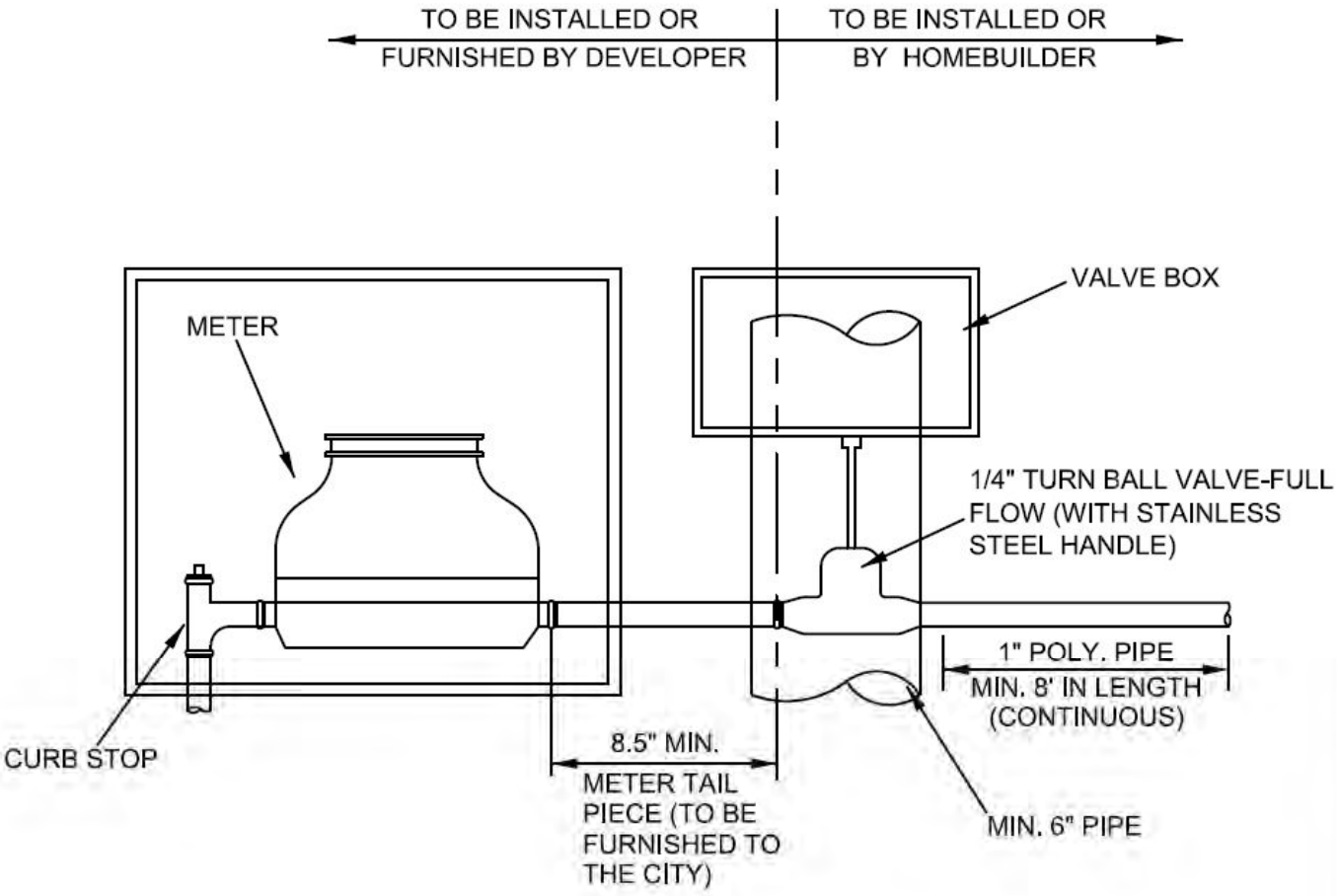
NOTES:

1. SERVICE PIPE SHALL BE 1" OR 2" SEAMLESS 250 PSI BLUE COLORED POLYETHYLENE ASTM D2737, SDR 9, CTS WATER SERVICE PIPE, NSF61 APPROVED.
2. TOP OF METER BOXES SHALL BE 1" ABOVE FINISHED GRADE.
3. METER BOX SHALL HAVE A MINIMUM OF 6" OF GRAVEL BENEATH METER BOX AS ILLUSTRATED.
4. LOCATION OF THE METER BOX SHALL BE LOCATED TO ALLOW 6" CLEARANCE FROM CURB.

MATERIAL LIST:

A. SERVICE SADDLE SHALL BE BRASS WITH DOUBLE BRONZE FLATTENED STRAPS OR STAINLESS STEEL DOUBLE BOLT WIDE STRAPS. NO BANDED OR HINGED STRAPS SHALL BE ALLOWED. SERVICE SADDLES SHALL MEET AWWA/CC TAPPING OUTLET (TAPERED THREADS) REQUIREMENTS. ALL SERVICE SADDLES SHALL BE PER APPROVED WATER MATERIALS LIST.
B. 1" OR 2" CORPORATION STOP PER APPROVED WATER MATERIALS LIST.
C. 1" OR 2" SERVICE PIPE SHALL BE SEAMLESS 250 PSI BLUE COLORED POLYETHYLENE ASTM D2737, SDR9, CTS WATER SERVICE PIPE, NSF61 APPROVED.
D. 1" OR 2" LOCKING ANGLE METER VALVE (STOP) PER APPROVED WATER MATERIALS LIST.
E. WATER METERS CENTERED IN BOX AS ILLUSTRATED.
F. ROUND METER BOX PER APPROVED WATER MATERIALS LIST.

WATER SERVICE INSTALLATION	CITY OF ROCKWALL		
1" OR 2" LINE		DATE AUG '19	DRAWING NO. R-4130



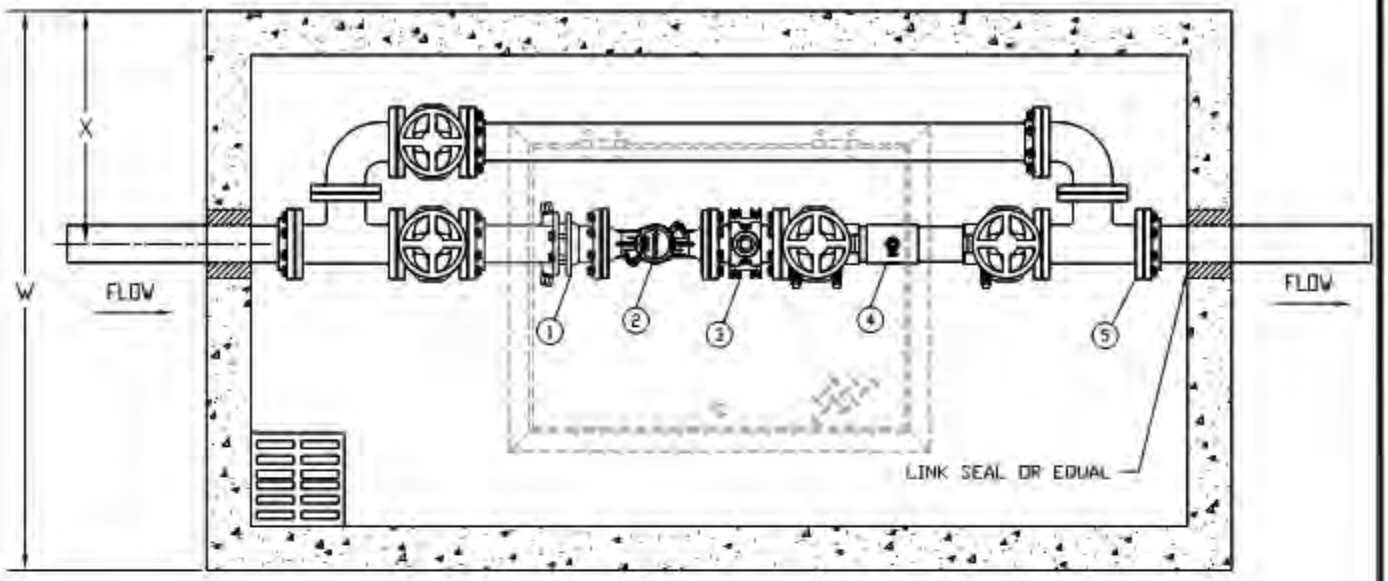
NOTE:

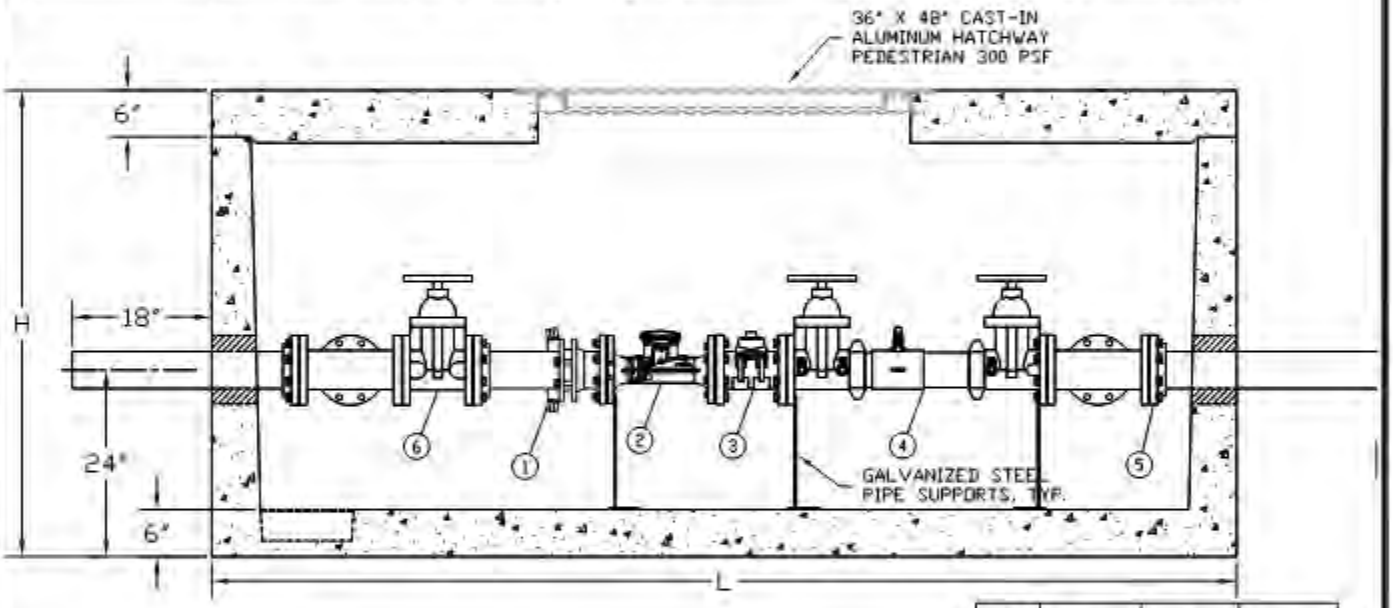
VALVE BOX TO BE TRAFFIC RATED IF UNDER PAVING.

SINGLE SERVICE METER TAIL CONNECTION

NOT TO SCALE

WATER METER DETAIL	CITY OF ROCKWALL	
SINGLE SERVICE		DATE AUG. '15 / DRAWING NO. R-4145





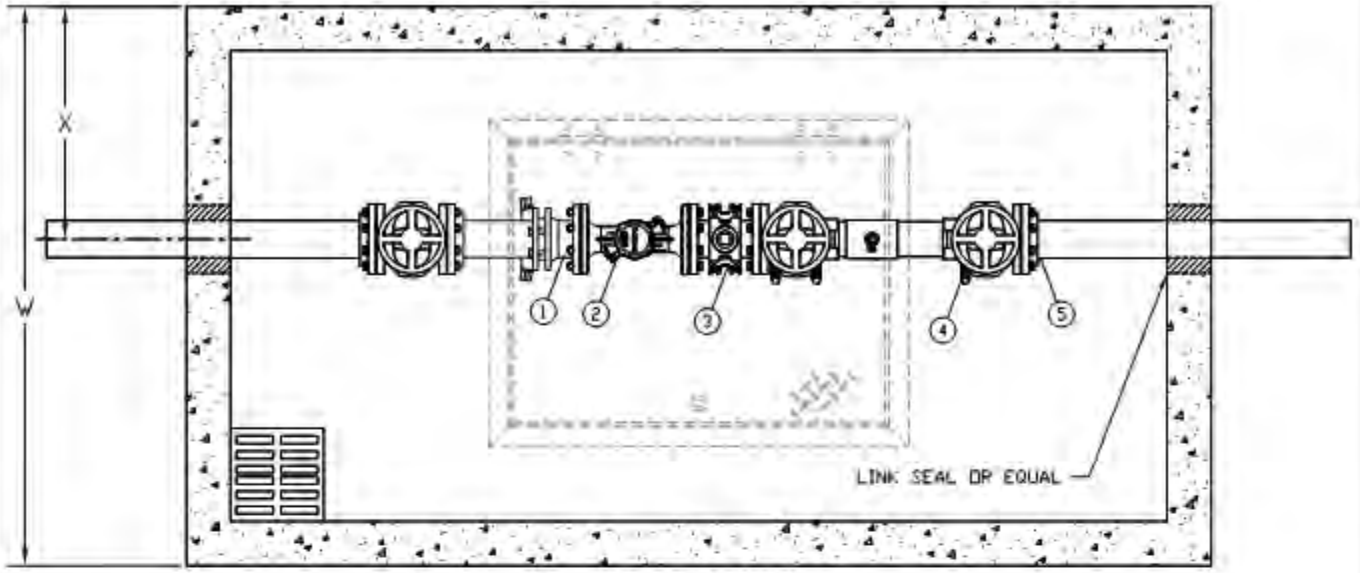
SIZE	L	W	H
3"	11'- 0"	6'- 0"	5'- 0"
4"	8'- 8"	5'- 0"	5'- 0"
6"	11'- 0"	6' 0"	5'- 0"

NOTES:

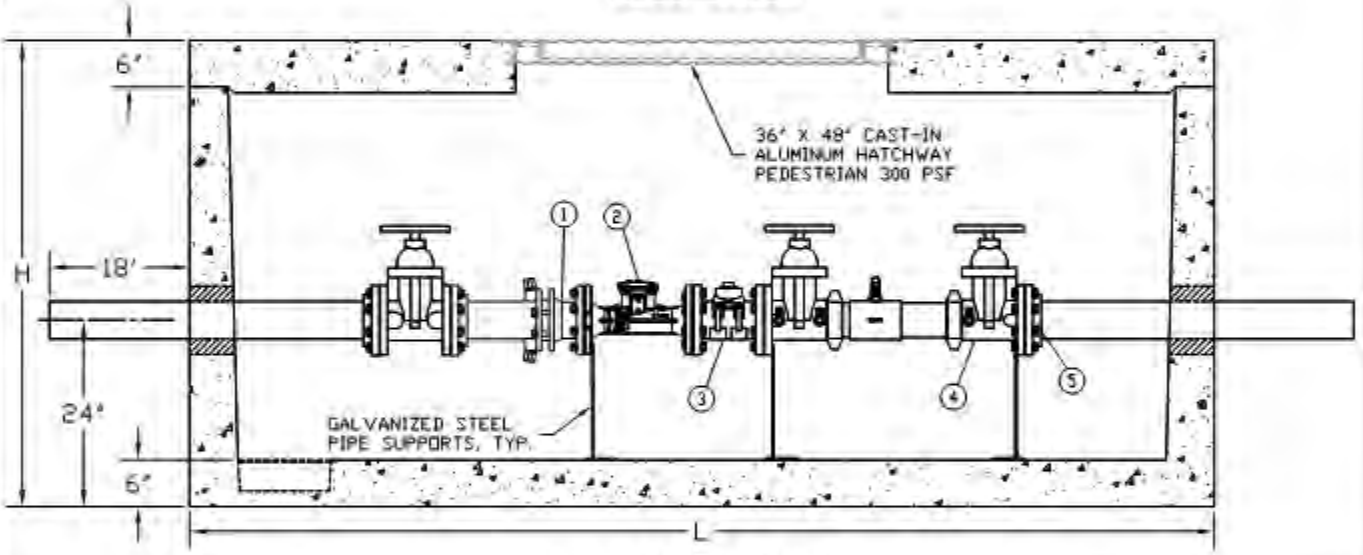
1. CONCRETE SHALL HAVE MIN STRENGTH OF 4200 PSI AT 28 DAYS. NO CAST IN PLACE VAULTS SHALL BE ALLOWED.
2. REINFORCEMENT SHALL BE GRADE 60. STEEL BAR SHALL CONFORM TO ASTM A615 ON REQUIRED CENTERS OR EQUALS.
3. ACCESS IS 1/4" ALUMINUM DIAMOND PLATE COVER WITH ALUMINUM FRAME. HATCH TO BE FURNISHED WITH 316 STAINLESS STEEL SLAM LOCK & HINGES.

ITEM	DESCRIPTION
1	FLANGE COUPLING ADAPTER
2	MASTER METER OCTAVE METER
3	STRAPPING SADDLE W/2" NPT PLUG
4	DOUBLE CHECK ASSEMBLY
5	FLG X P.E. SPOOL, D.I.
6	FLG NRS GATE VALVE

IRRIGATION WATER METER VAULT	CITY OF ROCKWALL	
3", 4" OR 6" LINE		DATE: AUG '19 / DRAWING NO.: R-4160



PLAN VIEW



ELEVATION VIEW

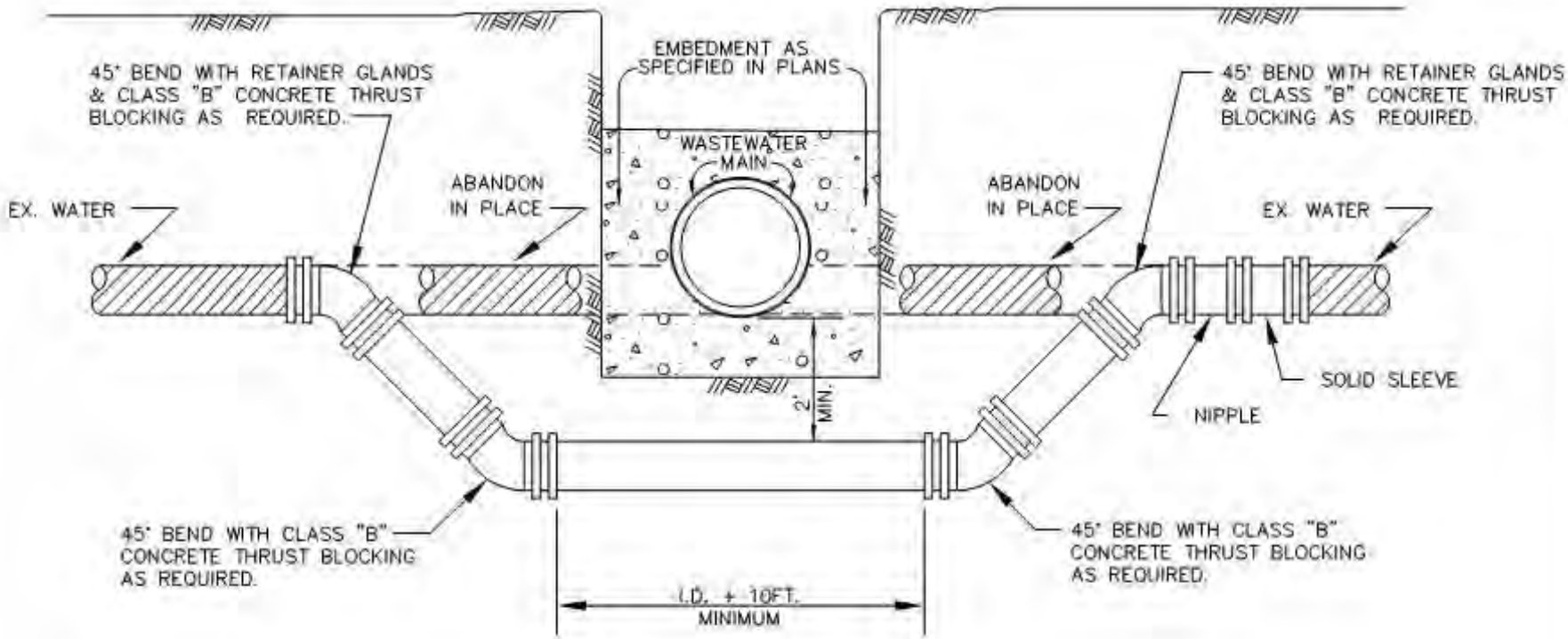
SIZE	L	W	H
3"	11'- 0"	6'- 0"	5'- 0"
4"	11'- 0"	6'- 0"	5'- 0"
6"	11'- 0"	6'- 0"	5'- 0"

NOTES:

1. CONCRETE SHALL HAVE MIN STRENGTH OF 4200 PSI AT 28 DAYS. NO CAST IN PLACE VAULTS SHALL BE ALLOWED.
2. REINFORCEMENT SHALL BE GRADE 60. STEEL BAR SHALL CONFORM TO ASTM A615 ON REQUIRED CENTERS OR EQUALS.
3. ACCESS IS 1/4" ALUMINUM DIAMOND PLATE COVER WITH ALUMINUM FRAME. HATCH TO BE FURNISHED WITH 316 STAINLESS STEEL SLAM LOCK & HINGES.

ITEM	DESCRIPTION
1	FLANGE COUPLING ADAPTER
2	MASTER METER OCTAVE METER
3	STRAPPING SADDLE W/2" NPT PLUG
4	DOUBLE CHECK ASSEMBLY
5	FLG X P.E. SPOOL, D.I.

IRRIGATION WATER METER VAULT	CITY OF ROCKWALL	
3", 4" OR 6" LINE		DATE: AUG '19 / DRAWING NO.: R-4170



CONCRETE ENCASEMENT SHALL ENCASE ENTIRE WASTEWATER MAIN. DEFLECT WATER LINE WHEN POSSIBLE

STANDARD DRAWING NO. R-4200

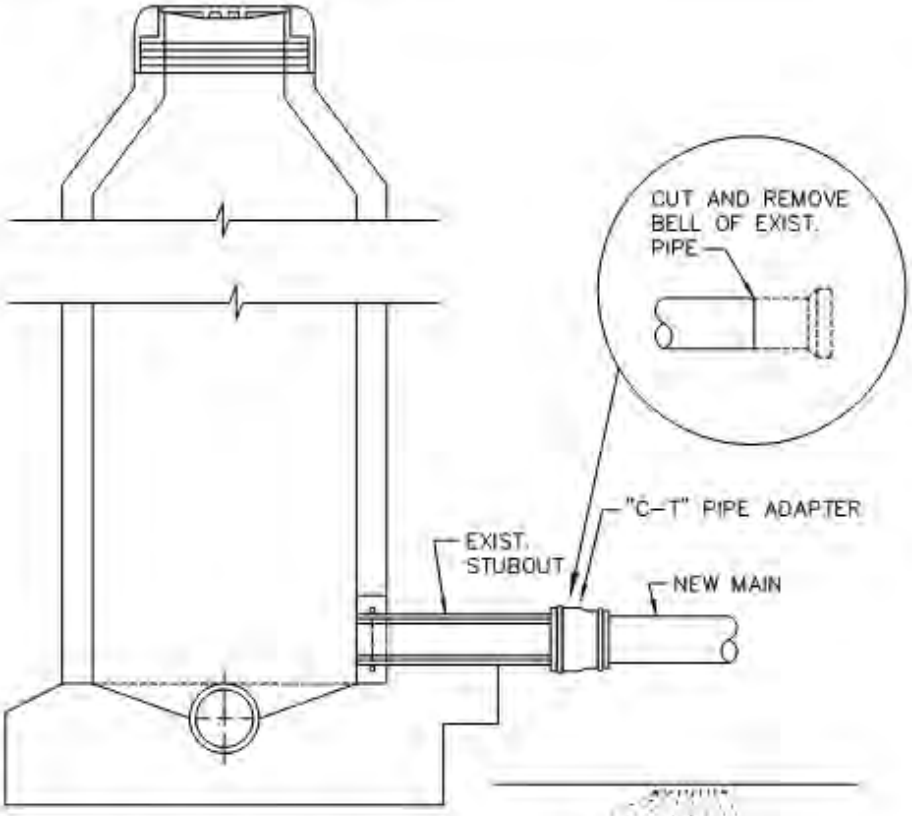
WATER MAIN LOWERING BELOW WASTEWATER MAIN	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 506.6	
		DATE Mar. 2018	STANDARD DRAWING NO R-4200

8.5 Division 5000 Wastewater Collection

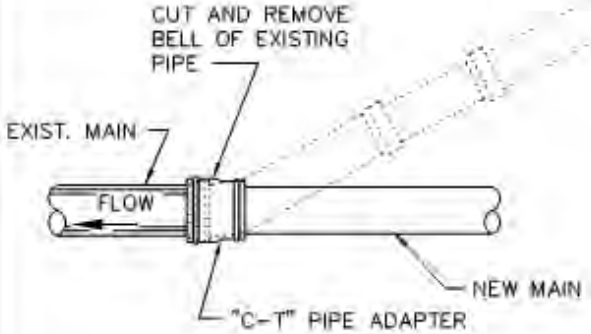
NOTE: *(1) Deleted NCTCOG Drawing*
(2) Revised NCTGOG Drawing (see revisions below)
(3) Added Rockwall Standard Drawing (see drawing below)
(4) Added Current TxDOT Standards

Table 9.5: Revisions to NCTCOG's Division 5000 Wastewater Collection

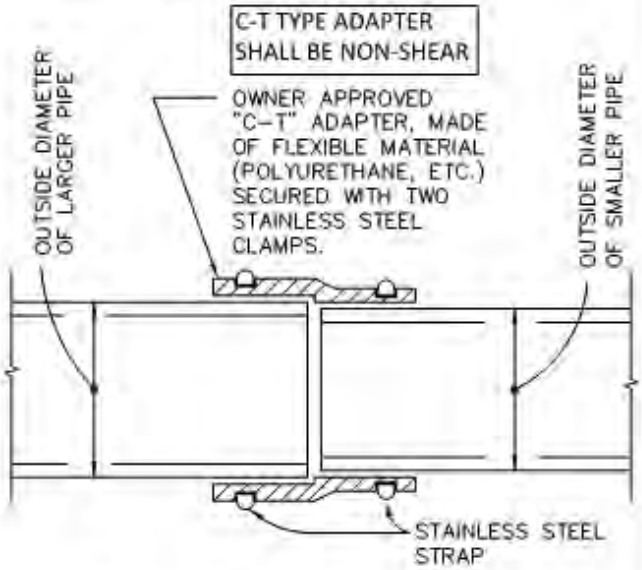
Revised	Drawing No.	Subject
(1)	~~*5010*~~	~~*Wastewater Main Tie-In – At Cleanout or M.H. Stubout*~~
(3)	***R-5010***	***Wastewater Main Tie-In – At Cleanout or M.H. Stubout***
(1)	~~*5020*~~	~~*Wastewater Manhole – Precast*~~
(3)	***R-5020***	***Wastewater Manhole – Precast***
(1)	~~*5030*~~	~~*Wastewater Manhole – Cast-In-Place*~~
(3)	***R-5030***	***Wastewater Manhole – Cast-In-Place***
(1)	~~*5040*~~	~~*Wastewater Manhole – Fiberglass*~~
(1)	~~*5050*~~	~~*Wastewater Manhole – Pressure Type*~~
(3)	***R-5050***	***Wastewater Manhole – Pressure Type***
(1)	~~*5060*~~	~~*Wastewater Manhole – Vented*~~
(3)	***R-5060***	***Wastewater Manhole – Vented***
(1)	~~*5070*~~	~~*Wastewater Manhole – Outside Drop Connections*~~
(1)	~~*5080*~~	~~*Wastewater Manhole – Inside Drop Connection*~~
(3)	***R-5080***	***Wastewater Manhole – Inside Drop Connection***
	5090	Wastewater Manhole – Line Intersection
	5100	Wastewater Manhole – False Bottom
(3)	**R-5101**	**Wastewater Manhole – Hinged Rim & Cover**
(3)	**R-5102**	**Wastewater Manhole – Bolt and Gasket Rim & Cover**
(3)	**R-5103**	**Wastewater Manhole – Private Rim & Cover**
(1)	~~5110~~	~~Wastewater Main – Cleanout~~
(3)	**R-5110**	**Wastewater Main – Cleanout**
(1)	~~5120~~	~~Wastewater Laterals – With & Without Cleanout~~
(3)	**R-5120**	**Wastewater Lateral Connections – Residential**
(1)	~~5130~~	~~Wastewater Lateral Connections – In Earth & In Rock~~
	5140	Wastewater Lateral Connections – Cleanout Frame & Cover
(1)	~~5150~~	~~Wastewater Lateral Stubout – In Advance of Paving~~
(3)	**R-5150**	**Wastewater Lateral Stubout – In Advance of Paving**
(1)	~~5160~~	~~Wastewater Lateral Replacement – In Advance of Paving~~
(3)	**R-5160**	**Wastewater Lateral Replacement – In Advance of Paving**
(1)	~~5170~~	~~Abandonment of Manhole – In or Out of Pavement~~
(3)	**R-5170**	**Abandonment of Manhole – In or Out of Pavement**
(3)	**R-5180**	**Manhole and Valve Vault – Mow Strip**



AT STUBOUT
N.T.S.



AT CLEANOUT
N.T.S.



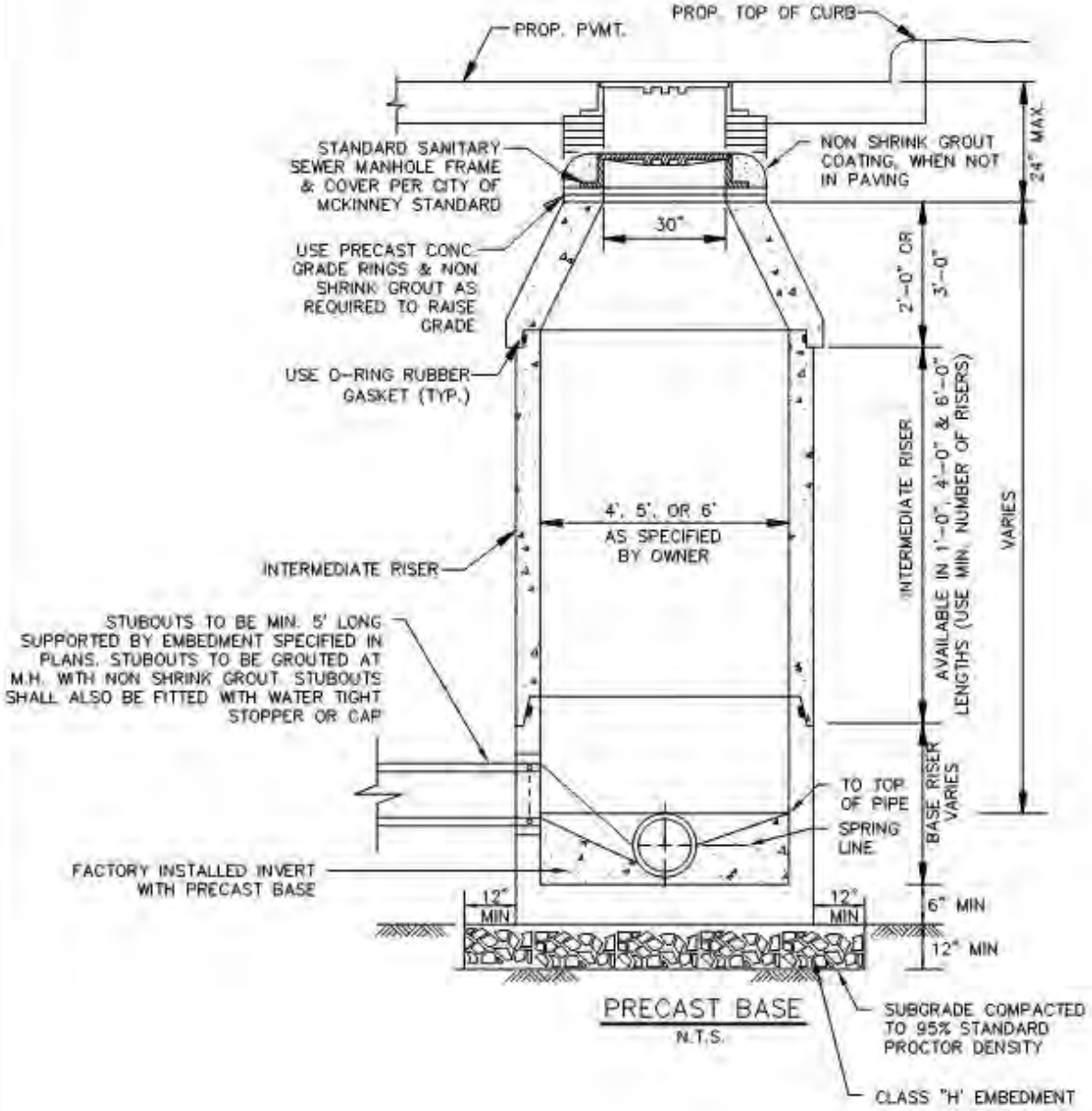
"C-T" PIPE ADAPTER
N.T.S.

NOTE:
THIS DETAIL FOR USE ONLY WHEN NEW MAIN WILL NOT MATE WITH EXISTING MAIN JOINT DUE TO DIFFERENT DIMENSIONS OR MATERIALS AND A MANHOLE IS NOT REQUIRED.

WASTEWATER MAIN TIE-IN	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 502.10	
AT CLEANOUT OR M.H. STUBOUT		DATE Mar. 2018	STANDARD DRAWING NO. R-5010

NOTES:

1. FIRST MAIN LINE JOINT TO BE A MIN. OF 5' LONG.
2. IF FALSE M.H. ARE REQUIRED, THEY SHALL BE CONSTRUCTED, INSTALLED AND REMOVED PER STD. DWG. NO. 5100.
3. M.H.'S LOCATED OUTSIDE OF PAVING SHALL BE CONSTRUCTED WITH A CONCRETE MOW STRIP PER STD. DWG. NO. R-7005.
4. REFER TO STD. DWG. NO. R-5031 FOR INFLOW PROTECTION AT MANHOLE GRADE RINGS, MANHOLE JOINTS AND ON OUTSIDE OF STRUCTURE.
5. REFER TO STD. DWG. NO. R-5032 FOR CORROSION PROTECTION.
6. CONCRETE SHALL BE 4,200 PSI (7.0 SACK/CY) 28 DAY STRENGTH.
7. REINFORCING SHALL MEET OR EXCEED ASTM C478 REQUIREMENTS.
8. INSTALL GREEN EMS DISK AT ALL MANHOLES.
9. LIP TO BE PRECAST.



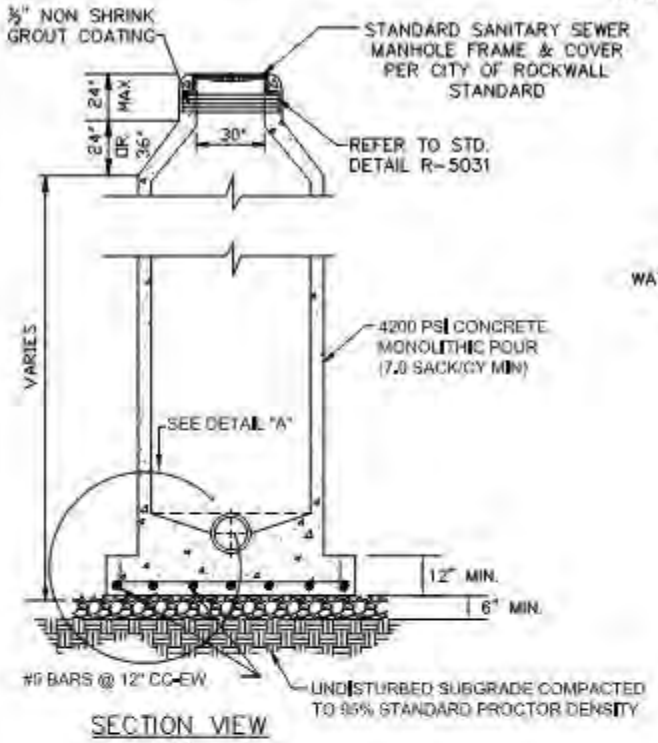
WASTEWATER MANHOLE	CITY OF ROCKWALL		
PRECAST		DATE AUG '19	DRAWING NO. R-5020

CONCRETE CONE

⇦ ACCESS OPTIONS ⇨

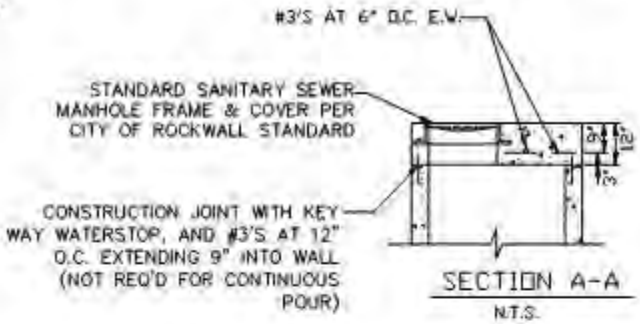
N.T.S.

REINFORCED CONCRETE SLAB (FLAT TOP) TO BE USED WHEN MANHOLE IS IN FLOODPLAIN



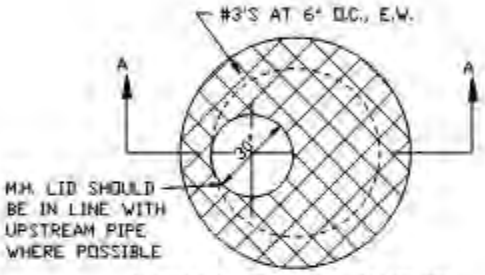
SECTION VIEW

N.T.S.



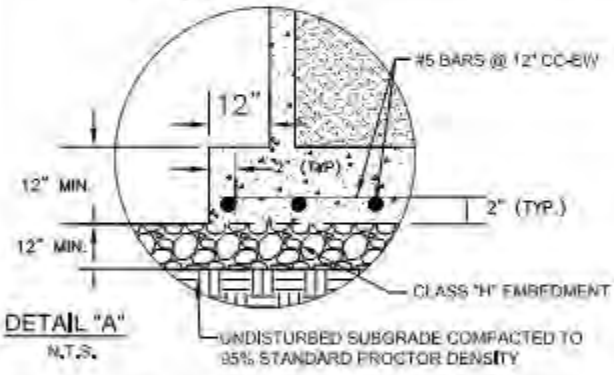
SECTION A-A

N.T.S.



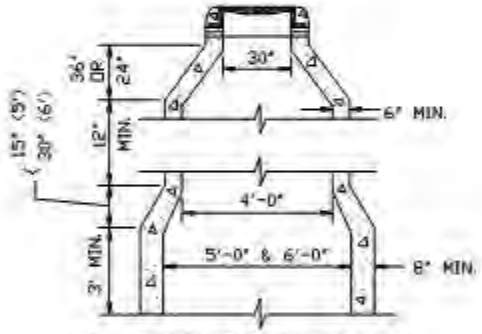
ACCESS STEEL LAYOUT

N.T.S.



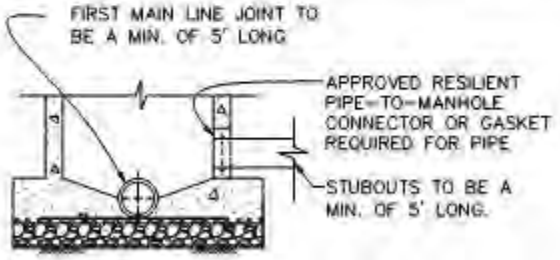
DETAIL "A"

N.T.S.



TRANSITION DETAIL FOR 5' & 6' DIA. M.H.'S

N.T.S.



STUBOUT CONNECTION

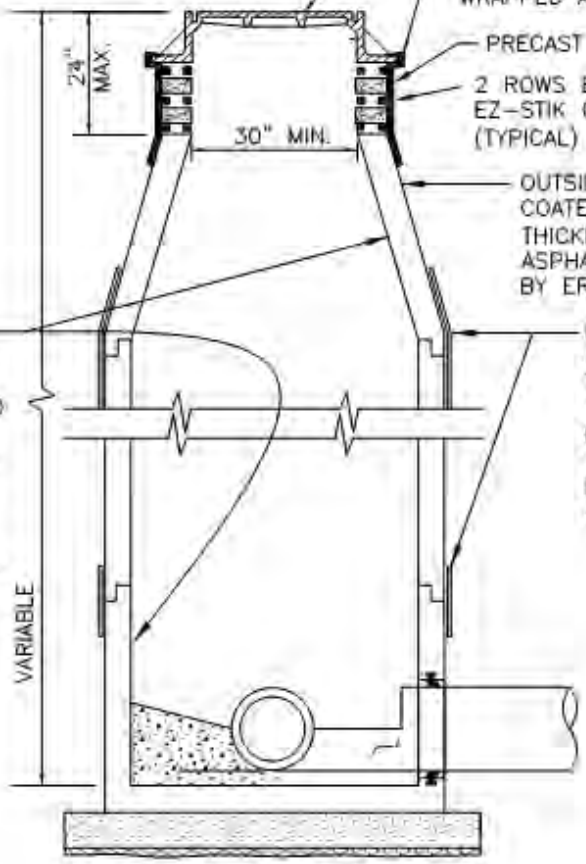
N.T.S.

NOTES:

1. IF FALSE M.H. BOTTOMS ARE REQUIRED THEY SHALL BE CONSTRUCTED, INSTALLED AND REMOVED PER STD. DWG. NO. 5100
2. M.H.'S LOCATED OUTSIDE OF PAVING SHALL BE CONSTRUCTED WITH A CONCRETE MOW STRIP PER STANDARD DETAIL R-7005.
3. REFER TO STD. DWG. NO. R-5031 FOR INFLOW PROTECTION AT MANHOLE GRADE RINGS AND ON THE OUTSIDE OF MANHOLE STRUCTURE.
4. CAST IN PLACE BASE MUST BE A MINIMUM 12" THICK WITH #5 BARS @ 12" OC-EW (EACH WAY) AND SHALL EXTEND 1' BEYOND MANHOLE.
6. CONCRETE SHALL BE 4,200 PSI (7.0 SACK/CY) 28 DAY STRENGTH.
7. REINFORCING SHALL MEET OR EXCEED ASTM C478 REQUIREMENTS.
8. INSTALL GREEN EMS DISK AT ALL MANHOLES.

WASTEWATER MANHOLE	CITY OF ROCKWALL	
CAST-IN-PLACE		DATE: AUG '19 / DRAWING NO.: R-5030

CORROSION PROTECTION ⇦ ⇨ INFLOW PREVENTION



ELEVATION
N.T.S.

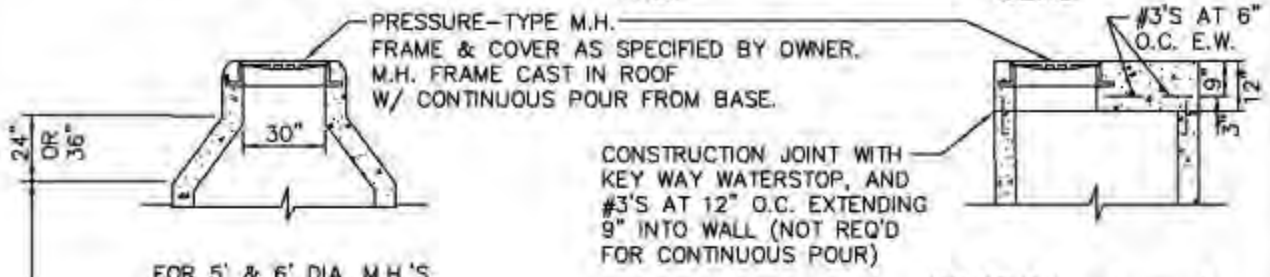
INFLOW PREVENTION NOTES:
1. REQUIRED ON ALL SANITARY SEWER MANHOLES AND LIFT STATION WET WELLS AND VALVE VAULTS.

CORROSION PREVENTION NOTES:
1. TO CORROSION PROTECTIVE COATING PROCESS, PRESSURE WASH AND CLEAN STRUCTURE. FILL BUG HOLES, JOINTS, HONEYCOMBS AND AROUND PIPE PENETRATIONS WITH A CEMENTITOUS REPAIR MATERIAL (CRM) AS NEEDED. USE STRONG SEAL MS2C MANUFACTURED BY THE STRONG COMPANY, INC. OR APPROVED EQUAL. THEN APPLY A MINIMUM OF 125 MILS ($\frac{1}{8}$ INCH) THICKNESS OF A POLYURETHANE COATING MATERIAL (EXISTING MANHOLES REQUIRE A MINIMUM OF 250 MILS THICKNESS OF POLYURETANE COATING MATERIAL). FOR THE POLYURETHANE COATING MATERIAL USE RAVEN 405 LINER OR APPROVED EQUAL.
2. ADDITIONAL CLEANING, PREPARATION, AND REPAIR METHODS MAY BE REQUIRED FOR EXISTING MANHOLES DEPENDING ON CONDITION ASSESSMENT OF THE MANHOLE. CONTACT ENGINEERING DIVISION FOR ADDITIONAL SPECIFICATIONS.
3. SPARK TESTING IS REQUIRED FOR COATINGS. COST FOR TESTING IS SUBSIDIARY TO OTHER BID ITEMS. CITY INSPECTOR TO BE PRESENT FOR SPARK TESTING. CONTRACTOR TO PROVIDE WRITTEN SPARK TEST RESULTS TO CITY.
4. EXISTING BRICK MANHOLES SHALL BE REPLACED.
5. REQUIRED ON ALL WASTEWATER MANHOLES AND LIFT STATION WET WELLS.

WASTEWATER MANHOLE	CITY OF ROCKWALL	
INFLOW PREVENTION & CORROSION PROTECTION		DATE: AUG '19 / DRAWING NO.: R-5031

CONCRETE CONE ⇦ ROOF OPTIONS ⇨ REINFORCED CONCRETE SLAB

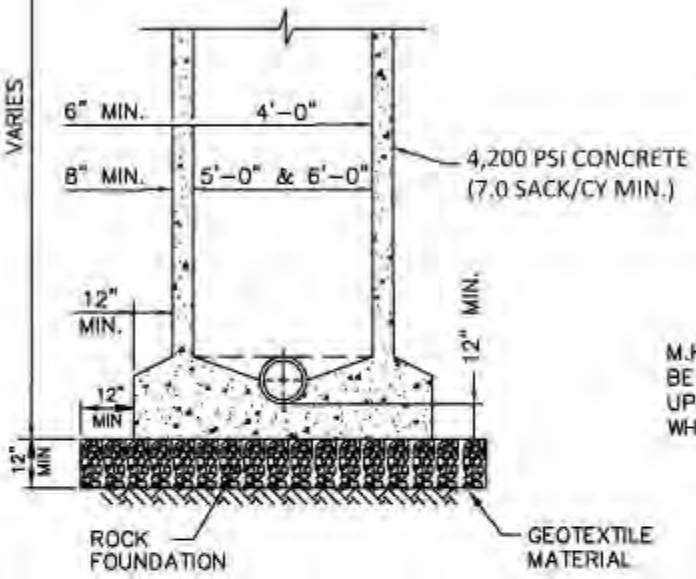
N.T.S.

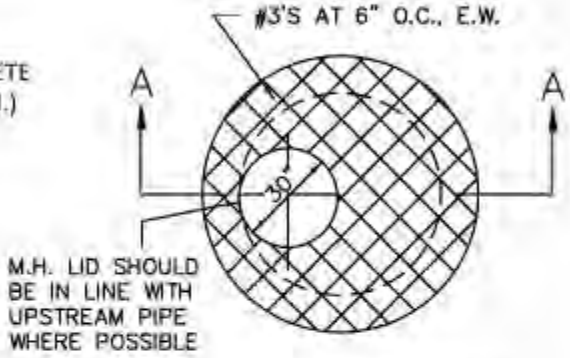


FOR 5' & 6' DIA. M.H.'S SEE TRANSITION DETAIL

SECTION A – A

N.T.S.

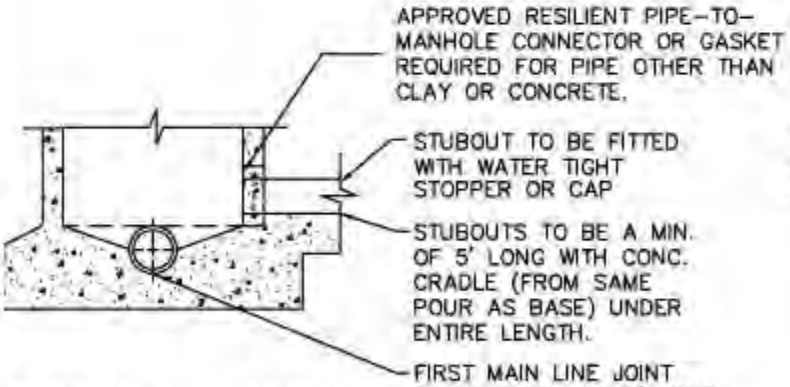




ROOF STEEL LAYOUT

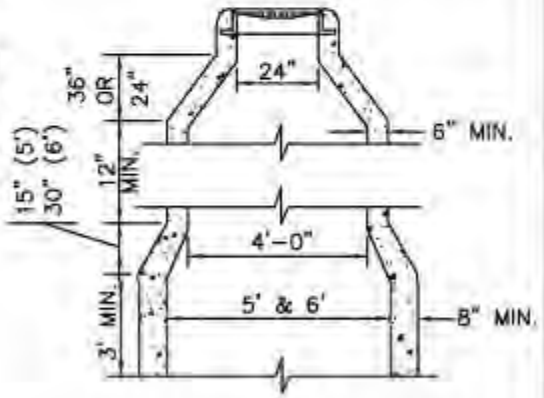
N.T.S.

INSTALL GREEN EMS DISKS AT ALL MANHOLES.



STUBOUT CONNECTION

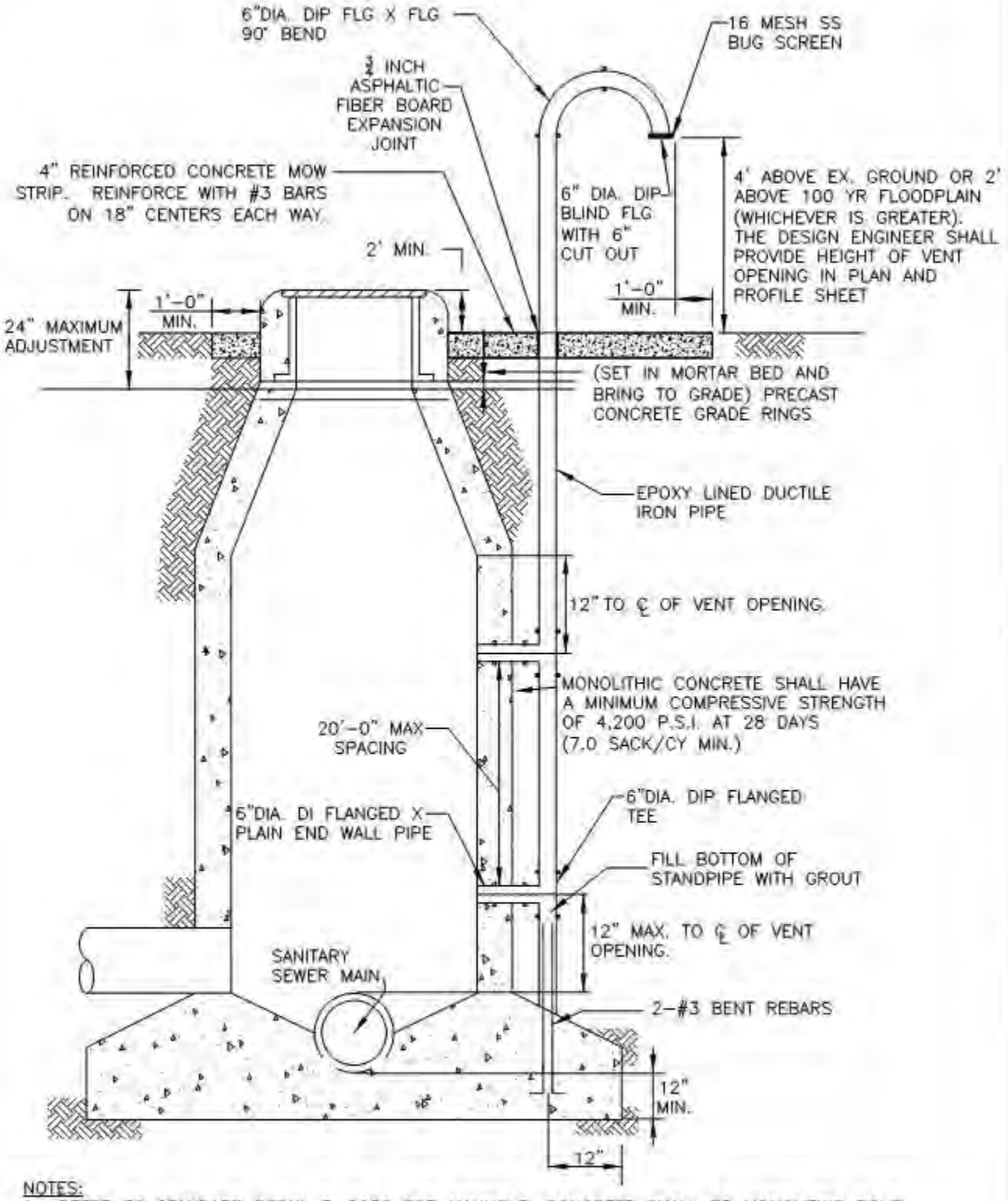
N.T.S.



TRANSITION DETAIL FOR 5' & 6' DIA. M.H.'S

N.T.S.

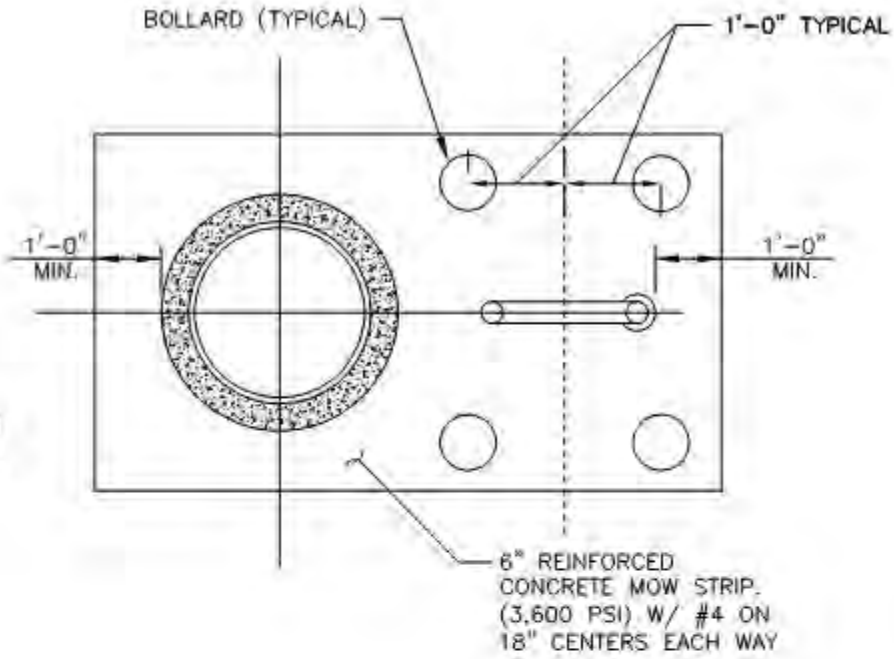
WASTEWATER MANHOLE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 502.1.4.1.5*	
PRESSURE-TYPE		DATE Mar. 2018	STANDARD DRAWING NO. R-5050



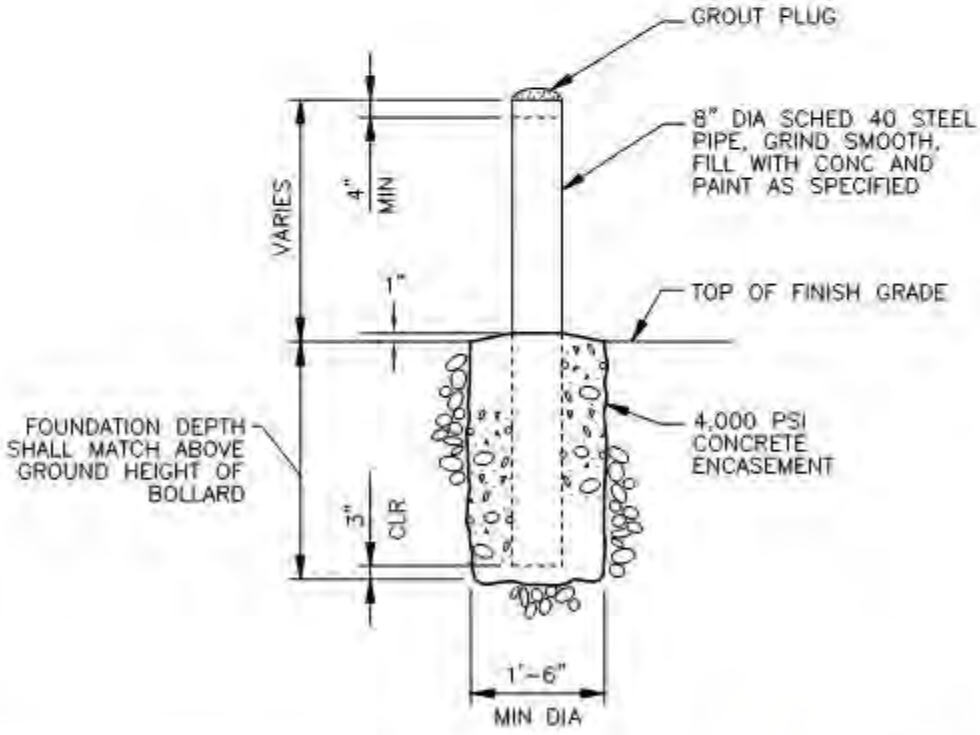
NOTES:
1. REFER TO STANDARD DETAIL R-5030 FOR MANHOLE. CONCRETE SHALL BE MONOLITHIC POUR.
2. REFER TO STD. DWG. NO. R-5031 FOR INFLOW PROTECTION AT MANHOLE GRADE RINGS, MANHOLE JOINTS, AND ON OUTSIDE OF STRUCTURE.

SHEET 1 OF 2

WASTEWATER MANHOLE	CITY OF ROCKWALL		
VENTED		DATE AUG '19	DRAWING NO. R-5060

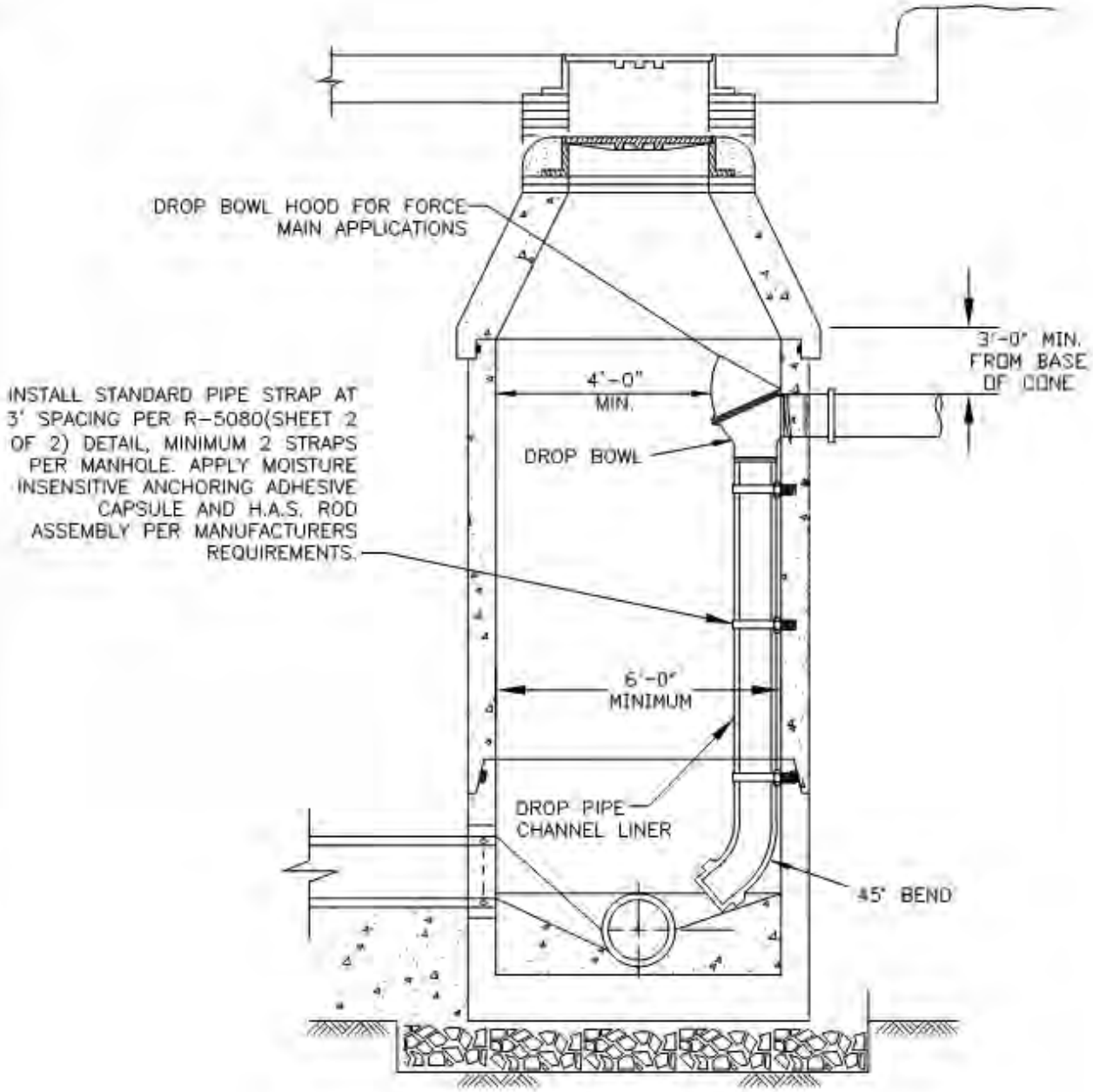


NOTES:
1. BOLLARD HEIGHT SHALL EXTEND TO 1 FOOT ABOVE THE OVERALL HEIGHT OF THE VENT PIPE.



SHEET 2 OF 2

WASTEWATER MANHOLE	CITY OF ROCKWALL	
VENTED		DATE: AUG '19 / DRAWING NO.: R-5060



ELEVATION
N.T.S.

NOTE:
1. DROP BOWL, DROP PIPE CHANNEL LINER AND STAINLESS STEEL PIPE CLAMPS AS MANUFACTURED BY RELINER/DURAN INC. OR APPROVED EQUAL.

SHEET 1 OF 2

WASTEWATER MANHOLE	CITY OF ROCKWALL		
DROP CONNECTIONS		DATE AUG '19	DRAWING NO R-5080

HVA ADHESIVE CAPSULE ANCHOR

A. DRILL HOLES WITH ANSI B212.15 MATCHED TOLERANCE CARBIDE TIPPED DRILL BITS WITH DRILL IN ROTO-HAMMER MODE OR USE A MATCHED TOLERANCE DIAMOND CORE DRILL BIT OF DIAMETER SPECIFIED BY HILTI.
B. DRILLED HOLE SPECIFICATIONS (DIAMETER & DEPTH) SHALL COMPLY WITH HILTI SPECIFICATION OR ICC ESR 1582.
C. ALLOWABLE LOADS MAY BE INCREASED BY 33-1/3% FOR SHORT-TERM WIND OR SEISMIC LOAD RESISTANCE (W ICC ESR 1682 UNLESS NOT PERMITTED BY THE APPLICABLE BUILDING CODE.
D. WHEN CONDUCTED, PROOF TEST ANCHORS IN THE FIELD TO 150-200% OF HILTI PUBLISHED ALLOWABLE TENSION LOAD UNLESS NOTED OTHERWISE IN A PROOF TEST LOAD TABLE. TORQUE TESTING IS NOT PERMITTED.
E. ANCHORS SHALL BE TIGHTENED WITH A CALIBRATED TORQUE WRENCH. USE OF AN IMPACT WRENCH IS NOT PERMITTED.
F. CONTACT HILTI TECHNICAL SUPPORT AT 1-800-879-8000 FOR INSTALLATION INSTRUCTIONS IN SUBMERGED WATER CONDITIONS.
G. CONTACT HILTI TECHNICAL SUPPORT AT 1-800-879-8000 FOR ADDITIONAL ASSISTANCE WITH HVA ADHESIVE ANCHOR INSTALLATIONS.
H. INSTALLATION INSTRUCTIONS:

*1. FOR HVA ADHESIVE CAPSULES WITH H.A.S. THREADED RODS:

1. DRILL ANCHOR HOLE WITH A CARBIDE BIT (SEE NOTE 1 ABOVE), TO SPECIFIED EMBEDMENT DEPTH.
2. CLEAN HOLE WITH COMPRESSED AIR OR BLOW OUT PUMP. INSERT NOZZLE TO BOTTOM OF HOLE.
3. IF USING MATCHED TOLERANCE CORE BIT, REMOVE STANDING WATER FROM HOLE.
4. INSERT APPROPRIATE HVU CAPSULE INTO HOLE WITH POINTED END FIRST. CAPSULE LENGTH IS LONGER THAN STANDARD EMBEDMENT AND WILL PROTRUDE FROM HOLE. DO NOT CUT OFF ANY PART OF THE HVU CAPSULE.
5. THREAD NUT ONTO ROD.
6. PLACE A WASHER ON FIRST NUT AND THREAD BLACK SETTING NUT DOWN ON WASHER.
7. TIGHTEN NUTS TOGETHER SO THAT BLACK SETTING WASHER IS AT TOP OF ROD.
8. INSERT SQUARE DRIVE SHAFT INTO HAMMER DRILL AND ATTACH PROPER IMPACT SOCKET.
9. WITH HAMMER DRILL ON ROTARY HAMMER, ENGAGE TOP NUT OF HAS ROD ASSEMBLY AND ROTOHAMMER ROD THROUGH CAPSULE(S) INTO THE HOLE. STOP DRILL ROTATION IMMEDIATELY UPON REACHING BOTTOM OF HOLE.
10. DO NOT DISTURB OR LOAD ANCHOR BEFORE CURING TIME ELAPSES.

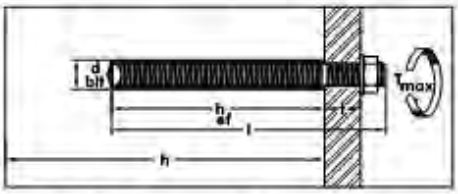
HVA INSTALLATION SPECIFICATION TABLE FOR H.A.S. RODS

DETAILS / HAS Rod Size		In.	3/8	1/2	5/8	3/4	7/8	1	1-1/4
d_{bit} : nominal bit diameter		In.	15/32	9/16	11/16	7/8	1	1-1/8	1-3/8
h_{nom} = std. depth of embed. = capsule length		In.	3-1/2	4-1/4	5	6-5/8	6-5/8	8-3/4	12
t: max. thickness fastened		In.	1	1-1/2	1-3/4	2	2-1/4	2-1/2	2-3/4
T_{max} : max. tightening torque	All HILTI Rods	ft-lb	15	30	75	150	175	235	400
h: minimum base material thickness	h_{ef} = h_{nom}	In.	5-1/4	6-3/8	7-1/2	10	10	13-3/8	18
	h_{ef} = h_{min}	In.	$1.0h_{ef}+2$	$1.0h_{ef}+2$	$1.0h_{ef}+2$	$1.0h_{ef}+2$	$1.0h_{ef}+2$	$1.0h_{ef}+2\ 1/4$	$1.0h_{ef}+2$
Recommended HILTI Rotary Hammer Drill			TE-5,15, 18M,25	TE-18M,25,55,76		TE-55, 76		TE-76	

For SI: 1 inch = 25.4mm, 1ft-lb = 1.4 Nm.

Curing Time Table (Approximate)

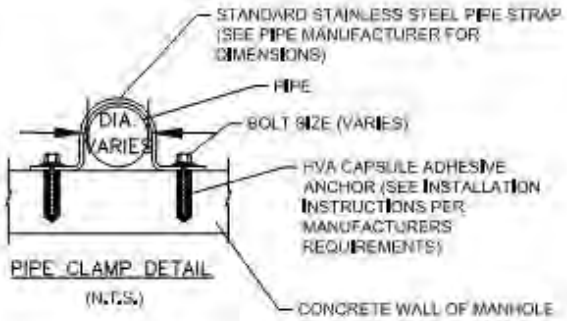
Approx. Curing Time	Base Material Temperature
20 Minutes	ABOVE 68° F(20°C
30 Minutes	50° F(10° C
1 Hour	32° F(0° C
5 Hour	23° F(-5° C



HILTI HVA ADHESIVE CAPSULE ANCHOR
OR APPROVED EQUAL

INSTALLATION INSTRUCTIONS:

1. SET THE DRILL DEPTH GAUGE AND DRILL A HOLE TO THE REQUIRED HOLE DEPTH. IMPORTANT: CLEAN OUT DUST AND DEBRIS. USE COMPRESSED AIR OR VACUUM AT BOTTOM OF THE HOLE. WHEN USING THE HILTI MATCHED TOLERANCE DIAMOND CORE BIT, IMMEDIATELY REMOVE STANDING WATER.
2. INSERT APPROPRIATE DIAMETER HVU ADHESIVE CAPSULE INTO PRE-DRILLED HOLE IN BASE MATERIAL. NOTE: THE BEST METHOD FOR SETTING MULTIPLE CAPSULES IS TO CRUSH THE FIRST CAPSULES(S) INTO THE HOLE AND THEN INSERT THE NEXT CAPSULE. DO NOT CUT OFF CAPSULES PARTIALLY PROTRUDING FROM THE HOLE.
3. CAPSULE LENGTH IS LONGER THAN STANDARD EMBED. DEPTH AND WILL PROTRUDE FROM THE HOLE.
4. THREAD A H.A.S. NUT ON THE H.A.S. ROD. PLACE A WASHER ON TOP OF THE FIRST NUT AND THEN THREAD A BLACK SETTING NUT DOWN ON TOP OF THE WASHER. TIGHTEN THE TWO NUTS TOGETHER "LOCKING" THE WASHER BETWEEN THEM. THE TOP NUT SHOULD BE FLUSH WITH THE TOP OF THE ROD.
5. INSERT A SQUARE DRIVE SHAFT INTO THE HAMMER DRILL AND ATTACH THE PROPER IMPACT SOCKET. AT THE ROTARY HAMMER DRILL SETTING, ENGAGE THE TOP NUT OF THE HAS ROD ASSEMBLY WITH THE SOCKET AND DRIVE THE ROD DOWN THROUGH THE CAPSULE(S). STOP DRILL ROTATION IMMEDIATELY UPON REACHING BOTTOM OF HOLE.
6. DO NOT DISTURB OR LOAD THE SET ANCHOR BEFORE THE SPECIFIED CURING TIME ELPASES.

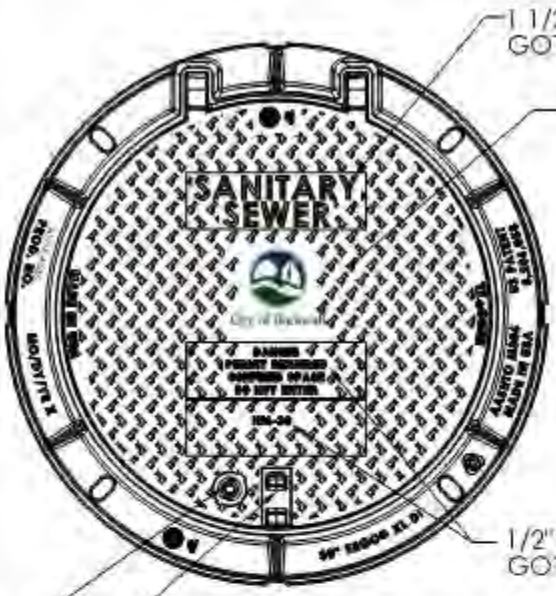


PIPE CLAMP DETAIL
(N.T.S.)

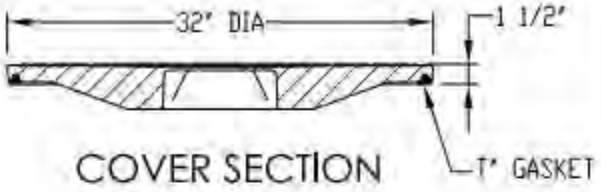
DROP FIXTURE ANCHOR
(N.T.S.)

SHEET 2 OF 2

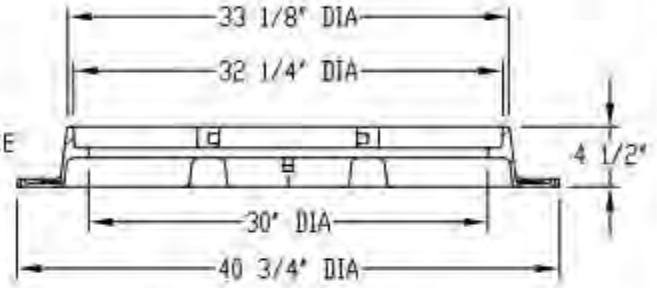
WASTEWATER MANHOLE	CITY OF ROCKWALL	
DROP CONNECTIONS		DATE: AUG '19 / DRAWING NO.: R-5080



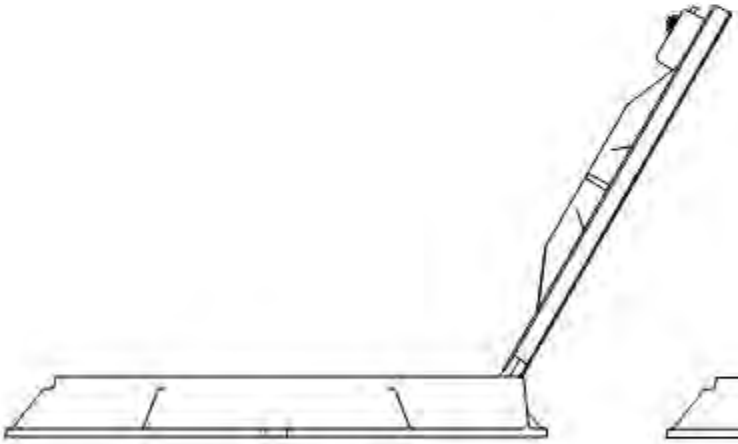
PLAN VIEW



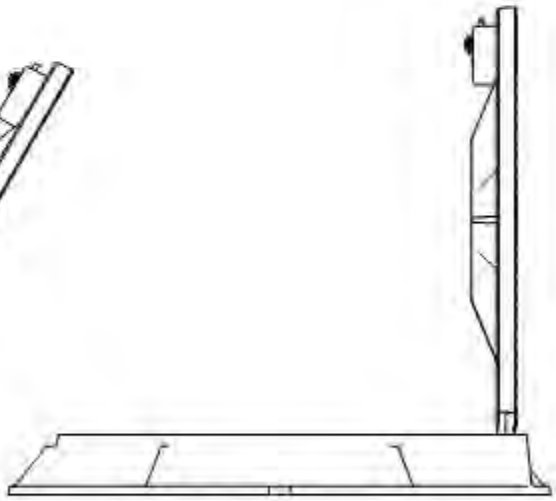
COVER SECTION



FRAME SECTION

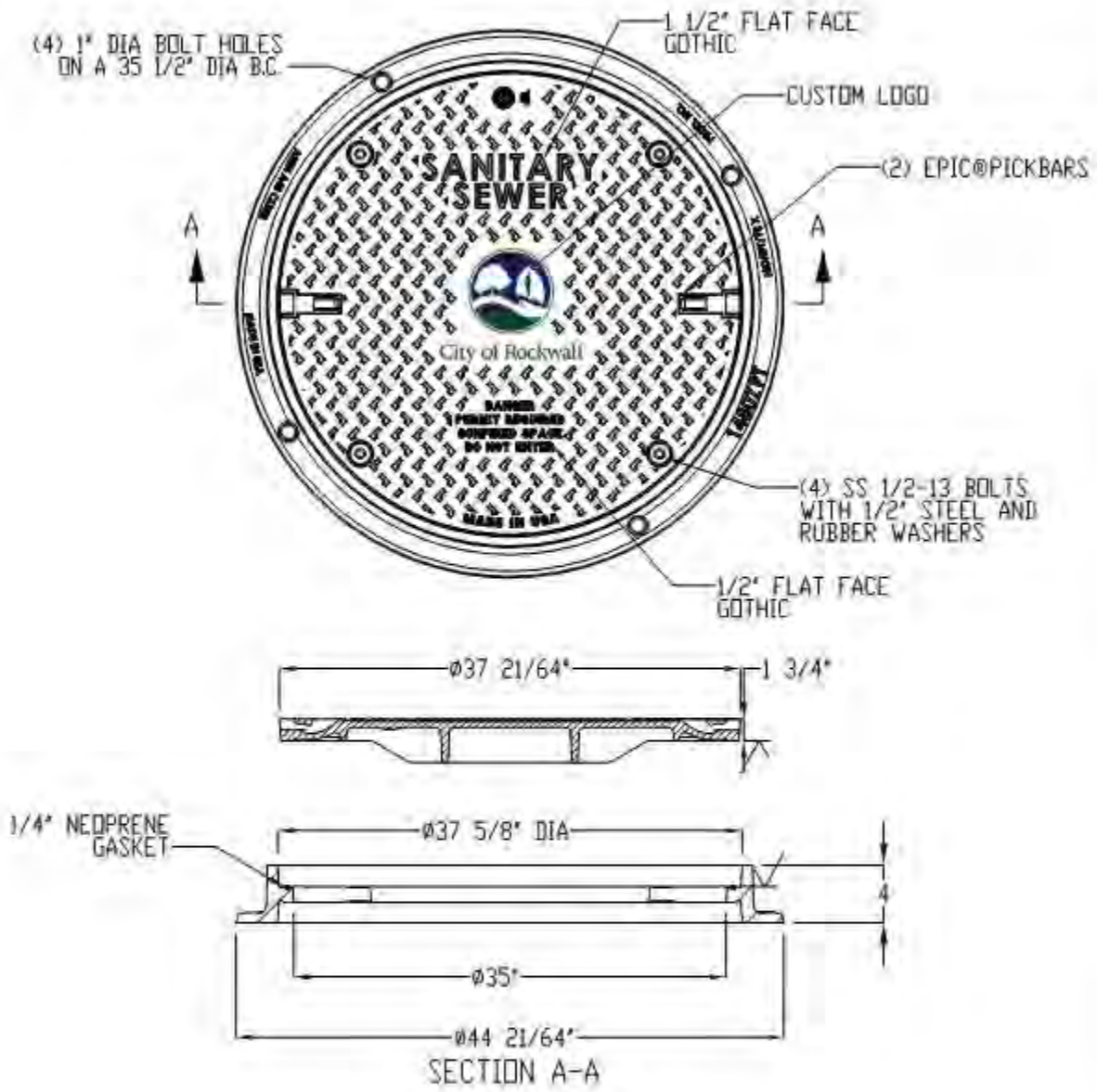


FULLY OPENED POSITION AT 120°

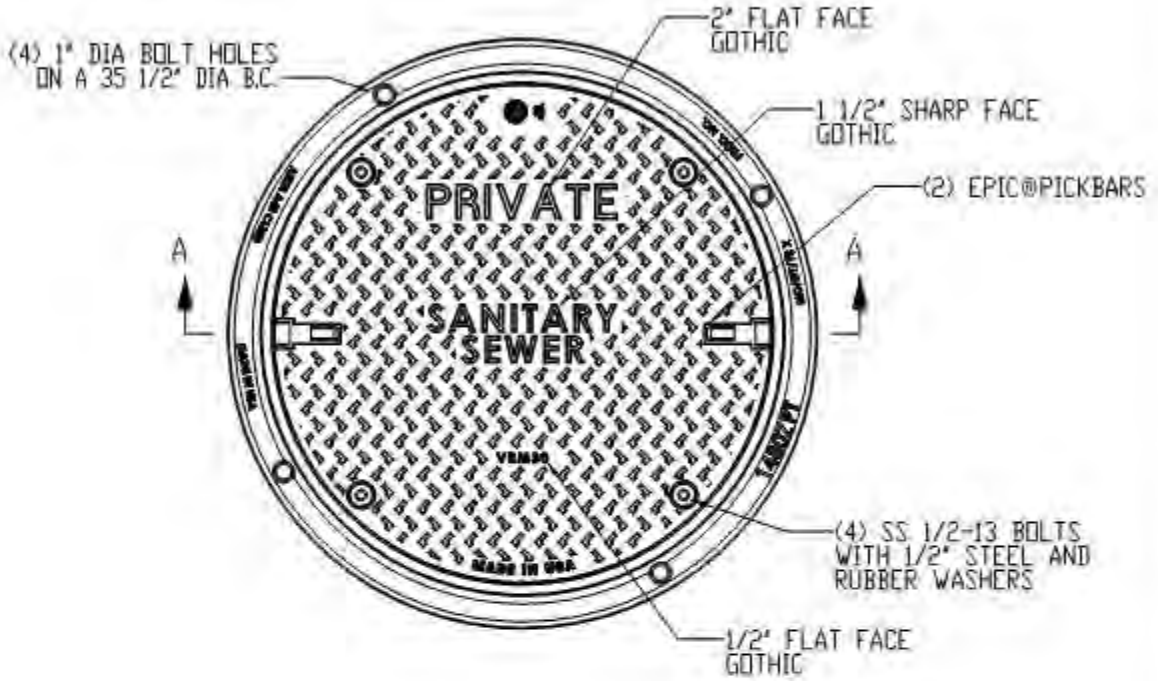


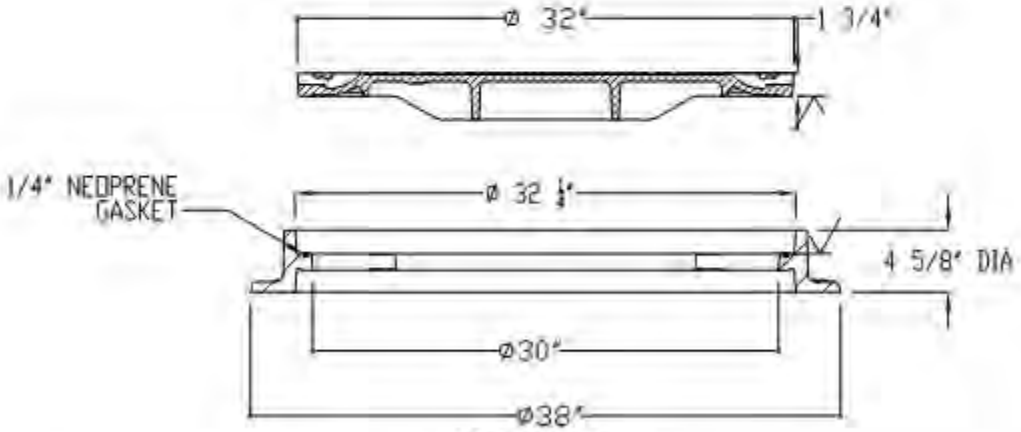
SAFETY LOCK & REMOVAL POSITION AT 90°

WASTEWATER MANHOLE	CITY OF ROCKWALL		
HINGED RIM AND COVER		DATE AUG '19	DRAWING NO. R-5101



WASTEWATER MANHOLE	CITY OF ROCKWALL		
BOLT AND GASKET RIM AND COVER		DATE AUG '19	DRAWING NO. R-5102

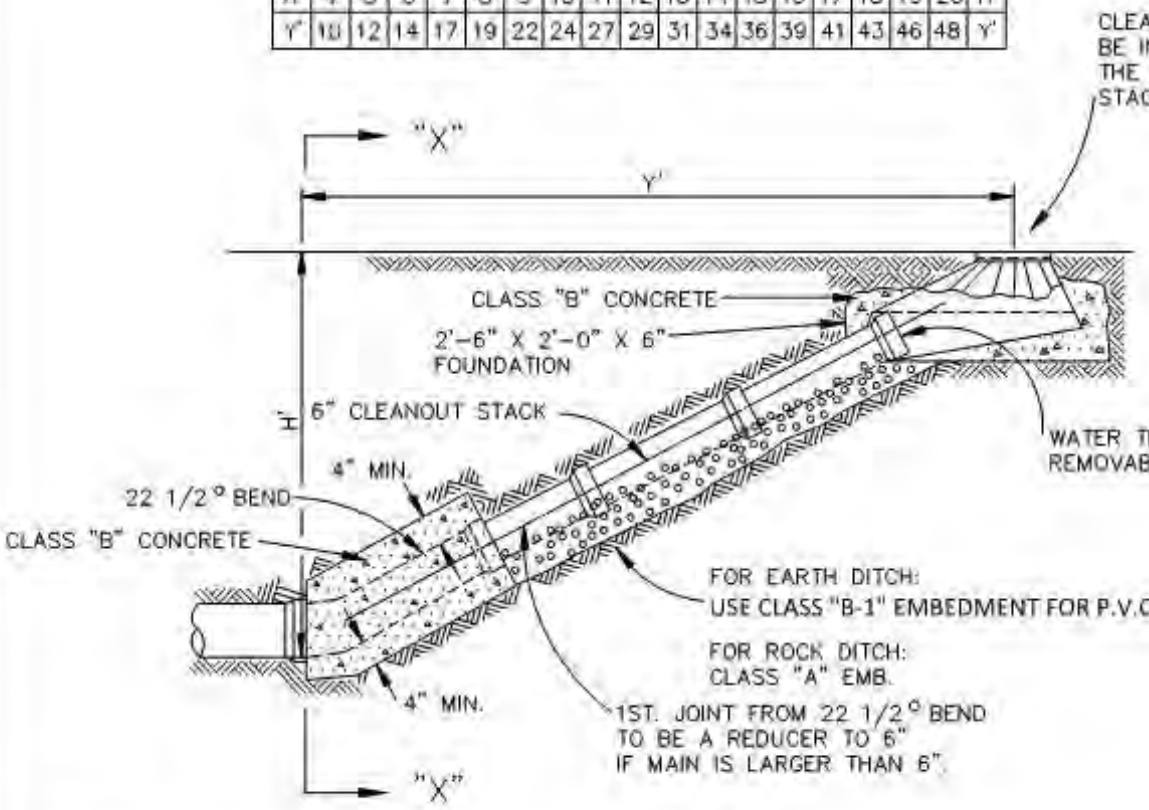




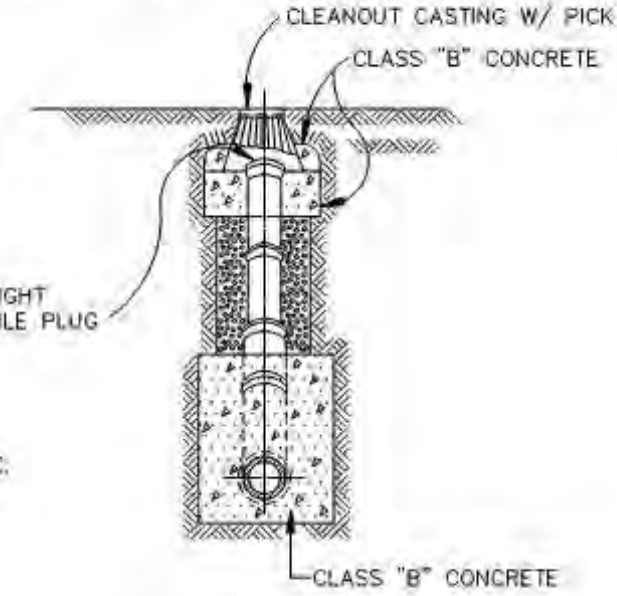
SECTION A-A

WASTEWATER MANHOLE	CITY OF ROCKWALL		
PRIVATE RIM AND COVER		DATE AUG '19	DRAWING NO. R-5103

H'	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	H'
Y'	10	12	14	17	19	22	24	27	29	31	34	36	39	41	43	46	48	Y'



PROFILE VIEW
N.T.S



SECTION "X - X"
N.T.S

NOTES:
1. IF CLEANOUT IS PLACED IN ADVANCE OF PAVEMENT PLACE SAND AROUND CLEANOUT CASTING IN LIEU OF CLASS "B" CONCRETE.
2. IF CLEANOUT IS OUTSIDE OF PAVEMENT, CENTER CASTING IN 15"x15" CLASS "A" CONCRETE PAD "4" THICK.

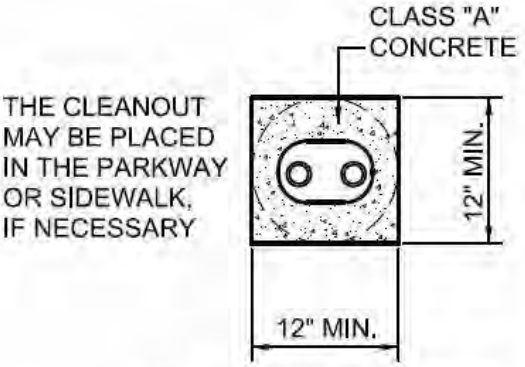
STANDARD DRAWING NO. R-5110

WASTEWATER MAIN
CLEANOUT

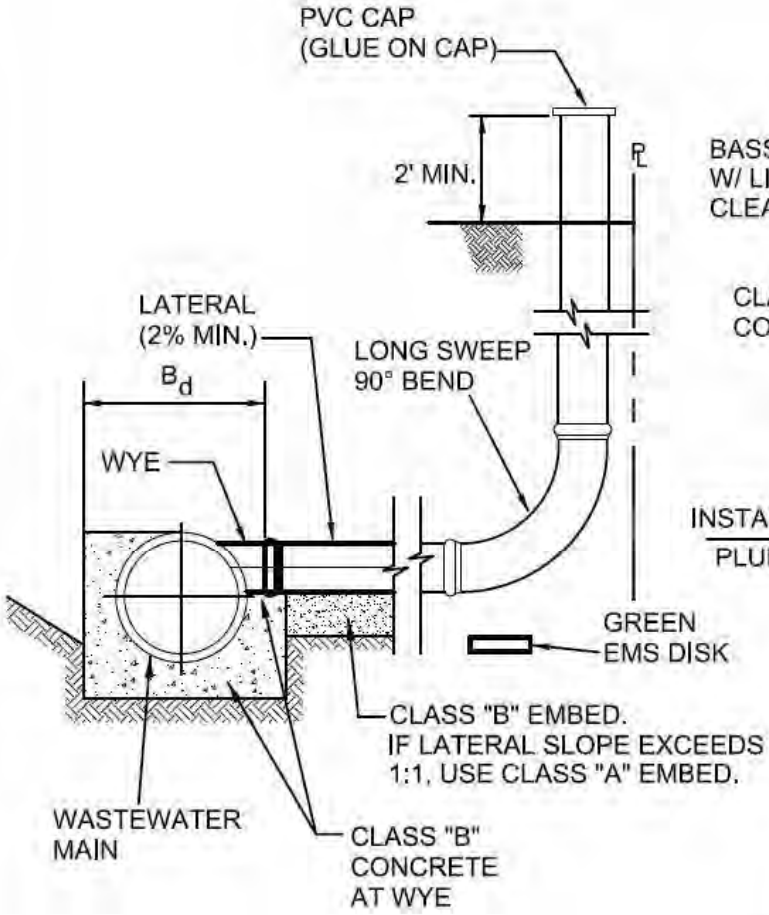
CITY OF ROCKWALL

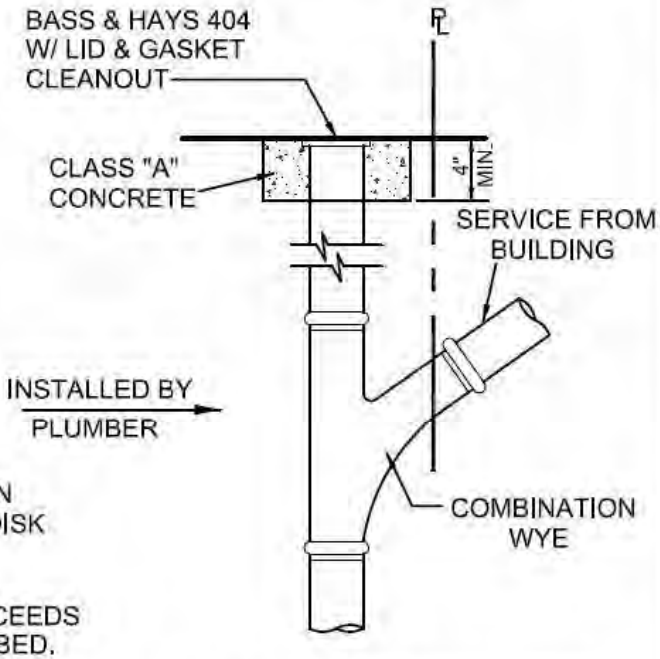
STANDARD SPECIFICATION REFERENCE	
502.2	
DATE	STANDARD DRAWING NO.
Mar. 2018	R-5110

CLASS CONCRETE	BAGS CEMENT PER C.Y.	MIN. STRENGTH 28 - DAY PSI
A	5.5	3000
B	4	2000



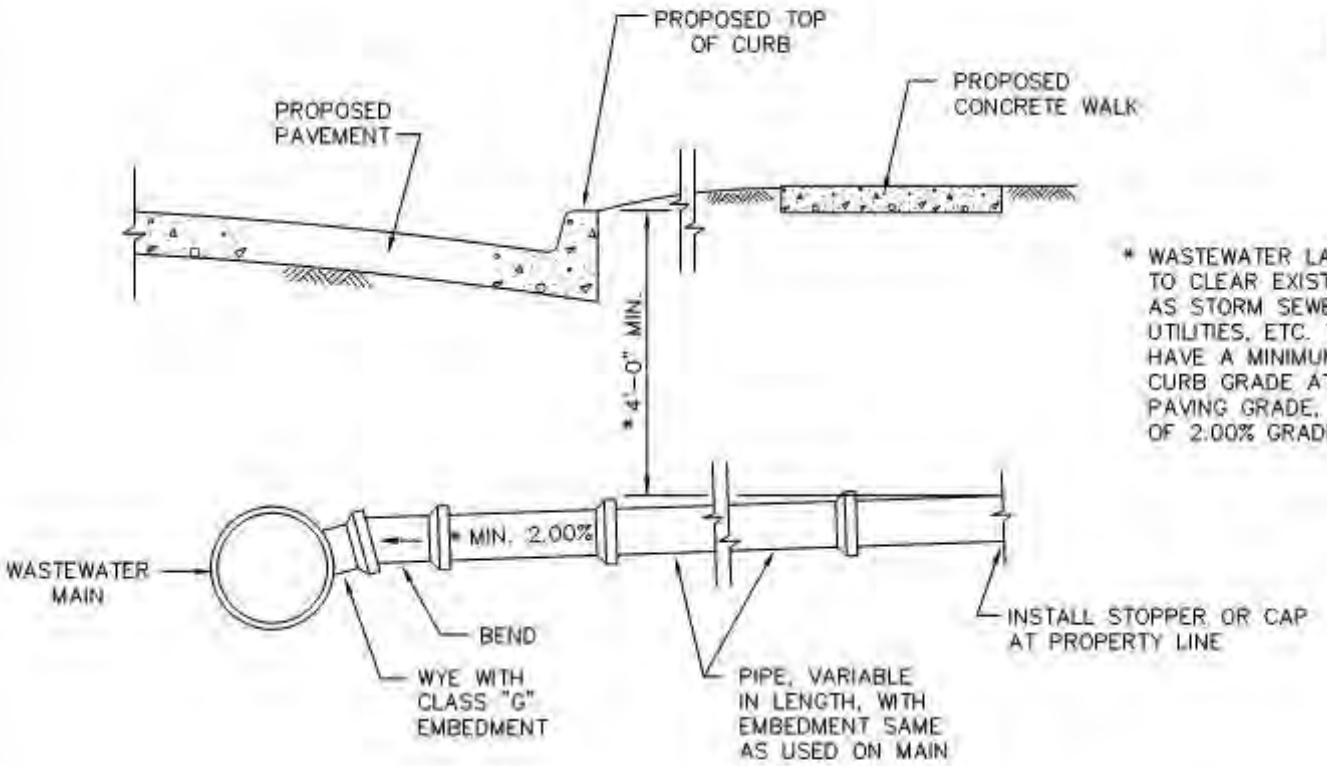
TOP VIEW OF CLEANOUT





PLUMBER TO CUT CLEANOUT RISER TO INSTALL COMBINATION WYE TO CORRESPOND W/ GRADE OF THE PIPE LEADING FROM BUILDING. AFTER INSTALLATION OF THE WYE, INSERT CLEANOUT INTO THE TOP OF THE RISOR.

WASTEWATER LATERAL	CITY OF ROCKWALL	
CONNECTIONS – RESIDENTIAL		DATE AUG. '15 / DRAWING NO. R-5120



INSTALL GREEN EMS DISKS AT END OF LATERAL.

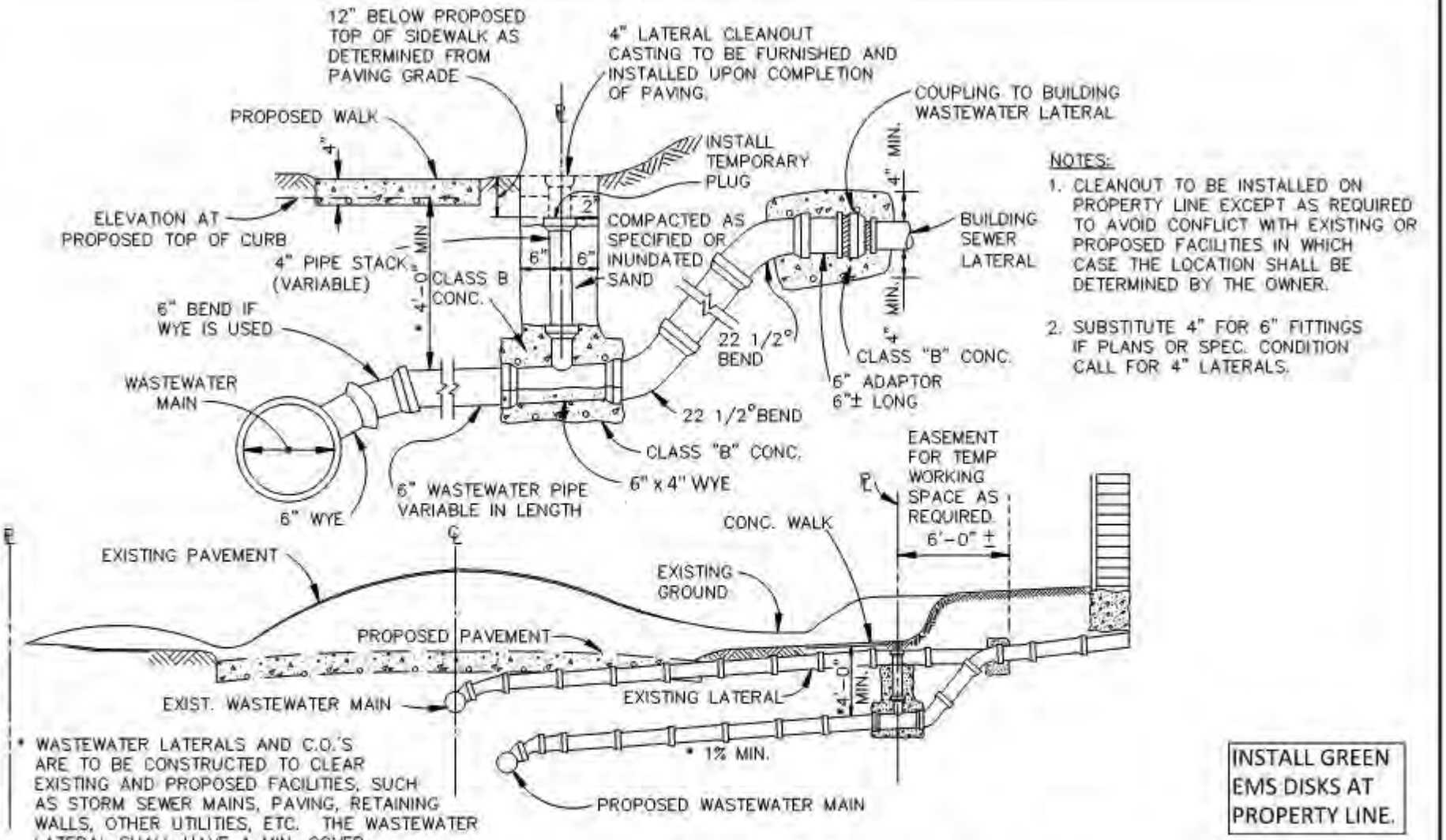
* WASTEWATER LATERALS ARE TO BE CONSTRUCTED TO CLEAR EXISTING AND PROPOSED FACILITIES, SUCH AS STORM SEWER MAINS, RETAINING WALLS, OTHER UTILITIES, ETC. THE WASTEWATER LATERAL SHALL HAVE A MINIMUM COVER OF 4'-0" BELOW THE PROPOSED CURB GRADE AT THE PROPERTY LINE, DETERMINED FROM PAVING GRADE, OR AS REQUIRED TO MAINTAIN A MINIMUM OF 2.00% GRADE, OR AS DIRECTED BY THE OWNER.

WASTEWATER LATERAL STUBOUT

(FOR FUTURE CONNECTION, 4" OR 6" AS SPECIFIED)

N.T.S.

STANDARD DRAWING NO.				
R-5150	WASTEWATER LATERAL STUBOUT IN ADVANCE OF PAVING	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 502.10	
			DATE Mar. 2018	STANDARD DRAWING NO. R-5150

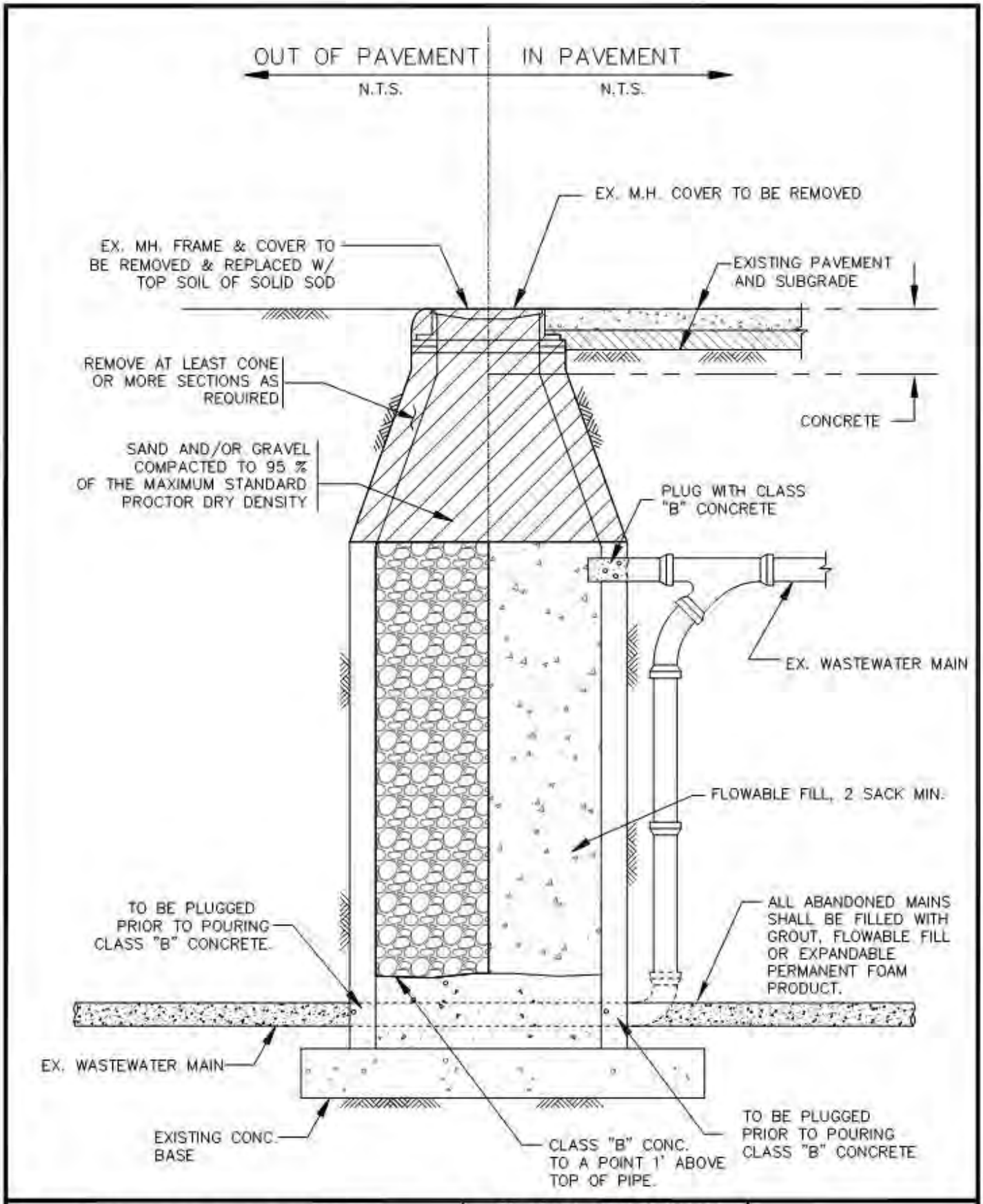


WASTEWATER LATERAL REPLACEMENT

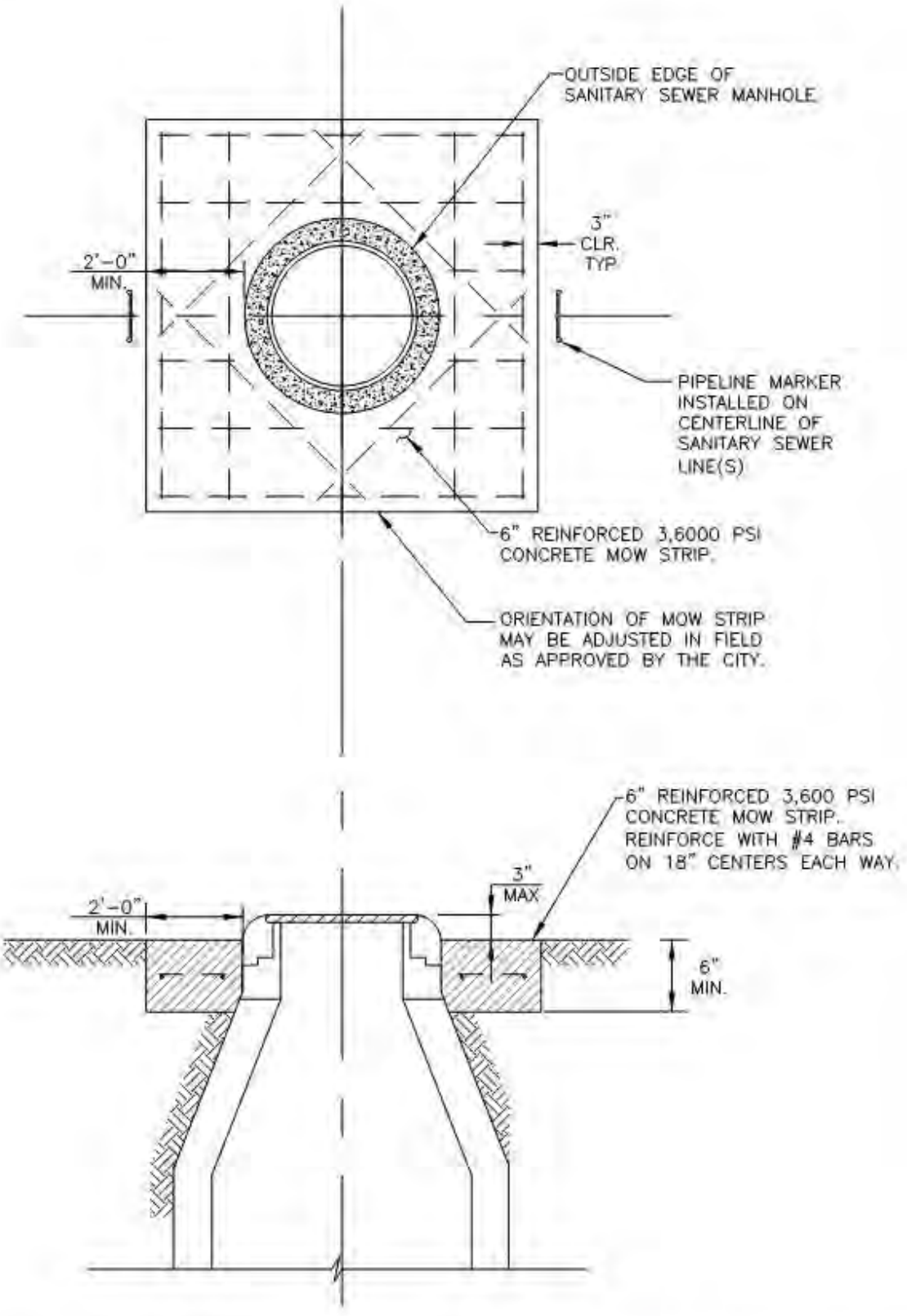
N.T.S.

WASTEWATER LATERAL REPLACEMENT IN ADVANCE OF PAVING	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 502.10	
		DATE Mar. 2018	STANDARD DRAWING NO R-5160

STANDARD DRAWING NO R-5160



ABANDONMENT OF MANHOLE	CITY OF ROCKWALL	
INSIDE AND OUTSIDE OF PAVEMENT		DATE: AUG '19 / DRAWING NO.: R-5170



MANHOLE AND VALVE VAULT	CITY OF ROCKWALL		
MOW STRIP		DATE AUG '19	DRAWING NO. R-5180

City of Rockwall
The New Horizon

8.6 Division 6000 Storm Water Drainage

NOTE: *(1) Deleted NCTCOG Drawing*
(2) Revised NCTGOG Drawing (see revisions below)
(3) Added Rockwall Standard Drawing (see drawing below)
(4) Added Current TxDOT Standards

Table 9.6: Revisions to NCTCOG's Division 6000 Storm Water Drainage

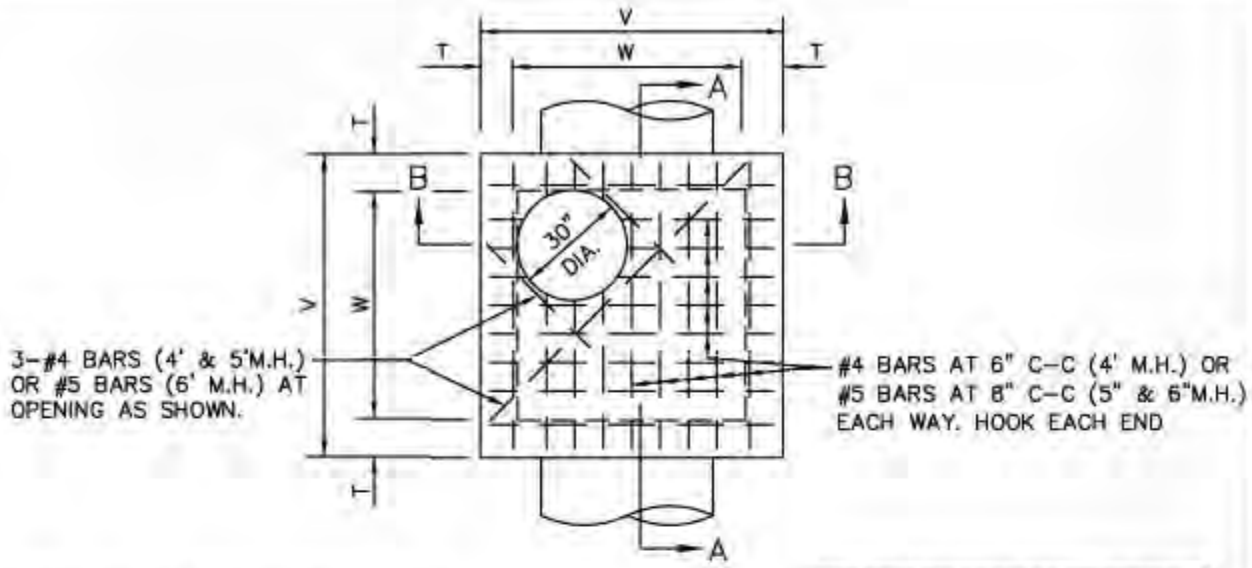
Revised	Drawing No.	Subject
(1)	~~6010A~~	~~Storm Water Manhole – 4', 5', 6' Square~~
(3)	**R-6010A**	**Storm Water Manhole – 4', 5', 6' Square**
(1)	~~6010B~~	~~Storm Water Manhole – 4', 5', 6' Square~~
(3)	**R-6010B**	**Storm Water Manhole – 4', 5', 6' Square**
(1)	~~6020A~~	~~Curb Inlet – 5', 10' 15' or 20' Opening~~
(3)	**R-6020A**	**Curb Inlet – 5', 10' 15' or 20' Opening**
(1)	~~6020B~~	~~Curb Inlet – Cross Section & Inlet Throat~~
(3)	**R-6020B**	**Curb Inlet – Cross Section & Inlet Throat**
(1)	~~6020C~~	~~Curb Inlet – Rebar & M.H. Frame & Cover~~
(3)	**R-6020C**	**Curb Inlet – Rebar & M.H. Frame & Cover**
(1)	~~6020D~~	~~Curb Inlet – Bill of Reinforcing Steel~~
(3)	**R-6020D**	**Curb Inlet – Bill of Reinforcing Steel**
(1)	~~6020E~~	~~Curb Inlet – Summary of Quantities~~
(3)	**R-6020E**	**Curb Inlet – Summary of Quantities**
(1)	~~6030A~~	~~Curb Inlet Recessed – 5', 10' 15' or 20' Opening~~
(3)	**R-6030A**	**Curb Inlet Recessed – 5', 10' 15' or 20' Opening**
(1)	~~6030B~~	~~Curb Inlet Recessed – Cross Section & Center Beam~~
(3)	**R-6030B**	**Curb Inlet Recessed – Cross Section & Center Beam**
(1)	~~6030C~~	~~Curb Inlet Recessed – Inlet Throat & M.H. Frame & Cover~~
(3)	**R-6030C**	**Curb Inlet Recessed – Inlet Throat & M.H. Frame & Cover**
(1)	~~6030D~~	~~Curb Inlet Recessed – General Notes~~
(3)	**R-6030D**	**Curb Inlet Recessed – General Notes**
(1)	~~6040~~	~~Drop Inlet – 2', 4', 5', or 6' Square~~
(3)	**R-6040**	**Drop Inlet – 2', 4', 5', or 6' Square**
(1)	~~6050~~	~~Full Channel Lining – Concrete Reinforced~~
(3)	**R-6050**	**Full Channel Lining – Concrete Reinforced**
(1)	~~6060~~	~~Concrete Apron – Vertical Headwall~~
(3)	**R-6060**	**Concrete Apron – Vertical Headwall**
(1)	~~6070~~	~~Concrete Apron - Sloping Headwall~~
(3)	**R-6070**	**Concrete Apron - Sloping Headwall**
(4)		TxDOT: Single Box Culvert – Cast-in-place and Precast
(4)		TxDOT: Multiple Box Culvert – Cast-in-place
(4)		TxDOT: Wingwalls for Single & Multi-Box Culverts
(4)		TxDOT: Concrete Headwalls for Pipe Culverts
(4)		TxDOT: Safety End Treatment for Box Culverts
(4)		TxDOT: Safety End Treatment For Pipe Culverts

Note: Storm sewer headwalls, wingwalls, box culverts and safety pipe runners shall be per Texas Department of Transportation Standard Details and made part of the City of Rockwall Standard Details.

TxDOT Standard Drawings

Drawings shall be modified as follows:

1. All concrete for structures shall be Class F (4200 psi, minimum 6.5 sack cement).
2. No fly ash is allowed in concrete for structures.

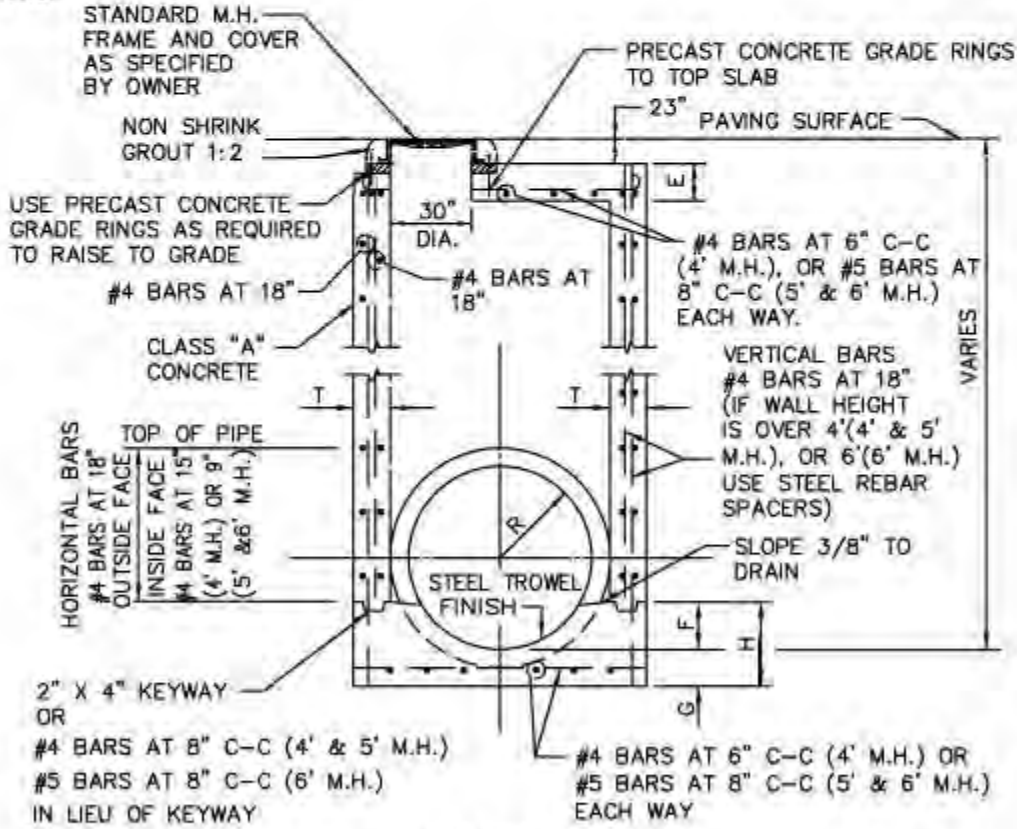


PLAN
N.T.S.

M.H. SIZE(W)	V	T	E	F	G	H
4'	5'-4"	8"	6"	9"	6"	1'-3"
5'	6'-4"	8"	6"	12"	8"	1'-8"
6'	7'-6"	9"	9"	16"	10"	2'-2"

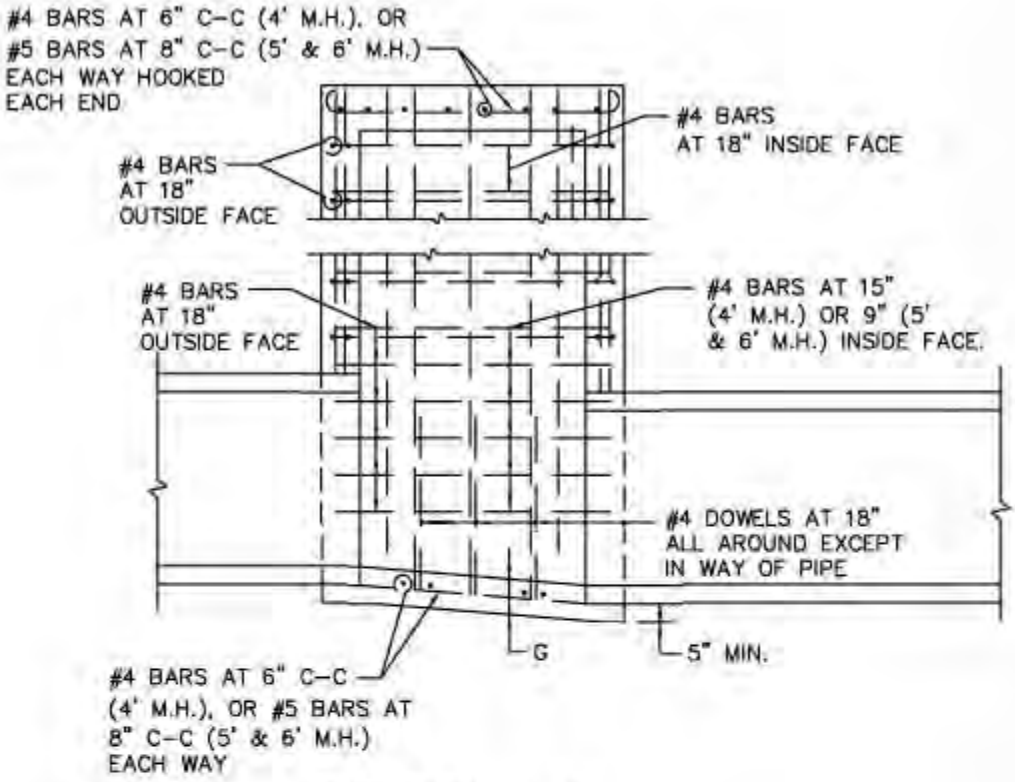
TABLE OF DIMENSIONS
N.T.S.

ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT). NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES.

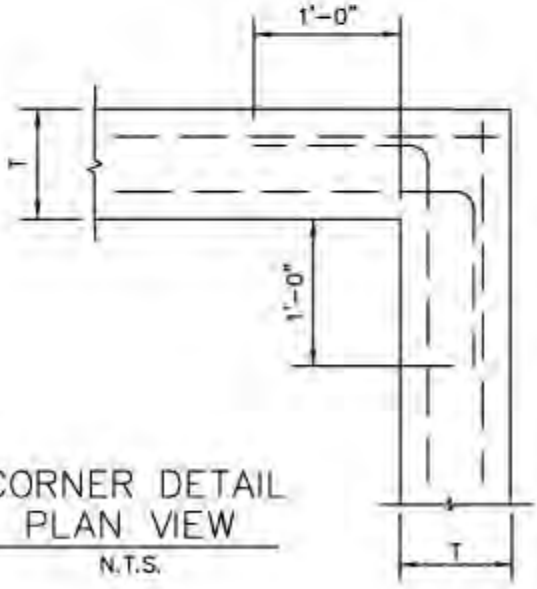


SECTION B-B
N.T.S.

STORM WATER MANHOLE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 502.1.4.1*	
4', 5', OR 6' SQUARE		DATE Mar. 2018	STANDARD DRAWING NO. R-6010A



SECTION A-A
N.T.S.

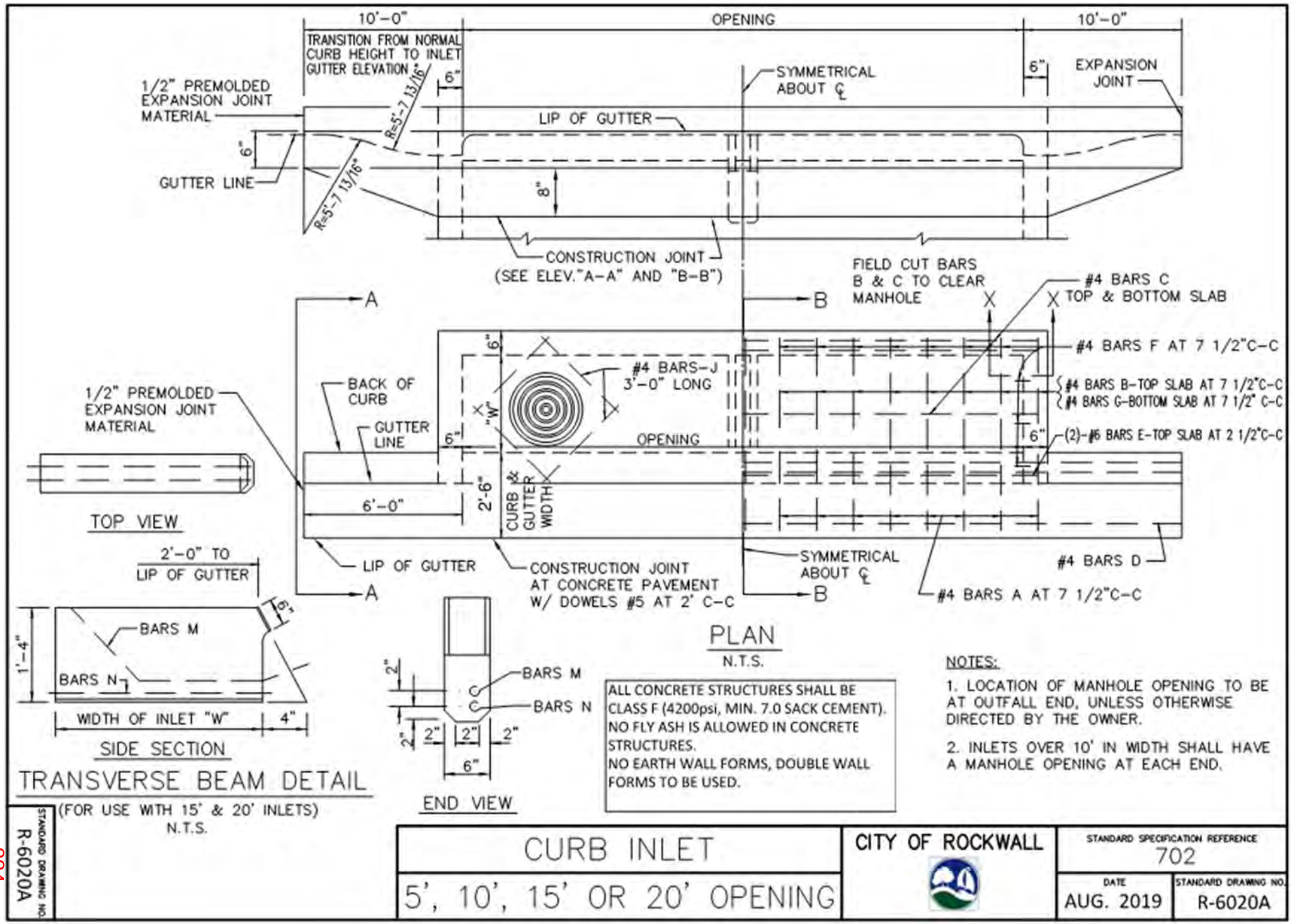


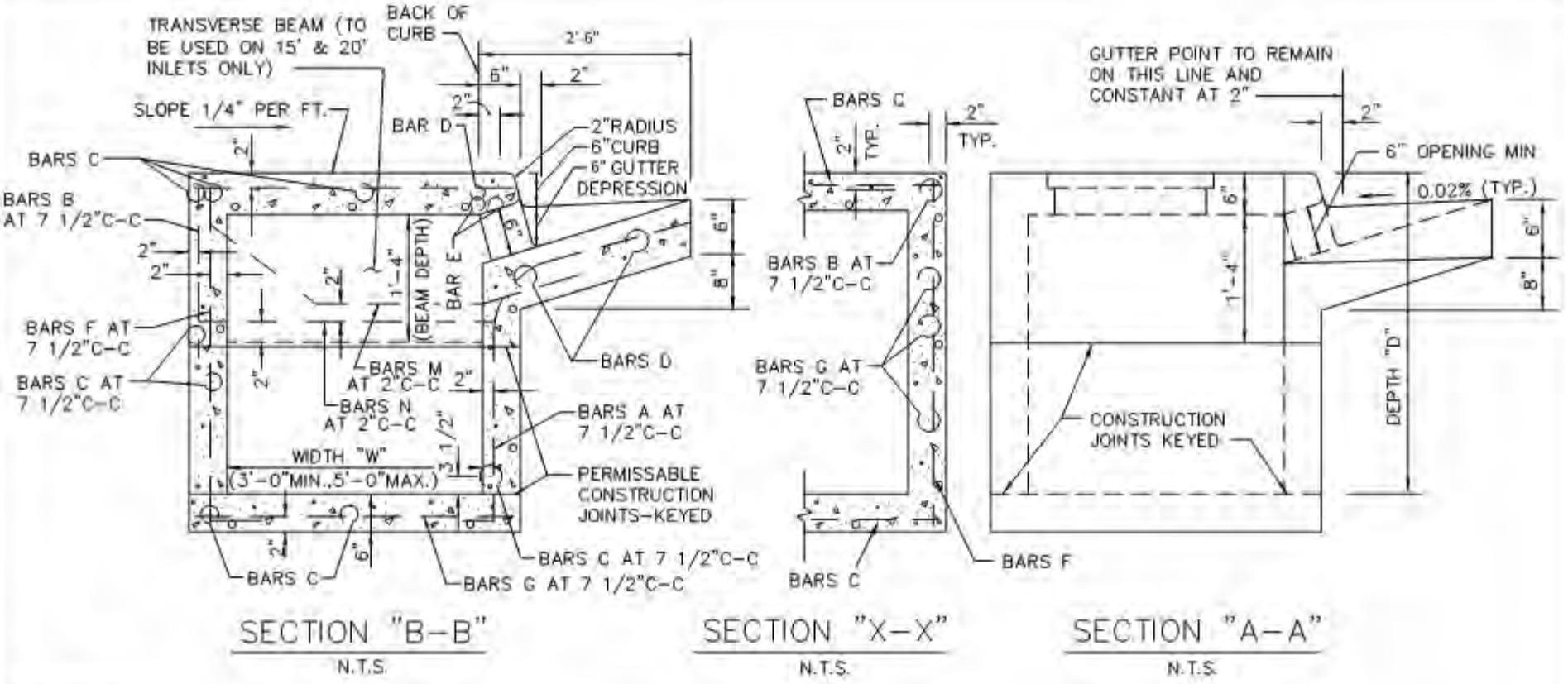
CORNER DETAIL
PLAN VIEW
N.T.S.

NOTES:

1. SLOPE INVERT OF MANHOLE AS INDICATED ON PLAN-PROFILE SHEET.
2. LAYERS OF REINFORCING STEEL NEAREST THE INTERIOR AND EXTERIOR SURFACE SHALL HAVE A COVER OF 2" TO THE CENTER OF BARS, UNLESS OTHERWISE NOTED.
3. ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT).
4. NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES.

STORM WATER MANHOLE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 502.1.4.1*	
4', 5', OR 6' SQUARE		DATE Mar. 2018	STANDARD DRAWING NO. R-6010B


10'-0"
TRANSITION FROM NORMAL CURB HEIGHT TO INLET GUTTER ELEVATION
OPENING
10'-0"
1/2" PREMOLDED EXPANSION JOINT MATERIAL
R=5'-7 13/16"
6"
SYMMETRICAL ABOUT ℄
EXPANSION JOINT
LIP OF GUTTER
GUTTER LINE
8"
CONSTRUCTION JOINT (SEE ELEV."A-A" AND "B-B")
FIELD CUT BARS B & C TO CLEAR MANHOLE
#4 BARS C TOP & BOTTOM SLAB
#4 BARS F AT 7 1/2"C-C
#4 BARS B-TOP SLAB AT 7 1/2"C-C
#4 BARS G-BOTTOM SLAB AT 7 1/2" C-C
(2)-#6 BARS E-TOP SLAB AT 2 1/2"C-C
#4 BARS-J 3'-0" LONG
BACK OF CURB
GUTTER LINE
"W"
OPENING
CURB & GUTTER WIDTH
2'-6"
6'-0"
#4 BARS D
#4 BARS A AT 7 1/2"C-C
A
B
TOP VIEW
2'-0" TO LIP OF GUTTER
LIP OF GUTTER
CONSTRUCTION JOINT AT CONCRETE PAVEMENT W/ DOWELS #5 AT 2' C-C
1'-4"
BARS M
BARS N
WIDTH OF INLET "W"
4"
SIDE SECTION
PLAN
N.T.S.
END VIEW
TRANSVERSE BEAM DETAIL
(FOR USE WITH 15' & 20' INLETS)
N.T.S.
ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT).
NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES.
NO EARTH WALL FORMS, DOUBLE WALL FORMS TO BE USED.
NOTES:
1. LOCATION OF MANHOLE OPENING TO BE AT OUTFALL END, UNLESS OTHERWISE DIRECTED BY THE OWNER.
2. INLETS OVER 10' IN WIDTH SHALL HAVE A MANHOLE OPENING AT EACH END.
STANDARD DRAWING NO. R-6020A
CURB INLET
5', 10', 15' OR 20' OPENING
CITY OF ROCKWALL
STANDARD SPECIFICATION REFERENCE 702
DATE AUG. 2019
STANDARD DRAWING NO. R-6020A



SECTION "B-B"
N.T.S.

SECTION "X-X"
N.T.S.

SECTION "A-A"
N.T.S.

GENERAL NOTES:

1. ALL CONCRETE SHALL BE CLASS "A" CONCRETE.
2. REINFORCING BARS SHALL BE STANDARD GRADE STEEL, DEFORMED REINFORCING BARS OF A DIAMETER AND LENGTH AS SHOWN.
3. CHAMFER ALL EXPOSED CORNERS 3/4" EXCEPT WHERE OTHERWISE NOTED.
4. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTERS OF BARS.
5. FIELD CUT AND BEND BARS AS NECESSARY TO ACCOMODATE STORM SEWER PIPE.
6. RING AND COVER SHALL BE APPROVED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.

ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT). NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES.
NO EARTH WALL FORMS, DOUBLE WALL FORMS TO BE USED.

STANDARD DRAWING NO. R-6020B

CURB INLET

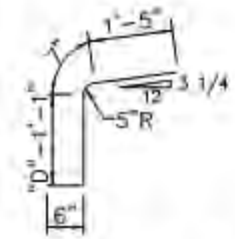
CROSS SECTION & INLET THROAT

CITY OF ROCKWALL

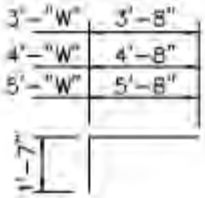
STANDARD SPECIFICATION REFERENCE 702

DATE AUG. 2019

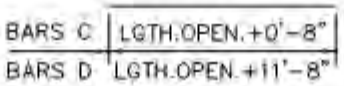
STANDARD DRAWING NO. R-6020B



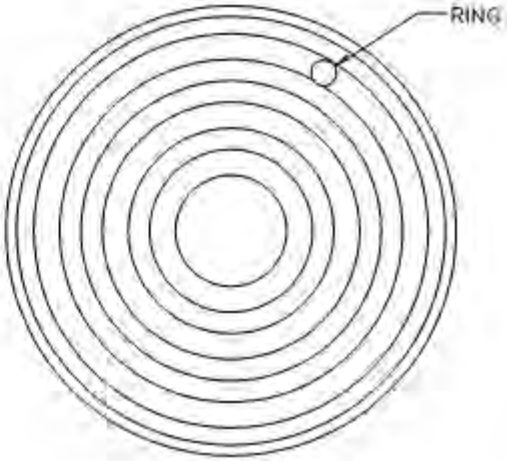
#4 BARS A
N.T.S.

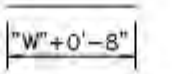


#4 BARS B
N.T.S.



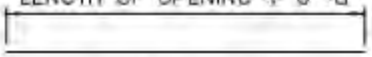
#4 BARS C & D
N.T.S.





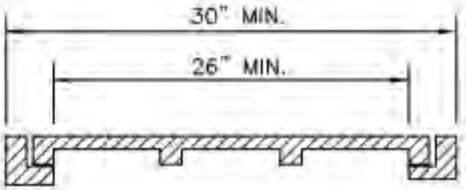
#4 BARS G
N.T.S.

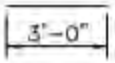
#4 BARS F
N.T.S.



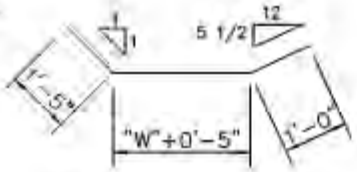
#4 BARS E
N.T.S.

ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT). NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES. INLET LID TO BE LOCKING.

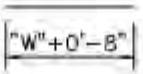




#4 BARS J
N.T.S.



#3 BARS M
N.T.S.



#5 BARS N
N.T.S.

CAST IRON
FRAME AND COVER
N.T.S

STANDARD DRAWING NO. 6020C

CURB INLET
REBAR & M.H. FRAME & COVER

CITY OF ROCKWALL

STANDARD SPECIFICATION REFERENCE 702

DATE Mar. 2018

STANDARD DRAWING NO. R-6020C

BILL OF REINFORCING STEEL

DEPTH "D"	ALL WIDTHS AND LENGTHS				OPENING LENGTH "L" = 5ft						OPENING LENGTH "L" = 10ft						OPENING LENGTH "L" = 15 ft								OPENING LENGTH "L" = 20 ft							
					Widths "W"						Widths "W"						Widths "W"								Widths "W"							
					3ft	4ft	5ft				3ft	4ft	5ft				3ft	4ft	5ft						3ft	4ft	5ft					
	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS	BARS
	C	D	E	J	F	F	F	A	B	G	F	F	F	A	B	G	F	F	F	A	B	G	M	N	F	F	F	A	B	G	M	N
3'-6"	17	3	2	4	20	24	28	10	10	20	28	32	36	18	18	28	36	40	44	26	26	36	2	2	44	48	52	34	34	44	2	2
3'-9"	18	"	"	"	"	"	"	"	"	20	"	"	"	"	"	28	"	"	"	"	"	36	"	"	"	"	"	"	"	44	"	"
4'-0"	19	"	"	"	"	"	"	"	"	24	"	"	"	"	"	32	"	"	"	"	"	40	"	"	"	"	"	"	"	48	"	"
4'-3"	19	"	"	"	"	"	"	"	"	24	"	"	"	"	"	32	"	"	"	"	"	40	"	"	"	"	"	"	"	48	"	"
4'-6"	21	"	"	"	"	"	"	"	"	26	"	"	"	"	"	34	"	"	"	"	"	42	"	"	"	"	"	"	"	50	"	"
4'-9"	21	"	"	"	"	"	"	"	"	26	"	"	"	"	"	34	"	"	"	"	"	42	"	"	"	"	"	"	"	50	"	"
5'-0"	21	"	"	"	"	"	"	"	"	26	"	"	"	"	"	34	"	"	"	"	"	42	"	"	"	"	"	"	"	50	"	"
5'-3"	23	"	"	"	"	"	"	"	"	28	"	"	"	"	"	36	"	"	"	"	"	44	"	"	"	"	"	"	"	52	"	"
5'-6"	23	"	"	"	"	"	"	"	"	28	"	"	"	"	"	36	"	"	"	"	"	44	"	"	"	"	"	"	"	52	"	"
5'-9"	25	"	"	"	"	"	"	"	"	30	"	"	"	"	"	38	"	"	"	"	"	46	"	"	"	"	"	"	"	54	"	"
6'-0"	25	"	"	"	"	"	"	"	"	30	"	"	"	"	"	38	"	"	"	"	"	46	"	"	"	"	"	"	"	54	"	"
6'-3"	26	"	"	"	"	"	"	"	"	30	"	"	"	"	"	38	"	"	"	"	"	46	"	"	"	"	"	"	"	54	"	"
6'-6"	27	"	"	"	"	"	"	"	"	32	"	"	"	"	"	40	"	"	"	"	"	48	"	"	"	"	"	"	"	56	"	"
6'-9"	27	"	"	"	"	"	"	"	"	32	"	"	"	"	"	40	"	"	"	"	"	48	"	"	"	"	"	"	"	56	"	"
7'-0"	29	"	"	"	"	"	"	"	"	34	"	"	"	"	"	42	"	"	"	"	"	50	"	"	"	"	"	"	"	58	"	"
7'-3"	29	"	"	"	"	"	"	"	"	34	"	"	"	"	"	42	"	"	"	"	"	50	"	"	"	"	"	"	"	58	"	"
7'-6"	30	"	"	"	"	"	"	"	"	34	"	"	"	"	"	42	"	"	"	"	"	50	"	"	"	"	"	"	"	58	"	"
7'-9"	31	"	"	"	"	"	"	"	"	36	"	"	"	"	"	44	"	"	"	"	"	52	"	"	"	"	"	"	"	60	"	"
8'-0"	31	"	"	"	"	"	"	"	"	36	"	"	"	"	"	44	"	"	"	"	"	52	"	"	"	"	"	"	"	60	"	"
8'-3"	32	"	"	"	"	"	"	"	"	36	"	"	"	"	"	44	"	"	"	"	"	52	"	"	"	"	"	"	"	60	"	"
8'-6"	33	"	"	"	"	"	"	"	"	38	"	"	"	"	"	46	"	"	"	"	"	54	"	"	"	"	"	"	"	62	"	"
8'-9"	34	"	"	"	"	"	"	"	"	38	"	"	"	"	"	46	"	"	"	"	"	54	"	"	"	"	"	"	"	62	"	"
9'-0"	35	"	"	"	"	"	"	"	"	40	"	"	"	"	"	48	"	"	"	"	"	56	"	"	"	"	"	"	"	64	"	"
9'-3"	36	"	"	"	"	"	"	"	"	40	"	"	"	"	"	48	"	"	"	"	"	56	"	"	"	"	"	"	"	64	"	"
9'-6"	37	"	"	"	"	"	"	"	"	42	"	"	"	"	"	50	"	"	"	"	"	58	"	"	"	"	"	"	"	66	"	"
10'-0"	38	"	"	"	"	"	"	"	"	42	"	"	"	"	"	50	"	"	"	"	"	58	"	"	"	"	"	"	"	66	"	"

ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT). NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES.

NOTE:
FOR CONVENIENCE, DEPTHS OF INLETS SHOWN IN ABOVE TABLES ARE IN INCREMENTS OF 3 INCHES BUT ANY DEPTHS OTHER THAN THOSE SHOWN ABOVE MAY BE USED WHEREVER DEEMED NECESSARY. QUANTITIES FOR OTHER DEPTHS FALLING WITHIN THE LIMITS OF THE TABLE MAY BE FOUND BY INTERPOLATION.

STANDARD DRAWING NO. R-6020D

CURB INLET

BILL OF REINFORCING STEEL

CITY OF ROCKWALL

STANDARD SPECIFICATION REFERENCE: 702

DATE: Mar. 2018

STANDARD DRAWING NO: R-6020D

SUMMARY OF QUANTITIES FOR CURB INLETS

DEPTH "D"	5'–0" OPENING						10'–0" OPENING						15'–0" OPENING						20'–0" OPENING					
	WIDTH 3'–0"		WIDTH 4'–0"		WIDTH 5'–0"		WIDTH 3'–0"		WIDTH 4'–0"		WIDTH 5'–0"		WIDTH 3'–0"		WIDTH 4'–0"		WIDTH 5'–0"		WIDTH 3'–0"		WIDTH 4'–0"		WIDTH 5'–0"	
	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.
3'–6"	2.62	306	2.95	332	3.28	373	4.12	479	4.64	521	5.20	564	5.69	667	6.40	721	7.10	775	7.20	846	8.11	909	9.03	976
3'–9"	2.70	309	3.04	341	3.39	373	4.25	494	4.78	536	5.34	579	5.87	687	6.58	741	7.30	796	7.42	874	8.34	937	9.27	1010
4'–0"	2.78	328	3.14	364	3.49	399	4.38	518	4.92	565	5.49	610	6.05	718	6.77	776	7.49	835	7.64	909	8.58	976	9.51	1046
4'–3"	2.87	334	3.23	370	3.59	406	4.51	526	5.06	573	5.64	619	6.22	729	6.95	787	7.69	847	7.87	922	8.81	990	9.75	1061
4'–6"	2.95	356	3.32	394	3.69	431	4.64	558	5.20	607	5.79	656	6.40	770	7.14	830	7.88	891	8.09	973	9.04	1043	9.99	1115
4'–9"	3.03	361	3.41	410	3.79	438	4.77	566	5.34	616	5.94	665	6.57	780	7.32	841	8.07	903	8.31	986	9.27	1056	10.23	1129
5'–0"	3.12	367	3.51	416	3.90	445	4.90	574	5.47	624	6.09	674	6.75	791	7.51	853	8.27	915	8.53	999	9.50	1070	10.47	1144
5'–3"	3.20	383	3.60	424	4.00	465	5.03	600	5.61	652	6.23	704	6.93	827	7.69	890	8.46	955	8.76	1044	9.73	1118	10.71	1194
5'–6"	3.28	389	3.69	430	4.10	472	5.16	608	5.75	661	6.38	713	7.11	837	7.88	901	8.66	967	8.98	1057	9.97	1131	10.95	1208
5'–9"	3.37	405	3.78	451	4.20	495	5.29	635	5.89	690	6.53	744	7.28	874	8.07	940	8.85	1007	9.20	1102	10.20	1178	11.19	1258
6'–0"	3.45	415	3.88	460	4.30	504	5.42	646	6.03	702	6.68	757	7.45	888	8.25	954	9.05	1022	9.42	1119	10.43	1196	11.43	1276
6'–3"	3.53	425	3.97	470	4.41	515	5.55	661	6.17	718	6.83	773	7.63	908	8.44	975	9.24	1044	9.64	1147	10.66	1223	11.67	1305
6'–6"	3.62	437	4.06	486	4.51	532	5.68	681	6.31	739	6.97	797	7.81	935	8.62	1005	9.43	1057	9.87	1178	10.89	1258	11.92	1340
6'–9"	3.70	441	4.15	490	4.61	537	5.81	688	6.45	747	7.12	806	7.98	945	8.81	1015	9.63	1066	10.09	1191	11.12	1272	12.15	1355
7'–0"	3.78	460	4.25	510	4.71	560	5.94	716	6.59	777	7.27	837	8.16	981	8.99	1053	9.82	1126	10.31	1237	11.35	1319	12.40	1404
7'–3"	3.86	465	4.34	516	4.81	567	6.07	724	6.72	785	7.42	846	8.33	992	9.18	1065	10.02	1138	10.53	1249	11.59	1333	12.64	1418
7'–6"	3.95	477	4.43	529	4.91	570	6.20	742	6.86	804	7.57	866	8.51	1016	9.36	1089	10.21	1163	10.75	1290	11.82	1365	12.88	1451
7'–9"	4.03	491	4.53	544	5.02	597	6.33	762	7.00	826	7.71	890	8.67	1040	9.55	1116	10.41	1193	10.98	1313	12.05	1399	13.12	1498
8'–0"	4.12	496	4.62	550	5.12	604	6.46	770	7.14	834	7.86	899	8.86	1051	9.73	1129	10.60	1205	11.20	1325	12.28	1412	13.36	1510
8'–3"	4.20	504	4.71	559	5.22	613	6.59	784	7.28	849	8.01	915	9.04	1069	9.92	1149	10.80	1228	11.42	1353	12.51	1440	13.60	1529
8'–6"	4.28	519	4.80	576	5.32	632	6.71	804	7.42	871	8.16	938	9.21	1107	10.10	1176	10.99	1257	11.64	1385	12.74	1474	13.84	1565
8'–9"	4.37	528	4.90	586	5.42	643	6.84	819	7.56	886	8.31	954	9.39	1119	10.29	1199	11.18	1280	11.87	1410	12.97	1500	14.08	1592
9'–0"	4.45	545	4.99	605	5.53	664	6.97	842	7.70	912	8.46	982	9.56	1148	10.47	1231	11.38	1313	12.09	1447	13.21	1539	14.32	1631
9'–3"	4.53	554	5.08	614	5.63	674	7.10	858	7.84	929	8.60	999	9.74	1169	10.66	1252	11.57	1335	12.31	1474	13.44	1563	14.56	1660
9'–6"	4.62	568	5.17	630	5.73	692	7.23	878	7.97	950	8.75	1022	9.92	1195	10.84	1280	11.77	1365	12.53	1505	13.67	1600	14.80	1696
10'–0"	4.78	582	5.36	645	5.93	708	7.49	900	8.11	974	9.05	1048	10.27	1227	11.21	1312	12.16	1399	12.98	1546	14.13	1642	15.29	1739

NOTE:
FOR CONVENIENCE, DEPTHS OF INLETS SHOWN IN ABOVE TABLES ARE IN INCREMENTS OF 3 INCHES BUT ANY DEPTHS OTHER THAN THOSE SHOWN ABOVE MAY BE USED WHEREVER DEEMED NECESSARY. QUANTITIES FOR OTHER DEPTHS FALLING WITHIN THE LIMITS OF THE TABLE MAY BE FOUND BY INTERPOLATION.

ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT).
NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES.

STANDARD DRAWING NO. R-6020E

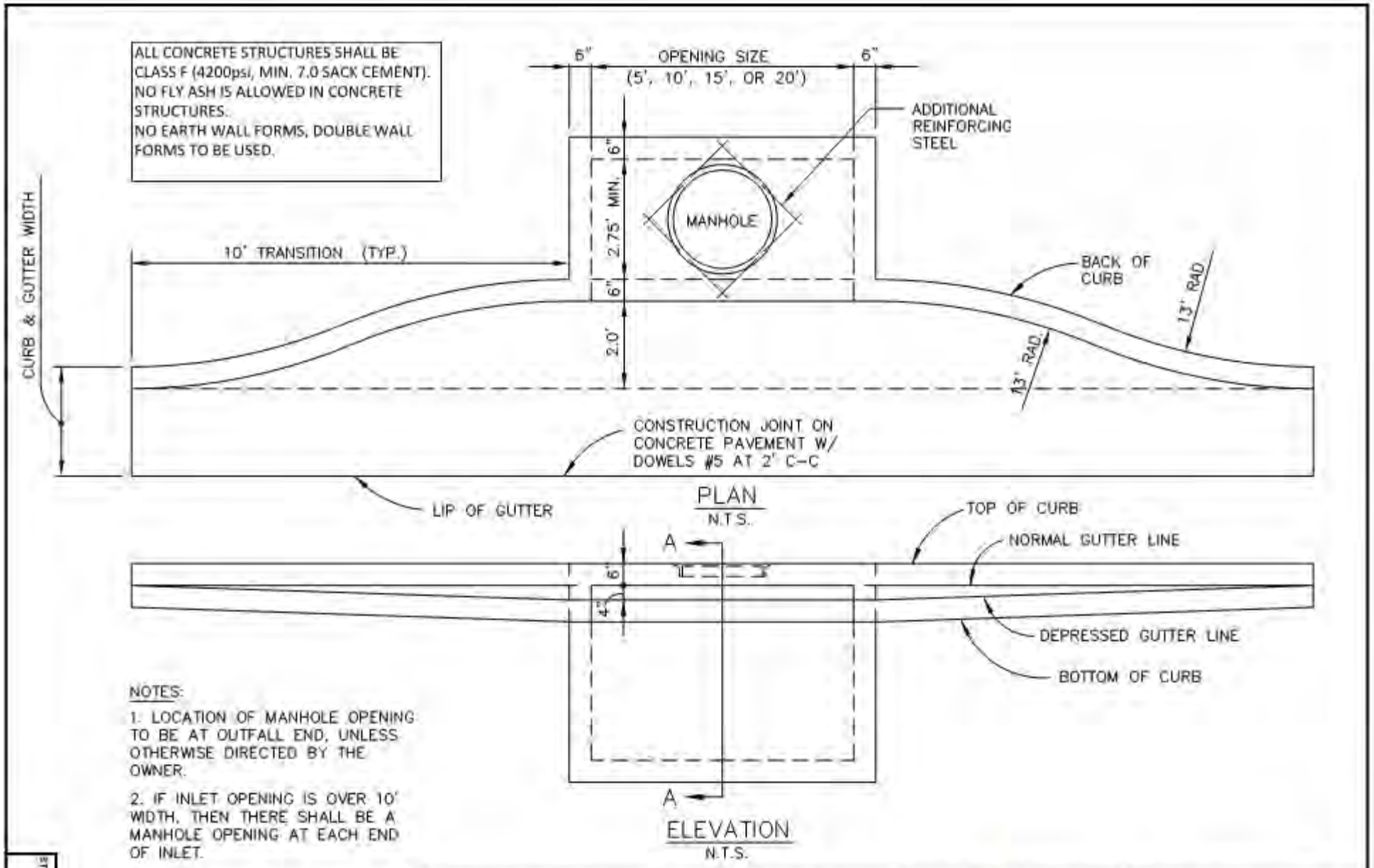
CURB INLET
SUMMARY OF QUANTITIES

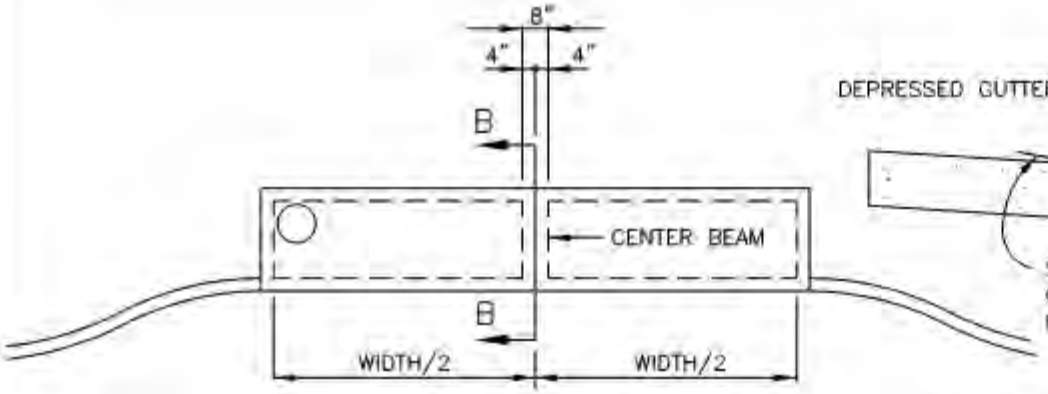
CITY OF ROCKWALL

STANDARD SPECIFICATION REFERENCE: 702

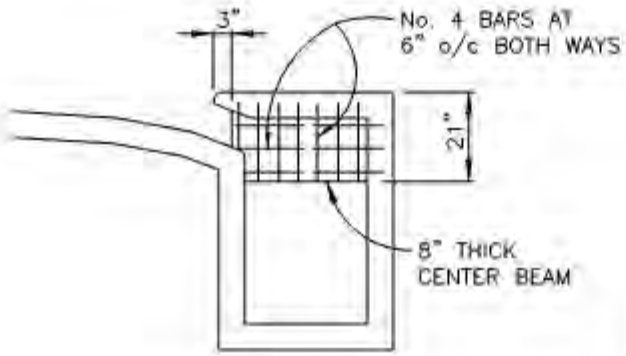
DATE: Mar. 2018

STANDARD DRAWING NO.: R-6020E

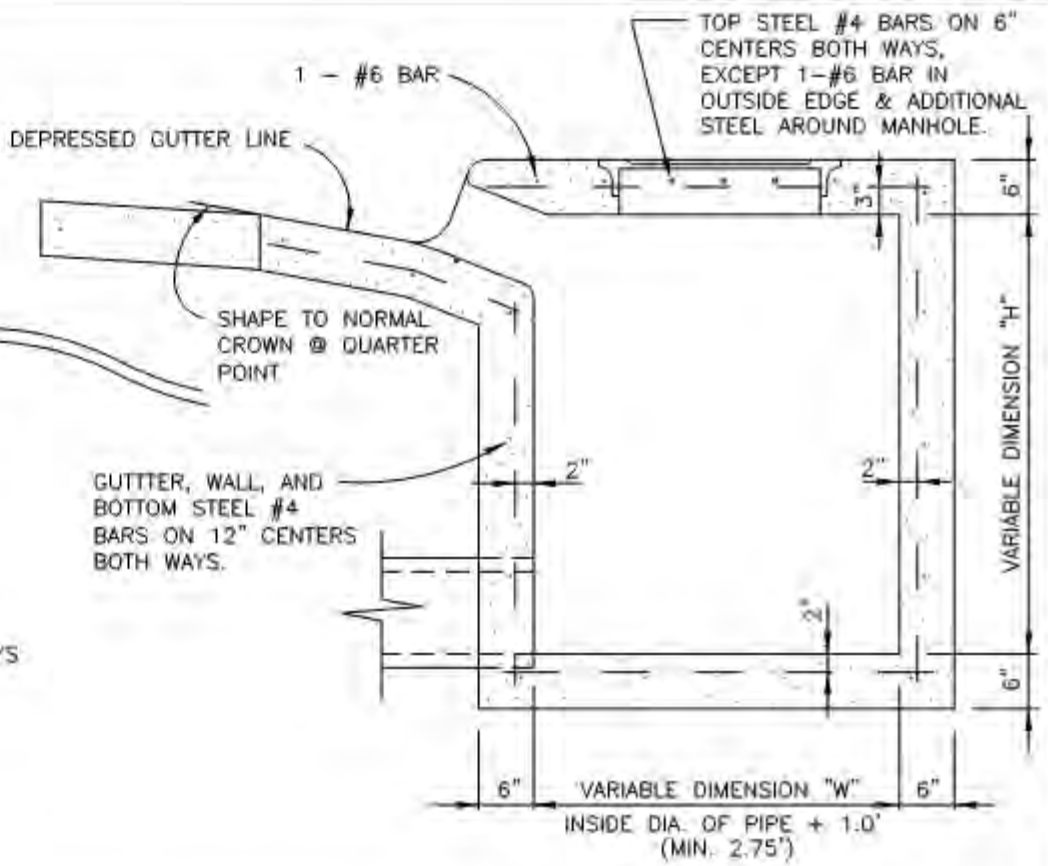

ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT).
NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES.
NO EARTH WALL FORMS, DOUBLE WALL FORMS TO BE USED.
6"
OPENING SIZE
(5', 10', 15', OR 20')
6"
ADDITIONAL REINFORCING STEEL
6"
2.75' MIN.
6"
2.0'
MANHOLE
CURB & GUTTER WIDTH
10' TRANSITION (TYP.)
BACK OF CURB
13' RAD.
13' RAD.
CONSTRUCTION JOINT ON CONCRETE PAVEMENT W/ DOWELS #5 AT 2' C-C
LIP OF GUTTER
PLAN
N.T.S.
A
A
6"
4"
TOP OF CURB
NORMAL GUTTER LINE
DEPRESSED GUTTER LINE
BOTTOM OF CURB
ELEVATION
N.T.S.
NOTES:
1. LOCATION OF MANHOLE OPENING TO BE AT OUTFALL END, UNLESS OTHERWISE DIRECTED BY THE OWNER.
2. IF INLET OPENING IS OVER 10' WIDTH, THEN THERE SHALL BE A MANHOLE OPENING AT EACH END OF INLET.
STANDARD DRAWING NO.
R-6030A
CURB INLET RECESSED
5', 10', 15' OR 20' OPENING
CITY OF ROCKWALL
STANDARD SPECIFICATION REFERENCE
702
DATE
Mar. 2018
STANDARD DRAWING NO.
R-6030A



CENTER BEAM FOR
15' AND 20' INLETS
N.T.S.



SECTION B–B
N.T.S.



SECTION A–A
N.T.S.

ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT) NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES.
NO EARTH WALL FORMS, DOUBLE WALL FORMS TO BE USED.

STANDARD DRAWING NO. R-6030B

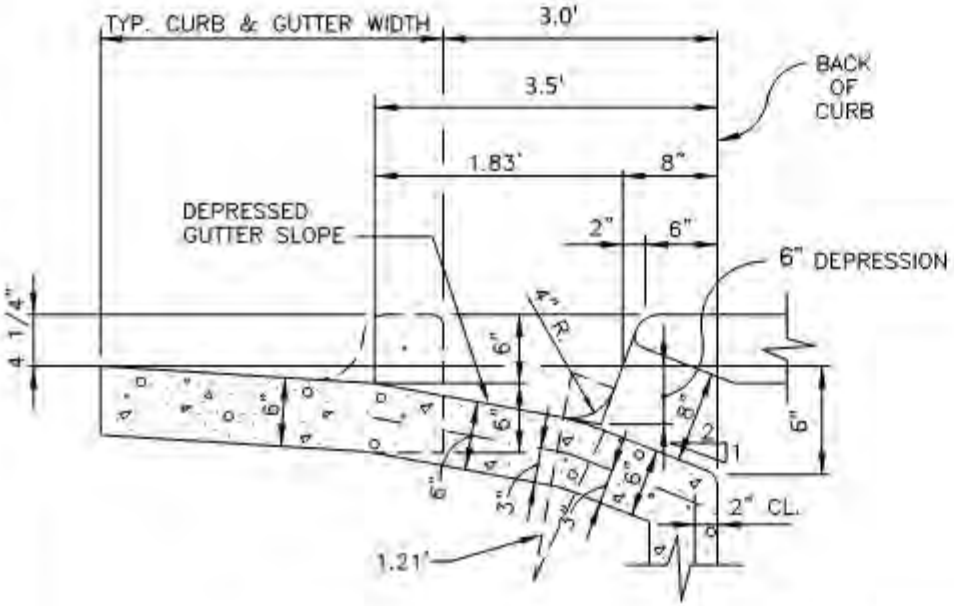
CURB INLET RECESSED
CROSS SECTION & CENTER BEAM

CITY OF ROCKWALL

STANDARD SPECIFICATION REFERENCE 702

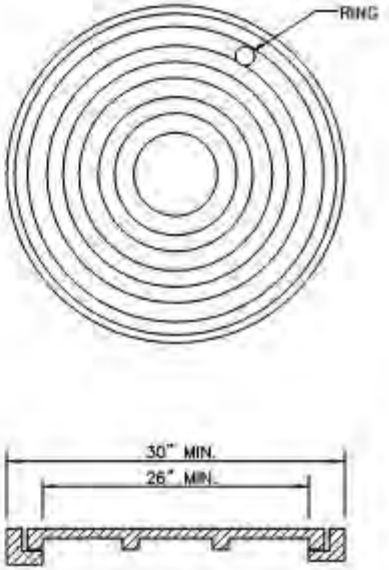
DATE Mar. 2018

STANDARD DRAWING NO. R-6030B



INLET THROAT
N.T.S.

ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT). NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES.



MANHOLE FRAME & COVER
N.T.S.

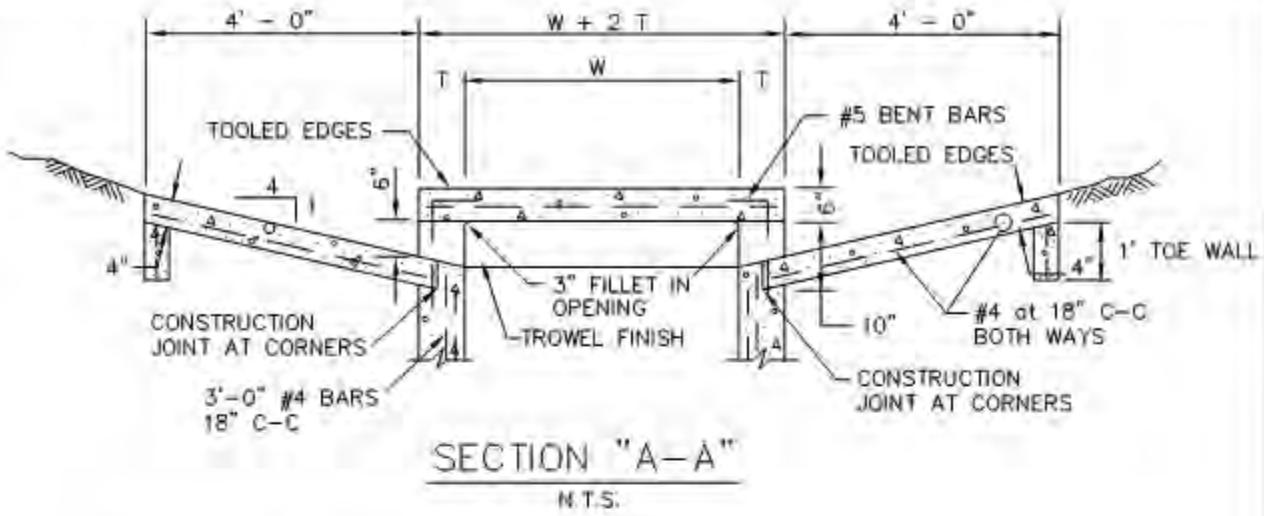
INLET LID OF BE LOCKING

STANDARD DRAWING NO. R-6030C	CURB INLET RECESSED INLET THROAT & M.H. FRAME & COVER	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 702 DATE Mar. 2018 / STANDARD DRAWING NO. R-6030C

GENERAL NOTES:

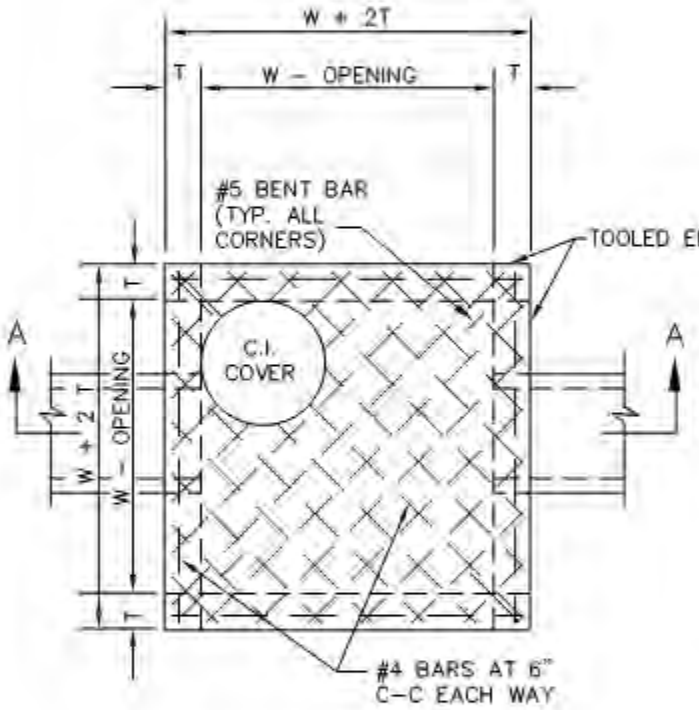
1. IN GENERAL, REINFORCING STEEL SHALL BE #4 BARS ON 12" CENTERS BOTH WAYS FOR GUTTER, BOTTOM SLAB ENDS, FRONT AND BACK WALLS, AND #4 BARS ON 6" CENTERS BOTH WAYS FOR TOP SLAB. AN ADDITIONAL #6 BAR SHALL BE PLACED IN THE FRONT EDGE OF THE TOP SLAB IN THE INLETS AND ADDITIONAL REINFORCING STEEL SHALL BE PLACED AROUND MANHOLES AS SHOWN.
2. ALL REINFORCING STEEL SHALL BE GRADE 60.
3. ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT). ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4".
4. ALL REINFORCING STEEL SHALL HAVE A MINIMUM COVER OF 2" TO THE CENTERS OF THE BARS.
5. 10'-0" OF EXISTING CURB AND GUTTER UPSTREAM AND 10'-0" OF EXISTING CURB AND GUTTER DOWNSTREAM SHALL BE REMOVED AND REPOURED INTEGRALLY WITH EACH INLET.
6. ALL BACK FILLING SHALL BE PERFORMED BY MECHANICAL TAMPING TO 95% STANDARD PROCTOR DENSITY
7. NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES.

STANDARD DRAWING NO.				
R-6030D	CURB INLET RECESSED GENERAL NOTES	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 702	
			DATE Mar. 2018	STANDARD DRAWING NO. R-6030D



SECTION "A-A"

N.T.S.



PLAN OF TOP SLAB

N.T.S.

ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT). NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES.
NO EARTH WALL FORMS, DOUBLE WALL FORMS TO BE USED.

INLET SIZE	T	W
2' SQUARE	7"	2'-0"
4' SQUARE	7"	4'-0"
5' SQUARE	8"	5'-0"
6' SQUARE	9"	6'-0"

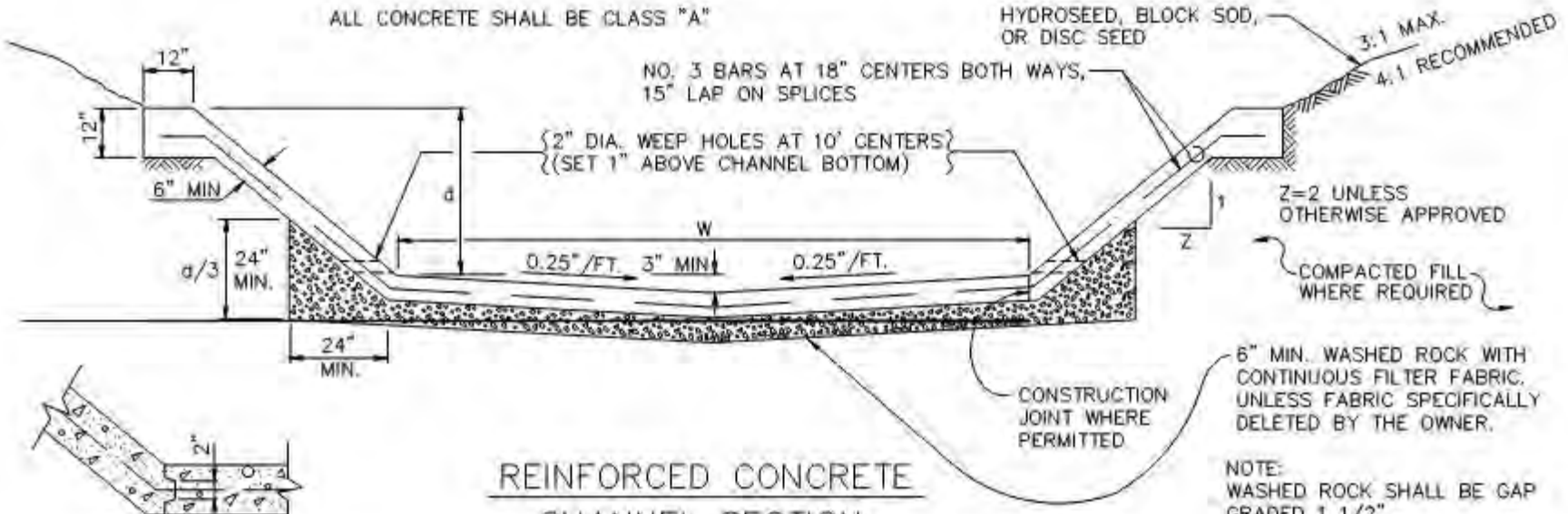
NOTES:

1. MATERIAL AND WORKMANSHIP SHALL CONFORM WITH THE REQUIREMENTS OF NCTCOG STANDARD SPECIFICATIONS FOR STANDARD CONCRETE MANHOLES. MINIMUM CLASS "A" CONCRETE.
2. LAYERS OF REINFORCING STEEL NEAREST THE INTERIOR AND EXTERIOR SURFACES SHALL HAVE A COVER OF 2" TO THE CENTER OF BARS, UNLESS OTHERWISE NOTED.
3. FOR DETAILS OF REINFORCING OF LOWER PORTIONS OF INLET SEE APPROPRIATE SQUARE MANHOLE DETAILS.
4. DEPTH OF DROP INLET FROM FINISHED GRADE TO FLOW LINE OF INLET IS VARIABLE. APPROXIMATE DEPTH WILL BE SHOWN ON PLANS AT LOCATION OF INLET.
5. ALL STANDARD DROP INLETS SHALL HAVE ONE OPENING ON EACH SIDE UNLESS OTHERWISE SHOWN ON PLANS.
6. DECK MAY BE REINFORCED SAME AS 4' SQUARE MANHOLE.

DROP INLET	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 702	
2', 4', 5' OR 6' SQUARE		DATE Mar. 2018	STANDARD DRAWING NO. R-6040

FILL AREAS SHALL BE COMPACTED TO 95% STD. PROCTOR DENSITY AT OPTIMUM MOISTURE CONTENT PRIOR TO CHANNEL EXCAVATION.

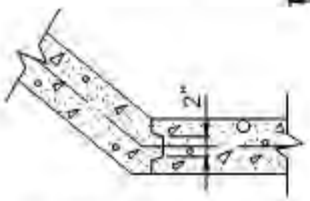
ALL CONCRETE SHALL BE CLASS "A"



NOTE:
WASHED ROCK SHALL BE GAP GRADED 1 1/2".

REINFORCED CONCRETE CHANNEL SECTION

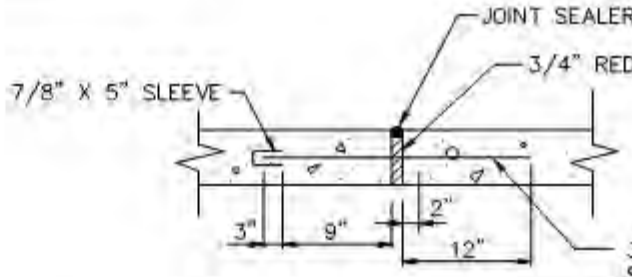
N.T.S.



CONSTRUCTION JOINT

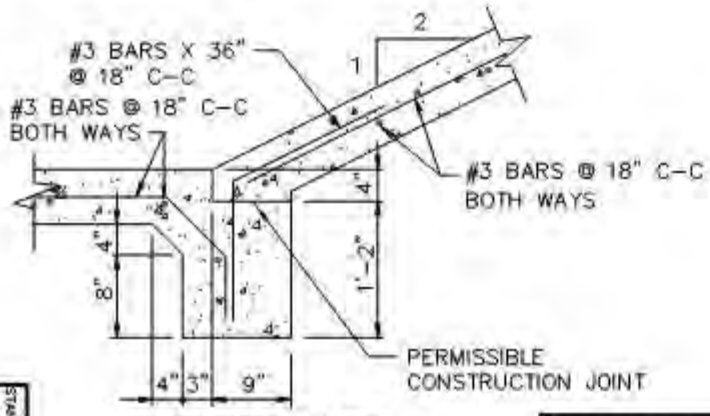
N.T.S.

ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT). NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES.



TRANSVERSE EXPANSION JOINT

SPACE 100' C-C AND USE AT ENDS OF CURVES - P.C. AND P.T.
N.T.S.



ALTERNATE CONSTRUCTION JOINT

N.T.S.

STANDARD DRAWING NO. R-6050

FULL CHANNEL LINING

CONCRETE REINFORCED

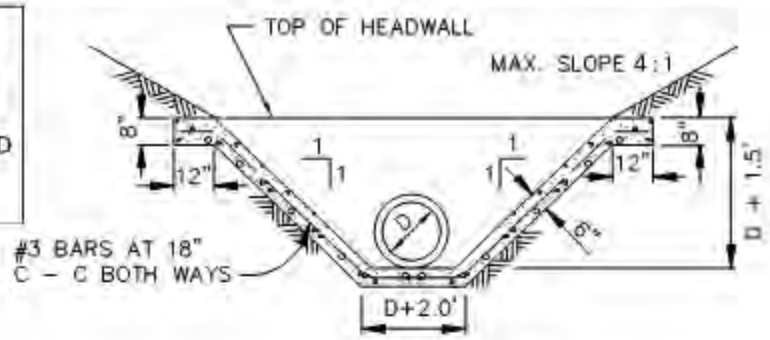
CITY OF ROCKWALL

STANDARD SPECIFICATION REFERENCE: 803.3

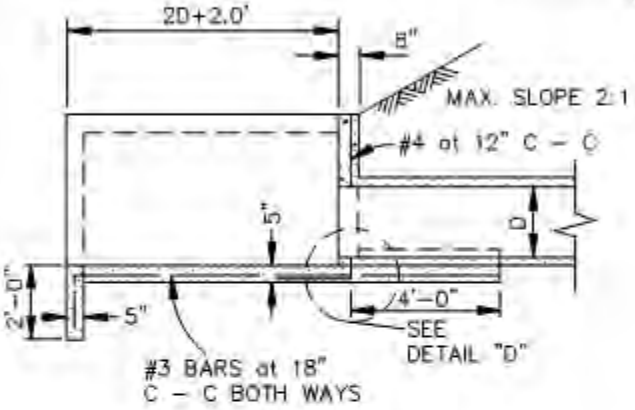
DATE: Mar. 2018

STANDARD DRAWING NO.: R-6050

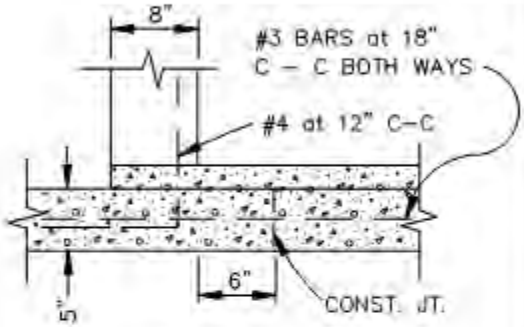
ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT). NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES.



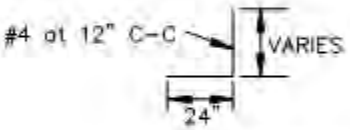
SECTION "B-B"
N.T.S.



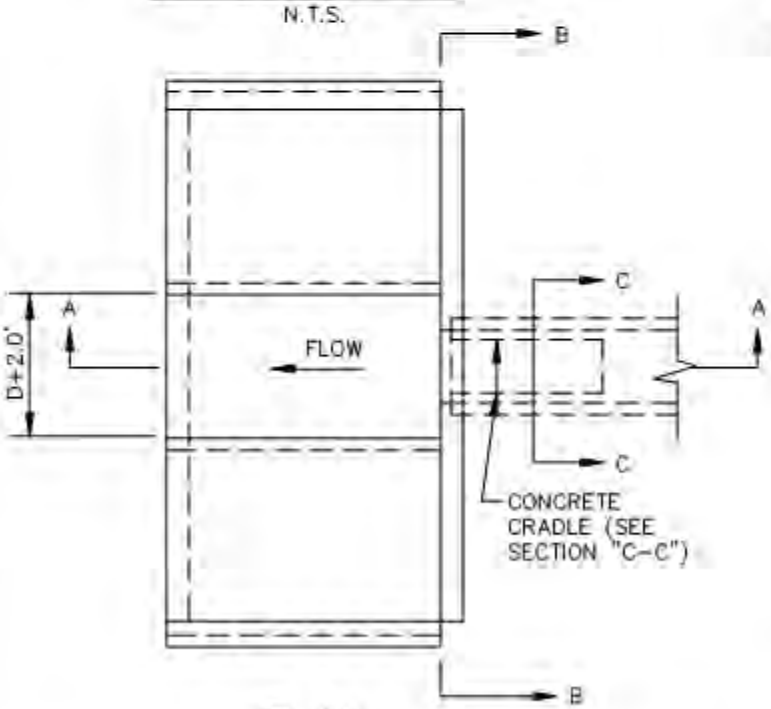
SECTION "A-A"
N.T.S.



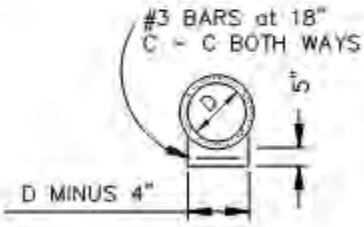
DETAIL "D"
N.T.S.



BAR DETAIL
N.T.S.



PLAN
N.T.S.

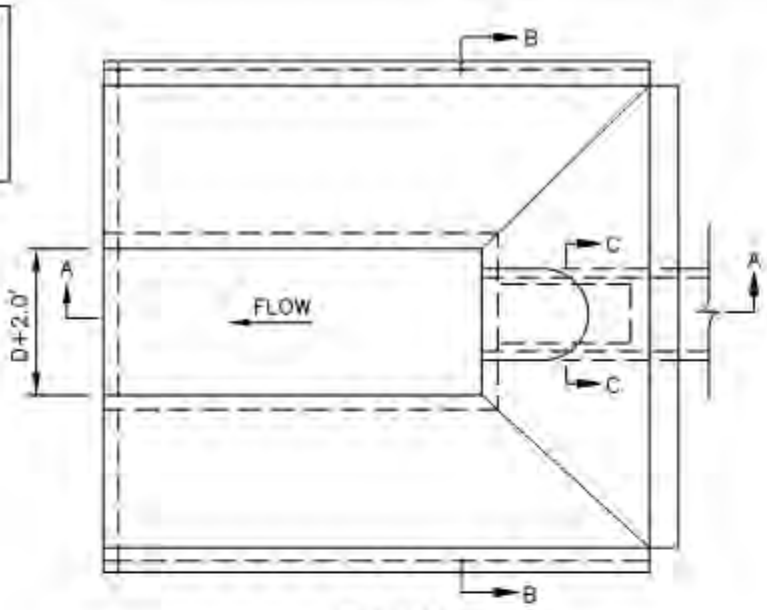


SECTION "C-C"
N.T.S.

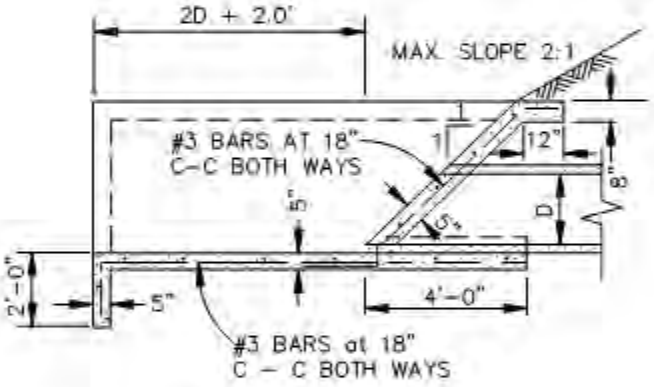
NOTE:
CONCRETE SHALL BE CLASS "A"

CONCRETE APRON VERTICAL HEADWALL	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 803.3	
		DATE Mar. 2018	STANDARD DRAWING NO. R-6060

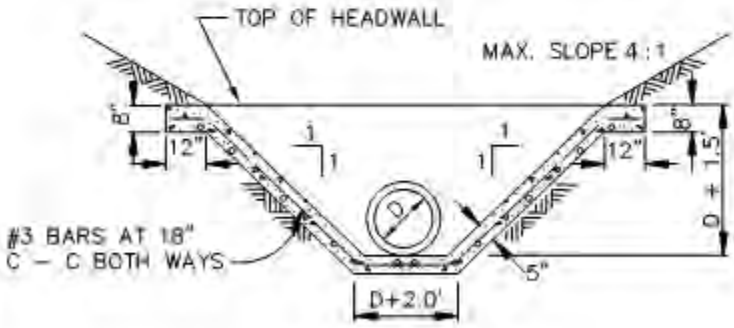
ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT). NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES.



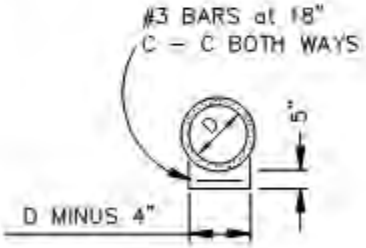
PLAN
N.T.S.



SECTION A–A
N.T.S.



SECTION B–B
N.T.S.



SECTION C–C
N.T.S.

NOTE:
CONCRETE SHALL BE CLASS "A".

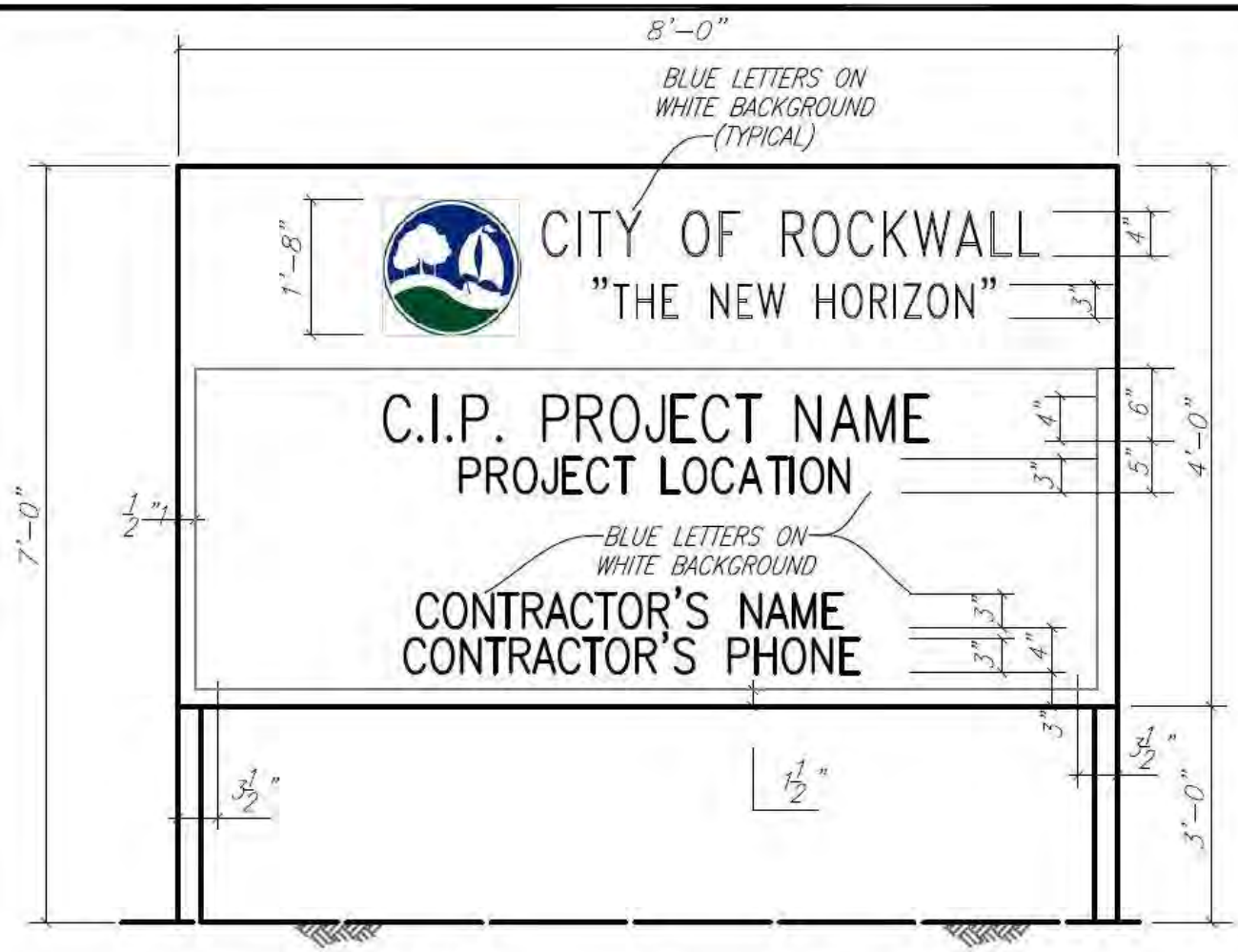
CONCRETE APRON	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 803.3	
SLOPING HEADWALL		DATE Mar. 2018	STANDARD DRAWING NO. R-6070

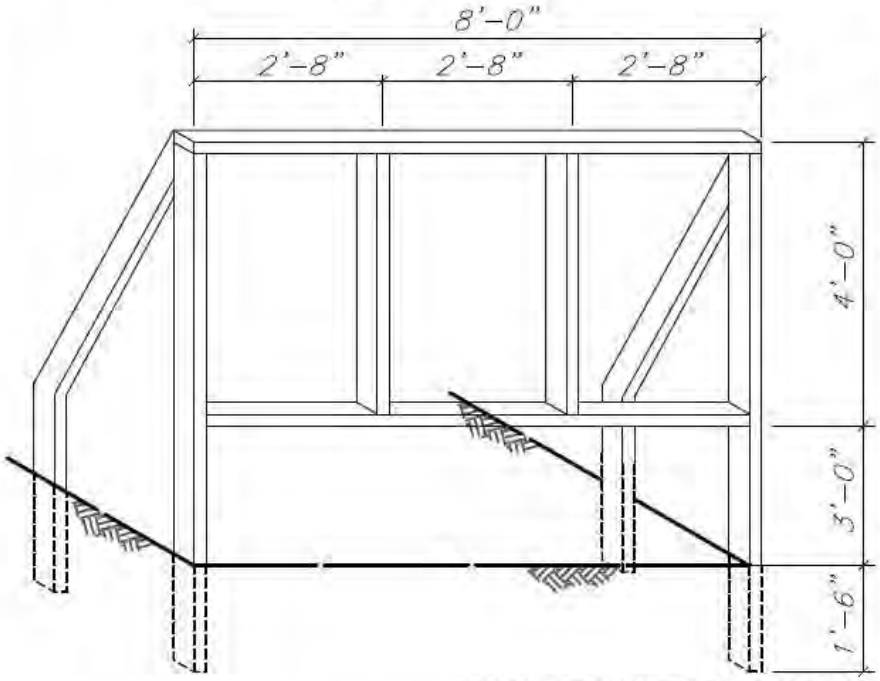
8.7 Division 7000 Rockwall Miscellaneous Details

This Division 7000 is to be added to the NCTCOG's Standard Drawings for Public Works Construction Standards. Division 7000 contains miscellaneous standard details added by the City. The following Table 9.7 contains a list of the miscellaneous standards being added.

Table 9.7: Division 7000 Rockwall Miscellaneous Details

Drawing No.	Subject
R-7010	**Miscellaneous Details – Construction Sign Detail**
R-7020	**Miscellaneous Details – Residential Lot Typical Wall & Swale Detail**





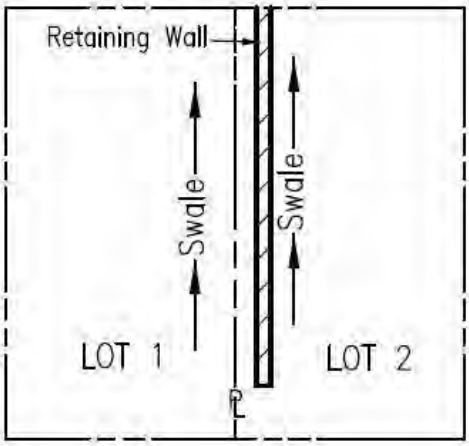
SIGN FRAME ELEVATION

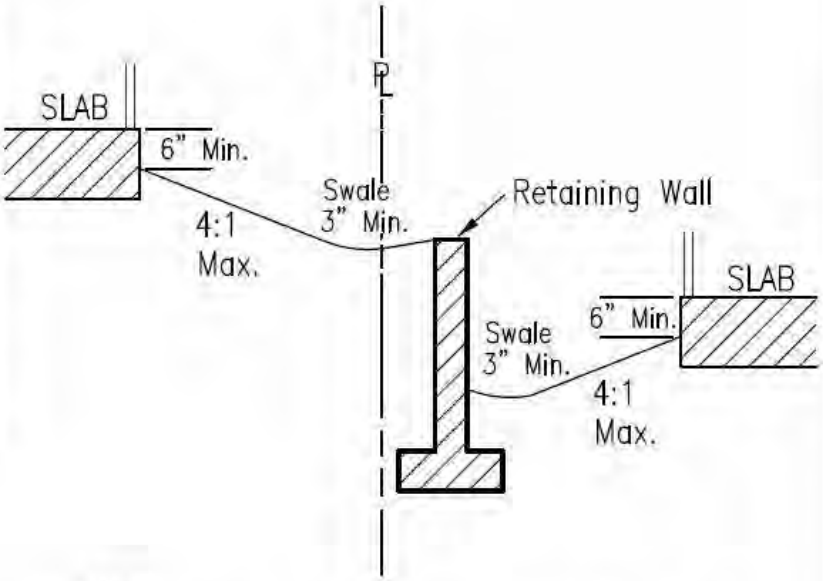
SIGN PANEL 3/4" EXTERIOR PLYWOOD PAINT AS SHOWN ON DETAIL ABOVE

FRAME 2"x4" STOCK FRAME TO BE PAINTED WHITE

ALL PAINT TO BE "EXTERIOR GRADE"

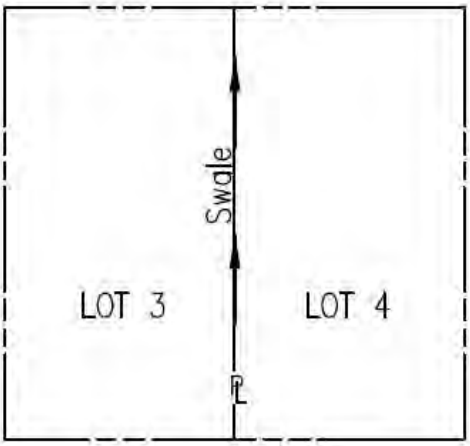
MISCELLANEOUS DETAILS	CITY OF ROCKWALL	
CONSTRUCTION SIGN DETAIL		DATE AUG. '15 / DRAWING NO. R-7010

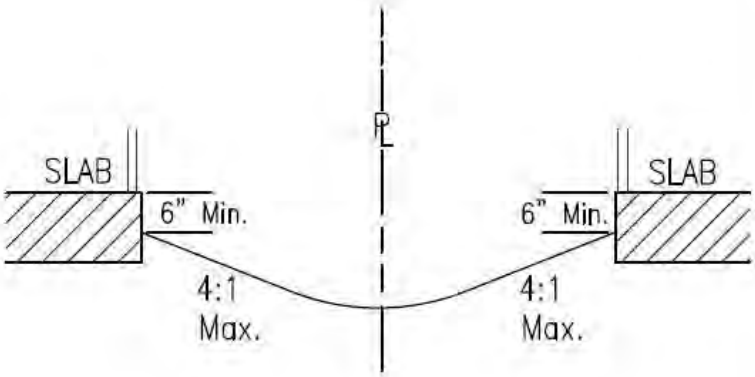




NOTE:

No Retaining Walls including the footing shall be placed in the right-of-way, easements, or overlapping property lines.





NO WALL

MISCELLANEOUS DETAILS	CITY OF ROCKWALL	
RESIDENTIAL LOT TYPICAL WALL & SWALE DETAIL		DATE: AUG. '15 / DRAWING NO.: R-7020

APPENDIX

City of Rockwall
The New Horizon

APPENDIX A – Engineering Plan Review Check List

City of Rockwall
The New Horizon

Engineering Plan Review Check List

Item Description
Administrative Items
Engineering Plan Submission Application with submittal checklist
Engineering-Plan Review Checklist
Four Complete Copies of Engineering Plans Initial Submittal; Three Complete Copies of Engineering Plans Re-Submittal; Two additional sets each submittal is proposed lift station.
Markups from Previous Submittals, if subsequent submittal
Annotated Review Comments, if applicable
Two copies of any Study or Report Completed in Support of the Project
Submission of Required Fire Flows Form to Fire Marshal
Submission of Fire Hydrant Flow Form to Fire Marshal
Floodplain Administrator Development Permit Application
Storm Drainage Management Plan
TxDOT preliminary letter of approval for Drive Approach Connections
TxDOT permits obtained
Franchised Utility Approval Obtained (specify)
Other Agency or Land Owner Approval Obtained (specify)
Corps of Engineers (COE) Wetland Permit Obtained (if applicable) or letter of determination
Federal Emergency Management Agency (FEMA) Letter of Map Revision (LOMR)
Other Agreements (explain)
Studies - If Required
Geotechnical Report
Federal Emergency Management Agency (FEMA) Letter of Map Revision (LOMR) Flood Study
Wetland Determination
Lift Station Report
Hydraulic Study Submitted
Water Study Submitted
Sanitary Sewer Capacity Study Submitted
Traffic Impact Analysis
Flood Study (100 year-fully developed) (Local or FEMA)
Sight Visibility Determination for easements
All Sheets
Sheet Size 24" x 36"
Title Block with Subdivision Name, Project Name and Sheet Description
Revision Block - Filled Out
North Arrow

City of Rockwall
The New Horizon

Item Description
Vertical and Horizontal Scale Listed and Accurate
Benchmarks Listed and Described
Legend of All Drawing Symbols and Line Types Used
Engineer's Seal, Signature and Date per Texas Engineering Practices Act
Responsibility Note Required on All Sheets except site plan and standard details: "ALL RESPONSIBILITY FOR ADEQUACY OF DESIGN REMAINS WITH THE DESIGN ENGINEER. THE CITY OF ROCKWALL, IN REVIEWING AND RELEASING PLANS FOR CONSTRUCTION, ASSUMES NO RESPONSIBILITY FOR ADEQUACY OR ACCURACY OF DESIGN."
Provide Key Map for Large Projects Showing Sheet Locations
Clear Drafting with Proper Line Weights for Ease of Reading
No Overlapping Text
Drafting at Adequate Scale to Obtain Ease of Reading and Scanning
Cover Sheet
Project Name
Official Plat Name as Assigned by the Planning and Zoning Department (including Block & Lot)
Official Project Address Assigned by the City Planning and Zoning Department
Mapsco Grid Reference
Month and Year of Probable Start of Project Construction
Revision Table
Engineer Contact Information (Name, Address, Phone Number, email address)
Owner Contact Information (Name, Address, Phone Number, email address)
Sheet Index - List ALL sheets included in plan set including details
Location Map with North Arrow
Side Bar - Plat Subdivision Name & Project Name
Title of type of sheet (i.e. Grading, Utility, Water,….)
Approved Site Plan
Approved Site Plan
Approved Landscape/Treescape Plan
Approved Landscape and Treescape Plan
Proposed Final Plat
Plat Included
Correct Plat Name
Plat Closure Calculations (Sealed by Registered Surveyor or Engineer)
GPS Grid Coordinates Shown for the Property Corners Properly Into City Monumentation System (x, y coordinates on 2 property corners)
Location map
Street Names with Right-of-Ways Widths Identified

City of Rockwall
The New Horizon

Item Description
Benchmark (if near drainage feature or flood zone)
Basis of bearing
Metes and Bounds of Tract
Adjacent Land Ownership Information
List Corners Found or Set
Property Pins Shown for tracts across ROW with verification of existing ROW Widths
Building Setback Lines Shown
Recording Volume and Page Information for all separate easements and ROW dedications within platted area or adjacent tracts
100-Year Floodplain for Fully Developed Conditions showing cross sections and elevations
Minimum Finished Floor Elevations Shown (if near drainage feature or flood zone)
Drainage & Drainage Maintenance Easements Shown and annotated
Required Utility Easements Shown (20' minimum width) and annotated
Access Easements Shown and annotated
ROW. Dedication Shown and annotated
ROW Corner Clips and annotated
All Existing easements (on-site) shown and annotated
Visibility Easements Shown and annotated
Surveyor Seal, Signature and Date
Demolition Plan
All existing topographic features including but not limited to: pavement, curbs sidewalks, barrier-free-ramps, light poles, driveways, storm sewer inlets, manholes, junction boxes headwalls retaining walls, fences , mailboxes landscape planters, trees, etc.
All wet utilities (water lines, wastewater lines and storm sewer) including sizes
All franchise utilities (electric, cable, communications, gas, etc.)
Pavement removals with full depth pavement sawcut locations
Water line, wastewater line and storm sewer removals
Dimensional Control & Paving Plan
Lot Boundary with Dimensions and Bearings
Street Names Shown
Existing ROW
ROW. Dedication and ROW Corner Clips Shown with Dimensions
Verification of public rights-of-way width ("variable width" is not acceptable) (When Required)
Visibility Easements Shown as Required by City Code
Building Setback Lines Shown
Dimensions (thickness, width, length, radius) for all paved areas (parking areas, driveways, fire lanes, turn lanes, drive aisles, sidewalks, etc)
Driveways Location, Spacing and Width Meet City Code and TxDOT Requirements

City of Rockwall
The New Horizon

Item Description
Driveways- Width, Radius, Distance to Adjacent Drives, Alignment with other Drives Across Street Shown
Fire Lane - Width, Radius & Distance from Building Shown and Detailed including turn-arounds and dead-ends
All Pavement Thickness, Concrete Strength, Reinforcing, Subgrade Detailed Per City Requirements
Location of Fire Sprinkler Fire Department Connection (FDC) Shown
Location of Electrical Transformers Shown
Dumpster Location, Access and Construction Requirements Met and approved by Planning and Zoning Department (Backing Distance and Maneuver - Accessible by SU-30 Turning Template)
All Existing and Proposed Utility and Drainage Easements Shown
Existing and Required Access Easements Shown
Screening Wall Location, Foundation, Height, Start/End of Wall
Retaining Wall Location, Foundation, Height, Start/End of Wall
Existing and Required Sidewalks and Trails Shown with Dimensions
Show Location of Required ADA Ramps
Limits of 100-Year Ultimate Flood Plain Shown (FEMA and local)
Note Identifying Reference for 100-Year Floodplain and WSE Information with cross section with elevations
New/Relocating Left Turn Lane and/or deceleration lanes complies with City and TxDOT Requirements (Spacing, Length, Construction)
Existing and Proposed Infrastructure within Median Modifications Shown (Trees, Street Lights, Conduit, Irrigation, pavers, etc)
Street Lighting and Street Sign Plan
Roadway Paving Plan and Profile
Street Name and Cross Street Names
Block, Lot, and Address Labels
All existing and proposed easements
Dimensions labels of roadway width, ROW width, sidewalk widths, curb return radius, etc.
Show and label all storm sewer inlets with roadway stationing
Legend showing type of pavements, thickness, strength, reinforcing, etc.
Roadway centerline stationing every 100 ft, al labels for all Start, PC, PT, PI, PRC, etc.
Driveway centerline stationing location off roadway
Label Cross-slope (At cross-slope transitions the cross-slope shall be labeled every 25 ft and at critical design points)
Show and Label Proposed Profile station and elevation (All Slopes, VPI, PI, Vertical Curves, LP, HP, K, e, PC, PT,VPRC, etc.)
Show and Label Existing ground Centerline, Left ROW, Right ROW, and any other critical profiles
Show in Profile an Major Utility Crossing (Culverts, Water/Wastewater Transmission Lines, Gas Transmission Lines, Electric and Communication Duct Banks)
Existing and Proposed Ground lines elevation in profile every 50 ft
100-Year floodplain line and WSEL

City of Rockwall
The New Horizon

Item Description
Cross-Sections
Cross sections shall be provided for all Arterial and Collector Roadways
Cross-Sections shall be taken every 50 feet, driveway centerline, intersecting streets, and other critical points or features.
Include Existing and Proposed ROW lines
Existing Ground Line
Proposed Pavement thickness, and subgrade depths, and sidewalks
Proposed Slopes
Cross-sections at Driveways shall have all slope and VC Labeled
Grading Plan
Benchmarks
Exist Lot Lines & Corners (lot lines screened if being changed)
Proposed Lot Lines
Existing (screened) & Proposed ROW
Street Names Shown
Drainage Easements for Drainage Features and Structures Shown
Existing & Proposed Improvements (paving and building footprints)
Minimum Finished Floor (FF) Elevations for Structures meet Requirements of Drainage Ordinance
Minimum Finished Floor (FF) Elevation Shown for each Structure
Existing & Proposed Contours for Site and Minimum of 50' Beyond Property Lines (with appropriate contour interval) with all ponds and waterways labeled
Existing & Proposed Spot Elev. Showing Grade; High & Low Points; Swales, Inverts & Ridges with Flow Arrows
Label Lot Area and Disturbed Land Area
Adjacent Property Improvements Within Minimum 25' of site
Existing & Proposed On-site and Off-site Drainage Features (Design Info Shown)
Maximum Cross Slope 4H:1V (H=Horizontal, V=Vertical) Min Running Slope 1% for unpaved areas
Ditches Adjacent to Site Cleared, Cleaned & Regraded (only with permission from property owner)
Positive Overflow Routes with elevations (All public roads that have a sag require an overflow route)
Lot grading to be above street elevation (Residential Only)
Limits of 100-Year Ultimate Floodplain Shown
Ultimate (Fully Developed) 100-Year Floodplain Water Surface Elevations (WSE's) shown on cross sections
Note Identifying Reference for 100-Year Floodplain and WSE Information
Cross sections to scale with hydraulic calculations
Location of Cross-Sections With Stationing Shown
Cut or Fill Areas shown on Cross-Sections

Item Description
Existing and Proposed Retaining Walls with Top & Bottom Spot Elevations and calculations as required
No Residential Cross Lot Drainage
Grading Plan Matches Drainage Area Map
Does Grading Plan Address Impacts to Adjacent Properties Requiring Easements or Letters of Permission
All Detention Areas with Flumes with Elevations and Side Slopes Labeled
Retaining Wall Plan and Profiles
Label Beginning and Ending of Wall
Label Top of Wall, Bottom of Wall, Bottom of Footing
Railing type and limits
Detailed Structural Sections for each differing section type
Flume locations shown in plan and sections (no water allowed to overtop retaining walls)
Show locations of all Water, Sanitary Sewer, Storm Sewer, Franchise Utility Crossings in Plan
Show locations of all Water, Sanitary Sewer, Storm Sewer, Franchise Utility Crossings in Profile along with elevations
Profile Existing Natural Ground Line, Proposed Ground Line at Bottom and Top of Wall
Drainage Area Map
Existing Drainage Area Map (Pre-Project Conditions), Proposed Drainage Area Map (Current proposed phase of development conditions) and Ultimate Drainage Area Map (Built-out conditions of development)
Storm Drainage Analysis and design shall comply with the Drainage Ordinance and the Flood Hazard Damage Prevention and Control Ordinance.
Existing and Proposed Drainage System and Structures Shown (pipe, inlets, etc)
Current Zoning or Anticipated Ultimate Development Shown and Correct For Off-Site Areas
Ensure Site Drainage is Collected on Site
Design for a Ultimate (Fully Developed) 100 Year Storm Event
Design showing Elevation Contours for the Entire Off-Site Drainage Basin and 50' beyond Property
Design with most recent surveyed Contour Information
Drainage Area Map shows Subbasins For Each Collection Point and Inlet
Each Drainage Area has ID, Q100, Acres and Direction of Flow to the Outfall Shown
Each Outfall labeled with an Identification, direction of flow and Total Flow
Drainage Direction Arrows for Both On-site and Off-site Drainage Basins
Indicate all Sags and Crests With Flow Arrows
City Standard Drainage Area Map Calculation Table for Current and Future Conditions With Outfall Summary Included
I - Values Meet City Requirements
C - Values Meet City Requirements (based on Zoning)
Time of Concentration Values Used Meet City Requirements
Q - Calculated Flow in cfs

Item Description
Provide a Subtotal for each Major Drainage Line
Drainage Area Map & Calculations for all Offsite Drainage
Limits of 100-Year Ultimate Floodplain Shown
Ultimate (Fully Developed) 100-Year Floodplain Water Surface Elevations (WSE's) shown (FEMA and local)
Note Identifying Reference for 100 Year Floodplain and WSE Information (FEMA and local)
Show Limits of Each Plan Sheet (Tile)
Show Detention
Show Existing Drainage Areas (lighter line type)
Label where each drainage area drains (inlet number, swale, etc.)
Storm Drainage Plans and Profiles *(Storm Drainage Structures including Pipe, Inlets, Etc.)*
Benchmark Location and Elevation
Flood Study / FEMA FIRM Map Reference Information Listed by Note
Storm Sewer Alignment Logical, Sharp Bends Eliminated
Collecting On-Site Drainage with Storm Sewer/Inlets
Profile Given for all Storm Sewer Mains and Laterals (shall be along the centerline of pipe)
Pipe Size, Material and Class Identified on Plan and Profile
Hydraulic Grade Line Shown on all Storm Sewer Profiles for Mains/Laterals, in both full and partial flow conduit conditions
Hydraulic Grade Line Elevations labeled on Storm Sewer Profiles at every change in flow, change in pipe size, horizontal bend, vertical bend, wye, manhole, inlet, headwall, etc.
Other Hydraulic Info Shown on Storm Sewer Profiles for all Mains/Laterals (Q100, Qcap, Velocity, V2/2g) on every conduit section between every junction and/or increase in flow
Vertical and Horizontal Alignment and Slope Shown for all Mains/Laterals on Plan and Profile
Hydraulic Grade Line Meets City Design Requirements
Starting Hydraulic Grade Line Calculations/Assumptions Listed
Starting Hydraulic Grade Line Meets City Design Requirements
Pipe Velocity Within Ordinance Requirements and Limitations
Elevation Information on Plan View (Flowlines, Top-of-Curb, Hgl or 100 yr water surface (partial flow) at every inlet, etc) Matches Profile View
Show Crossings of Existing and Proposed Water and Sanitary Sewer on Storm Sewer Profile
Note minimum Cover for Pipes and Culverts
Drainage System Reviewed for Constructability - Depth and Clearance From Streets, Structures, Other Utilities (dimensions)
Inlet Capacity Calculations Provided In City Standard Tabular Form
Inlets Placed to Capture Runoff Before It Enters Street or Major Thoroughfare
Storm Sewer Calculations Provided In City Standard Tabular Form
If Street Drainage, Calculations Showing Curb & Street Capacity
If Street Drainage, Show Nearest Inlet & all Upstream Drainage
Inlet Construction Layout Information Shown (Top of Curb, Flowline, Throat Elevation, Type, Size, Hgl, Q100, Etc)

Item Description
Storm Sewer Inlet Location, Size, Type, and Construction Detail Per City Requirements
Storm Sewer Manhole Location, Size, Type, and Construction Detail Per City Requirements
Outfall, Headwall, and Other Structure Location, Type, Velocity and Erosion/Scouring Protection Per City Standards
Positive Overflow Route Through Site with grades
Sag Points Identified and Paved Positive Overflow Designed
Outfall/Headwall Locations No Greater Than 1' Above Creek Flowline and Pointed Down Stream
Outfalls Discharge into Existing Drainage Features or Provide Easements as Required
Outfall Velocity Meets City Requirements
Outfall Protection / Energy Dissipation When Required
Appropriate Details are Included for Structures, Junction Boxes, Headwalls and Inlets (if different than NCTCOG 4th Ed. or City details)
Connection Details Provided for Non-Standard Connections
Limits of 100-Year Ultimate Floodplain Shown (FEMA and local)
Ultimate (Fully Developed) 100-Year Floodplain Water Surface Elevations (WSE's) shown (FEMA and local)
Note Identifying Reference for 100 Year Floodplain and WSE Information
Drainage Easements for Drainage Features and Structures Shown (15' minimum width)
Storm Drainage Plans and Profiles *(Ditches, Swales, and Open Channels)*
Direction of Flow Indicated for Ditches, Swales and Open Channels
Ditches, Swales and Open Channels have 100 year Ultimate Water Surface Shown on Profile (min 1% Running Slope)
Ditches, Swales and Open Channels have 100 year Ultimate Water Surface Shown on Cross Sections
Ditches, Swales and Open Channels Armored with Approved Material in Areas Where Average & Localized Velocities are Above 6 fps
Ditches, Swales and Open Channels can Carry 100-year Ultimate Storm with required Freeboard
Ditches, Swales and Open Channels Hydraulic Information Shown On Plans
Ditches, Swales and Open Channels Hydraulic Information Shown On Plans Matches Hydraulic Report or Flood Study Submitted
Ditches, Swales and Open Channels Side Slopes Less Than 4H:1V for Grassed/Un-Armored Sections
Ditch, Swale and Open Channel Width, Depth, Running and Side Slopes and Capacity Per City Requirements
Drainage Easements for Drainage Features and Structures Shown
Storm Drainage Plans *(Detention and Ponds)*
Required Detention Shown
Detention Calculation Shown and Correct
Outfall discharge curves for required storm events
Detention/Retention Pond Location, Size, Depth, Capacity, and Material Per City Requirements, 100 year Water Surface Elevations
Provide Access and Structures that Contribute to Long Term Maintenance of Detention Pond

Item Description
Drainage Easements for Drainage Features and Structures Shown (15' minimum width)
Provide chart showing flow allowable vs. flow actual for Q_5, Q_{10}, Q_{25}, and Q_{100}
Utility Plans *(Water & Wastewater)*
Water
Water Main Sized In Compliance with Water System Master Plan
Water Mains Provided to Front Property Along all Street Frontages or Otherwise Extended to Serve Adjacent Properties
Water Main Extension Required By Code Shown
Water Mains Looped to Provide Circulating and Redundant Feed
Water Main Size, Material and Class Called Out
Existing Water Mains and Valves Shown; Show Valves on both sides of Tap in Case Area Needs to be Isolated
Existing & Proposed Fire Hydrants Shown
Utility Easements for Water Mains Shown
Proposed and Existing Fire Lanes Shown
Fire Hydrant Spacing Meets Requirements of Adopted International Fire Code (IFC)
Fire Sprinkler Fire Department Connection (FDC) Location Shown
Water Main Fittings, Valves, etc Identified
Water Mains 16" and Larger Profiled
All Water Main Bores Profiled
All Crossings Identified on Appropriate Profile
Bore complies with Bore and Utility Crossing General Design Standards and TxDOT Standards if in TxDOT ROW
Existing Water Meters Shown
Proposed Water Meters Shown (Both Domestic and Irrigation)
Domestic and Irrigation Water Meters on Looped/Circulating Main
All Water Meters on Separate Service - No Water Meter "Bullheads" or Manifolds Allowed
Water Meters Location, Preferred to be in Unpaved Area
Water Meter Sizes Identified
Appropriate Double Check/Backflow Prevention Shown on Private Side of All Meters
Water System Reviewed for Constructability and Maintenance - Depth and Clearance From Streets, Structures, Other Utilities (Dimensions)
Water Mains Identified as Either Public or Private with Lines of Demarcation
Utility Crossings Shown in All Profiles and Bore Profiles including Franchise Utilities and Street Light Utilities
If Fire Sprinkler Line is Shown, Add Note to Plans to Indicated the Requirement for Separate Permit from the Fire Department and label min 10-foot separation distance from all other utilities
Wastewater
Wastewater Mains Provided to Front Property or Otherwise Extended to Serve Upstream Property
Existing Wastewater Mains, Manholes, Cleanouts and Services Shown

City of Rockwall
The New Horizon

Item Description
Proposed Wastewater Mains, Manholes, Cleanouts and Services Shown
Sanitary Sewer Mains Profiled along centerline of pipe
Bore complies with Bore and Utility Crossing General Design Standards and TxDOT Standards if in TxDOT ROW
Wastewater Main Size, Material and Class Identified on Plan and Profile
Wastewater Main Depth, Slope, Service Locations, Cleanouts and Manholes shown in all Profiles
Wastewater Rim, Flow Line In & Flow Line Out Elevations for All Manholes (min 2% drop between manhole flow-in and flow-out)
Utility Crossings Shown in All Profiles and Bore Profiles including Franchise Utilities and Street Light Utilities
Wastewater System Reviewed for Constructability and Maintainability - Depth and Clearance From Streets, Structures, Other Utilities (Dimensions)
All Existing and Proposed Public and Private Easements and Rights of Way Shown
Wastewater Mains Identified as Either Public or Private with Lines of Demarcation and Private Utility Note
Private Utility Note: "ALL WASTEWATER WORK DESIGNATED AS “PRIVATE” IN THIS SET OF PLANS SHALL BE INSTALLED IN ACCORDANCE WITH THE INTERNATIONAL PLUMBING CODE, PERMITTED AND INSPECTED BY THE CITY BUILDING INSPECTION DEPARTMENT AND INSTALLED BY A LICENSED PLUMBER."
Lift Station
Lift Station Report
Dimension and Site Plans
Grading Plan
Force Main Plan and Profile
Landscape Plan
Electrical and Control Plans
Detail Sheets
Erosion Control *(For Sites Greater 1- Acre or Larger)* / SWP3 *(If Required by TCEQ Regulations)*
Owners Name , Address & Phone No.
Developers Name Address & Phone No.
Engineers Name Address & Phone No.
Site Acreage Listed
Disturbed Acreage Listed (Acres)
Limits of Construction and Disturbed Areas Shown
Existing Ground Contours, Drainage Features and Structures
100-Yr Flood Plain with Elevations (FEMA and local)
Limits of Trees/Shrubs to Remain
Grades to Match Grading Plan
Proposed Storm Drainage, Structures & Pavement
Borrow & Spoil Area Identified

Item Description
BMP Locations, details, Calculations, and Maintenance Schedule
Sediment Basin, required if disturbed area greater than 10 acres
Standard Details
All Standard Details that are required for construction from Standard Specifications for Public Works Construction, North Central Texas, Fifth Edition, or the City of Rockwall Standards of Design and Construction shall be included in all plan sets.
TXDOT Details
Include all Pertinent Details called out in plans

City of Rockwall
The New Horizon

APPENDIX B – Approved Water Materials List

City of Rockwall
The New Horizon

Approved Water Materials List

All materials on this list do not require separate submittals. All materials must be new and in good condition.

Fire Hydrants

- Mueller "Super Centurion 250-A423"
- American Darling "B-84B-5"
- Waterous "Pacer WB67"
- Clow "Medallion"
- M&H "Model 129 & 929"
- WaterMaster 5CD250

Valves (all bolts, nuts and washers for valves to be type 316 stainless steel)

- Mueller Resilient Seat
- Mueller Resilient Wedge
- Mueller Butterfly
- American Darling Resilient Wedge
- American Darling Butterfly
- U.S. Pipe & Foundry "Metro-Seal" Resilient Wedge
- American Flow Control – Series 2500 Resilient Wedge Valve
- Clow Resilient Wedge
- Pratt Butterfly
- American AVK Resilient Seated Gate Valve Series 25, 4"-12"

Valves – Air Release / Combination Air & Vacuum

- Vent-O-Mat 025 RBX 2521 – 1"
- Vent-O-Mat 050 RBX 2521 – 2"

Tapping Sleeves and Valves (all bolts, nuts and washers to be type 316 stainless steel)

- All require ¾" NPT brass test plug.

Sleeves (all bolts, nuts and washers to be type 316 stainless steel)

- Mueller H-304 Stainless Steel Tapping Sleeve w/Stainless Steel Flange
- Tyler Traverse Tapping Sleeve
- Clow Traverse Tapping Sleeve
- Dresser Style 630 Heavy Stainless Steel Tapping Sleeve
- PowerSeal Model 3490 Stainless Steel Tapping Sleeve
- Ford All Stainless Tapping Sleeve Style FTSS
- Ford All Stainless Tapping Sleeve Style FTSS-MJ
- Smith-Blair 665 Stainless Steel Tapping Sleeve with Stainless Steel Flange
  Smith-Blair 665MJ Stainless Steel Tapping Sleeve with Stainless Steel Flange
  Romac Industries, SST III

Service Saddles

Service Saddles (for PVC, DI or CI)				
Size/Manufacturer	Mueller	Jones	Ford	A.Y. McDonald
¾-inch, 2 Strap	BR-2B, BR-2S	J-979, J-969	202B, 202BS	3825, 3845
1-inch, 2 Strap	BR-2B, BR-2S	J-979, J-969	202B, 202BS	3825, 3845
1 ½ -inch, 2 Strap	BR-2B, BR-2S	J-979, J-969	202B, 202BS	3825, 3845
2-inch, 2 Strap	BR-2B, BR-2S	J-979, J-969	202B, 202BS	3825, 3845

All of the above service saddles are to be cc thread. Saddles must be supplied with stainless steel bolt/nut/washer, with the exception of a double strap bronze saddle.

Restraint (Retainer) Glands (all bolts, nuts and washers to be type 316 stainless steel)

- Uni-Flange Series 1400 for 4" thru 12" (Ductile Iron)
- Uni-Flange Series 1500 for 4" thru 12" (C900 PVC)
- EBAA Iron 1100 Series Megalug (Ductile Iron)
- EBAA Iron 2000PV Series Megalug (C900 PVC)
- Stargrip Series 4000 (C900 PVC)
- Stargrip Series 3000 (Ductile Iron)
- Sigma – One Lok (C900/905 PVC)
- Tyler Union Field Lock (Ductile Iron)
- Tyler Union Tufgrip 1000 (Ductile Iron)
- Tyler Union Tufgrip 2000 (PVC)

Restraint (Internal Joint Restrained) (all bolts, nuts and washers to be type 316 stainless steel)

- Eagle LOC 900 for 4" thru 12" C900 DR14 PVC Pipe
- Diamond Lok-21 for 4" thru 12" C900 DR14 PVC Pipe

Corporation Valve (Stops)

Corporation Valves				
Size/Manufacturer	Mueller	Jones	Ford	A.Y. McDonald
¾-inch	B-25008	J-1937-SG	FB-1000-3-Q	4701BQ
1-inch	B-25008	J-1937-SG	FB-1000-4-Q	4701BQ
1 ½ -inch	B-25008	J-1937-SG	FB-1000-6-Q	4701BQ
2-inch	B-25008	J-1937-SG	FB-1000-7-Q	4701BQ

Angle Valves (Stops)

Angle Meter Valves				
Size/ Manufacturer	Mueller	Jones	Ford	A.Y. McDonald
¾-inch	B-24258	J-1963W-SG	BA43-332-WQ	4602BQ 3/4
1-inch	B-24258	J-1963W-SG	BA43-444-WQ	4602BQ 1
1 ½ -inch	B-24276	J-1975W-SG	BFA43-666-WQ	4602BQ 1 ½
2-inch	B-24276	J-1975W-SG	BFA43-777-WQ	4602BQ 2

Ductile Iron Fittings (Compact Only -C153)

- American Pipe
- Tyler Pipe Products
- Clow Products
- Star Pipe Products (tees, bends & anchor nipples)
- Sigma/Nappco Products (tees, bends & anchor nipples)
- Griffin Pipe Products

Valve Stacks and Boxes

- Bass & Hays adjustable valve box Model No. 2436S

Fire Hydrant Paint

Main Size	Color	Paint
6”	Silver – Top & Bottom	Sherwin Williams Silver-Brite Heavy Duty Rust Resistant Aluminum Paint B59S11
8”	Safety Blue Top – Aluminum Bottom	Sherwin Williams Heavy Duty Rust Resistant Aluminum Paint-Safety Blue B54T104
10” or larger	Yellow Top – Aluminum Bottom	Sherwin Williams Heavy Duty Rust Resistant Aluminum Paint-Safety Yellow B54Y37

Meter Boxes

< 1 inch Service	DFW1814F-1BA DFW Plastics, Inc Not Traffic Rated
1-1/2-inch, 2-inch Service	DFW2818F-1BA DFW Plastics, Inc Not Traffic Rated
Traffic Rated Meter Box	DFW65C-14-10BA DFW65C-1BA - Can DFW65C-Overlay-Lid DFW Plastics
Lids	DFW 18-AMRL-lid E Series

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APPENDIX C – Approved Wastewater Materials List

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Approved Wastewater Materials List

Note: All specified materials on this list do not require separate submittals. All materials must be new and in good condition.

Wastewater Main and Service Pipe (Gravity Flow Only)

- ASTM D3034 SDR-35 PVC 4" to 15" Diameter (Green in color)
- ASTM D3034 SDR-26 PVC 18" to 30" Diameter and for any wastewater installed 10' and deeper (Green in color)
- ASTM D3262 Fiberglass Sewer Pipe 18" to 54" and ASTM 4161 Fiberglass Fittings (must submit thickness design for wall thickness calculations) Approved Manufactures for Fiberglass Pipe and fitting are Hobas Pipe, US Composite Pipe South and Ameron International.

Manhole Pipe Connectors

- Link-Seal
- A-LOC
- KOR-N-SEAL – 306 Series By National Pollution Control Systems Inc.
- PS (Press-Seal) – PSX: Direct Drive

Wastewater Manhole Lids and Rings

- Pamrex with Lock
- East Jordan Iron Works 30" ERGO XL with Camlock Security closing device, MPIC Pick slot, elastomer T-Gasket in lid and infiltration plugs at the hinges. – Product No. 00148026L01
- East Jordan Iron Works 24" ERGO with Camlock Security closing device, MPIC Pick slot, elastomer T-Gasket in lid and infiltration plugs at the hinges – Product No. NPR10-1213A (for retrofit work only).

Manhole Coatings (No dark colors allowed)

- Raven 405 (125 mils thick)-light blue colored only
- ConShield-terra cotta colored only (must be spark tested per NACE International Standard)

Geotextile Material (installed under precast manholes)

- Mirafi 140N
- Geotex 401

Manhole Grade Rings

- HDPE Adjustment Rings by Ladtech Inc.
- ARPRO Expanded Polypropylene, ASTM D3575, by Cretex Seals
- East Jordan Iron Works Infra-Riser.

Pre-Cast Manhole Gaskets

- Hanson – CR 097
- Hydroconduit – Profile

Manhole Chimney Seals and Ring & Cover Sealing Systems

- Cretex with stainless steel self locking bands. (interior & exterior)
- Riser Wrap by PSI

Manhole Drop Bowl

- Reliner / Duran Inc., Inside Drop Bowl with Stainless Steel anchor assemblies
- Approved Equal

Cleanout

- Bass & Hays 404 Lateral Cleanout with lid and gasket
- Bass & Hays 339 Wastewater Cleanout Boot

Double Cleanout Meter Box

- Bass & Hays 3-LID2 (Sewer)
- Approved Equal

Threaded Anchor

- Hilti – KB3-SS304 5/8" anchor bolts or equal
- Stainless Steel all thread 5/8" (embedded min 4-1/2" into cone with a epoxy or Wedge-it)
- Simpson Strong Tie – Strong-Bolt 5/8"

Force Main Pipe

- AWWA C-905 pipe, green colored

Air Release Valve

- Vent-O-Mat Anti-Shock Air Release and Vacuum Break Valves
- Approved Equal

Isolation Gate Valve

- American-Series 2500 2"-12" Resilient Wedge Gate Valves with Flanged Ends
- Approved Equal

All exposed Stainless Steel Bolts and Nuts must be coated with approved anti-seize compound: Permatex Nickel Anti-Seize or approved equal.

Materials not on this list will need to be submitted for review

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APPENDIX D – Example Checklist for Final Acceptance (Residential and Commercial)

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EXAMPLE – CHECKLIST FOR FINAL ACCEPTANCE (RESIDENTIAL)

(DATE)

(ENGINEER'S NAME)
(ENGINEERING COMPANY)
(ADDRESS)
(CITY, TX ZIP)

Re. *(PROJECT NAME)* – Checklist for final acceptance

Dear *(ENGINEER'S NAME)*,

The following items are to be completed at the above mentioned site to bring the project into compliance with City specifications and to meet specific project requirements. The listed items are items identified during the walkover of the site and are to be addressed prior to final acceptance of the project. The City will conduct daily site visits (during daily rounds) at the project until completion of the noted items. A copy of this list will also be directed to the developer/owner and general contractor. The below listed items are to be directed to the appropriate responsible parties for completion.

-Required Documentation-

1. The City of Rockwall requires that the design engineer provide a letter of concurrence. The letter is to verify that the drainage flow patterns, grade to drain locations, pad elevations, and drainage structures, including the volume of the surface and/or subsurface detention system and detention outlet structure located at the project were installed to the general elevations as shown on the approved plans. The letter shall also verify that the project was constructed to meet the approved design requirements or is within acceptable design tolerances. **The Design Engineer or his designated representative shall direct all "survey-work"** necessary to **verify** elevations and design compliance. The letter of concurrence is to have the **seal and signature** of the design engineer.

Example of Letter of Concurrence verbiage which will not be accepted by the City:

"A representative of this company visited the site and has visually verified to the best of the engineer's professional opinion, knowledge and belief, the final grading and site drainage comply with the City approved plans and details".

Example of Letter of Concurrence verbiage which will be accepted by the City:

"A representative of this company visited the site and has visually verified to the best of the engineer's professional opinion, knowledge and belief, that based on my observations along with survey work conducted at the site, the final grading, site drainage, and detention outfall with required volume comply with the City approved plans and details".

2. The Design Engineer shall furnish a digital file of the project formatted in Auto Cad 14, or 2000 format or newer **and** Adobe Acrobat (pdf.) format with a CD-ROM. The disk shall include a full set of plans along with any landscaping, wall plans, and details sheets.

- Submit 1-set of blue line drawings of the "Record Drawings" containing copies of all sheets. The blue line copy will be reviewed by the construction inspector **PRIOR** to producing the "Record Drawing" disk. This will allow any revisions to be addressed prior to producing the disk.

Record Drawing Disk drawings shall have the Design Engineers seal, signature and must be stamped and dated as "Record Drawings" or "As Built Drawings" on all sheets.

The City of Rockwall will not accept any Record Drawing disk drawings which include a disclaimer with the like or similar verbiage. A disclaimer shall not directly or indirectly state or indicate that the design engineer or the design engineers, surveyor/surveyors did not verify or grades after construction, or that the Record Drawings were based solely on information provided by the construction contractor/contractors. Any Record Drawings which include like or similar disclaimer verbiage will not be accepted by the City of Rockwall.

Example of Acceptable Disclaimer:

To the best of our knowledge Smith Engineering, Inc., hereby states that this plan is As-Built. This information provided is based on surveying at the site and information provided by the contractor.

3. 4% Engineering Inspection Fee (Final As-Built Adjustments) – Prior to the start of construction at the project, engineering inspection fees for the project were established. The preliminary inspection fee amounts were based upon the projected contract quantity and unit price amounts which were submitted to the City. A fee based on 4% of the projected quantity cost was paid to the City. The final fee amounts are to be adjusted if necessary to match the unit quantity and unit price amounts based on the as-built contract unit quantity amounts. Please provide a copy of the as-built quantity amounts with total amounts for each item. The as built amounts should be noted or stamped as "as-built contract quantity and unit price amounts". The engineering inspection fee charged by the City will be adjusted to match these amounts if necessary. The City is to receive payment on the adjusted cost amounts prior to project acceptance. As-built contract **unit quantity and unit price** amounts for the pavement, drive approaches, sidewalks, barrier free ramps, wastewater, storm sewer, drainage structures (including underground detention), water lines, along with all associated fixtures which are located within the defined right-of-ways and easements of the project.

4. All weekday and weekend overtime engineering inspections fees are to be paid.

5. Flood study review fees to be paid if there is an excess due over the initial review fee. If all of the initial fees were not utilized for the flood study review, those monies will be refunded.

6. Gas and Electric facilities are to be installed at the site and be ready to provide service to each lot. A letter of installation verification and operation will be required from electric and gas project managers and will need to be directed to the City of Rockwall prior to project acceptance or any early lot releases. The letter may be from the above noted parties or their designated representatives.

7. Storm Sewer Outfall Coordinates - It is now necessary to tie down all the storm sewer outfall pipes to our state plane Coordinate System. The design engineer will be required to provide the following coordinate information which is to be submitted in letterform showing the x, y, and z coordinates at the end of all storm sewer outfalls of the project.

8. The City of Rockwall – Elevation Survey Monuments which are to be installed at the project shall be tied to the City of Rockwall monument coordinates both horizontally and vertically. The information shall be transferred to the City of Rockwall. **Elevations and monument locations are to be shown on the as built mylars on both the paving plans and the storm sewer plans and shall also be submitted to the City in letter-form.** The monuments are to be supplied by the City of Rockwall and installed by the utility contractor. The monument locations are as follows:

    A. *(LOCATION)*
    B. *(LOCATION)*

9. Right-of-way Compaction and Density Reports – Final grade densities are to be conducted at approximately each 500 – foot intervals on both sides of each street in the general fill areas of the right-of-ways. Full Depth trench densities are to be taken at all utility trenching locations where trenching operations consisted of cutting trench 10-inches wide or wider. All final grade right-of-way and easement compaction density tests are to be a minimum of 95% of the standard proctor density. Copies of the compaction tests performed for the developer's contractors as well as by the franchise utility company's contractors shall be provided to the City prior to project acceptance.

10. Maintenance bonds are to be submitted to the City of Rockwall for the paving and utilities installed at the project. The bonds shall be **two-year** 10% maintenance bonds to cover maintenance, for a two-year timeline starting from the **"Date of City of Rockwall's Acceptance"** for the project. There is to be no date in the starting timeline only the above wording.

    A. The utility bond shall cover the following utility systems and their associated fixtures.

        - Water
        - Wastewater
        - Storm sewer (including detention systems)

    B. The paving bond shall cover the following:

        - Street Pavement.
        - Driveway Approaches
        - Side walks.
        - Barrier free ramps.

11. Engineered Retaining Wall Inspection & Letter of Concurrence – The City requires the design engineer for any retaining wall which is three-feet in height or taller, to periodically inspect, or make arrangements for his designated representative to periodically inspect the retaining wall/walls during the construction process. The design engineer is to submit letter of concurrence for the retaining wall/walls to the City prior to project acceptance. The letter shall contain the **seal and signature** of the retaining wall design engineer.

12. City Council approved and owner signed final/replat plat mylars and tax certificates to be submitted to Planning Department for filing.

- Site Items -

1. Site Working Hours and Noise Control Signage **- Ordinance No. 05-45 –** signs are to be placed at all

entrances, which provides an access entry way into the subdivision. The signs are to note allowed hours of construction as mandated by the City Ordinance. The signs must be installed prior to project acceptance or prior to the start of any early lot release construction. The signs may be placed in the City right-of-way provided that it is not placed within the 30-feet visibility easement clips, which are located at all street intersections. Each posted sign shall contain the following ordinance work-hours information and contain both the English and the Spanish version of the ordinance. The face of the sign shall be a minimum of 4-feet wide by 3-feet tall with the sign post being approximately 4-feet tall when measured from the top of the ground to the bottom of the sign face. The maximum height of the sign shall not exceed a height of 7-feet, 6 inches when measured from the top of the ground to the top of the sign. The sign face shall consist of a white background with blue or black lettering. The letters shall be of sufficient size so as to be readily visible to all vehicular traffic entering the subdivision.

City of Rockwall - Ordinance

Ordinance # 05-45
Construction Site Working Hours and Noise Control

City Ordinance – No. 05-45 limits construction and construction related activities to the hours of 7:00 a.m. - 7:00 p.m. Monday through Friday, and 8:00 a.m. - 7:00 p.m. on Saturday. (No Sunday construction allowed).

ORDENANZA # 05-45
HORAS DE TRABAJO EN EL SITIO DE CONSTRUCCION Y EL CONTROL DE RUIDO

La Ordenanza de la Ciudad – No. 05-45 limita la construcción y las actividades relacionadas con la construcción a las horas de 7:00 a.m. – 7:00 p.m. de Lunes a Viernes, y de 8:00 a.m. – 7:00 p.m. los Sábados. (No se permitirá construcción los Domingo).

(Sign size to be approximately 4-feet wide x 3-feet tall)

2. The maximum slope allowed by the City will be a 4:1 slope, however this slope will only be allowed when it is not possible or feasible to achieve a slope of 4:1 or less. Retaining walls or other City approved retaining methods will be required where it is not possible or feasible to comply with the 4:1 maximum slope requirement. All slopes are to be compacted to 95% of the standard proctor density.

3. Install floodway monument markers. The City will furnish the marker cap, which is to be set in concrete as directed by the City of Rockwall. The developers designated representative shall install the marker prior to project acceptance. Monument installation shall meet City of Rockwall specifications.

   A. **The monument marker location is to be shown on the Record Drawing Mylar's on the grading plan.**

B. The City of Rockwall will furnish the marker cap.

C. Install "No Dumping, Drains to Waterway" inlet markers to be installed on each inlet by the developer

4. Street Address Marker Blocks – shall be painted on the curbs in the center of each lot and comply with the City of Rockwall specifications. The street address markers are to be installed at each lot in the subdivision. The markers shall be located at the center of the lot on the face of the street curb. The address markers shall have a Forest green background with **reflective** white numbers. The number size shall be four-inches in height. The background of the address marker shall be eighteen-inches in length and be located from the top of the curb to the gutter flow line. The address marks shall show the full numerical portion of the address of the lot.

5. Interior Erosion Protection – install reinforced silt fencing which complies with (NCTCOG) standard drawing (1020A) Third Addition. Silt fencing is to be installed at the back of the street pavement curbs and at 1-foot off the outside pavement edge of the alleys. The silt fence should contain the entire perimeter of the disturbed lot areas.

6. When installing the silt fence at the street (back of curb) and alley (edge of paving) locations take care to address the following issues:

   A. Allow for a clearance radius of 5-feet around each hydrant.

   B. Block the silt fence around and to the backside of each water meter.

   C. When placing the silt fence at an alley intersection be sure to transition the silt fence to allow a turning radius for vehicles.

   D. Do place the silt fence within the sight visibility easements which are located at the street and alley intersections.

7. Maintain existing or install additional construction site erosion BMP's as necessary, to stabilize the disturbed soil or contain silt migration.

8. All street and alley parkways and right-of-way locations are to be graded so as to obtain a 2% grade (1/4-inch per foot) slope. All parkways and right-of-way locations are to have positive drainage flow towards the street or alley to the right-of-way. The transitional grading from the right-of-way to the existing natural grade is to match the approved grading plans.

9. Final Site Grading – all grading is to be completed and verified to meet the approved grading plans. All graded areas including slopes are to be brought to a final grade surface that is smooth and uniform being relatively free of erosion washouts, tire ruts, dirt clods, silt deposits, etc, care should be taken to re-grade any rough surface areas prior to the application of grass seed, sod or erosion matting.

10. Remove and dispose any miscellaneous construction related debris, trash rocks etc from the job-site and properly dispose.

11. Rout and seal all miscellaneous random cracks which are located in the street and alley locations.

12. Provide the construction inspector with electronic copies of all testing reports for the project. These

shall include but not be limited to soils reports, utility densities, utility videos along with supporting documents, subgrade test reports and all concrete related reports for utilities and paving.

13. Conduct a video survey of the public sanitary and storm lines to the construction inspector assigned to the project. Videos shall be taken after the franchise utilities on the project have been completed.

14. Complete the installation of all barrier free ramps.

15. Construct all sidewalks that are located in the common open areas.

16. Clean and sweep all roadways to remove all of the dirt and debris that has accumulated during construction.

17. Random Pavement Depth Checks – random depth core test are to be conducted at various street and alley locations, as directed by the engineering inspector. The location of the test and the number of test necessary will be left to the discretion of the engineering inspector.

18. Complete the landscaping per the approved landscaping plans.

19. Fire hydrants are required to have a nozzle height of 19-inches to 28-inches above the final grade elevation. Hydrant nozzles that do not meet this specification are to be raised or lowered as necessary to obtain compliance.

20. All fire hydrants are to have a clearance radius of 5-feet in all directions. No structures, traffic bollards, silt fencing, landscaping etc, are to be placed within the clearance area.

21. Paint all fire hydrants located at the site to City specifications. A minimum of two coats of aluminum paint, Mobile 11-A-19 or Tnemec 2-color Tnemec-Gloss or approved equal are to be applied to each hydrant. The fire hydrant body shall be painted silver. The hydrant nozzle and bonnet are to be painted to comply with the following line size color code. The color indicating the line size shall be as follows:

    A. Solid silver for 6-inch water mains.

    B. Blue for 8-inch lines water mains.

    C. Yellow for 10-inch water mains and above.

22. Water Valve and Waste Water Manhole Curb Cut Marks – The pavement curbs are to be marked at all water valve and waste water manhole locations. The curb cut marks are to be sawn into the pavement curb. The curb cut marks are to consist of the following :

    A. Valves – place a (V) mark on the curb to note the valve locations, (blue paint for general, white paint for stub outs or dead ends, and red paint for fire hydrants and or fire lines).

    B. Manholes – place a (M-H) mark on the pavement curb to indicate manhole locations (green paint).

    C. Curb stops – place a (I) mark on the pavement curb to indicate curb stop locations (blue paint).

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D. Cleanouts – place a (II) mark on the pavement curb to indicate sewer clean out locations (green paint).

23. Seal and vacuum test all manholes. All manholes which require grade adjustments are to be re-tested.

24. Perform a television camera inspection of all sanitary sewer and storm sewers, along with the associated storm sewer laterals. Copies of the inspection tapes which are to be on a thumb drive or DVD format are to be submitted to *Engineering Inspector* with the City of Rockwall Engineering Department. Videos shall be taken after the franchise utilities on the project have been completed. Also forward the results of all air and mandrel test to *Engineering Inspector*.

25. The lift station is to be operational and approved for use, by the design engineer and the City of Rockwall.

26. Install guard rail at all locations as noted on the approved plans.

27. Ryan Miller - Director of Planning and Zoning or his designated representative shall conduct an inspection of the landscaping and project screening upon completion.

28. Information (Future Item) – Twenty-Month Maintenance Review – The City of Rockwall requires a twenty-month maintenance review of every project. This review is to be conducted at twenty-months into the two-year maintenance warranty. The Design Engineer or his designated representative along with the contractors designated representatives shall be present to perform a walkover of the project with the City of Rockwall. A second T.V. camera of sanitary sewer main shall be done at this time with a thumb drive or DVD formatted copy provided to the City of Rockwall

29. Grass is to be established in all disturbed areas. Grass shall be at least 1'' in height with 75%-80% coverage of all disturbed areas.

For additional information, regarding this check list or site work status please contact – *Engineering Inspector* who is the designated Construction Inspector for the site-work on this project for the City of Rockwall, regarding this list. Project acceptance is subject to but not necessarily limited to the above listed punch list items. *Engineering Inspector* may be reached at telephone no. 972-771-7746.

Sincerely,

Engineering Inspector
Construction Inspector
City of Rockwall Engineering Department

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EXAMPLE – CHECKLIST FOR FINAL ACCEPTANCE (COMMERCIAL)

(DATE)

(ENGINEER'S NAME)
(ENGINEERING COMPANY)
(ADDRESS)
(CITY, TX ZIP)

Re: *(PROJECT NAME)* – Checklist for final acceptance

Dear *(ENGINEER'S NAME)*,

The following items are to be completed at the above mentioned site to bring the project into compliance with City specifications and to meet specific project requirements. The listed items are items identified during the walkover of the site and are to be addressed prior to final acceptance of the project. The City will conduct daily site visits (during daily rounds) at the project until completion of the noted items. A copy of this list will also be directed to the developer/owner and general contractor. The below listed items are to be directed to the appropriate responsible parties for completion.

-Required Documentation-

1. The City of Rockwall requires that the design engineer provide a letter of concurrence. The letter is to verify that the drainage flow patterns, grade to drain locations and drainage structures, including the volume of the surface and/or subsurface detention system and detention outlet structure located at the project were installed to the general elevations as shown on the approved plans. The letter shall also verify that the project was constructed to meet the approved design requirements or is within acceptable design tolerances. **The Design Engineer or his designated representative shall direct all "survey-work"** necessary to **verify** elevations and design compliance. The letter of concurrence is to have the **seal and signature** of the design engineer.

Example of Letter of Concurrence verbiage which will not be accepted by the City:

"A representative of this company visited the site and has visually verified to the best of the engineer's professional opinion, knowledge and belief, the final grading and site drainage comply with the City approved plans and details".

Example of Letter of Concurrence verbiage which will be accepted by the City:

"A representative of this company visited the site and has visually verified to the best of the engineer's professional opinion, knowledge and belief, that based on my observations along with survey work conducted at the site, the final grading, site drainage, and detention outfall with required volume comply with the City approved plans and details".

2. The Design Engineer shall furnish a digital file of the project formatted in Auto Cad 14, or 2000 format or newer **and** Adobe Acrobat (pdf.) format with a CD-ROM. The disk shall include a full set of plans along with any landscaping, wall plans, and details sheets.

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- Submit 1-set of blue line drawings of the "Record Drawings" containing copies of all sheets. The blue line copy will be reviewed by the construction inspector **PRIOR** to producing the "Record Drawing" disk. This will allow any revisions to be addressed prior to producing the disk.

Record Drawing Disk drawings shall have the Design Engineers seal, signature and must be stamped and dated as "Record Drawings" or "As Built Drawings" on all sheets.

The City of Rockwall will not accept any Record Drawing disk drawings which include a disclaimer with the like or similar verbiage. A disclaimer shall not directly or indirectly state or indicate that the design engineer or the design engineers, surveyor/surveyors did not verify or grades after construction, or that the Record Drawings were based solely on information provided by the construction contractor/contractors. Any Record Drawings which include like or similar disclaimer verbiage will not be accepted by the City of Rockwall.

Example of Acceptable Disclaimer:

To the best of our knowledge Smith Engineering, Inc., hereby states that this plan is As-Built. This information provided is based on surveying at the site and information provided by the contractor.

3. 4% Engineering Inspection Fee (Final As-Built Adjustments) – Prior to the start of construction at the project, engineering inspection fees for the project were established. The preliminary inspection fee amounts were based upon the projected contract quantity and unit price amounts which were submitted to the City. A fee based on 4% of the projected quantity cost was paid to the City. The final fee amounts are to be adjusted if necessary to match the unit quantity and unit price amounts based on the as-built contract unit quantity amounts. Please provide a copy of the as-built quantity amounts with total amounts for each item. The as built amounts should be noted or stamped as "as-built contract quantity and unit price amounts". The engineering inspection fee charged by the City will be adjusted to match these amounts if necessary. The City is to receive payment on the adjusted cost amounts prior to project acceptance. As-built contract **unit quantity and unit price** amounts for the pavement (including fire lane if applicable), drive approaches, sidewalks, barrier free ramps, wastewater, storm sewer, drainage structures (including underground detention), water lines, along with all associated fixtures which are located within the defined right-of-ways and easements of the project.

4. All weekday and weekend overtime engineering inspections fees are to be paid.

5. Flood study review fees to be paid if there is an excess due over the initial review fee. If all of the initial fees were not utilized for the flood study review, those monies will be refunded.

6. Storm Sewer Outfall Coordinates - It is now necessary to tie down all the storm sewer outfall pipes to our state plane Coordinate System. The design engineer will be required to provide the following coordinate information which is to be submitted in letterform showing the x, y, and z coordinates at the end of all storm sewer outfalls of the project.

7. Maintenance bonds are to be submitted to the City of Rockwall for the paving and utilities installed at the project. The bonds shall be **two-year** 10% maintenance bonds to cover maintenance, for a two-year timeline starting from the **"Date of City of Rockwall's Acceptance"** for the project. There is to be no date in the starting timeline only the above wording.

A. The utility bond shall cover the following utility systems and their associated fixtures.
   - Water
   - Wastewater
   - Storm sewer (including detention systems)

B. The paving bond shall cover the following:
   - Street Pavement.
   - Driveway Approaches
   - Fire Lane.
   - Side walks.
   - Barrier free ramps.

8. Engineered Retaining Wall Inspection & Letter of Concurrence – The City requires the design engineer for any retaining wall which is three-feet in height or taller, to periodically inspect, or make arrangements for his designated representative to periodically inspect the retaining wall/walls during the construction process. The design engineer is to submit letter of concurrence for the retaining wall/walls to the City prior to project acceptance. The letter shall contain the **seal and signature** of the retaining wall design engineer.

9. City Council approved and owner signed final/replat plat mylars and tax certificates to be submitted to Planning Department for filing.

- Site Items -

1. Grass is to be established at all of the disturbed areas. The grass is to be maintained until such time that a general coverage density of 75-80% of the disturbed area has been established with a minimum grass stand height of one-inch.

2. Maintain existing or install additional construction site erosion BMP's as necessary, to stabilize the disturbed soil or contain silt migration.

3. All fire lanes are to be sawn and crack sealed. All miscellaneous random cracks are to be routed and sealed. All expansion joints are to be sealed in the fire lane.

4. The fire lane is to be re-painted where necessary if there are locations where the fire lane is scuffed or is flaking. The locations which require re-painting shall be sandblasted, prior to re-painting.

5. Wipe the inside ring and cover of the sanitary sewer manhole, using "Non-Shrink" grout and seal if necessary.

6. Repair all gouges, cracks, and other deformities on the curbs.

7. Adjust meter cans and valve stacks to final grade elevation.

8. Adjust fire hydrants to grade. All fire hydrants must have the operating nut between 19 and 28 inches above the final grade elevation around them.

9. All fire hydrants are to have a clearance radius of 5-feet in all directions. No structures, traffic bollards, barricades, guardrail, landscaping etc, are to be placed within the clearance area.

10. All valve stacks located outside of paving are to have a 2'x2' four inch thick reinforced concrete pad

around them.

11. Water Valve and Waste Water manhole curb cut marks- The pavement curbs are to be marked at all water valve and waste water manhole locations. The curb cut marks are to be sawn into the pavement curb. The curb cut marks are to consist of the following:

    A. Valves - Place a (V) mark on the curb to note the valve locations, (blue paint for general, white paint for sub outs or dead ends, and red paint for fire hydrants and or fire lines).

    B. Curb stops – Place a (I) mark on the pavement curb to indicate curb stop locations, (blue paint).

    C. Clean outs – Place a (II) mark on the pavement curb to indicate sewer clean-out locations, (green paint).

12. Cut an invert in the sanitary sewer connection into the existing manhole at station 0+00, and re-seal the bottom of the manhole.

13. Clean mud from concrete flume in detention pond.

14. Install floodway monument markers. The City will furnish the marker cap, which is to be set in concrete as directed by the City of Rockwall. The developers designated representative shall install the marker prior to project acceptance. Monument installation shall meet City of Rockwall specifications.

    A. **The monument marker location is to be shown on the Record Drawing Mylar's on the grading plan.**

    B. The City of Rockwall will furnish the marker cap.

    C. Install "No Dumping, Drains to Waterway" inlet markers to be installed on each inlet by the developer

15. All parking lot and handicap striping along with all associated signs must be installed.

16. All construction related trash material and miscellaneous debris is to be removed from the site and properly disposed.

17. Maximum slopes allowed by the City of Rockwall shall be a 3:1 slope. All slope areas which exceed the above noted slope requirements are to be re-graded or retained unless otherwise approved by the City Engineer. All slopes are to be graded so as to achieve the most gradual slope possible, unless otherwise noted on the approved construction plans.

18. Final Grading – re-establish all drainage swales, as necessary to achieve conformance to the drainage patterns shown on the approved grading plans. Grade to drain any locations which may hold water or obstruct approved drainage flow patterns. All graded areas, including slopes are to be brought to a final grade surface that is smooth and uniform being relatively free of erosion washouts, tire ruts, dirt clods, silt deposits etc, care should be taken to re-grade any rough surface areas prior to the application of erosion matting or grass seeding.

19. All required landscaping is to be installed at the site and comply with the approved landscape plan.

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The New Horizon

The site landscaping is to be inspected by Ryan Miller- Director of Planning and Zoning, or his designated representative prior to project acceptance.

For additional information, regarding this check list or site work status please contact – *(Inspector's Name)*, who is the designated Construction Inspector for the site-work on this project for the City of Rockwall, regarding this list. Project acceptance is subject to but not necessarily limited to the above listed punch list items. *(Inspector's Name)* may be reached at telephone no. 972-771-7746.

Sincerely,

Construction Inspector
City of Rockwall, Engineering Department