CITY OF SAN ANGELO
BELL STREET PAVING, WATER AND WASTWATER IMPROVEMENTS PHASE I
SAN16188

ADDENDUM NO. 1
July 27, 2017

00 91 13 ADDENDUM NUMBER 001

The following additions, deletions, modifications, or clarifications shall be made to the appropriate sections of the Contract Documents. Bidders shall acknowledge receipt of this Addendum in the space provided on the Bid Form.

The Pre-Bid Questions Response Log documents all questions received by July 26, 2017 with responses provided by Freese and Nichols, Inc. If a question warranted a change to the bid documents then those changes are reflected in the addenda and supporting documentation. If a question did not warrant a change to the bid documents, a response is provided as part of the response log, which has been included as an attachment to this Addendum.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

PHASE 1 PRE-BID QUESTIONS RESPONSE LOG

PHASE I PRE-BID QUESTIONS RESPONSE LOG

FREESE AND NICHOLS

Innovative approaches
Practical results
Outstanding service

THE CITY OF SAN ANGELO TEXAS

Project: Bell Street Paving, Water, and Wastewater Improvements **FNI Project:** SAN16188 **Last Updated:** 7/27/2017

QUESTIONS/CORRECTIONS FROM PRE-BID AGENDA

NUM.	QUESTION	RESPONSE	ACTION
1	Correction, Item III-2 is for 18-inch wastewater line instead of 15-inch.	FNI will update Price Proposal.	Bid Item III-2 has been updated to 18-inch wastewater line instead of 15-inch wastewater line.
2	Addition: 1) Bid item for Rehau Municipex water service line (poly) or compatible material.	FNI will provide clarification in specification since material for water service line is not a bid item.	Specifications have been updated to allow Rehau Municipex water service line as acceptable material in Addendum 01, Item A1-2 A. No bid item has been added.
3	Addition: 2) Rock excavation.	See response to Question 31. Rock is anticipated to be encountered. Per the specifications, no additional compensation will be made for rock excavation, as it will be considered subsidiary to excavation.	General Notes sheet in plans have been updated. Refer to Addendum 01, Item A1-4 C.
4	Backfill of sewer trench – for deep trench, compacted native soil may be used in place of flexbase. Flexbase still must be placed for 24 inches below pavement section.	Plans and details will be updated.	Detail 4 on Sheet DT-1 has been updated to allow native soil backfill within allowable constraints and compaction requirements. Flex base still must be placed for 24 inches below pavement. Specifications have been updated to note that there will be no additional payment for use of flex base over native backfill. Refer to Addendum 01, Item A1-1 E.
5	TV wastewater main – TV of existing sewer main is not required.	FNI will update specification to provide clarification.	Specification has been updated in Addendum 1, Item A1-1 H to state that City will perform all CCTV and associated cleaning of the existing and new SS main.
6	Compaction – density testing of backfill material.	Frequency of testing for roadway base course and subgrade is shown on CoSA Standard Detail S-EE-1 on Sheet 52 of the plans. Frequency of testing for utility backfill has been shown in the Addendum 01, Item A1-1 A.	Specification has been updated in Addendum 01, Item A1-1 A.
7	Confirm number of 4-ft and 5-ft manholes.	Confirmed to be 26 manholes total.	Quantities for 4-ft and 5-ft manholes have been updated in Price Proposal. See Items III-9, III-10, III-11, III-12.

QUESTIONS SUBMITTED ON: JULY 20, 2017

NUM.	QUESTION	RESPONSE	ACTION
8	Is there an Engineer's estimate?	Yes. Estimated range of construction costs is $4,500,000 - $5,500,000.	None.
9	Will bids be read aloud on August 3, 2017 at 2:00 PM?	Yes, the bids will be read aloud at the time of bid opening.	None.
10	Will a printed copy of the bid form (complete with unit prices and amounts) be acceptable in lieu of hand writing all the unit prices and extensions?	Yes, either method of completing the bid form will be acceptable.	None.

PHASE I PRE-BID QUESTIONS RESPONSE LOG

FREESE AND NICHOLS

Innovative approaches
Practical results
Outstanding service

THE CITY OF SAN ANGELO TEXAS

Project: Bell Street Paving, Water, and Wastewater Improvements **FNI Project:** SAN16188 **Last Updated:** 7/27/2017

11	Does the excavation quantity reflect alternate "A" or alternate "B"? Shouldn't the excavation item be placed with the alternates?	Excavation quantities will be provided with bid alternate as suggested.	The revised bid form has been updated to reflect estimated quantites associated with each bid alternate. Refer to Price Proposal Items IA-4 and IB-2.
12	There appears to be an overlap in bid items I-3 and I-4. The excavation quantity back calculates an average of 1.85' of cut based on the cement stabilized SY's. Looking over the cross sections and plan profile sheets, it's hard to see an additional 8" to 20" of asphalt and base being excavated as well?	Yes, there is overlap with earthwork calculcated per the method of average end areas described in the specifications. See the adjacent action item for a description of how the earthwork calculations have been revised.	Since the City desires to salvage the existing asphalt pavement, we have revised the description for pavement removal (Bid Item I-3) to include only the HMAC (4" thick avg). The updated excavation quantities provided for each bid alternate now includes the existing base material but not the existing HMAC. A general note has been added on Sheet NOTES-2 to describe how the earthwork was calculated. Also refer to Addendum 01, Item A1-1 C for more clarification regarding salvaging asphalt pavement.
13	There are several power poles two to three feet off of the back of the existing curb and gutter. Since the road is widening, will these poles be relocated?	Franchise utility relocations have been coordinated with the respective utility owners throughout the design process.	These poles will need to be relocated by the Franchise Utility Owner.
14	Per 2014 TXDOT specifications item 341 the minimum Type B hot mix thickness is 2.5" (page 245 item 341 in the TXDOT spec book). The bid item is for 2" of Type B mix? Maybe go with 2.5" of Ty-B and 1.5" of Ty-D?	Agree. See the adjacent action item for a description of how the HMAC layer thicknesses have been revised.	The pavement design has been revised to reflect 2.5" of TY-B and 1.5" of Ty-D as shown on the revised typical section sheet TS-02.
15	The Plan and Profile sheets indicate the project ends at station 58+50. The TCP plans are showing continuing to station 69+50?	TCP plans show the required TCP for the Sewer that goes past the planned paving limits for Phase I. The paving stops at 58+50, while the sewer continues to station 69+50.	None.
16	There is not a pay item for the 6" hot mix transition between station 58+50 and 59+00.	See adjacent action item for clarification.	A General Note was added on Sheet NOTES-2 that describes payment for this work is to be included in Revised Bid Item Numbers I-6 (FL BS) and I-9 (D-GR HMA TY D).
17	On the last page of the bid form, what makes up the total base bid? I'm assuming everything but Alternate A and B. Should the Total Base + Alt A or B include the contingency money as well?	Total Base does not include contingency or Alt A or Alt B. Total Base + Alt A or B includes the contingency money.	The City Purchasing POC stated she would offer clarification.
18	Will a 2-course penetration pavement be acceptable in lieu of the 2" temporary hot mix pavement (item I-10)?	City said at the Pre-Bid meeting that a 2-course asphalt surface treatment would be acceptable for temporary hot mix pavement.	A General Notes has been added to Sheet NOTES-2 to allow the use of alternative 2-course asphalt surface treatments in lieu of the 2" temporary HMAC item indicated.

PHASE I PRE-BID QUESTIONS RESPONSE LOG

FREESE AND NICHOLS

Innovative approaches
Practical results
Outstanding service

THE CITY OF SAN ANGELO TEXAS

Project: Bell Street Paving, Water, and Wastewater Improvements **FNI Project:** SAN16188 **Last Updated:** 7/27/2017

19	ON PAGE 98 OF THE SPECIFICATION: Temporary Bypass Pumping it states contractor to implement Pumping system for the purpose of diverting the existing flow around the work area for the duration of The project. Question: Are you requiring us to pump the existing sewer regardless if it needs to be or not to install new line? If the answer is no, can you identify what portions of the line are going to need to be Bypassed.	No, the specification has been updated for additional clarification. The intent of the specification is to provide the regulatory and site performance requirements for by-pass pumping and allow the contractor to develop a plan using the installation means and methods they feel most comfortable with.	Refer to Addendum 01, Updated Technical Specifications section for updated Specification 4.29, which has been reissued to provide clarification regarding by-pass pumping.
20	On page 120 of the Specification Furnishing and placing topsoil it states furnishing and placing of approved Topsoil to the depths and area shown on the plans or as directed by the owner. Question: The water and sewer sheets do not show any topsoil placement. Phone lines and gas lines are being relocated along the same route the new sewer and water lines will be taking. If topsoil needs to be placed how are we to identify what area?	The specification is meant to be a performance-based specification. Anything necessary required to achieve the vegetation percentage required by the drill seeding specification is subsidary to that bid item.	Specifications have been updated to indicate that no additional payment for furnishing and placing of topsoil will be made in Addendum 01, Item A1-3 A. Payment of furnishing and placing of topsoil will be subsidiary to drill seeding and contractor should meet vegetation establishment requirements listed in specifications.
21	Question: Bid item II-14 Shows 7 each 1-inch water services. Plans show 8 ea. Sta; 4+19-Sta-19+03 Sta 32+22 Sta. 34+59 Sta. 35+61 Sta. 39+52 Sta. 41+60	Quantity Verified. There are 8 1-inch water services total called for at the stations listed.	Refer to Price Proposal Item II-14 and Addendum 01 Updated Drawings section, updated Sheet NOTES-04.
22	Question: Bid item II-6 Shows water line placed inside of casing plan sheet W-3 There are 13 other crossing were Water crosses sewer line. Could we have a bid item because of the large number and expense? Sta.10+29 Sta. 12+56 Sta.15+25 Sta. 20+53 Sta. 20+69 Sta. 25+25 Sta. 30+35 Sta. 30+48 Sta. 34+83 sta. 35+35 Sta. 38+59 Sta. 42+52 Sta. 43+59	Crossings have been verified. If casing is required due to the available separation it has been shown on the plans and quantities updated in the bid form.	In the plan sheets, W-7 (Sta 27+31.66) and SS-16 have been updated so crossings meet TCEQ requirements. In the Price Proposal, III-22 - "8" Pressure Rated SS" has been added.
23	Question: Bid Item II-5 Shows 80 lf of 6-inch water main. Plan sheet W-7 Sta. 25+47 and Plan Sheet w-8 Sta. 30+23 Shows additional 6-inch water	The quanity for Bid Item II-5 has been revised to 267 LF. Sheet NOTES-04 has been updated to reflect the revised quantity.	Refer to Price Proposal Item II-5 and Addendum 01 Updated Drawings section, updated Sheet NOTES-04.
24	Question: Sheet W-10 Sta. 43+20 approximate water line crossing proposed sewer line. Since this is a temporary Connection do we need to install the water line inside of casing?	Casing is not necessary as water is above sewer and the they are seperated by more than 2'.	None.
25	Question: Sanitary Sewer beginning at Sta. 1+00 Connect to existing 48-inch sewer calls for Detail-3 as shown On sheet D-7 is this correct or would we use Detail 6 Type A man-hole?	Detail 6 on Sheet DT-7 has been updated as part of Addendum No.1. Sheet SS-2 has been updated for revised detail reference.	Refer to Updated Drawings in Addendum 01.
26	Question: Plan sheet SS-6 and SS-15 the 18-inch sewer line to be abandoned on these sheets are they connected. If so does the bid item III-14 cover the line?	Yes, they are connected.The quantity for Bid Item III-14 (Wastewater Line Abandonment Grout) covers this with the 158 CY.	Quantity confirmed

PHASE I PRE-BID QUESTIONS RESPONSE LOG

FREESE AND NICHOLS

Innovative approaches
Practical results
Outstanding service

THE CITY OF SAN ANGELO TEXAS

Project: Bell Street Paving, Water, and Wastewater Improvements **FNI Project:** SAN16188 **Last Updated:** 7/27/2017

27	Question; Plan sheet SS-15 Shows remove and replace sewer man-hole that sits on one 18-inch sewer lines a 8 inch sewer line and a 15 inch sewer line. Can you give us the distance to the next upstream man-hole? For Bypass calculations?	Plan sheet SS-15 has been updated to show distances to upstream manholes and included in Addendum 01.	Sheet updated and reissued with Addendum 01.
28	Question; Plan sheet DT-8-3 Shows an epoxy coated eccentric CMP for the air and vacuum release valve vault. There is no such item can we use a fiberglass man-hole. Also, can we use schedule 80 pvc underground instead of DI. And galvanized pipe above ground? Can the Screen be PVC? The screen shown would have to be special made.	Detail updated per discussion at Pre-Bid Meeting with City of San Angelo and Utility Contractors.	Detail updated and revised Sheet DT-8 included as part of Addendum 01.
29	Question: Will we be able to close portions of Bell Street while installing sanitary sewer line?	No complete street closure is allowed. Partial closure (two lanes at a time, etc) is acceptable.	None.
30	Project Schedule will be extended	Project schedule was extended to 540 days from 365 days.	Refer to Price Proposal and Addendum 01, Item A1-1 I.

QUESTIONS SUBMITTED ON: JULY 21, 2017

NUM.	QUESTION	RESPONSE	ACTION
31	On the geotechnical engineering study, there is no (tsf) numbers associated with the boring logs. It would be most helpful having that information for each boring log number. Can you provide that information?	Shelby tubes were not obtained during the field investigation; therefore, we do not have those values. It has been the experience of the City of San Angelo that subsurface rock has been previously encountered in surrounding areas. The Contractor shall include the potential cost of rock excavation in the unit costs for the bid items provided in the contract documents. No additional compensation will be provided for rock excavation.	Refer to Addendum 01, Item A1-1 F for clarification.
32	Plan markup revision received from a vendor by Purchasing Specialist Candice Baker Indicating the foundation size for 32' long mast arm poles should be changed from type 36-A to 30-A	The designer origially called for larger than the TxDOT minimum required foundation size for four(4) 32' long single mast arm assemblies. This was done to accommodate longer mast arms if needed in the future. After additional consideration, the City does not wish to bear the additional expense.	Refer to Addendum 01 Updated Drawings section. Plans have been revised to indicate minimum TxDOT standard foundation size. Four (4) foundations for 32' long mast arm assemblies have been changed from foundation Type 36-A to Type 30-A.
33	Could you provide me with a map of the drill seeding areas for the Phase 1 project?	Map of drill seeding areas sent to Q. Payment planned for stabilization of disturbed areas within the ROW. Areas disturbed by franchise utilities will be the responsibility of the franchise companies and not the contractor.	Specifications have been updated to indicate that drill seeding will be required for all unimproved surfaces located within the ROW, in Addendum 1, Item A1-1 D.

PHASE I PRE-BID QUESTIONS RESPONSE LOG

FREESE AND NICHOLS

Innovative approaches
Practical results
Outstanding service

THE CITY OF SAN ANGELO TEXAS

Project: Bell Street Paving, Water, and Wastewater Improvements **FNI Project:** SAN16188 **Last Updated:** 7/27/2017

CLARIFICATION PROVIDED BY CITY JULY 24, 2017

NUM.	QUESTION	RESPONSE	ACTION
34	The City will perform the video-taping and cleaning of the existing and new lines	FNI will update specification to provide clarification.	Specification has been updated in Addendum 1, Item A1-1 H to state that City will perform all CCTV and associated cleaning of the SS main.
35	No complete street closure is allowed. Partial closure is OK	See response to Question 29.	
36	The existing 18-inch sewer line needed to be grouted as part of the abandonment due to potential for collapsing and infiltration of stormwater.	FNI will update specification to provide clarification.	Specification has been updated. Refer to Addendum 01, Item A1-1 B to state that all abandoned lines under pavement, as well as the existing 18-inch sewer line, must be grouted when abandoned.
37	All valves and fire hydrants that are part of the tie-in process (already being dug up) or installation work need to be salvaged. If a valve is just an in-line valve (not accessible) then it can be abandoned in place	FNI will update specification.	Specification has been updated. Referto Addendum 01, Item A1-1 G with requested addition.
38	Permanent pavement repair needs to be done at the joint between Phase 1 and Phase 3.	FNI will update plans.	Sheets SS-8, SS-9 and SS-10 have been updated to call for permanent pavement repair. Refer to Addendum 01, Updated Drawings section.
39	Drill seeding to be done where needed	Specifications have been updated to indicate that drill seeding will be required for all unimproved surfaces located within the ROW, in Addendum 01, Item A1-1 D.	Refer to Addendum 01, Item A1-1 D and A1-4 A.

QUESTIONS RECEIVED ON JULY 25, 2017

NUM.	QUESTION	RESPONSE	ACTION
40	Verify that Quantities for MH have been checked, based on questions from the Pre-Bid meeting.	Quantities were checked and have been verified.	Refer to Price Proposal, Items III-9, III-10, III-11 and III-12 and Addendum 01, Updated Drawings section, Sheet Notes-04 for updated quantities.
41	Utility contractor believes that the MH at STA 2+28 (SS-6) on SS Line B needs to be an 8' Diameter MH	For a 5-ft Diameter MH the 18-in (SS Line B-1) and the 24-in (SS Line B) would have a 5-in clearance from OD of the two pipes and with a 6-ft MH you would have 11.5-in of clearance from OD of the 24-in and 18-in SS lines.	MH will be upsized to 6-ft diameter. Refer to Price Proposal, Item III-12 and Addendum 01, Updated Drawings section, Sheet Notes-04.
42	Utility contractor believes that the MH at STA 1+33.62 (SS-15) on SS Line B needs to be an 8' Diameter MH	For a 4-ft Diameter MH the Ex 18-in and the Ex 15-in would have a 8-in clearance from OD of the two pipes and with a 5-ft MH you would have 14.5-in of clearance from OD of the Ex 18-in and 15-in SS lines.	MH will be upsized to 5-ft diameter. Refer to Price Proposal, Item III-10 and Addendum 01, Updated Drawings section, Sheet Notes-04.
43	Is Trench Check Dam required to go the full trench as shown in the Details	The Trench Check Dam must adhere to the City Standard detail on Sheet DT-1.	None.
44	Clarify Phase I Abandonment and grouting stopping point for existing 12"SS	There is an existing MH at Koberlin and Bell St that will be a natural stopping point for the PH I grouting and abandonment of the existing SS.	Refer to Addendum 01, Updated Drawings section, Sheet SS-9 updated for additional clarification.

Project: Bell Street Paving, Water, and Wastewater Improvements **FNI Project:** SAN16188 **Last Updated:** 7/27/2017

45	16" and 20" Inserta Valves are not compatible with Asbestos Cement Pipe	An alternative connection plan has been designed. If existing valve is determined to be functional near Sta 1+00, then linestop connection is not necessary.	Refer to Addendum 01, Updated Drawings, Sheets W-2, W-10 and W-11, which have been reissued to show the changes needed for the alternative connection plan.
46	we would like to purpose on plan sheet SS-2 we begin our by -pass pumping from existing man-hole to the upstream west man-hole. We would then install the new man-hole at sta 1+00 lay up to sta.1+65 Add a 12x12 y to pick up the existing 12inch line after we lay up to about sta .1+65 we would install an additional man-hole test the section and then tie existing 12in. sewer back into new line. This will drastically reduce the cost of continuously running by-pass pumps. Once the whole line is installed we Would come back install plug in 12inch y and concrete this plug in place.	The bypass plan should meet the requirements of the updated Specification 4.29 and will be approved as part of the formal submittal process during construction.	None. The contractor's brief explanation of his approach sounds logical but shall not be evaluated during the advertisement phase. Refer to Addendum 01, Updated Technical Specifications, Specfication 4.29 for requirements.
47	Can we use pressure tested flat line hose for short runs. This hose will be rated 150 percent of the anticipated head of the pumping system, at locations were we will be picking up smaller than 12 inch diameter lines?	The piping for the bypass must be in accordance with Specification 4.29	None. Refer to Addendum 01, Updated Technical Specifications, Specfication 4.29 for requirements.
48	On page 104 section 4.29.8 paragraph d is the 7 day monitoring of each smaller pump set-up going to be required as we move up Bell Street and pick up 8 inch and 6 inch lateral lines ? If so this will require countless return trips for the by-pass contractor and an expense We feel is not necessary.	The intent is that the pump set-up be manned for the duration of the by-pass pumping operation or the first 7 days which ever is shorter.	None.
49	On page 103 section 4.29.8 Paragraph a -2. On main lines less than 12 inch it calls for a primary pump and a back-up pump . Can the backup pump be on site but not hooked to primary pump pumping system?	The Back Up pump must be physically connected to the discharge header per TCEQ requirements.	None.
50	On sheet SS-15 we are going to have to install an additional new man-hole on the existing 15 inch line and the existing 18 inch line as well as the man-holes shown on plan sheet. If more than one man-hole is being by-passed and it's within a 100 feet of each Other can the by-pass contractor representative watch both pumping systems for the 7 day period?	The current alignment and MH location deliver a complete system and we do not believe that additrional manholes are necessary. If the Contractor can maintain visual contact with both bypass pump set ups and meet the response time then yes, you may have the same person monitoring buth pump set-ups.	None. Refer to Addendum 01, Updated Technical Specifications, Specfication 4.29 for requirements.
51	Also, Item II-19 calls out a 8" x 2" Tapping Saddle and valve at station 3+19.89 but before that at station 2+78.01 there is a 8" x 2" Tee reconnect. How is the 8" Saddle possible if we are on a 2" line already. Please clarify.	The Saddle has been changed to a tee for the reconnection to the existing Water Meters and 2" WL in that location.	Sheet W-11 has been updated as part of Addendum 01.

PHASE I PRE-BID QUESTIONS RESPONSE LOG

FREESE AND NICHOLS

Innovative approaches
Practical results
Outstanding service

THE CITY OF SAN ANGELO TEXAS

Project: Bell Street Paving, Water, and Wastewater Improvements **FNI Project:** SAN16188 **Last Updated:** 7/27/2017

QUESTIONS RECEIVED ON JULY 26, 2017

NUM.	QUESTION	RESPONSE	ACTION
52	I had mention in a question at the Pre-bid meeting about changing the Type B hot mix depth to 2.5" since the 2" is not thick enough for that mix. Another solution to the problem would be to go with a Type C mix in lieu of the Type B mix. 2" would be fine for a C mix.	See response to Question 14.	The Type B hot mix depth has been changed from 2" to 2.5". Type D hot mix depth has been changed from 2" to 1.5". Refer to Addendum 01, Updated Drawings, Sheet TS-02 for more detail.
53	Question on detail sheet DT-5 on service lines it shows a pressure reducing valve. Are these really needed ? The 2 inch are fairly expensive.	PRVs are necessary due to the 16-inch water main running about 90 to 100 psi. This was a decision early on in the project in order to protect the services.	None.

QUESTIONS RECEIVED ON JULY 27, 2017

NUM.	QUESTION	RESPONSE	ACTION
54	On the 1-inch water service, please double check carefully and provide the correct numbers. Do we count the 2" line with double 1" service lines as one 1" service or two? Please clarify.	1-inch water service quantity has been verified. 2" line with double 1" service lines is its own bid item.	None.

TECHNICAL SPECIFICATIONS:

A1-1 Section 4.1 – "General Notes"

A. Reference Page **8**.

Addition:

4.1.24 The minimum frequency of testing for utility pipeline trench compaction test is as followed.

- Granular embedment max density proctor: Perform test once per source
- Soil proctor: Perform test once every 500 LF of every soil type change
- Pipeline embedment densities: Perform test once each lift every 200 LF
- Above pipe zone density: Perform test once each lift every 150 – 200 LF

These are minimum standards and the Contractor is still responsible for quality control. It is acceptable if the Contractor's program determines more frequent testing is necessary.

B. Reference Page **8**.

Addition:

4.1.25 All abandonment of pipeline under proposed pavement shall be grouted to include the 18-inch sanitary sewer being abandoned on Sheet SS-15. All abandonment of pipeline outside of proposed pavement with the exception of the 18-inch sanitary sewer, shall be cap and plug and grouting is not required.

C. Reference Page **8**.

Addition:

4.1.26 City would like to retain the removed asphalt. Asphalt does not need to be milled and can remain in large chunks. Deliver asphalt to the City's Yard on St. Ann Street.

D. Reference Page **8**.

Addition:

4.1.27 Drill seeding shall be accomplished for all unimproved surfaces within right-of-way and easements and as directed by the City.

E. Reference Page **8**.

Addition:

4.1.28 If flex base is used as backfill, any additional cost shall be the responsibility of the Contractor and shall not be passed on to the City.

F. Reference Page **8**.

Addition:

4.1.29 The site is very dense to hard at depths deeper than 5 feet below existing ground surface. Heavy duty equipment may be required if excavations extend into the dense material. In the area of Boring B21, (Lowrie Avenue and La Follette), a conglomerate layer was encountered and hard excavation will most likely be required in that area.

G. Reference Page **8**.

Addition:

4.1.30 All valves and fire hydrants that are part of the tie-in process and installation work shall be salvaged. If a valve is marked to be removed and salvaged but is not uncovered as part of the excavation during the installation of proposed utility improvements, then the valve may be abandoned in place.

H. Reference Page **8**.

Addition:

4.1.31 The City will perform all CCTV and associated cleaning of the existing SS main and new lines.

I. Reference Page **8**.

Addition:

4.1.32 All references to construction time shall be updated to 18 months or 540 days.

A1-2 Section 4.11 – "Pressure Pipe Testing and Disinfection"

A. Reference Page **44, 4.11.3**.

Addition:

Rehau Municipex is an acceptable material for the installation of new water service lines.

A1-3 Section 4.33 – "Furnishing and Placing Topsoil"

A. Reference Page **120, 4.33.4**.

Addition:

There shall be no measurement for top soil as any use of top soil is for the Contractor's benefit. Payment of top soil shall be subsidiary to drill seeding.

ADD THE FOLLOWING SECTIONS:

33 01 10.03 Linestop/Plugging Large Diameter Water Lines

REMOVE THE FOLLOWING SECTIONS:

22 29 00 Temporary Bypass Pumping

REPLACE THE FOLLOWING SECTIONS:

Replace Section	With Section
Price Proposal	Price Proposal
4.29	4.29

DRAWINGS:

A1-4 Sheet Notes-1 – "General Notes"

A. Reference Sequence **3**.

Addition:

48. Drill seeding shall be accomplished for all unimproved surfaces within right-of-way and easements and as directed by the City.

B. Reference Sequence **3**.

Addition:

49. If flex base is used as backfill, any additional cost shall be the responsibility of the Contractor and shall not be passed on to the City.

C. Reference Sequence **3**.

Addition:

50. It has been the experience of the City of San Angelo that subsurface rock has been previously encountered in surrounding areas. The Contractor shall include the potential cost of rock excavation in the unit costs for the bid items provided in the contract documents. No additional compensation will be provided for rock excavation.

D. Reference Sequence **3**.

Addition:

51. All valves and fire hydrants that are part of the tie-in process and installation work shall be salvaged. If a valve is marked to be removed and salvaged but is not uncovered as part of the

excavation during the installation of proposed utility improvements, then the valve may be abandoned in place.

REPLACE THE FOLLOWING SHEETS

Replace Sheet	With Sheet
NOTES-2	NOTES-2
NOTES-03	NOTES-03
NOTES-04	NOTES-04
TYPICAL SECTION TS-02	TYPICAL SECTION TS-02
TRAFFIC SIGNAL TS-01	TRAFFIC SIGNAL TS-01
TRAFFIC SIGNAL TS-03	TRAFFIC SIGNAL TS-03
TRAFFIC SIGNAL TS-04	TRAFFIC SIGNAL TS-04
TXDOT STD. TS-FD-12	TXDOT STD. TS-FD-12
TXDOT STD. SMA-80(1)-12	TXDOT STD. SMA-80(1)-12
W-2	W-2
W-7	W-7
W-10	W-10
W-11	W-11
SS-2	SS-2
SS-6	SS-6
SS-8	SS-8
SS-9	SS-9
SS-10	SS-10
SS-15	SS-15
SS-16	SS-16
DT-1	DT-1
DT-7	DT-7
DT-8	DT-8

END OF ADDENDUM NO. 1

UPDATED TECHNICAL SPECIFICATIONS

Price Proposal

San Angelo Bell Street Paving, Water and Wastewater Improvements – Phase I

Pursuant to the Foregoing Notice to Respondents, the undersigned Respondent hereby proposes to do all work and furnish all necessary superintendence, labor, machinery, equipment, tools, and materials, and whatever else may be necessary to complete all work upon which he Proposals, as provided by the attached specifications and shown on the plans, and binds himself on acceptance of this proposal to execute an Agreement and Bonds according to the accompanying forms, for performing and completing the said work within the time stated, and furnishing all required guarantees, for the following prices to-wit:

FRONT END COSTS

ITEM	SPEC./SHT No.	EST. QTY	UNITS	DESCRIPTION	UNIT COST	AMOUNT
1		1	LS	MOBILIZATION & START UP (5% CONSTRUCTION COST)	$_____	$_____

UNIT I: PAVING IMPROVEMENTS

	ITEM No.	SPEC./SHT No.	EST. QTY	UNITS	DESCRIPTION	UNIT COST	AMOUNT
	I-1	CoSA 104 6017	1496	SY	REMOVING CONCRETE (DRIVEWAYS AND SIDEWALK)	$_____	$_____
	I-2	CoSA 104 6022	6809	LF	REMOVING CONCRETE (CURB & GUTTER)	$_____	$_____
1	I-3	CoSA 105 6006	25450	SY	REMOVE ASPHALT PAVEMENT (4" AVG DEPTH)	$_____	$_____
	I-4	CoSA 132 6003	273	CY	EMBANKMENT (DENS CNTRL)(CL 3)	$_____	$_____
	I-5	TxDOT 162 6002	4316	SY	DRILL SEEDING	$_____	$_____
1	I-6	CoSA 247 6061	1511	SY	FL BS (CMP IN PLC)(TY A)(GR1-2)(6")(TCP TEMP PAVT)	$_____	$_____
	I-7	CoSA 275 6010	28604	SY	CEMENT TREATED SUBGRADE (8")	$_____	$_____
	I-8	CoSA 275 6001	395	TN	CEMENT	$_____	$_____
1	I-9	CoSA 340 6270	1511	SY	D-GR HMA(SQ) TY D PG 64-72 (2" THICK)(TCP TEMP PAVT)	$_____	$_____
1	I-10	CoSA 502 6001	18	MO	BARRICADES, SIGNS AND TRAFFIC HANDLING	$_____	$_____
	I-11	CoSA 502 6002	48	LF	ROCK FILTER DAMS	$_____	$_____
	I-12	CoSA 506 6011	48	LF	REMOVE ROCK FILTER DAMS	$_____	$_____
	I-13	CoSA 506 6038	2150	LF	TEMP SEDIMENT CONTROL FENCE (INSTALL)	$_____	$_____
	I-14	CoSA 506 6039	2150	LF	TEMP SEDIMENT CONTROL FENCE (REMOVE)	$_____	$_____
	I-15	CoSA 529 6008	7233	LF	CONCRETE CURB & GUTTER (6")	$_____	$_____
	I-16	CoSA 530 6004	2159	SY	DRIVEWAYS (CONCRETE)	$_____	$_____
	I-17	CoSA 531 6001	2313	SY	CONCRETE SIDEWALKS (4")	$_____	$_____
	I-18	CoSA 531 6010	26	EA	CURB RAMPS (TY 7)	$_____	$_____
	I-19	CoSA 531 6013	2	EA	CURB RAMPS (TY 10)	$_____	$_____
	I-20	CoSA 560 6001	9	EA	MAILBOX INSTALL-S (TWG POST) TY 1	$_____	$_____
	I-21	CoSA 644 6068	17	EA	RELOCATE SM RD SIGN SUP & AMS	$_____	$_____
	I-22	TxDOT 644 6030	12	EA	INST SM RD SIGN SUP & AM	$_____	$_____

I-23	CoSA 666 6003	1631	LF	REFL PAVEMENT MARKING TY 1 (W) 4" (BRK)	$_____	$_____
I-24	CoSA 666 6036	219	LF	REFL PAVEMENT MARKING TY 1 (W) 8" (SLD)	$_____	$_____
I-25	CoSA 666 6048	744	LF	REFL PAVEMENT MARKING TY 1 (W) 24" (SLD)	$_____	$_____
I-26	CoSA 666 6054	2	EA	REFL PAVEMENT MARKING TY 1 (W) (ARROW)	$_____	$_____
I-27	CoSA 666 6078	2	EA	REFL PAVEMENT MARKING TY 1 (W) (WORD)	$_____	$_____
I-28	CoSA 666 6126	7242	LF	REFL PAVEMENT MARKING TY 1 (Y) 4" (SLD)	$_____	$_____
I-29	CoSA 666 6141	170	LF	REFL PAVEMENT MARKING TY 1 (Y) 12" (SLD)	$_____	$_____
I-30	CoSA 672 6009	98	EA	REFLECTOR PAVEMENT MARKING TY 2 - A - A	$_____	$_____
I-31	CoSA 672 6007	82	EA	REFLECTOR PAVEMENT MARKING TY 1 - C	$_____	$_____
I-32	CoSA 680 6002	2	EA	INSTALL HWY TRAF SIGNAL (ISOLATED)	$_____	$_____
I-33	CoSA 690 6051	6	EA	REMOVAL OF TRAFFIC SIGNAL POLE ASSEM	$_____	$_____
I-34	CoSA 6002 6001	2	EA	VIVIDS PROCESSOR SYSTEM	$_____	$_____
I-35	CoSA 6002 6002	2	EA	VIVIDS CAMERA ASSEMBLY	$_____	$_____
I-36	TxDOT 6002 6003	2	EA	VIVIDS SETUP SYSTEM (ISOLATED)	$_____	$_____
1 I-37	TxDOT 6002 6005	132	LF	VIVDS COMMUNICATION CABLE (Cat-5)	$_____	$_____
I-38	TxDOT 618 6023	235	LF	CONDT (PVC) (SCH 40) (2")	$_____	$_____
I-39	TxDOT 618 6029	156	LF	CONDT (PVC) (SCH 40) (3")	$_____	$_____
I-40	TxDOT 618 6030	464	LF	CONDT (PVC) (SCH 40) (3") (BORE)	$_____	$_____
I-41	TxDOT 618 6070	40	LF	CONDT (RM) (2")	$_____	$_____
I-42	TxDOT 620 2009	861	LF	ELEC CONDR (NO. 6) BARE	$_____	$_____
I-43	TxDOT 620 6010	108	LF	ELEC CONDR (NO.6) INSULATED	$_____	$_____
I-44	TxDOT 621 6005	680	LF	TRAY CABLE (4 CONDR) (12 AWG)	$_____	$_____
I-45	TxDOT 684 6031	1785	LF	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	$_____	$_____
I-46	TxDOT 684 6042	897	LF	TRF SIG CBL (TY A)(14 AWG)(16 CONDR)	$_____	$_____
I-47	TxDOT 6089 6002	259	LF	CAT 5 ETHERNET CABLE	$_____	$_____
I-48	TxDOT 684 6029	404	LF	TRF SIG CBL (TY A)(14 AWG)(3 CONDR)	$_____	$_____
I-49	TxDOT 6054 6002	112	LF	COAXIAL CABLE	$_____	$_____
I-50	TxDOT 416 6030	78	LF	DRILL SHAFT (TRF SIG POLE) (24 IN)	$_____	$_____
I-51	TxDOT 416 6031	12	LF	DRILL SHAFT (TRF SIG POLE) (30 IN)	$_____	$_____
I-52	CoSA 416 6032	98	LF	DRILL SHAFT (TRF SIG POLE) (36 IN)	$_____	$_____

	I-53	CoSA 682 6001	16	EA	VEH SIG SEC (12")LED(GRN)	$_____	$_____
	I-54	CoSA 682 6002	1	EA	VEH SIG SEC (12")LED(GRN ARW)	$_____	$_____
	I-55	TxDOT 682 6003	16	EA	VEH SIG SEC (12")LED(YEL)	$_____	$_____
	I-56	TxDOT 682 6004	1	EA	VEH SIG SEC (12")LED(YEL ARW)	$_____	$_____
	I-57	TxDOT 682 6005	16	EA	VEH SIG SEC (12")LED(RED)	$_____	$_____
	I-58	TxDOT 682 6006	1	EA	VEH SIG SEC (12")LED(RED ARW)	$_____	$_____
	I-59	TxDOT 682 6018	16	EA	PED SIG SEC (LED)(COUNTDOWN)	$_____	$_____
1	I-60	TxDOT 686 6030	1	EA	INS TRF SIG PL AM(S)1 ARM(28')	$_____	$_____
1	I-61	TxDOT 686 6034	4	EA	INS TRF SIG PL AM(S)1 ARM(32')	$_____	$_____
	I-62	TxDOT 686 6035	1	EA	INS TRF SIG PL AM(S)1 ARM(32')LUM	$_____	$_____
1	I-63	TxDOT 686 6039	1	EA	INS TRF SIG PL AM(S)1 ARM(36')LUM	$_____	$_____
	I-64	TxDTO 686 6042	1	EA	INS TRF SIG PL AM(S)1 ARM(40')	$_____	$_____
	I-65	TxDOT 688 6001	16	EA	PED DETECT PUSH BUTTON (APS)	$_____	$_____
	I-66	TxDOT 687 6001	13	EA	PED POLE ASSEMBLY	$_____	$_____
	I-67	TxDOT 624 2012	11	EA	GROUND BOX TY C (162911) W/APRON	$_____	$_____
	I-68	TxDOT 624 2014	2	EA	GROUND BOX TY D (162922) W/APRON	$_____	$_____
					TOTAL AMOUNT BID FOR UNIT I: PAVING IMPROVEMENTS @		$_____

UNIT IA: Alt. A - HMAC PAVING

	ITEM No.	SPEC./SHT No.	EST. QTY	UNITS	DESCRIPTION	UNIT COST	AMOUNT
	IA-1	CoSA 247 6041	28604	SY	FLEX BASE (CMP IN PLACE)(TY A GR 1-2)(FNAL POS)(12") (BID ALT A)	$_____	$_____
1	IA-2	CoSA 341 6008	25793	SY	D-GR HMA TY-B PG64-22 (2.5" THICK) (BID ALT A)	$_____	$_____
1	IA-3	CoSA 341 6040	25793	SY	D-GR HMA TY-D PG64-22 (1.5" THICK) (BID ALT A)	$_____	$_____
1	IA-4	CoSA 110 6001	12906	CY	EXCAVATION (ROADWAY)(BID ALT A)	$_____	$_____
					TOTAL AMOUNT BID FOR UNIT IA: PAVING IMPROVEMENTS @		$_____

UNIT IB: ALT. B - ROLLER COMPACTED CONCRETE

	ITEM No.	SPEC./SHT No.	EST. QTY	UNITS	DESCRIPTION	UNIT COST	AMOUNT
	IB-1	TxDOT 3016 6001	25793	SY	ROLLER COMPACTED CONCRETE (8.5" THICK) (BID A	$_____	$_____
1	IB-2	CoSA 110 6001	6976	CY	EXCAVATION (ROADWAY)(BID ALT B)	$_____	$_____
					TOTAL AMOUNT BID FOR UNIT IB: PAVING IMPROVEMENTS @		$_____

UNIT II: WATER IMPROVEMENTS

	ITEM No.	SPEC./SHT No.	EST. QTY	UNITS	DESCRIPTION	UNIT COST	AMOUNT
	II-1	CoSA 4.90	4196	LF	16" WATER LINE	$_____	$_____
	II-2	CoSA 4.90	20	LF	16" WATER LINE INSIDE OF CASING	$_____	$_____
	II-3	CoSA 4.90	130	LF	10" WATER LINE (FOR LOWERING ON KOBERLIN ST)	$_____	$_____
	II-4	CoSA 4.90	366	LF	8" WATER LINE	$_____	$_____
1	II-5	CoSA 4.90	267	LF	6" WATER LINE	$_____	$_____
	II-6	CoSA 4.10	20	LF	24" PVC CASING BY OTHER THAN OPEN CUT	$_____	$_____
	II-7	CoSA 4.10	1	EA	2" COMBINATION AIR VALVE	$_____	$_____
	II-8	CoSA 4.10	5	EA	16" GATE VALVE	$_____	$_____
	II-9	CoSA 4.10	12	EA	8" GATE VALVE	$_____	$_____
	II-10	CoSA 4.10	11	EA	6" GATE VALVE	$_____	$_____
1	II-11	CoSA 4.13	7	EA	FIRE HYDRANT	$_____	$_____
1	II-12	CoSA 4.40	4849	LF	TRENCH SAFETY	$_____	$_____
1	II-13	CoSA 4.14	8	EA	1" WATER SERVICE	$_____	$_____
	II-14	CoSA 4.14	1	EA	2" WATER SERVICE	$_____	$_____
1	II-15	CoSA 4.14	9	EA	2" WATER SERVICE WITH DOUBLE 1" SERVICE	$_____	$_____
	II-16	CoSA 4.14	1	EA	20"X16" WET TAP & VALVE	$_____	$_____
1	II-17	CoSA 4.14	1	EA	16"X16" WET TAP & VALVE	$_____	$_____
1	II-18	CoSA 4.14	1	EA	8"X8" TAPPING SLEEVE & VALVE	$_____	$_____
1	~~II-19~~	~~CoSA 4.14~~	~~0~~	~~EA~~	~~8"X2" TAPPING SADDLE & VALVE~~	~~$_____~~	~~$_____~~
	II-20	CoSA 4.14	1	EA	CONNECTION TO EXISTING 16" WATER LINE	$_____	$_____
	II-21	CoSA 4.14	5	EA	CONNECTION TO EXISTING 8" WATER LINE	$_____	$_____
	II-22	CoSA 4.14	7	EA	CONNECTION TO EXISTING 6" WATER LINE	$_____	$_____
	II-23	CoSA 4.10	257	CY	WATER LINE ABANDONMENT GROUT	$_____	$_____
	II-24	CoSA 4.10	18	EA	REMOVE EXISTING VALVE	$_____	$_____

II-25	CoSA 4.13	7	EA	REMOVE EXISTING FIRE HYDRANT	$_____	$_____
II-26	CoSA 4.17	3	EA	REMOVE EXISTING WATER METER	$_____	$_____
1 II-27	CoSA 4.60	20	SY	8" FLEX BASE (FOR ALLEY REPAIR BEYOND PROPOSED PAVEMENT LIMITS)	$_____	$_____
~~II-28~~	~~CoSA 4.70~~	~~0~~	~~SY~~	~~TEMPORARY ASPHALT PAVEMENT REPAIR~~	~~$_____~~	~~$_____~~
II-29	CoSA 4.70	501	SY	PERMANENT ASPHALT PAVEMENT REPAIR	$_____	$_____
1 II-30	CoSA 33 01 10.03	2	EA	16" LINESTOP	$_____	$_____
1 II-31	CoSA 33 01 10.03	1	EA	20" LINESTOP	$_____	$_____
				TOTAL AMOUNT BID FOR UNIT II: WATER IMPROVEMENTS @		$_____

UNIT III: WASTEWATER IMPROVEMENTS

ITEM No.	SPEC./SHT No.	EST. QTY	UNITS	DESCRIPTION	UNIT COST	AMOUNT
III-1	CoSA 4.23	1381	LF	24" WASTEWATER LINE	$_____	$_____
1 III-2	CoSA 4.23	134	LF	18" WASTEWATER LINE	$_____	$_____
III-3	CoSA 4.23	1509	LF	12" WASTEWATER LINE	$_____	$_____
III-4	CoSA 4.23	50	LF	12" WASTEWATER LINE INSIDE OF CASING	$_____	$_____
III-5	CoSA 4.23	1342	LF	10" WASTEWATER LINE	$_____	$_____
1 III-6	CoSA 4.23	1713	LF	8" WASTEWATER LINE	$_____	$_____
III-7	CoSA 4.23	50	LF	CONCRETE ENCASEMENT	$_____	$_____
1 III-8	CoSA 4.40	6128	LF	TRENCH SAFETY	$_____	$_____
1 III-9	CoSA 4.25	7	EA	4' DIAMETER MANHOLE	$_____	$_____
1 III-10	CoSA 4.25	9	EA	5' DIAMETER MANHOLE	$_____	$_____
1 III-11	CoSA 4.25	9	EA	5' DIAMETER DROP MANHOLE	$_____	$_____
1 III-12	CoSA 4.25	1	EA	6' DIAMETER DROP MANHOLE	$_____	$_____
III-13	CoSA 4.23	5	EA	CHECK DAM	$_____	$_____
III-14	CoSA 4.27	9	EA	WASTEWATER SERVICE	$_____	$_____
III-15	CoSA 4.34	158	CY	WASTEWATER LINE ABANDONMENT GROUT	$_____	$_____

	III-16	CoSA 4.34	7	EA	REMOVE/ABANDON EXISTING MANHOLE	$_____	$_____
1	~~III-17~~	~~CoSA 4.70~~	~~0~~	~~SY~~	~~TEMPORARY ASPHALT PAVEMENT REPAIR~~	$_____	$_____
1	III-18	CoSA 4.70	1118	SY	PERMANENT ASPHALT PAVEMENT REPAIR	$_____	$_____
	III-19	CoSA 4.34	1	EA	REMOVE EXISTING CLEANOUT	$_____	$_____
	III-20	CoSA 162 6002	3002	SY	DRILL SEEDING	$_____	$_____
1	III-21	CoSA 4.29	1	LS	BYPASS PUMPING	$_____	$_____
1	III-22	CoSA 4.23	109	LF	8" PRESSURED RATED SS	$_____	$_____
					TOTAL AMOUNT BID FOR UNIT III: WASTEWATER IMPROVEMENTS @		$_____

CONTINGENCY

	ITEM No.	SPEC./SHT No.	EST. QTY	UNITS	DESCRIPTION	UNIT COST	AMOUNT
1	1	N/A	1	LS	Base Bid with Alternative A Contingency (10%)	$468,000	$468,000
1	2	N/A	1	LS	Base Bid with Alternative B Contingency (10%)	$450,700	$450,700

In the case of a pricing discrepancy, the Unit Price will prevail.

The item "Contingency" is included for additional work that may be performed. The total unit cost for this line item may not be paid in full. The respondent shall submit change order requests within the contract to the City consistent with the requirement of the Owner's Construction General Conditions of the contract documents. Generally, change order requests will be funded by the "CONTINGENCY" line item. The respondent shall include the cost for this item in the "Total Base Price".

San Angelo Bell Street Paving, Water and Wastewater Improvements - Phase I

TOTAL BASE BID = $_____Dollars and _____Cents

TOTAL BASE BID + ALT "A" = $_____Dollars and _____Cents

TOTAL BASE BID + ALT "B" = $_____Dollars and _____Cents

It is understood the quantities of work to be done at unit prices are approximate and are intended for bidding purposes only. Unit quantities may be adjusted to determine final contract amount. Funding availability may also determine final contract amount.

Work zone temporary flexible, reflective roadway marker tabs (Tabs) will be subsidiary to the total bid amount.

A Performance Bond and Payment Bond will be required based on the Total Base Bid.

Liquidated Damages

Timely completion of this project is necessary to prevent delays in street reconstruction project(s) and to minimize project impact to the public.

Should the Contractor not complete the work at a permitted site within the required time period, the Owner may, at its option, assess an $820.00 per day delinquent charge against the Contractor, until such time as work at the site is complete. Estimated Completion Time is 540 Calendar Days.

Reservation

Respondent understands the City reserves the right to reject any irregular proposal and the right to waive technicalities if such waiver is in the best interest of the City and conforms to State and local laws and ordinances pertaining to the letting of construction contracts.

4.29 - Temporary Bypass Pumping Systems

4.29.0 General

4.29.0.1 Scope

a) Under this item, the CONTRACTOR is required to furnish all materials, labor, equipment, power and maintenance, etc. to implement a temporary pumping system for the purpose of diverting the existing flow around the work area for the duration of the project.

b) The design, installation, and operation of the temporary pumping system shall be the CONTRACTOR's responsibility. The CONTRACTOR shall employ the services of a "Bypass Sub-Contractor" who can demonstrate to the OWNER that he specializes in the design and operation of temporary bypass pumping systems. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction. "Bypass Sub-Contractor's shall be pre-qualified by the OWNER prior to the submission of bid. Approved "Bypass Sub-Contractors are:

- Godwin Pumps, 7096 Hwy 86 East, China Grove, TX 78263; 210-648-9101
- Global Pump, 10126 E. Coldwater Rd., Davison, MI 48423; 817-919-8997 or 866-360-7867
- Griffin Dewatering, 5306 Clinton Drive, Houston, TX 77020; Phone 713-676-8000, Fax 713-676-8080
- Sunbelt Rentals Pump & Power Services, 711 N Beach Street, Fort Worth, TX 76111; Phone: 817-759-0413, Fax: 817-834-0524
- Maverick Pump Services, 9791 Titan Park Circle, Littleton, CO 80125; 303-906-4202 or 817-919-8997
- Gajeske, Inc., 200 Preston Rd., Celina, TX 75009; 817-505-9453
- Or OWNER Approved Equal

Requests to approve additional "Bypass Sub-Contractors" shall be submitted in writing to the Engineering Manager, Department of Water Utilities at least seven (7) days prior to the bid opening date. The request shall include the company's experience, references, list of similar projects, a list of equipment available and a description of the equipment and methods employed. The "Bypass Sub-Contractor" shall provide at least five (5) references of projects of a similar size and complexity as this project performed by his firm within the past three (3) years.

4.29.1 Requirements for Submitting Pumping Proposals

a) The CONTRACTOR shall submit to the OWNER detailed plans and descriptions outlining all provisions and precautions to be taken by the CONTRACTOR regarding handling of existing wastewater flows. The Plan shall be prepared by the "Bypass Sub-Contractor". The Plan shall bear the signature demonstrating agreement and full understanding of the CONTRACTOR and the "Bypass Sub-Contractor". This Plan must be specific and complete, including such items as schedules, locations, elevations, capacities of equipment, materials, and all other incidental items necessary and/or required to ensure proper protection of the facilities, including protection of the access and bypass pumping locations from damage due to the discharge flows, and compliance with the requirements and permit conditions specified in these Contract documents. No construction shall begin until all provisions and requirements have been reviewed by the OWNER.

b) The Plan shall include but not be limited to the details of the following:

1. Staging areas for pumps
2. Sewer plugging method and types of plugs
3. Size and location of manholes or access points for suction and discharge hose or piping
4. Size of pipeline or conveyance system to be bypassed
5. Number, size, material, location and method of installation of suction piping
6. Number, size, material, method of installation and location of installation of discharge piping
7. Bypass pump sizes, capacity, number of each size to be on site and power requirements
8. Calculations of static lift, friction losses, and flow velocity (pump curves showing pump operating range shall be submitted)
9. Standby power generator size, location
10. Downstream discharge plan
11. Method of protecting discharge manholes or structures from erosion and damage
12. Thrust and restraint block sizes and locations
13. Sections showing suction and discharge pipe depth, embedment, select fill and special backfill
14. Method of noise control for each pump and/or generator
15. Any temporary pipe supports and anchoring requirements
16. Design plans and computation for access to bypass pumping locations indicated on the Plans
17. Calculations for selection of bypass pumping pipe size
18. Schedule for installation of and maintenance of bypass pumping line.
19. Plan indicating selection of location of bypass pumping line locations
20. A control plan demonstrating the instrumentation, equipment, alarms, operations procedures, emergency procedures, reset procedures, and system wiring schematics.

21. All pump, suction line and discharge line sizing calculations shall be sealed by a registered Professional Engineer licensed in the State of Texas.

4.29.2 Equipment

a) All pumps used shall be fully automatic self-priming units that do not require the use of foot-valves in the priming system. The pumps may be gas or diesel powered. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows. Each pump shall have an isolation valve for maintenance and pump removal. Discharge piping system or header shall be designed to allow pumping operations to continue unabated in the event of pump maintenance or change out. In triple redundant pumping systems, at least one pump shall have an independent suction line. If a common suction header is utilized for the two remaining pumps then sufficient valves shall be installed to allow each pump to be removed from the system without interrupting the system operation.

b) The "Bypass Sub-Contractor" shall provide the necessary stop/start controls for each pump. Controls for back-up and stand-by pumps shall be fully automatic. Operation of back-up or high flow pumps shall be based on water level inside the pumping point. **The CONTRACTOR shall continuously monitor flow and adjust pumps to meet flow requirements.** All employees utilized for flow monitoring shall be trained by the "Bypass Sub-Contractor" and shall be supplied with a cell phone to ensure time frames stipulated in Technical Specification 4.29.4 D.2 are met.

c) The CONTRACTOR shall provide primary, backup and standby pumps as described in Technical Specification 4.29.8, "Project Specific Requirements;" section "b". Backup and standby pumps shall be online, with automatic controls.

d) Pump and air relief valves shall be provided with spill protection & control devices designed to capture and contain any fuel or sewage that may spill during the normal course of operation.

e) Discharge Piping – In order to prevent the accidental spillage of flows, all discharge systems shall be constructed of HDPE pipe with fused joints. Under no circumstances will "irrigation" type piping or glued PVC pipe be allowed. Discharge piping shall be pressure rated for a minimum of 150% of maximum head of the pumping system.

f) Noise Control – All pumping equipment, including back-up and high flow pumps shall be sound attenuated. The measured sound level at thirty feet from the pumping unit shall be seventy (70) dBA or less.

g) **The CONTRACTOR and / or Bypass Sub-Contractor shall provide any suction vaults, manholes or other appurtenances required for a fully functional suction system. These systems shall be fully contained and shall not allow for leakage or discharge outside of the containment area. All costs associated shall be included in the Contract Bid.**

4.29.3 Design

a) Design Requirements

1. Trunk Bypass pumping systems shall have sufficient capacity to pump the following flows:

   Peak Flowrate: 0.55 MGD

2. The "Bypass Sub-Contractor" shall provide to the CONTRACTOR all pipeline plugs, pumps of adequate size to handle peak flow, and temporary discharge piping to ensure that the total flow of the main can be safely diverted around the section to be repaired. Bypass pumping systems will be required to be operated twenty-four (24) hours per day.

b) Performance Requirements

1. It is essential to the operation of the existing system being bypassed that no interruptions in the flow occur throughout the duration of the project. To this end, the CONTRACTOR shall provide, maintain, and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units are required), conduits, all necessary power, and all other labor and equipment necessary to intercept the incoming flow before it reaches the point where it would interfere with his work, carry it past the work area and return it to the existing system downstream of his work.
2. The design, installation and operation of the temporary pumping system shall be the CONTRACTOR's responsibility. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.
3. The CONTRACTOR shall provide all necessary means to safely convey the sewage past the work area. The CONTRACTOR will not be permitted to stop or impede the main flows under any circumstances.
4. The CONTRACTOR shall divert the flow around the work area in a manner that will not cause damage to, or surcharging of customer's system and will protect public and private property from damage and flooding.
5. The CONTRACTOR shall protect water resources, wetlands, and other natural resources.

4.29.4 Field Quality Control and Maintenance

a) Test:

1. The CONTRACTOR shall perform leakage and pressure tests of the bypass pumping discharge piping using clean water prior to the actual operation. The OWNER will be given twenty-four (24) hours notice prior to testing. Piping shall be tested to minimum of 150% of maximum design head of the pumping system.

b) Inspection:

1. The CONTRACTOR shall monitor and operate the bypass pumping systems on a continuous basis to ensure the system is working correctly.

c) Maintenance Service:
    1. The CONTRACTOR shall ensure the pumping system is properly maintained and a responsible operator shall be on hand at all times when pumps are operating.
    2. The CONTRACTOR shall monitor pump fuel levels and make arrangements for timely refueling as needed.

d) Extra Materials:
    1. Spare parts for pumps (minimum of air and fuel filters) and piping shall be kept on site as required for continuous operation. "Bypass Sub-Contractor" shall provide a contact that is continually available (24 hours a day). "Bypass Sub-Contractor" shall provide replacement units within twenty-four (24) hours of notice being provided.
    2. Adequate hoisting equipment for each pump and accessories shall be maintained on the site.

4.29.5 Preparation

a) Precautions
    1. CONTRACTOR is responsible for locating any existing utilities in the area selected for the bypass pipelines. The CONTRACTOR shall locate the bypass pipelines to minimize any disturbance to existing utilities and shall obtain approval of the pipeline locations from the customer. All costs associated with relocating utilities and obtaining all approvals shall be paid by the CONTRACTOR.
    2. During all bypass pumping operations, the CONTRACTOR shall protect the OWNER's system (Pumping Station, Conveyance System, etc.) as applicable from damage inflicted by any equipment. The CONTRACTOR shall be responsible for all physical damage to the OWNER's system caused by human or mechanical failure.

4.29.6 Installation and Removal

a) The CONTRACTOR shall remove manhole sections or make connections to the existing conveyance system and construct temporary bypass pumping structures only at the access location indicated on the Plans and as may be required to provide adequate suction conduit.

b) Plugging or blocking of flows shall incorporate a primary or secondary plugging device. When plugging or blocking is no longer needed for performance and acceptance or work, it is to be removed in a manner that permits the sewage flow to slowly return to normal without surge, to prevent surcharging or causing other major disturbances downstream.

c) When working inside manhole or force main, the CONTRACTOR shall exercise caution and comply with OSHA requirements when working in the presence of sewer gases, combustible or oxygen-deficient atmospheres, and confined spaces.

d) The installation of the bypass pipelines is prohibited in all marsh/wetland areas. The pipeline must be located if possible off streets and sidewalks and on shoulders of the roads. When the bypass pipeline crosses local streets and private driveways, the CONTRACTOR must place the bypass pipelines in trenches and cover with temporary pavement or steel plates. Upon completion of the bypass pumping operations, the CONTRACTOR shall remove all the piping, restore all property to pre-construction condition, and restore all pavement. The CONTRACTOR is responsible for obtaining any approvals for placement of the temporary pipeline from the OWNER.

4.29.7 Emergency Conditions

Emergency conditions shall be declared to exist if a sufficient number of pumps in the system become inoperable to the point that the peak flow cannot be pumped. Once this condition exists, the CONTRACTOR shall immediately initiate work to allow for the return to gravity flow. Pumping operations will not be allowed to resume until the full number of primary, standby and backup pumps are returned into service. Monitoring requirements shall be same as required in Technical Specification 4.29.4, "Field Quality Control and Maintenance;" section "f".

4.29.8 Project Specific Requirements

a) All Pumps (Primary, Standby and Backup) required for the Bypass Pump Set shall be commonly headered on discharge and shall either be commonly headered on suction (according to provisions of Technical Specification 4.29.2, "Equipment") or each have individual suction lines that are all available to pick up suction immediately on demand to pump.

   Minimum total number of pumps required for each pump set location shall be as follows:

   1. Sewer mains twelve inches (12") in diameter and larger: Triple redundancy is required. System shall consist of a) primary pump(s), b) stand-by pump(s) and c) back-up pump(s).
   2. Sewer mains less than twelve inches (12") in diameter: System shall consist of a)primary pump(s) and b)back-up pump(s)

b) Trunk Bypass Pump Set Pumps and Capacities:
   1. Primary Pump Set (Critically Silenced / Sound Attenuated)
      i. Peak Pump – Capacity provided shall be at least the peak flow specified at the required system head without cavitation.
      ii. Avg. Flow Pump – Capacity provided shall be at least the average flow specified at the required system head without cavitation and shall be able to pump minimum flow specified at system head without cavitation.
   2. Standby Pump Set (Critically Silenced / Sound Attenuated):

i. Peak Pump – Capacity provided shall be at least the peak flow specified at the required system head without cavitation.
ii. Avg. Flow Pump – Capacity provided shall be at least the average flow specified at the required system head without cavitation and shall be able to pump minimum flow specified at system head without cavitation.

3. Backup Pump Set (May be Non-Critically Silenced / Non-Sound Attenuated, Open Pumps with Mufflers):
    i. Peak Pump – Capacity provided shall be at least the peak flow specified at the required system head without cavitation.

c) Piping System:
1. Suction Piping: Shall be engineered and sized to meet the required suction heads of the pumps under maximum flow conditions.
2. Discharge Piping: Shall be engineered such that the system requirements for peak, average and minimum flows are consistent with the pump curves and specified flow requirements. The minimum pipe size shall be sized to maintain a minimum velocity of two feet per second (2 fps). If multiple discharge pipe runs are utilized, at least one (1) of the discharge line runs shall be the same size as the force main.

d) "Bypass Sub-Contractor" Representation:
1. Setup: A "Bypass Sub-Contractor" Representative qualified in operation and repair of the "Bypass Sub-Contractor's bypass pumping systems shall be on-site for a minimum seven (7) days of continuous system operation after start-up of each pump set-up.
2. Service Check: A "Bypass Sub-Contractor" Representative / Mechanic shall check all systems once every two (2) weeks and provide a detailed service report to the City of San Angelo Representative. Any repairs or problems shall be corrected immediately. Maximum time allowance for routine system repair is twenty-four (24) hours.
3. Full Service: The "Bypass Sub-Contractor" shall provide full service for each of the pumps once (1) every two (2) months or more frequently if recommended under Manufacturer's standard operations manual.

e) Pump Tests:
1. Each pump shall be run at least once every week demonstrating that it will automatically prime and pump continuously for a minimum of thirty (30) minutes.
2. A written report detailing performance, problems, alerts, failures and repairs shall be provided to the OWNER within twenty-four (24) hours of test completion.

f) System Monitoring:
1. The CONTRACTOR shall require and ensure that the Bypass Pump System is continuously manned by the CONTRACTOR during operations.

i. The individuals responsible to monitor the system shall be fully trained by the "Bypass Sub-Contractor" on the operation of the system and emergency actions and restart of the system.
ii. The individuals may be employed by either the "Bypass Sub-Contractor" or the CONTRACTOR". In either case, letters shall be provided certifying that the named individuals are employees of the either the "Bypass Sub-Contractor"-or the CONTRACTOR and are certified as competent to monitor and operate the Bypass Pump System. These letters shall be provided to the OWNER. Any changes in personnel shall require the same documentation.

g) Pumping System Repairs:
1. Pump Failure: Should any one (1) of the Trunk Bypass Pumps fail:
i. The CONTRACTOR, "Bypass Sub-Contractor", and City of San Angelo shall be notified immediately.
ii. The "Bypass Sub-Contractor" shall have a qualified representative and mechanic on-site within twenty-four (24) hours of failure.
iii. The Trunk Bypass System shall be returned to 100% function within seventy-two (72) hours of failure.
2. Multiple Pump (more than one) or System Failure:
i. The CONTRACTOR, "Bypass Sub-Contractor", and City of San Angelo shall be notified immediately.
ii. The "Bypass Sub-Contractor" shall have a qualified representative and mechanic on-site within six (6) hours of failure.
iii. The Trunk Bypass System or System Gravity Flow shall be restored to Peak Flow Capacity within twelve (12) hours of failure.
iv. The Trunk Bypass System shall be returned to 100% function within seventy-two (72) hours of failure.

h) 24 Hour Emergency Contacts:
1. CONTRACTOR:
i. The CONTRACTOR shall provide a priority twenty-four (24) hour phone number to call in an emergency.
ii. The CONTRACTOR shall provide a list of three (3) Qualified Representatives for this project. These individuals shall have complete access to "Bypass Sub-Contractor's and personnel for response to any emergency. The list shall have three (3) personnel with action / decision authorization to respond. One (1) of these individuals shall be on-site within one (1) hour of any emergency situation.
iii. This number shall be available and responsive twenty-four (24) hours a day; 365 days a year.
iv. Any messages received via this line shall be responded to by a Qualified Representative of the CONTRACTOR within thirty (30) minutes.
2. "Bypass Sub-Contractor":
i. The "Bypass Sub-Contractor" shall provide a priority twenty-four (24) hour phone number to call in an emergency.

ii. The "Bypass Sub-Contractor" shall provide a list of Qualified Representatives for this project. The list shall have a minimum of three (3) personnel and a maximum of four (4).
iii. This number shall be available and responsive twenty-four (24) hours a day; 365 days a year.
iv. Any messages received via this line shall be responded to by a Qualified Representative of the "Bypass Sub-Contractor" within thirty (30) minutes.

1 i) BYPASS PUMPING SCHEDULE

1. Flows shown below are based on City of San Angelo GIS Manhole IDs and modeled flows.

Sanitary Sewer Size	Peak Wet Weather (MGD)
8" SS	0.36
10" SS	0.31
12" SS	0.53
18" SS	2.99

2. Suggested sequence is shown below for areas that may require bypass pumping.
   i. Sanitary Sewer Laterals: For sanitary sewer laterals; A1, A2, A3, A4, A5, and A6, provide temporary bypass flow from existing lateral to the nearest downstream active manhole.

   ii. Proposed Sanitary Sewer Line A
      1. Install Manhole connecting to existing 48" SS Main during dry and/or low flow conditions to avoid providing bypass pumping at Station 1+00.
         a. By-Pass Pumping of the existing 12" SS will likely be Required to install Line A from 1+00 to 1+60.

   iii. For Connections to existing Laterals at 5+32, 9+04, 14+02 and 16+59 provide temporary by-pass pumping from existing lateral to the nearest active downstream manhole.

iv. Proposed Sanitary Sewer Line B

1. Existing 18" Sanitary Sewer:
    a. Provide temporary bypass pumping for the existing 18-inch sanitary sewer along the San Angelo draw from the proposed manhole near Station 2+00 to the nearest existing and active manhole on Preusser Street.
    b. Provide temporary bypass pumping for the existing 18-inch sanitary sewer near the alley between Koberlin Street and Spaulding Street from an existing active manhole closest to the proposed line along Station 14+00 to 15+00 on Bell Street to a proposed manhole near Station 14+50 once line has been accepted and brought in to service.

2. Existing 15" Sanitary Sewer: Provide temporary bypass pumping for the existing 15-inch sanitary sewer line located near the intersection of N Schroeder Avenue and Koberlin St. Test to ensure the proposed sanitary sewer from Station 2+00 to 15+00 is approved per specification prior to using for temporary bypass pumping. Provide temporary plug and bypass pumping from the existing 15-inch sanitary sewer line that connects with the existing 18-inch line along San Angelo draw to the proposed manhole nearest Station 2+00.

3. Existing 8" Sanitary Sewer: Provide temporary bypass pumping for the existing 8-inch sanitary sewer line located in the alley between Koberlin Street and Preusser Street. Test to ensure the proposed sanitary sewer from Station 2+00 to 15+00 is approved per specification prior to using for temporary bypass pumping. Provide temporary plug and bypass pumping from the existing 8-inch sanitary sewer line that connects with the existing 18-inch line along San Angelo draw to the proposed manhole nearest Station 2+00.For Connections to existing Laterals at 18+55, 23+65, 38+56 and 43+54 provide temporary by-pass pumping from existing lateral to the nearest active downstream manhole.

4.29.9 Measurement and Payment

Measurement for this item will be based on the lump sum price bid. Payment will include full compensation for all excavation, embankment, backfilling, hauling and laying pipe, fittings, materials, testing, equipment, labor, and resources required to install and maintain a complete working installation. CONTRACTOR shall be responsible for all costs incurred by the OWNER associated with any spills (sewage and/or fuel) due to failure of the pumping system or actions of employees. CONTRACTOR shall be responsible for any fines issued to the OWNER by state or federal agencies associated with any spills (sewage and/or fuel).

1 33 01 10.03 LINESTOP/PLUGGING LARGE DIAMETER WATER LINES

1.00 GENERAL

1.01 WORK INCLUDED

A. Provide all necessary materials, equipment, tools, labor, and associated appurtenances for plugging water line while water line is in service.

1.02 SUBMITTALS

A. Submittals shall be in contract general conditions and shall include:

1. Plan of when work will take place.
2. Record Data of field measurements of existing pipe outer diameter at the location of the tapping.
3. Shop drawings of linestop plug and fittings
4. Provided a list of at least five references for installations provided by the company on polyvinyl chloride pipe 16” and larger.

1.03 QUALITY CONTROL

A. The hot tapping/linestop plugging company must have a minimum of 10 years of experience supplying large diameter hot tapping/linestop plugging services to the Water & Wastewater Industry and have completed several linestop plugging projects on concrete cylinder pipelines of equal size or larger.

2.00 PRODUCTS

2.01 MATERIALS

A. All materials that come in contact with potable water shall be NSF 61 certified.

B. Linestop plugging and tapping fittings must be a mechanical bolt on fitting with an elastomer gasket for sealing against the pipe outside diameter. Linestop plugging fittings require a completion flange, completion plug and blind flange with studs, nuts & gasket. The completion flange and completion plug allows the removal of the tapping valve. All fittings must be supplied with a shop coating of corrosion resistant metal primer and corrosion resistant, high strength low alloy bolts, studs and nuts. Linestop plugging fittings must be supplied by the hot tapping/linestop plugging company and compatible with their linestop plugging equipment.

3.00 EXECUTION

A. INSTALLATION OF LINESTOP PLUGGING / TAPPING FITTING

1. Contractor must excavate locations for installation of Linestop/Tapping Fittings and measure pipe O.D., prior to ordering fittings. Mechanical bolt on Fittings must be encased in concrete for supporting the weight of the linestop plugging/tapping

equipment and to act as a thrust block. All fittings must be pressure tested prior to hot tapping to verify the quality of the gasket seal.

B. PRESSURE EQUALIZATION / DRAIN CONNECTION

1. A 2” tap fitting shall be installed downstream of each linestop fitting for pressure equalization and for verifying the linestop plugging machine’s seal prior to cutting into the existing line. This 2” fitting should come complete with a completion plug and pipe cap for removal of the tapping valve at completion of the linestop plugging application. This fitting must also be supplied by the hot tapping and linestop plugging company for equipment compatibility.

END OF SECTION

UPDATED DRAWINGS

EROSION & SEDIMENTATION CONTROL NOTES

1. CONTRACTOR WILL BE RESPONSIBLE FOR COMPLYING WITH TCEQ'S TPDES AND EPA'S NPDES PROGRAMS FOR CONTROL OF SILT AND EROSION. CONTRACTOR SHALL PREPARE A STORMWATER POLLUTION PREVENTION PLAN (SWPPP). THE CONTRACTOR SHALL UPDATE THE SWPPP AS NECESSARY BASED ON FIELD CONDITIONS.

2. ALL EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO ANY CONSTRUCTION ACTIVITIES. THEY SHALL REMAIN IN PLACE AND FUNCTIONAL UNTIL AFTER THE PROPOSED IMPROVEMENTS ARE IN PLACE.

3. THE CONTRACTOR IS RESPONSIBLE FOR KEEPING STREETS AND SIDEWALKS ADJACENT TO THE PROJECT FREE OF MUD AND DEBRIS FROM CONSTRUCTION AT ALL TIMES.

4. SEDIMENT CONTROL DEVICES SHALL BE INSTALLED AS INDICATED ON THE PLANS. PRIOR TO ANY EMBANKMENT OR EXCAVATION WORK BEING DONE. WHEN THE PROJECT IS COMPLETE AND THE ENTIRE PROJECT SITE IS COMPLETELY STABILIZED, THE SEDIMENT CONTROL DEVICES AND ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED MANNER. THE CONTRACTOR HAS THE ULTIMATE RESPONSIBILITY FOR THE EFFECTIVE CONTROL OF EROSION AND SEDIMENTATION.

5. THE SITE SHALL BE REVIEWED WEEKLY AND AFTER ANY MAJOR STORM ADJUSTMENTS/REPAIRS TO THE EROSION CONTROL DEVICES SHALL BE MADE AS DIRECTED BY THE CITY.

6. THE EROSION CONTROL PLANS PROVIDED IN THE PLAN SET DOES NOT RELIEVE THE CONTRACTOR FROM PROVIDING ADDITIONAL EROSION CONTROL MEASURES AS REQUIRED BY THE SWPPP OR AS REQUIRED BY FIELD CONDITIONS AND DIRECTED BY THE CITY. THE EROSION CONTROL PLANS ARE PROVIDED AS A COURTESY TO THE CONTRACTOR. HOWEVER, IT IS THE CONTRACTORS RESPONSIBILITY TO MEET ALL REGULATORY REQUIREMENTS FOR EROSION CONTROL.

7. EROSION CONTROL MEASURES MAY ONLY BE PLACED IN FRONT OF INLETS, OR IN CHANNELS, DRAINAGEWAYS OR BORROW DITCHES AT RISK OF CONTRACTOR. CONTRACTOR SHALL REMAIN LIABLE FOR ANY DAMAGE CAUSED BY THE MEASURES, INCLUDING FLOODING DAMAGE, WHICH MAY OCCUR DUE TO BLOCKED DRAINAGE. AT THE CONCLUSION OF ANY PROJECT, ALL CHANNELS, DRAINAGEWAYS AND BORROW DITCHES IN THE WORK ZONE SHALL BE DREDGED OF ANY SEDIMENT GENERATED BY THE PROJECT OR DEPOSITED AS A RESULT OF EROSION CONTROL MEASURES.

8. THE CONTRACTOR WILL BE RESPONSIBLE FOR PREPARING, IMPLEMENTATION AND MAINTENANCE OF THE SWPPP. THE INSPECTION AND MAINTENANCE OF THE EROSION PREVENTION MEASURES SHALL BE THE CONTRACTOR'S RESPONSIBILITY THROUGHOUT ALL PHASES OF CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO COMPLY WITH TCEQ'S TPDES AND THE EPA'S NPDES (NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM) REGULATIONS 40-CFR-122, 123, 124 CONCERNING EROSION AND SEDIMENT CONTROL. THE CONTRACTOR WILL BE RESPONSIBLE FOR SUBMITTING A NOTICE OF INTENT "NOI" TO EPA 72 HOURS PRIOR TO BEGINNING CONSTRUCTION AND NOTICE OF TERMINATION "NOT" TO EPA UPON COMPLETION OF THE PROJECT.

TRAFFIC SIGNS AND PAVEMENT MARKINGS:

1. ALL TRAFFIC SIGNS SHOWN ON THE PLANS WILL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.

PAVING NOTES

1. ALL DRIVEWAYS, WHICH ARE OPEN CUT, SHALL HAVE AT LEAST A TEMPORARY DRIVING SURFACE AT THE END OF EACH DAY. THE TEMPORARY SURFACE SHALL BE CONSIDERED AS A SUBSIDIARY ITEM OF WORK. THE COST OF WHICH SHALL BE INCLUDED IN THE PRICE BID IN THE PROPOSAL FOR VARIOUS BID ITEMS.

2. EXISTING ASPHALT CONCRETE PAVEMENT SHALL BE REMOVED AND DELIVERED TO THE CITY'S MAINTENACE YARD ON ANN STREET. REMOVAL BY MILLING SHALL NOT BE ALLOWED.

3. ASPHALT PAVEMENT REMOVAL IS NOT REFLECTED IN THE ROADWAY EXCAVATION QUANTITIES.

3. QUANTITIES FOR ITEM 1-7 AND 1-10 INCLUDE TRANSITION PAVEMENT FROM STA 58+50 TO STA 59+00.

SIDEWALKS AND CURB RAMP NOTES:

1. THE CURB RAMP STANDARD DETAILS ARE INTENDED TO SHOW TYPICAL LAYOUTS FOR THE CONSTRUCTION OF THE CURB RAMPS. THE INFORMATION SHOWN ON THE STANDARD DETAILS MEET THE REQUIREMENTS SHOWN IN THE 2012 TEXAS ACCESSIBILITY STANDARDS(TAS) AND THE 2010 ADA STANDARDS FOR ACCESSIBLE DESIGN BY THE DEPARTMENT OF JUSTICE.

2. THE CONTRACTOR MAY NOT MAKE CHANGES TO THE SIDEWALK AND CURB RAMP LAYOUT WITHOUT APPROVAL OF THE CITY. THE CONTRACTOR MAY PROPOSE CHANGES TO THE SIDEWALK AND CURB RAMP LAYOUT DUE TO FIELD CONDITIONS, BUT ANY PROPOSED CHANGES MUST BE APPROVED BY THE CITY.

3. CURB RAMP RUNNING SLOPES SHALL NOT BE STEEPER THAN 8.3% (12:1). ADJUST CURB RAMP LENGTH OR GRADE OF APPROACH SIDEWALKS AS DIRECTED BY THE CITY.

4. CURB RAMP FLARE SLOPES SHALL NOT BE STEEPER THAN 10% (10:1) AS MEASURED ALONG BACK OF CURB.

5. MAXIMUM ALLOWABLE CROSS SLOPE ON SIDEWALK AND CURB RAMP SURFACES IS 2%.

6. THE MINIMUM WIDTH OF SIDEWALKS AND CURB RAMPS SHALL BE 3 FEET. SIDEWALK WIDTHS UNDER 4 FEET CONNOT EXCEED 150 FT IN LENGTH.

7. LANDINGS SHALL BE PROVIDED AT THE TOP OF CURB RAMPS. THE LANDING CLEAR LENGTH SHALL BE 5 FEET MINIMUM FROM THE END OF RAMP. THE LANDING CLEAR WIDTH SHALL BE AT LEAST AS WIDE AS THE CURB RAMP, EXCLUDING FLARES. THE LANDING SHALL HAVE A MAXIMUM SLOPE OF 2% IN ANY DIRECTION.

8. IN ALTERATIONS WHERE THERE IS NO LANDING AT THE TOP OF THE CURB RAMP, CURB RAMP FLARES SHALL BE PROVIDED AND SHALL NOT BE STEEPER THAN 8.3% (12:1).

9. WHERE TURNING IS REQUIRED, MANEUVERING SPACE AT THE TOP AND BOTTOM OF CURB RAMPS SHALL BE 5 FEET BY 5 FEET MINIMUM. THE SPACE AT THE BOTTOM SHALL BE WHOLLY CONTAINED WITHIN THE CROSSWALK MARKINGS AND SHALL NOT PROJECT INTO VEHICULAR TRAFFIC LANES.

10. CURB RAMPS WITH RETURNED CURBS MAY BE USED ONLY WHERE PEDESTRIANS WOULD NORMALLY NOT WALK ACROSS THE RAMP, EITHER BECAUSE THE ADJACENT SURFACE IS PLANTING OR OTHER NON-WALKING SURFACE OR BECAUSE THE SIDE APPROACH IS SUBSTANTIALLY OBSTRUCTED.

11. WHERE CURB RAMPS ARE PROVIDED, CROSSWALK MARKINGS SHALL BE REQUIRED AND RAMPS SHALL BE ALIGNED WITH THE CROSSWALK.

12. COUNTER SLOPES OF ADJOINING GUTTERS AND ROAD SURFACES IMMEDIATELY ADJACENT TO THE CURB RAMP SHALL NOT BE STEEPER THAN 5% (20:1) IN ANY DIRECTION.

TRAFFIC CONTROL:

1. THE CONTRACTOR SHALL SUBMIT A WORK SCHEDULE & TRAFFIC CONTROL PLAN.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF PEDESTRIANS AND MOTORISTS IN THE AREA OF THE TRAFFIC SIGNAL CONSTRUCTION SITE.

3. ROADS AND STREETS SHALL BE KEPT OPEN TO TRAFFIC AT ALL TIMES. CONTRACTOR SHALL ARRANGE CONSTRUCTION SO AS TO CLOSE ONLY ONE LANE IN EACH DIRECTION OF A ROADWAY AT A TIME.

4. ALL CONSTRUCTION OPERATIONS SHALL BE CONDUCTED TO PROVIDE MINIMAL INTERFERENCE TO TRAFFIC. ALL TRAFFIC SIGNAL EQUIPMENT INSTALLATIONS SHALL BE ARRANGED SO AS TO PERMIT CONTINUOUS MOVEMENT OF TRAFFIC IN ALL DIRECTIONS AT ALL TIMES.

5. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY SIGNAGE NECESSARY DURING CONSTRUCTION.

6. ALL SIGNS, BARRICADES, PAVEMENT MARKINGS AND TRAFFIC CONTROL DEVICES, INCLUDING PLACEMENT, SHALL CONFORM TO THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

7. ALL TRAFFIC CONTROL DEVICES USED AT NIGHT SHALL BE REFLECTORIZED AND/OR ILLUMINATED. CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT BATTERIES IN ILLUMINATED DEVICES ARE CHARGED SUCH THAT NO DEVICE FAILS TO OPERATE DURING THE NIGHT.

8. THE CONTRACTOR SHALL FURNISH, INSTALL AND MAINTAIN BARRICADES, WARNING SIGNS, FLASHERS, AND OTHER DEVICES OF THE TYPE AND SIZE INDICATED IN THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, CURRENT REVISION.

9. IN LIEU OF TYPE D (2" THICK) SURFACE COURSE FOR TEMPORARY PAVEMENT, THE CONTRACTOR MAY SUBSTITUTE ALTERNATIVE 2-COURSE PENETRATION SURFACE TYPE(S) WITH THE UNDERSTANDING THAT AN ACCEPTABLE DRIVING SURFACE IS MAINTAINED TO THE SATISFACTION OF THE CITY.

9. CONTRACTOR SHALL MAINTAIN ACCESS TO ALL PROPERTIES DURING CONSTRUCTION.

10. TWO-WAY TRAFFIC MUST BE MAINTAINED AT ALL TIMES. ONE LANE OF TRAFFIC IN EACH DIRECTION AROUND CONSTRUCTION OPERATIONS IN PROGRESS WITH ADEQUATE SAFEGUARDS WILL BE ACCEPTABLE, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

11. A TRAFFIC CONTROL PLAN WAS PREPARED FOR THIS PROJECT. THE CONTRACTOR IS RESPONSIBLE FOR THE IMPLEMENTATION AND MAINTENANCE OF THE TRAFFIC CONTROL PLAN. CHANGES MADE TO THE TRAFFIC CONTROL PLAN SHALL BE PREPARED BY A PROFESSIONAL ENGINEER AND SUBMITTED FOR APPROVAL BY THE OWNER AT NO ADDITIONAL COST TO THE OWNER. TWO-WAY TRAFFIC MUST BE MAINTAINED AT ALL TIMES. ALL BARRICADES, WARNING SIGNS, LIGHTS DEVICES, AND ETC., FOR THE GUIDANCE AND PROTECTION OF TRAFFIC AND PEDESTRIANS MUST CONFORM TO THE INSTALLATION SHOWN IN THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (LATEST EDITION), TXDOT. ALL TRAFFIC CONTROL DEVICES SHALL BE INSPECTED DAILY.

WATER & WASTEWATER NOTES:

1. FOR UTILITY WORK WITHIN UTILITY EASEMENTS, ONCE PIPE OR APPURTENANCES HAVE BEEN INSTALLED OR REHABILITATED, IMMEDIATELY COMMENCE TEMPORARY SURFACE RESTORATION. COMPLETE SURFACE RESTORATION TO THE OWNER'S SATISFACTION WITHIN SEVEN (7) DAYS OF WORK FINISHING ON-SITE. FAILURE TO MAINTAIN SURFACE RESTORATION, AS NOTED ABOVE, MAY RESULT IN SUSPENSION OF WORK UNTIL RESTORATION IS COMPLETE.

2. EXISTING VERTICAL DEFLECTIONS AND PIPE SLOPES SHOWN ON THE DRAWINGS ARE APPROXIMATE AND HAVE NOT BEEN FIELD VERIFIED, UNLESS OTHERWISE NOTED. RIM ELEVATIONS, FLOW LINES, AND HORIZONTAL LOCATIONS OF EXISTING MANHOLES WERE DETERMINED FROM FIELD SURVEY. IF FIELD CONDITIONS VARY FROM THOSE SHOWN ON DRAWINGS CONTRACTOR SHALL NOTIFY CITY.

3. MAINTAIN ALL EXISTING WATER AND WASTEWATER CONNECTIONS TO CUSTOMERS IN WORKING ORDER AT ALL TIMES, EXCEPT FOR BRIEF INTERRUPTIONS IN SERVICE FOR WATER AND SEWER SERVICES TO BE REINSTATED. IN NO CASE SHALL SERVICES BE ALLOWED TO REMAIN OUT OF SERVICE OVERNIGHT.

4. PROVIDE AND FOLLOW APPROVED CONFINED SPACE ENTRY PROGRAM IN ACCORDANCE WITH OSHA REQUIREMENTS. CONFINED SPACES SHALL INCLUDE MANHOLES AND ALL OTHER CONFINED SPACES IN ACCORDANCE WITH OSHA'S PERMIT REQUIRED FOR CONFINED SPACES.

WATER:

1. PROVIDE THRUST RESTRAINT BY MEANS OF RESTRAINING JOINTS AT FITTINGS AND CONCRETE BLOCKING. WHEN SPECIFICALLY INDICATED ON THE DRAWINGS, PROVIDE THRUST RESTRAINT AT DESIGNATED JOINTS BEYOND THE FITTINGS. EACH METHOD SHALL BE CAPABLE OF THRUST RESTRAINT INDEPENDENT OF THE OTHER SYSTEM.

2. PROPOSED WATER MAINS SHALL HAVE A MINIMUM COVER OF 36-INCHES COVER ABOVE THE TOP OF PIPE, UNLESS SHOWN OTHERWISE ON THE DRAWINGS OR DETAILS.

3. ELEVATION ADJUSTMENT AT CONNECTIONS MAY BE MADE WITH BENDS, OFFSETS, OR JOINT DEFLECTIONS. JOINT DEFLECTIONS SHALL NOT EXCEED SEVENTY-FIVE PERCENT (75%) OF MANUFACTURER'S RECOMMENDATIONS.

4. TEMPORARY PRESSURE PLUGS REQUIRED FOR SEQUENCING OF CONSTRUCTION AND TESTING OF PROPOSED WATER LINES SHALL BE CONSIDERED SUBSIDIARY TO THE WORK AND SHALL BE INCLUDED IN THE PRICE BID IN THE PROPOSAL FOR VARIOUS BID ITEMS.

5. THE CONTRACTOR SHALL NOT PLACE THE PIPE IN WATER OR WHERE IT CAN BE FLOODED WITH WATER OR SEWAGE DURING ITS STORAGE OR INSTALLATION.

6. CONTRACTOR SHALL DECHLORINATE WATER USED FOR FLUSHING NEW PIPELINE PRIOR TO DISCHARGE TO STORM DRAIN PER TCEQ AND EPA REQUIREMENTS. WATER DISCHARGE WHILE DRAINING, TESTING, OR DISINFECTING PIPELINES SHALL BE DONE IN ACCORDANCE WITH TCEQ GENERAL PERMIT NO. TX670000.

7. ALL BURIED VALVES, FIRE HYDRANTS, METALLIC PIPING, AND METALLIC EQUIPMENT SHALL BE WRAPPED IN POLYETHYLENE IN ACCORDANCE WITH THE SPECIFICATIONS.

8. THE CONTRACTOR SHALL NOT OPERATE WATER MAIN VALVES WITHOUT DIRECT SUPERVISION BY CITY.

9. CONTRACTOR SHALL FURNISH AND INSTALL TEMPORARY BY-PASS WATER SYSTEMS AS REQUIRED TO MAINTAIN FRESH, CLEAN, POTABLE WATER SUPPLY TO WATER SERVICE CUSTOMERS. ONLY MINIMAL SERVICE SHUTDOWNS WILL BE ALLOWED. CONTRACTOR SHALL NOTIFY THE OWNER AND ALL WATER SERVICE CUSTOMERS OF ANY TEMPORARY WATER SERVICE SHUTDOWNS.

10. CONTRACTOR SHALL COORDINATE WITH THE CITY FOR ALL REMOVED AND SALVAGED EQUIPMENT TO BE TRANSPORTED TO THE CITY YARD ON BELL SREET. CONTRACTOR SHALL NOT REUSE ANY SALVAGED EQIPMENT FOR NEW CONSTRUCTION.

1

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144
STATE OF TEXAS
WAYNE P. HART
118231
LICENSED PROFESSIONAL ENGINEER
07/24/17

FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone - (817) 735-7300
Fax - (817) 735-7491
Web - www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE I
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS
GENERAL

GENERAL NOTES

F&N JOB NO.	SAN16188
DATE	07/2017
DESIGNED	JWP
DRAWN	EB
REVISED	
CHECKED	WH
FILE NAME	ph1-trt-gn-notes01.sht

NO.	ISSUES	BY	DATE
1	ADDENDUM NO. 1	WH	7/24/17

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET
NOTES-2
SEQ.
4

UNIT II - WATER IMPROVEMENTS

	UNIT	DESCRIPTION	W-2	W-3	W-4	W-5	W-6	W-7	W-8	W-9	W-10	W-11	DT-02	QUANTITY	UNIT
	II-1	16" WATER LINE	418	480	500	500	500	500	500	500	298			4196	LF
	II-2	16" WATER LINE INSIDE OF CASING		20										20	LF
	II-3	10" WATER LINE (FOR LOWERING ON KOBERLIN ST)											130	130	LF
	II-4	8" WATER LINE										365.5		366	LF
1	II-5	6" WATER LINE	150					35	30	52				267	LF
	II-6	24" PVC CASING BY OTHER THAN OPEN CUT		20										20	LF
	II-7	2" COMBINATION AIR VALVE						1						1	EA
	II-8	16" GATE VALVE			1		1		1		2			5	EA
	II-9	8" GATE VALVE			2	1	2	1	1	2	2	1		12	EA
	II-10	6" GATE VALVE	2		1		1	2	2	1	1	1		11	EA
	II-11	FIRE HYDRANT	1		1		1	1	1	1	1			7	EA
	II-12	TRENCH SAFETY	568	500	500	500	500	535	530	552	298	365.49		4849	LF
1	II-13	1" WATER SERVICE	1			1			2	2	1	1		8	EA
	II-14	2" WATER SERVICE		1										1	EA
1	II-15	2" WATER SERVICE WITH DOUBLE 1" SERVICE	1	1		1		2	1	2	1			9	EA
	II-16	20"X16" WET TAP & VALVE	1											1	EA
1	II-17	16"X16" WET TAP & VALVE	1											1	EA
	II-18	8"X8" TAPPING SLEEVE & VALVE										1		1	EA
	II-19	8"X2" TAPPING SADDLE & VALVE										1		1	EA
	II-20	CONNECTION TO EXISTING 16" WATER LINE									1			1	EA
	II-21	CONNECTION TO EXISTING 8" WATER LINE			2	1		1		1				5	EA
	II-22	CONNECTION TO EXISTING 6" WATER LINE					2		2	1	2			7	EA
	II-23	WATER LINE ABANDONMENT GROUT												257	CY
		16" WATER LINE ABANDONMENT GROUT	244											244	CY
		8" WATER LINE ABANDONMENT GROUT	3											4	CY
		6" WATER LINE ABANDONMENT GROUT	7											7	CY
		2" WATER LINE ABANDONMENT GROUT	2											2	CY
	II-24	REMOVE EXISTING VALVE	1		1	1	3	5		4	3			18	EA
	II-25	REMOVE EXISTING FIRE HYDRANT	1		1		1	1	1	1	1			7	EA
	II-26	REMOVE EXISTING WATER METER			1				2					3	EA
	II-27	8" FLEX BASE (FOR ALLEY REPAIR BEYOND PROPOSED PAVING LIMITS)						20						20	SY
1	II-28	~~TEMPORARY ASPHALT PAVEMENT REPAIR~~												~~0~~	~~SY~~
	II-29	PERMANENT ASPHALT PAVEMENT REPAIR			12	13	48	20	12	20	54	322		501	SY
	II-30	16" LINESTOP		1							1			2	EA
	II-31	20" LINESTOP		1										1	EA

UNIT III - WASTEWATER IMPROVEMENTS

	UNIT	DESCRIPTION	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8	SS-9	SS-10	SS-11	SS-12	SS-13	SS-14	SS-15	SS-16	QUANTITY	UNIT
	III-1	24" WASTEWATER LINE						400	500	481									1381	LF
1	III-2	18" WASTEWATER LINE															133.62		134	LF
	III-3	12" WASTEWATER LINE		450	500	500	58.87												1509	LF
	III-4	12" WASTEWATER LINE INSIDE OF CASING		50															50	LF
	III-5	10" WASTEWATER LINE								10	500	500	332						1342	LF
1	III-6	8" WASTEWATER LINE											168	500	500	379		165.46	1713	LF
	III-7	CONCRETE ENCASEMENT		50															50	LF
	III-8	TRENCH SAFETY		500	500	500	58.87	400	500	491	500	500	500	500	500	379	133.62	165.46	6128	LF
	III-9	4' DIAMETER MANHOLE		1	2							1	1	1	1				7	EA
1	III-10	5' DIAMETER MANHOLE					1	1	1	1	1			1	2		1		9	EA
	III-11	5' DIAMETER DROP MANHOLE			1	1	1				1	1	2	1		1			9	EA
	III-12	6' DIAMETER MANHOLE						1											1	EA
	III-13	CHECK DAM			1			1	1	1							1		5	EA
	III-14	WASTEWATER SERVICE		1	2	2							1		2	1			9	EA
	III-15	WASTEWATER LINE ABANDONMENT GROUT																	158	CY
		12" WW LINE ABANDONMENT GROUT	138																139	CY
		18" WW LINE ABANDONMENT GROUT	17																18	CY
		8" WW LINE ABANDONMENT GROUT	0.19																1	CY
	III-16	REMOVE/ABANDON EXISTING MANHOLE		1			1	1						1	1	1	1		7	EA
1	III-17	TEMPORARY ASPHALT PAVEMENT REPAIR																	0	LF
	III-18	PERMANENT ASPHALT PAVEMENT REPAIR								81	533	504							1118	SY
	III-19	REMOVE EXISTING CLEANOUT												1					1	EA
	III-20	DRILL SEEDING						861.1	1110.8	772.4							257.3		3002	SY
1	III-21	BYPASS PUMPING	1																1	LS
	III-22	8" PRESSURE RATED SS																108.8	109	LF

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

AARON B. CONINE
109794
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

27 Jul 2017

FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone - (817) 735-7300
Fax - (817) 735-7491
Web - www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE I
BELL ST. ROADWAY & UTILITY IMPROVEMENTS
CIVIL
QUANTITY TAKE OFF

NO.	ISSUE	BY	DATE
1	ADDENDUM NO. 1	ABC	7/24/17

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

F&N JOB NO.	SAN16188
DATE	07/07/17
DESIGNED	ABC
DRAWN	SB
CHECKED	ABC
REVISED	-
FILE NAME	GN-ALL-NOTES03.dwg

SHEET
NOTES-04

SEQ.
6

100% SUBMITTAL

ACAD Rel: 21.0s (LMS Tech)
Filename: N:\WTU\Drawings\GN-ALL-NOTES03.dwg
Last Saved: 7/26/2017 3:50 PM Saved By: sb

Plot Date: 7/27/2017 8:17 AM Plot By: sb Filename: N:\WTU\Drawings\GN-ALL-NOTES03.dwg

UNIT I - PAVING IMPROVEMENTS

UNIT	DESCRIPTION	PV-01	PV-02	PV-03	PV-04	PV-05	PV-06	PV-07	PV-08	PV-09	PV-10	PM-01	PM-02	PM-03	PM-04	QUANTITY	UNIT
I-1	REMOVING CONCRETE PVMT(DRIVEWAYS & SIDEWALK)															1496	SY
I-2	REMOVING CONCRETE (CURB & GUTTER)															6809	LF
1 I-3	REMOVE ASPHALT PAVEMENT (4" AVG DEPTH)															25450	SY
I-4	EMBANKMENT (FINAL)(DENS CNTRL)(CL 3)															273	CY
I-5	DRILL SEEDING	434	417	373	549	503	300	624	427	352	337					4316	SY
1 I-6	FL BS (CMP IN PLC)(TY A)(GR1-2)(6")(TCP TEMP PAVT)															1511	SY
I-7	CEMENT TREATED SUBGRADE (8")	2281	3229	2829	3148	2982	2875	2817	2901	3015	2527					28604	SY
I-8	CEMENT	31.5	44.6	39.1	43.5	41.2	39.7	38.9	40.1	41.6	34.9					395.1	TN
1 I-9	D-GR HMA(SQ) TY D PG 64-72 (2" THICK)(TCP TEMP PAVT)															1511	SY
I-10	BARRICADES, SIGNS AND TRAFFIC HANDLING															18	MO
I-11	ROCK FILTER DAMS															48	LF
I-12	REMOVE ROCK FILTER DAMS															48	LF
I-13	TEMP SEDIMENT CONTROL FENCE (INSTALL)															2150	LF
I-14	TEMP SEDIMENT CONTROL FENCE (REMOVE)															2150	LF
I-15	CONCRETE CURB & GUTTER (6")	536	744	740	836	829	831	777	691	687	562					7233	LF
I-16	DRIVEWAYS (CONCRETE)	321	469	59	57	48	254	380	318	253						2159	SY
I-17	CONCRETE SIDEWALKS (4")	219	254	211	227	276	271	259	187	203	206					2313	SY
I-18	CURB RAMPS (TY 7)	8			2	2	1	2	1	2	8					26	EA
I-19	CURB RAMPS (TY 10)								1	1						2	EA
I-20	MAILBOX INSTALL-S (TWG POST) TY 1													6	3	9	EA
I-21	RELOCATE SM RD SIGN SUP & AMS											3	9	2	3	17	EA
I-22	INST SM RD SIGN SUP & AM											1	4	7	0	12	EA
I-23	REFL PAVEMENT MARKING TY 1 (W) 4" (BRK)											443	490	482	216	1631	LF
I-24	REFL PAVEMENT MARKING TY 1 (W) 8" (SLD)											219				219	LF
I-25	REFL PAVEMENT MARKING TY 1 (W) 24" (SLD)											308	76	78	282	744	LF
I-26	REFL PAVEMENT MARKING TY 1 (W) (ARROW)											2				2	EA
I-27	REFL PAVEMENT MARKING TY 1 (W) (WORD)											2				2	EA
I-28	REFL PAVEMENT MARKING TY 1 (Y) 4" (SLD)											2486	1962	1930	864	7242	LF
I-29	REFL PAVEMENT MARKING TY 1 (Y) 12" (SLD)											170				170	LF
I-30	REFL PAVEMENT MARKER TY 2 - A - A											38	25	24	11	98	LF
I-31	REFL PAVEMENT MARKER TY 1 - C											22	25	24	11	82	LF

ALT. A - HMAC PAVING

UNIT	DESCRIPTION	PV-01	PV-02	PV-03	PV-04	PV-05	PV-06	PV-07	PV-08	PV-09	PV-10	PM-01	PM-02	PM-03	PM-04	QUANTITY	UNIT
IA-1	FLEX BASE (CMP IN PLACE)(TY A GR 1-2)(FNAL POS)(12") (BID ALT A)	2281	3229	2829	3148	2982	2875	2817	2901	3015	2527					28604	SY
1 IA-2	D-GR HMA TY-B PG64-22 (BID ALT A)(2" THICK)	2057	2911	2551	2839	2689	2592	2540	2616	2719	2279					25793	SY
IA-3	D-GR HMA TY-D PG64-22 (BID ALT A)(2" THICK)	2057	2911	2551	2839	2689	2592	2540	2616	2719	2279					25793	SY
IA-4	EXCAVATION (ROADWAY)(BID ALT A)															12906	CY

ALT. B - ROLLER COMPACTED CONCRETE

UNIT	DESCRIPTION	PV-01	PV-02	PV-03	PV-04	PV-05	PV-06	PV-07	PV-08	PV-09	PV-10	PM-01	PM-02	PM-03	PM-04	QUANTITY	UNIT
IB-1	ROLLER COMPACTED CONCRETE (8.5" THICK) (BID ALT B)	2057	2911	2551	2839	2689	2592	2540	2616	2719	2279					25793	SY
1 IB-2	EXCAVATION (ROADWAY)(BID ALT B)															6976	CY

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

AARON B. CONINE
109794
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

26 Jul 2017

FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone: (817) 336-5100
Fax – (817) 735-7491
Web – www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE I
BELL ST. ROADWAY & UTILITY IMPROVEMENTS
CIVIL
QUANTITY TAKE OFF

FAN JOB NO. SAN16188
DATE 07/07/17
DESIGNED ABC
DRAWN SB
CHECKED ABC
FILE NAME GN-ALL-NOTES03.dwg

NO.	ISSUE	BY	DATE
1	ADDENDUM NO. 1	ABC	7/24/17

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET NOTES–03
SEQ. 5

100% SUBMITTAL

ACAD Rel: 21.0s (LMS Tech)
Filename: N:\WTU\Drawings\GN-ALL-NOTES03.dwg
Last Saved: 7/24/2017 12:55 PM Saved By: sb

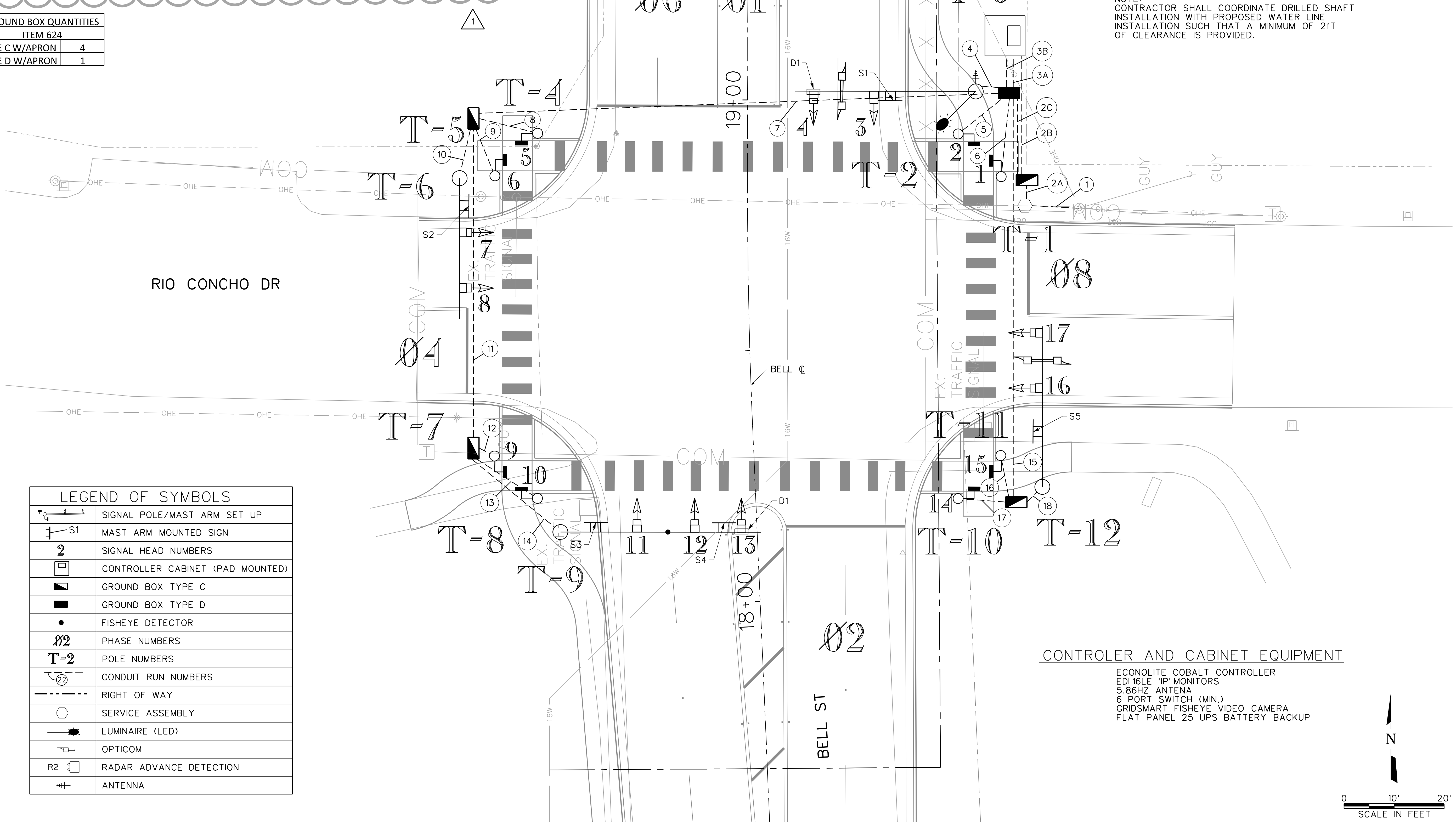
Plot Date: 7/24/2017 1:10 PM Plot By: sb Filename: N:\WTU\Drawings\GN-ALL-NOTES03.dwg

POLE NUMBER	T-1	T-2	T-3		T-4	T-5	T-6		T-7	T-8	T-9			T-10	T-11	T-12	
MAST ARM LENGTH	PED	PED	36'		PED	PED	28'		PED	PED	40'			PED	PED	32'	
FOUNDATION TYPE	24-A	24-A	36-A		24-A	24-A	30-A		24-A	24-A	36-A			24-A	24-A	30-A	
WITH LUMINAIRES	-	-	YES		-	-	NO		-	-	NO			-	-	NO	
SIZE OF LENS	-	-	12"		-	-	12"		-	-	12"			-	-	12"	
SIGNAL TYPE	C	C	A	A	C	C	A	A	C	C	A	A	B	C	C	A	A
SIGNAL FACE NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
LED SIGNAL INDICATIONS	DW	DW	R	R	DW	DW	R	R	DW	DW	R	R	<-R	DW	DW	R	R
	W	W	Y	Y	W	W	Y	Y	W	W	Y	Y	<-Y	W	W	Y	Y
			G	G			G	G			G	G	<-FY			G	G
													<-G				

GROUND BOX QUANTITIES	
ITEM 624	
TYPE C W/APRON	4
TYPE D W/APRON	1

TRAFFIC SIGNAL SIGNS SUMMARY				
ID	TYPE	LEGEND	QNTY	LOCATION
S1	R10-17T	STREET NAME (RIO CONCHO DR)	1	T-3 ARM
S2	R10-17T	STREET NAME (BELL ST)	1	T-6 ARM
S3	R10-17T	STREET NAME (RIO CONCHO DR)	1	T-9 ARM
S4	D3-1	LEFT TURN YIELD ON FLASHING YELLOW ARROW	1	T-9 ARM
S5	R10-17T	STREET NAME (BELL ST)	1	T-12 ARM
DI	MADPD-12	MAST ARM DAMPENING PLATE	2	T-3, T-9

NOTE:
CONTRACTOR SHALL COORDINATE DRILLED SHAFT INSTALLATION WITH PROPOSED WATER LINE INSTALLATION SUCH THAT A MINIMUM OF 2fT OF CLEARANCE IS PROVIDED.



LEGEND OF SYMBOLS

Symbol	Description
	SIGNAL POLE/MAST ARM SET UP
S1	MAST ARM MOUNTED SIGN
2	SIGNAL HEAD NUMBERS
	CONTROLLER CABINET (PAD MOUNTED)
	GROUND BOX TYPE C
	GROUND BOX TYPE D
	FISHEYE DETECTOR
Ø2	PHASE NUMBERS
T-2	POLE NUMBERS
22	CONDUIT RUN NUMBERS
	RIGHT OF WAY
	SERVICE ASSEMBLY
	LUMINAIRE (LED)
	OPTICOM
R2	RADAR ADVANCE DETECTION
	ANTENNA

CONTROLER AND CABINET EQUIPMENT

ECONOLITE COBALT CONTROLLER
EDI 16LE 'IP' MONITORS
5.86HZ ANTENA
6 PORT SWITCH (MIN.)
GRIDSMART FISHEYE VIDEO CAMERA
FLAT PANEL 25 UPS BATTERY BACKUP

0 10' 20'
SCALE IN FEET

07/24/17

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

STATE OF TEXAS
KEVIN R. ST. JACQUES
69700
LICENSED PROFESSIONAL ENGINEER

FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone - (817) 735-7300
Fax - (817) 735-7491
Web - www.freese.com

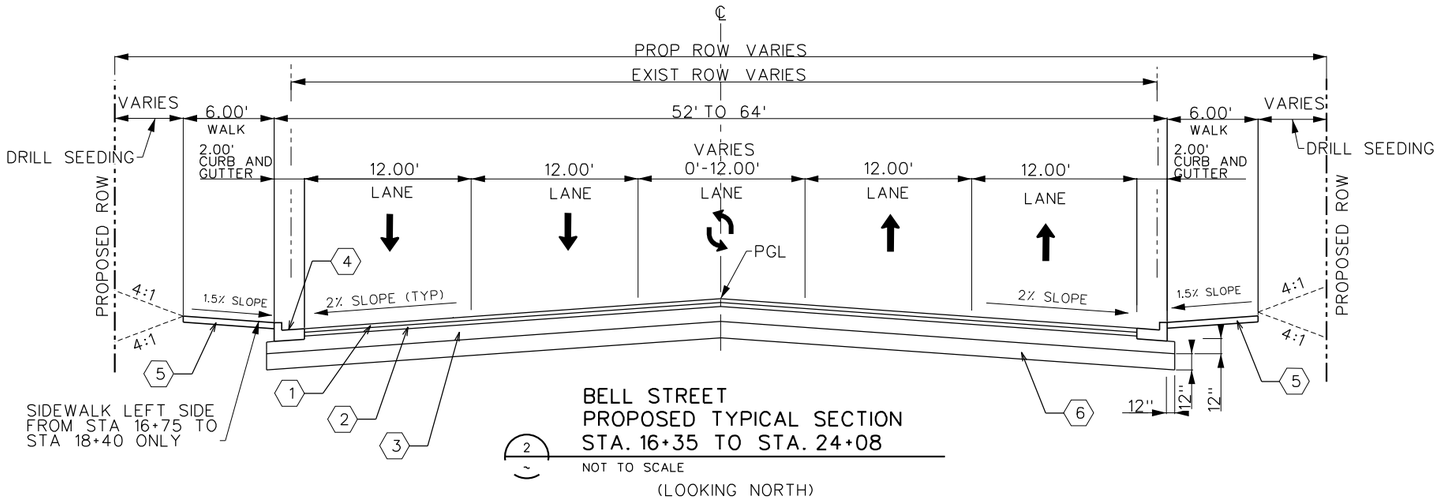
CITY OF SAN ANGELO, TEXAS
PHASE I
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS
TRAFFIC SIGNALS
RIO CONCHO DR TRAFFIC SIGNAL LAYOUT

F&N JOB NO. SAN16188
DATE 07/2017
DESIGNED JWP
DRAWN SI
CHECKED WH
FILE NAME ph1-trt-pl-signal01.dgn

NO.	ISSUES	BY	DATE
1	ADDENDUM NO. 1	KJ	7/24/17

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

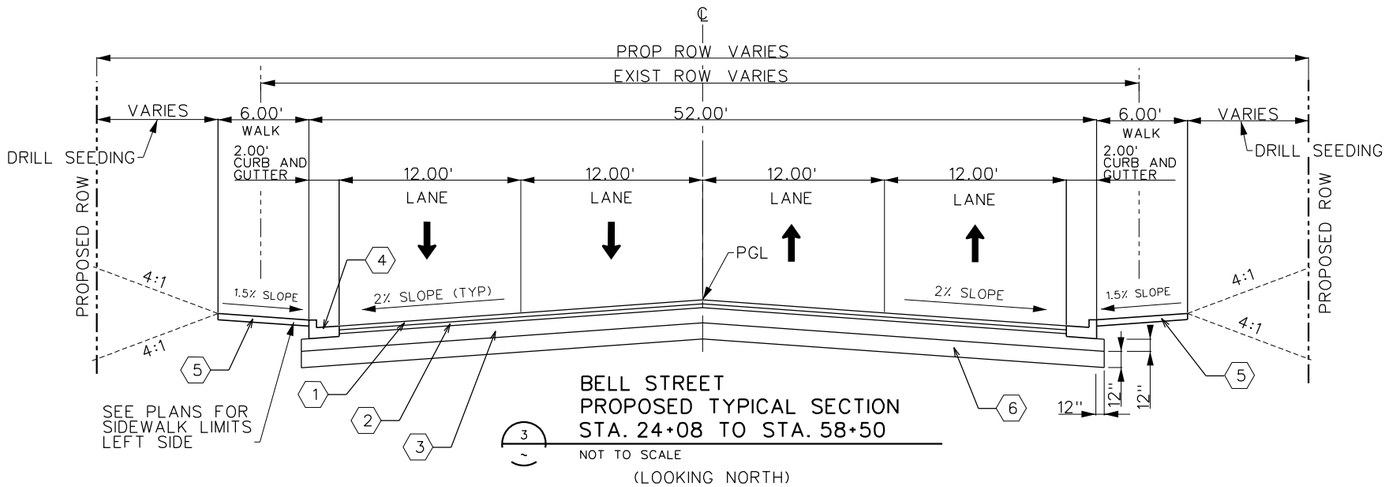
SHEET TS-01
SEQ. 76



BELL STREET
PROPOSED TYPICAL SECTION
STA. 16+35 TO STA. 24+08

(2) NOT TO SCALE

(LOOKING NORTH)



BELL STREET
PROPOSED TYPICAL SECTION
STA. 24+08 TO STA. 58+50

(3) NOT TO SCALE

(LOOKING NORTH)

NOTES BY SYMBOL

(1) - PROPOSED 1.5" HMAC TYPE D SURFACE COURSE (BID ALT. A)

(2) - PROPOSED 2.5" HMAC TYPE B BASE COURSE (BID ALT. A)

(1) (3) - PROPOSED 12" FLEXBASE TYPE A GR 2 6" MIN UNDER ALL CURBS AND GUTTERS (BID ALT. A) COMPATION BY DENSITY CONTROL.

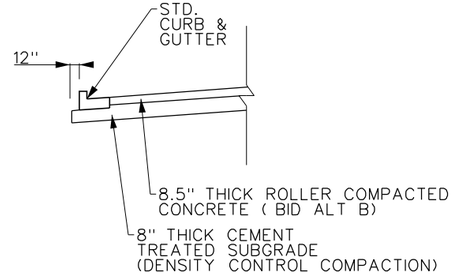
(4) - STD CURB & GUTTER

(5) - 4" MIN CONCRETE SIDEWALK CLASS 'A' CONCRETE REINFORCED WITH NOVOMESH. GROOVED CONTRACTION JOINT EVERY 5' AND EXPANSION JOINTS EVERY 40'

(6) - 8" THICKNESS OF CEMENT TREATED SUBGRADE (DENSITY CONTROL COMPACTION)

GENERAL NOTES

1. COMPLY WITH ALL SITE PREPARATION AND EARTHWORK RECOMMENDATIONS PROVIDED IN THE GEOTECHNICAL ENGINEERING STUDY.
2. PLANT SEED MIXTURE UNIFORMLY AT DEPTH OF 1/4 TO 1/3 INCH USING DRILLING EQUIPMENT INTENDED FOR THAT PURPOSE AND APPROVED BY THE CITY. DRILL SEEDING TO BE IN ACCORDANCE WITH SPECIFICATIONS (ITEM 107). TYPE OF SEED MIXTURE SHALL BE APPROVED BY THE CITY. PAYMENT IS FULL COMPENSATION FOR ALL MATERIALS AND WORK REQUIRED FOR ACCEPTANCE. NO SEPARTE PAYMENT SHALL BE MADE FOR WATER, FERTILIZER, OR MULCH.



BID ALTERNATE (ALT. B)
ROLLER COMPACTED CONCRETE (RCC)

(4) NOT TO SCALE

NOTE:
MEASURE RIDE QUALITY OF THE FINISHED RCC SURFACE IN ACCORDANCE WITH SPEC ITEM 585.

CEMENT TREATED SUBGRADE NOTES:

1. CEMENT TREAT EXISTING SUBGRADE TO 200 PSI COMPRESSIVE STRENGTH (MIN) (3%-5% OF PORTLAND CEMENT BY DRY SOIL WEIGHT, 20 LBS/SY TO 35 LBS/SY)
2. PERFORM COMPACTION IN ACCORDANCE WITH "DENSITY CONTROL" (ITEM 275).

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144
STATE OF TEXAS
KEVIN R. ST. JACQUES
69700
LICENSED PROFESSIONAL ENGINEER
07/24/17
FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone: (817) 735-7300
Fax: (817) 735-7491
Web: www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE I
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS
GENERAL
BELL STREET
PROPOSED TYPICAL SECTIONS

NO.	ISSUES	BY	DATE
1	ADDENDUM NO. 1	WH	7/24/17

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

F&N JOB NO. SAN16188
DATE 07/2017
DESIGNED JWP
DRAWN EB
CHECKED WH
FILE NAME pht-trt-gn-typicals02.sht

SHEET TS-02
SEQ. 9

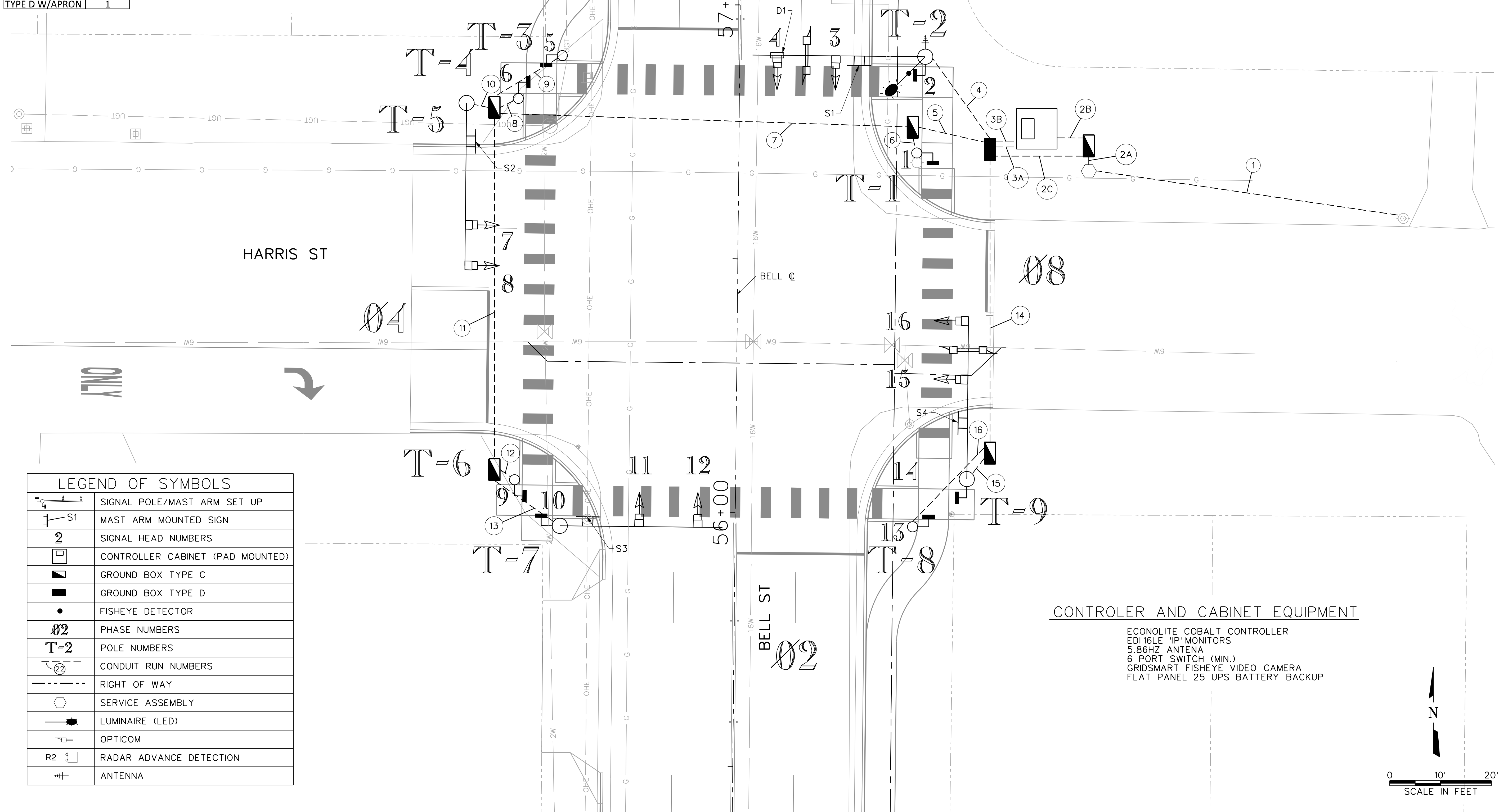
MicroStation V8 User: sli Office: Frisco
$ACCOUNT$ N:\F\Drawings\Phase I\pht-trt-gn-typicals02.sht
Plot Driver: HP DesignJet 4500 PostScript Model: $MODEL$
Plot Scale: 10.0000 '= 1' Plot Date: Jul. 24, 2017 - 02:16:14 PM Project Phase: I
Office: Frisco $ACCOUNT$ Date: Jul. 24, 2017 - 02:16:14 PM User: sli File: N:\F\Drawings\Phase I\pht-trt-gn-typicals02.sht

POLE NUMBER	T-1	T-2			T-3	T-4	T-5		T-6	T-7			T-8	T-9		
MAST ARM LENGTH	PED	36'			PED	PED	32'		PED	32'			PED	32'		
FOUNDATION TYPE	24-A	36-A			24-A	24-A	30-A		24-A	30-A			24-A	30-A		
WITH LUMINAIRES	-	YES			-	-	NO		-	NO			-	NO		
SIZE OF LENS	-	-	12"		-	-	12"		-	-	12"		-	-	12"	
SIGNAL TYPE	C	C	A	A	C	C	A	A	C	C	A	A	C	C	A	A
SIGNAL FACE NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
LED SIGNAL INDICATIONS	DW	DW	R	R	DW	DW	R	R	DW	DW	R	R	DW	DW	R	R
	W	W	Y	Y	W	W	Y	Y	W	W	Y	Y	W	W	Y	Y
			G	G			G	G			G	G			G	G

GROUND BOX QUANTITIES	
ITEM 624	
TYPE C W/APRON	5
TYPE D W/APRON	1

TRAFFIC SIGNAL SIGNS SUMMARY				
ID	TYPE	LEGEND	QNTY	LOCATION
S1	R10-17T	STREET NAME (Harris St)	1	T-2 ARM
S2	R10-17T	STREET NAME (Bell St)	1	T-5 ARM
S3	R10-17T	STREET NAME (Harris St)	1	T-7 ARM
S4	D3-1	STREET NAME (Bell St)	1	T-9 ARM
D1	MADPD-12	MAST ARM DAMPENING PLATE	1	T-2

NOTE:
CONTRACTOR SHALL COORDINATE DRILLED SHAFT INSTALLATION WITH PROPOSED WATER LINE INSTALLATION SUCH THAT A MINIMUM OF 2ft OF CLEARANCE IS PROVIDED.



LEGEND OF SYMBOLS

Symbol	Description
	SIGNAL POLE/MAST ARM SET UP
S1	MAST ARM MOUNTED SIGN
2	SIGNAL HEAD NUMBERS
	CONTROLLER CABINET (PAD MOUNTED)
	GROUND BOX TYPE C
	GROUND BOX TYPE D
•	FISHEYE DETECTOR
Ø2	PHASE NUMBERS
T-2	POLE NUMBERS
22	CONDUIT RUN NUMBERS
	RIGHT OF WAY
	SERVICE ASSEMBLY
	LUMINAIRE (LED)
	OPTICOM
R2	RADAR ADVANCE DETECTION
	ANTENNA

CONTROLER AND CABINET EQUIPMENT

ECONOLITE COBALT CONTROLLER
EDI 16LE 'IP' MONITORS
5.86HZ ANTENA
6 PORT SWITCH (MIN.)
GRIDSMART FISHEYE VIDEO CAMERA
FLAT PANEL 25 UPS BATTERY BACKUP

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144
07/24/17

FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone - (817) 735-7300
Fax - (817) 735-7491
Web - www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE I
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS
TRAFFIC SIGNALS
HARRIS STREET
TRAFFIC SIGNAL LAYOUT

F&N JOB NO. SAN16188
DATE 07/2017
DESIGNED JWP
DRAWN SI
REVISED
CHECKED WH
FILE NAME ph1-trf-pl-signal02.dgn

NO.	ISSUES	BY	DATE
1	ADDENDUM NO. 1	KJ	7/24/17

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET TS-03
SEQ. 78

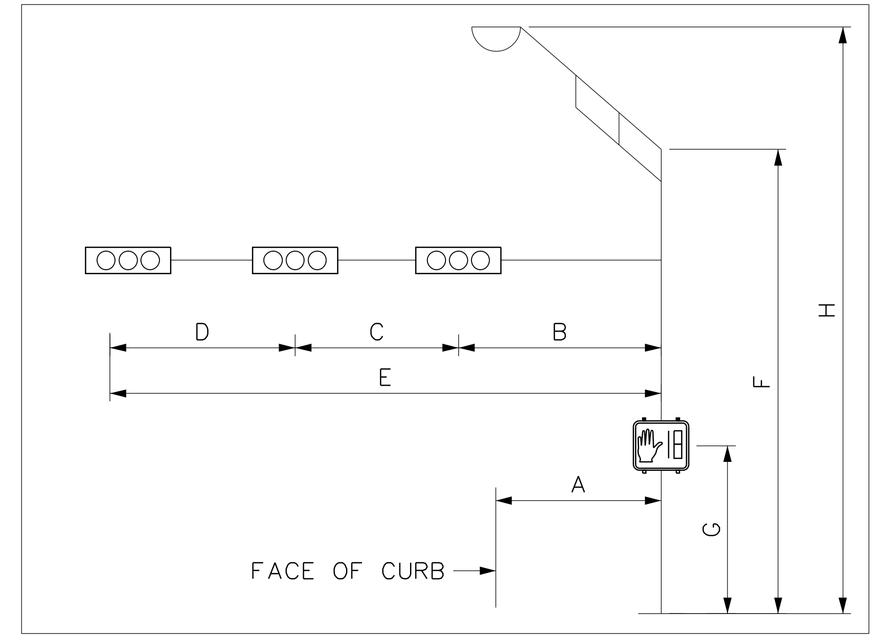
MINIMUM PEDESTRIAN TIMING				
PHASE	PEDESTRIAN SIGNAL HEAD NUMBERS	WALK	FLASHING DON'T WALK	TOTAL
ϕ2	1, 13	7	7	14
ϕ4	9, 14	14	14	28
ϕ6	5, 10	7	7	14
ϕ8	2, 6	14	14	28
Minimum Signal Cycle Length				42

NOTE:
ALL PEDESTRIAN PUSH BUTTONS TO THE ADA ACCESSIBLE WITH BUILT-IN AVALIBLE MESSAGE CAPABILITIES, POLARA OR APPROVED EQUAL. PED HEADS SHALL INCORPORATE COUNTDOWN INDICATIONS.

SIGNAL HEAD AND POLE PLACEMENT

POLE	MAST ARM LENGTH	A	B	C	D	E	F	G	H	LUMINAIRE
T-1	PED	6'	-	-	-	-	-	8'	-	-
T-2	32'	13'	20'	12'	-	32'	30'	8'	35'	1
T-3	PED	8'	-	-	-	-	-	8'	-	-
T-4	PED	8'	-	-	-	-	-	8'	-	-
T-5	32'	8'	20'	12'	-	32'	30'	-		
T-6	PED	9'	-	-	-	-	-	8'	-	-
T-7	32	8'	15'	12'	-	27'	30'	8'	35'	.-
T-8	PED	9'	-	-	-	-	-	8'	-	-
T-9	32'	20'	11'	12'	-	30'	30'	8'		
TOTAL	-	-	-	-	-	-	-	-	-	1

1



ELECTRICAL SERVICE DETAILS												
ELEECTRIC SERVICE NO.	SHEET NO.	ELECTRICAL SERVICE DESCRIPTION (SEE ED(4)&ED(5)-14	SERVICE CONDUIT SIZE (RMC)	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN CIRCUIT BREAKER POLE/AMP	TWO-POLE CONTACTOR AMPS	PANEL BD. / LOADCENTER AMP RATING	CIRCUIT NO.	BRANCH CIRCUIT BREAKER POLE/AMPS	KVA LOAD
2		ELEC SRV TY D 120/240 070 (NS)SS(E)SP(O)	2"	3/#4	N/A	2P/70	30	100	1-TS 2-LUM	1P/50 2P/15	6.2

CONDUIT RUNS AND IN-POLE SUMMARY

RUN NO.	ITEM 618						ITEM 620		ITEM 621	ITEM 684			ITEM 6045	ITEM 620	ITEM 6054
	CONDUIT RUN						ELECTRICAL CONDUCTORS			SIGNAL CABLE (TY-A, 14 AWG)			GRIDSMART CAMERA	OPTICOM	RADIO ANTENNA
	RUN LENGTH (FEET)	2" PVC TRENCH	3" PVC TRENCH	3" PVC BORE	2" RIGID METAL	4" PVC TRENCH	NO. 6 BARE	NO. 6 XHHW	TRAY CABLE 4 CNDR NO. 12	5 CNDR CABLE NO.14	10 CNDR CABLE	16 CNDR CABLE NO. 14	CAT5E CABLE (LF)	3 CNDR NO. 14 (LF)	CATSE CABLE (LF)
1	63	overhead, by power company													
2A	6	1					2	2	2						
2B	10	1					1	2							
2C	20	1					1		2						
3A	8		1				1					4	1		1
3B	8		1				1			8				2	
4	20		1				1		1			1	1	1	1
5	15		1				1		1	1		2			
6	5	1					1			1					
7	82			1			1		1	4		2			
8	5	1					1			1					
9	16	1					1			1					
10	5		1				1					1			
11	72			1			1		1	2		1			
12	4	1					1			1					
13	16		1				1		1	1		1			
14	60			1%			1			2		1		1	
15	8		1				1			1		1		1	
16	20	1					1			1					
SUBTOTAL (LF)		86	80	214	0	0	386	32	257	744	0	407	28	104	28
SA					20										
T-1										10					
T-2									40	10		5	40	45	30
T-3										10					
T-4										10					
T-5												5			
T-6										10					
T-7										10		5			
T-8										10					
T-9									40	10		5		45	
TOTAL (LF)		86	80	214	20	0	386	32	337	824	0	427	68	194	58

Note: Wiring lengths from signal pole terminal block to signal heads is incidental to the pay item for the signal heads.

CABLE TERMINATION CHART

CNDR #	PHASE	CNDR COLOR	CABLE 1 16 CNDR FROM CNTRL TO T-2	CABLE 2 16 CNDR FROM CNTRL TO T-5	CABLE 3 16 CNDR FROM CNTRL TO T-7	CABLE 4 16 CNDR FROM CNTRL TO T-9
1		BLACK	SPARE	SPARE	SPARE	SPARE
2	SIGNAL COMMON	WHITE	SH COMMON	SH COMMON	SH COMMON	SH COMMON
3	RED THRU PHASE	RED	SH 3, 4 ϕ 2R	SH 7, 8 ϕ 8R	SH 11, 12 ϕ 6R	SH 16, 17 ϕ 4R
4	YELLOW THRU PHASE	ORANGE	SH 3, 4 ϕ 2Y	SH 7, 8 ϕ 8Y	SH 11, 12 ϕ 6Y	SH 16, 17 ϕ 4Y
5	GREEN THRU PHASE	GREEN	SH 3, 4 ϕ 2G	SH 7, 8 ϕ 8G	SH 11, 12 ϕ 6G	SH 16, 17 ϕ 4G
6	WALK	BLUE	WALK ϕ 4&8	SPARE	WALK ϕ 2&6	WALK ϕ 4&8
7	DON'T WALK	WHITE/BLACK	D.W. ϕ 4&8	SPARE	D.W. ϕ 2&6	D.W. ϕ 4&8
8	WALK	RED/BLACK	SPARE	SPARE	SPARE	SPARE
9	DON'T WALK	GREEN/BLACK	SPARE	SPARE	SPARE	SPARE
10	LT RED ARROW	ORANGE/BLACK	SPARE	SPARE	SPARE	SPARE
11	LT YELLOW ARROW	BLUE/BLACK	SPARE	SPARE	SPARE	SPARE
12	LT GREEN ARROW	BLACK/WHITE	SPARE	SPARE	SPARE	SPARE
13	LT FLASHING YELLOW ARROW	RED/WHITE	SPARE	SPARE	SPARE	SPARE
14	SPARE	GREEN/WHITE	SPARE	SPARE	SPARE	SPARE
15	SPARE	BLUE/WHITE	SPARE	SPARE	SPARE	SPARE
16	SPARE	BLACK/RED	SPARE	SPARE	SPARE	SPARE

CABLE RUNS 5,6,7,8, AND 9 FROM CNTRL TO T-1, T-3, T-5, T-6, AND T-8 RESPECTIVELY, ARE 5 CNDR CABLES TO SERVE THE PEDESTRIAN HEADS AND PUSH BUTTONS ON THE PEDESTAL POLES. USE CONSISTENT CONDUCTOR COLORS FOR EACH INSTALLATION.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

STATE OF TEXAS
KEVIN R. St. JACQUES
89700
LICENSED
PROFESSIONAL ENGINEER
07/24/17

FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone - (817) 735-7300
Fax - (817) 735-7491
Web - www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE I
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS
TRAFFIC SIGNALS
HARRIS STREET
TRAFFIC SIGNAL SUMMARY

NO.	ISSUES	BY	DATE	
				F&N JOB NO. SAN16188
				DATE 07/2017
				DESIGNED JWP
				DRAWN EB
1	ADDEMDUM NO. 1	KJ	7/24/17	REVISED
				CHECKED WH
				FILE NAME ph1-trt-pl-signal02-2.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1

SHEET
TS-04
SEQ.
79

FOUNDATION DESIGN TABLE

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		EMBEDDED DRILLED SHAFT LENGTH-ft 4 5 6			ANCHOR BOLT DESIGN (1)				FOUNDATION DESIGN LOAD (2)		TYPICAL APPLICATION
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft			ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips	
				10	15	40							
24-A	24"	4- #5	#2 at 12"	6	5.3	4.5	3/4"	36	12 3/4"	1	10	1	Pedestal pole, pedestal mounted controller.
30-A	30"	8- #9	#3 at 6"	12	10.3	8.0	1 1/2"	55	17"	2	87	3	Mast arm assembly. (see Selection Table)
36-A	36"	10- #9	#3 at 6"	14	12.0	9.4	1 3/4"	55	19"	2	131	5	Mast arm assembly. (see Selection Table) 30' strain pole with or without luminaire.
36-B	36"	12- #9	#3 at 6"	16	13.6	10.4	2"	55	21"	2	190	7	Mast arm assembly. (see Selection Table) Strain pole taller than 30' & strain pole with mast arm
42-A	42"	14- #9	#3 at 6"	18	15.6	11.9	2 1/4"	55	23"	2	271	9	Mast arm assembly. (see Selection Table)

NOTES:

(1) Anchor bolt design develops the foundation capacity given under Foundation Design Loads.

(2) Foundation Design Loads are the allowable moments and shears at the base of the structure.

(3) Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

(4) Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

(5) If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

(6) Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

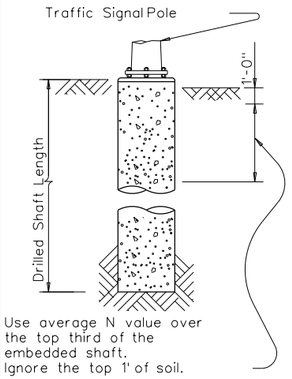
FOUNDATION SUMMARY TABLE (3)

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH (FEET) (6)				
				24-A	30-A	36-A	36-B	42-A
RIO CONCHO/BELL								
T-1,2,4,5,7,8,10,11	10	24-A	8	6				
T-6, 12	10	30-A	2		12			
T-3,9	10	36-A	2			14		
HARRIS/BELL								
T-1,3,4,6,8	10	24-A	5	6				
T-2	10	36-A	1			14		
T-5,7,9	10	30-A	3		12			
TOTAL DRILLED SHAFT LENGTHS				78	60	42		

FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM PLUS ILSN SUPPORT ASSEMBLIES (ft)

		FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	32'	48'		
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
		28' X 28'			
		32' X 28'	32' X 32'		
			36' X 36'		
			40' X 36'		
			44' X 28'	44' X 36'	
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH		36'	44'	
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS		24' X 24'		
			28' X 28'		
			32' X 24'	32' X 32'	
				36' X 36'	
				40' x24'	40' X 36'
					44' x 36'

EXAMPLE:
1. For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
2. For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.

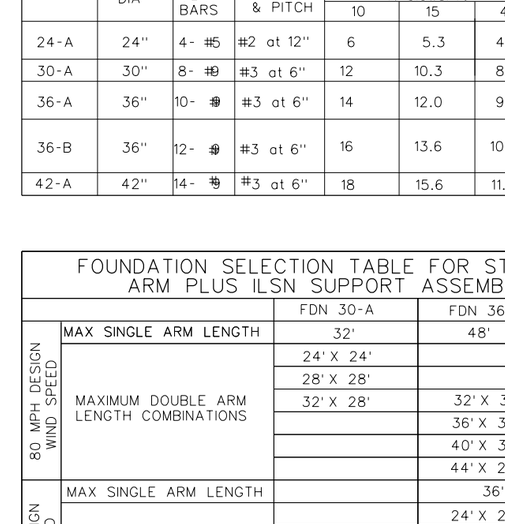


Use average N value over the top third of the embedded shaft. Ignore the top 1' of soil.

ANCHOR BOLT & TEMPLATE SIZES

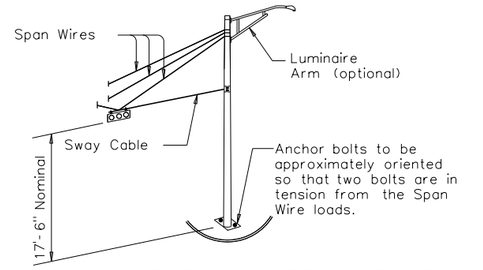
BOLT DIA IN.	(7) BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
3/4"	1'-6"	3"	—	12 3/4"	7 1/8"	5 5/8"
1 1/2"	3'-4"	6"	4"	17"	10"	7"
1 3/4"	3'-10"	7"	4 1/2"	19"	11 1/4"	7 3/4"
2"	4'-3"	8"	5"	21"	12 1/2"	8 1/2"
2 1/4"	4'-9"	9"	5 1/2"	23"	13 3/4"	9 1/4"

(7) Min dimensions given, longer bolts are acceptable.

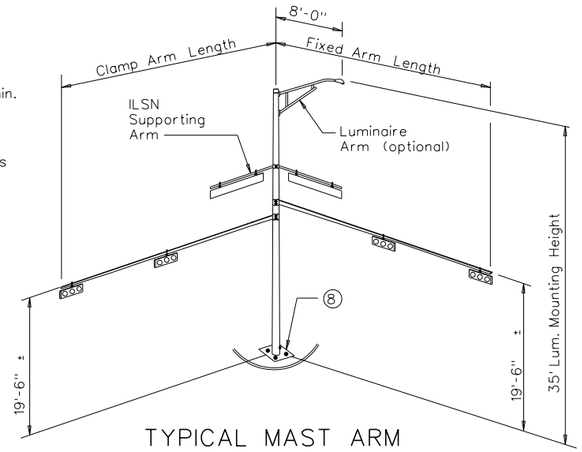


HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY

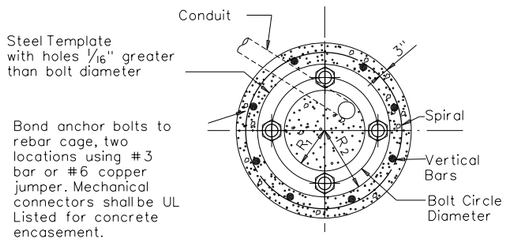


TYPICAL STRAIN POLE ASSEMBLY

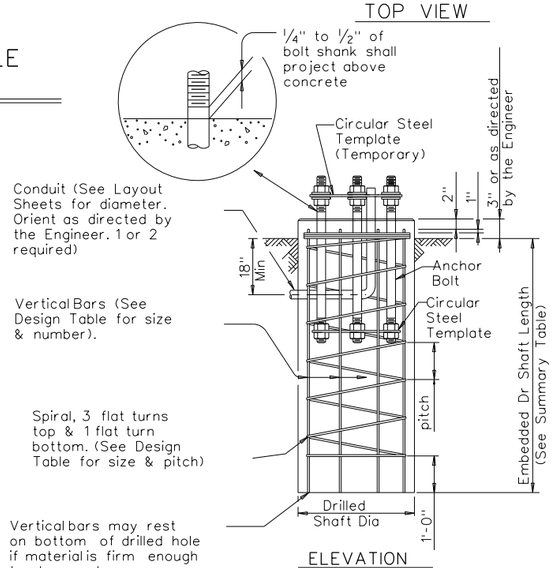


(8) Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.

TYPICAL MAST ARM ASSEMBLY



TOP VIEW



ELEVATION

FOUNDATION DETAILS

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and interim revisions thereto.

Reinforcing steel shall conform to Item 440, "Reinforcing Steel".

Concrete shall be Class "C".

Threads for anchor bolts and nuts shall be rolled or cut threads of 8UN series up to 2" in diameter or UNC series for all sizes. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be tapped after galvanizing.

Anchor bolts that are larger than 1" in diameter shall conform to "alloy steel" or "medium-strength mild steel" per Item 449, "Anchor Bolts". Anchor bolts that are 1" in diameter or less shall conform to ASTM A36. Galvanize a minimum of the top end thread length plus 6" for all anchor bolts unless otherwise noted. Exposed washers and exposed nuts shall be galvanized. All galvanizing shall be in accordance with Item 445, "Galvanizing".

Templates and embedded nuts need not be galvanized. Lubricate and tighten anchor bolts when erecting the structure in accordance with Item 449, "Anchor Bolts".

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB

REVISIONS
5-96
11-99
1-12

CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.

128

DATE:
FILE:

MicroStation V8 User: sli Office: Frisco
$ACCOUNT$ N:\IF\Drawings\TXDOT Details\Phase 1Txdot Details\Traffic Signal Details\ts-fd.dgn
Active Model: Default Model: $MODEL$
Plot Scale: 2.0000 FT / IN Plot Model: Model: $MODEL$
Date: Jul. 24, 2017 - 03:02:59 PM Project: Phase 1

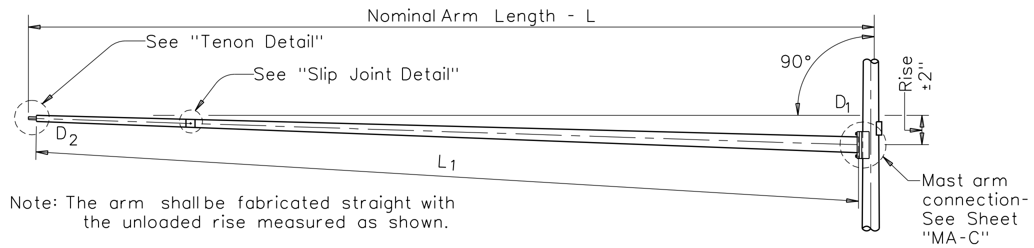
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	(1) thk	D_B	D_{19}	D_{24}	D_{30}	(1) thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	12.5	9.5	8.7	7.8	.179	30-A
32	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
36	12.0	9.3	8.6	7.8	.239	12.5	9.5	8.7	7.8	.239	36-A
40	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
44	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
48	13.0	10.3	9.6	8.8	.239	15.0	12.0	11.2	10.3	.239	36-A

Arm Length	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	(1) thk	Rise	L_1	D_1	(2) D_2	(1) thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1'-9"	19.1	7.0	3.5	.179	1'-8"
24	23.1	7.5	4.3	.179	1'-10"	23.1	7.5	3.5	.179	1'-9"
28	27.1	8.0	4.2	.179	1'-11"	27.1	8.0	3.5	.179	1'-10"
32	31.0	9.0	4.7	.179	2'-1"	31.0	9.0	3.5	.179	2'-0"
36	35.0	9.5	4.6	.179	2'-4"	35.0	10.0	3.5	.179	2'-1"
40	39.0	9.5	4.1	.239	2'-8"	39.0	9.5	3.5	.239	2'-3"
44	43.0	10.0	4.1	.239	2'-11"	43.0	10.0	3.5	.239	2'-6"
48	47.0	10.5	4.1	.239	3'-4"	47.0	11.0	3.5	.239	2'-9"

D_B = Pole Base O.D.
D_{19} = Pole Top O.D. with no Luminaire and no ILSN
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L = Nominal Arm Length

(1) Thickness shown are minimums, thicker materials may be used.

(2) D_2 may be increased by up to 1" for polygonal arms.



Note: The arm shall be fabricated straight with the unloaded rise measured as shown.

TRAFFIC SIGNAL ARM

(Fixed Mount)

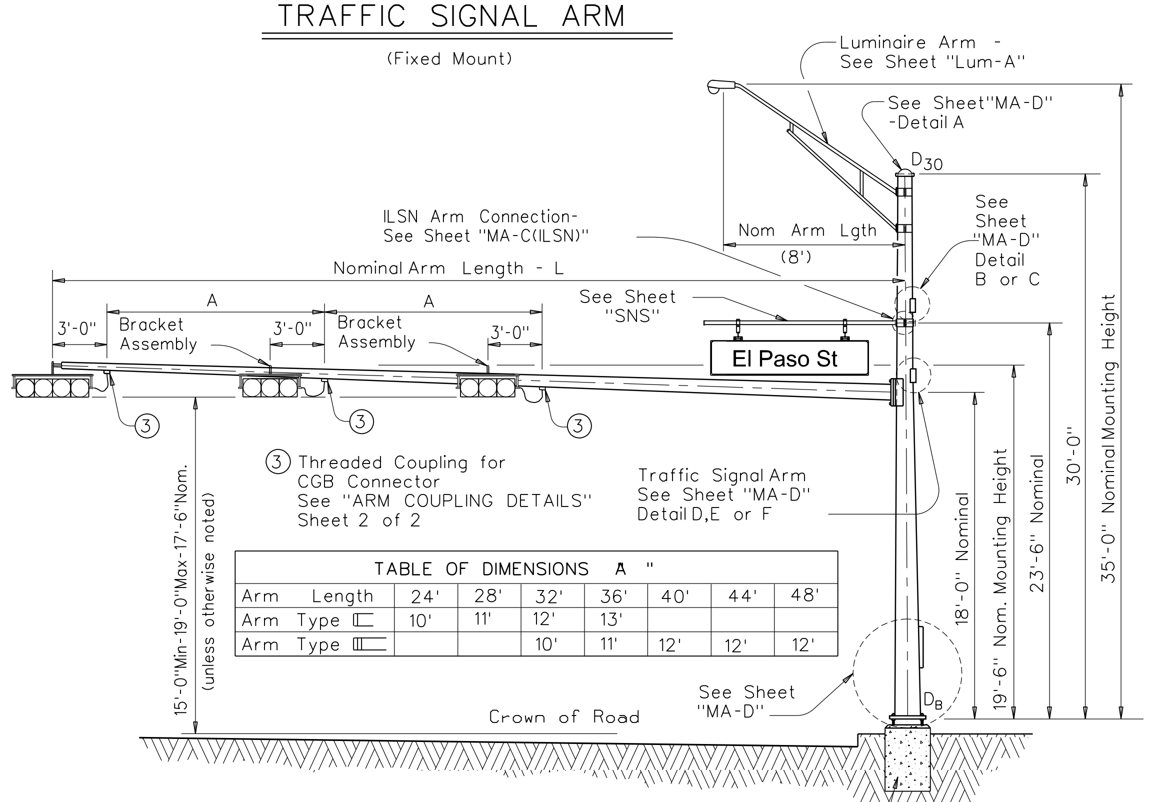


TABLE OF DIMENSIONS "A"							
Arm Length	24'	28'	32'	36'	40'	44'	48'
Arm Type II	10'	11'	12'	13'			
Arm Type III			10'	11'	12'	12'	12'

STRUCTURE ASSEMBLY

Foundation See Sheet "TS-FD"

SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed-arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length	30' Poles With Luminaire		24' Poles With ILSN		19' Poles With No Luminaire and No ILSN	
	Above hardware plus: One (or two if ILSN attached) small hand hole, clamp-on simplex		Above hardware plus one small hand hole		See note above	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20L-80		20S-80		20-80	
24	24L-80		24S-80		24-80	
28	28L-80		28S-80		28-80	1
32	32L-80		32S-80		32-80	4
36	36L-80	2	36S-80		36-80	1
40	40L-80		40S-80		40-80	
44	44L-80		44S-80		44-80	
48	48L-80		48S-80		48-80	

Traffic Signal Arms (1 per Pole) Ship each arm with the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	1 CGB connector		1 Bracket Assembly and 2 CGB Connectors		2 Bracket Assemblies and 3 CGB Connectors	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80	1		
32			32II-80	4	32III-80	
36			36II-80	2	36III-80	
40					40III-80	1
44					44III-80	
48					48III-80	

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	2

ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 1/2"	3'-4"	5
1 3/4"	3'-10"	3

Each anchor bolt assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD".

Templates may be removed for shipment.

SHEET 1 OF 2

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
SINGLE MAST ARM ASSEMBLY (80 MPH WIND ZONE)

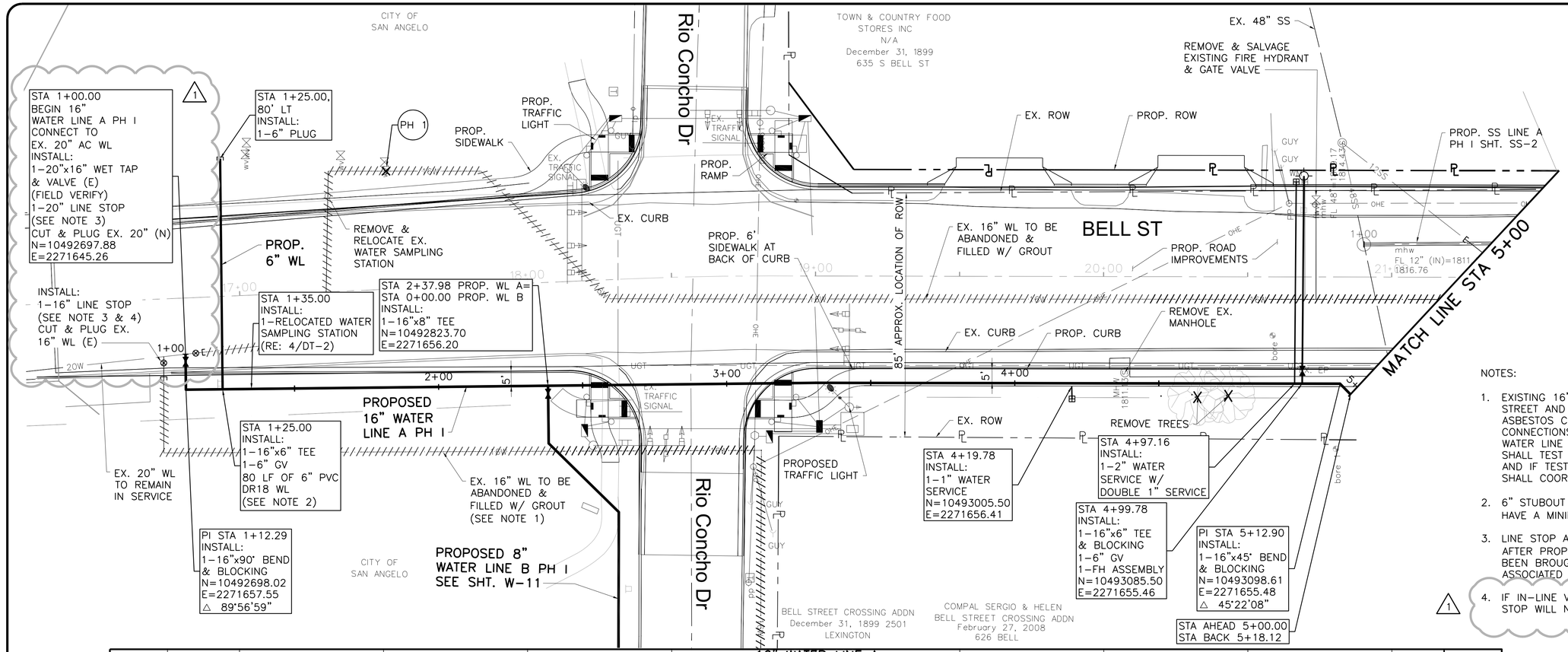
SMA-80(1)-12

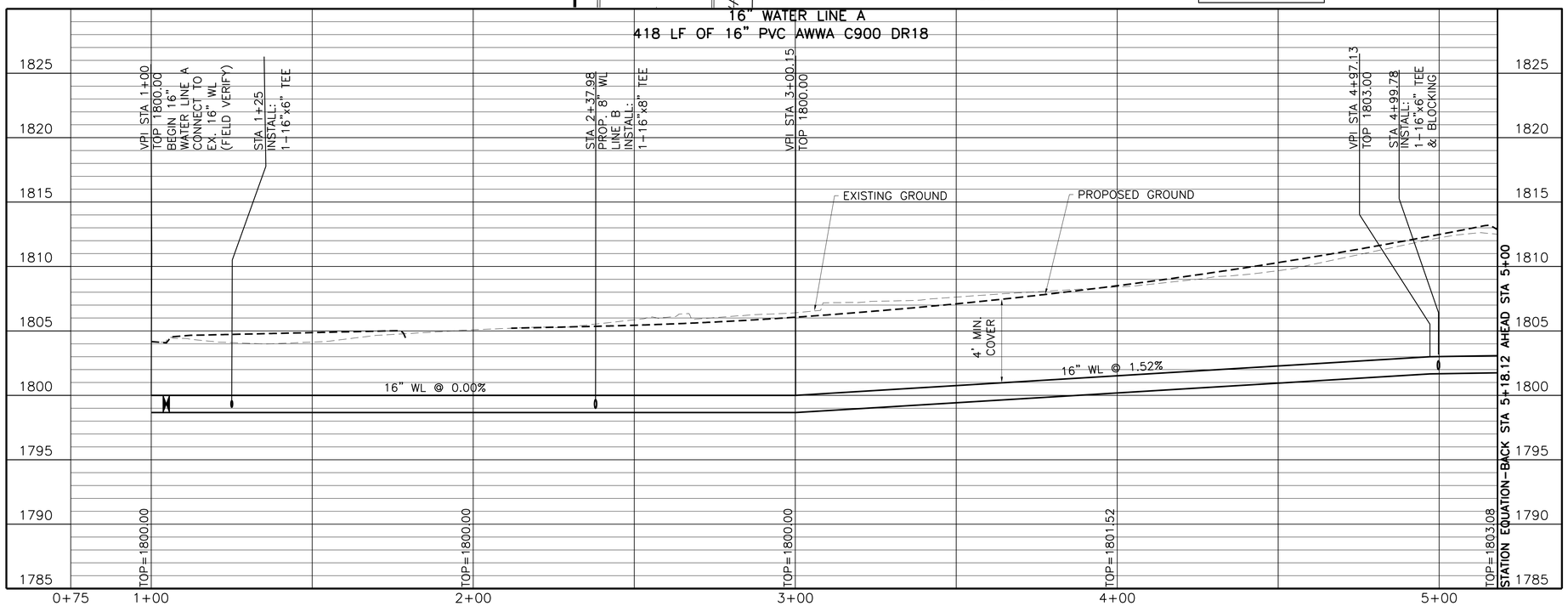
DN: MS	CK: JSY	DW: MMF	CK: JSY
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.

REVISIONS
5-96
11-99
1-12

122A

DATE:
FILE:





CAUTION!!!
EXISTING UNDERGROUND AND OVERHEAD UTILITIES IN THE AREA. 48 HOURS PRIOR TO CONSTRUCTION CONTACT 1-800-DIG-TESS

100% SUBMITTAL

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

STATE OF TEXAS
AARON B. CONINE
109794
LICENSED PROFESSIONAL ENGINEER
27 Jul 2017

FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone: (817) 735-7300
Fax: (817) 735-7491
Web - www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE I
BELL ST. ROADWAY & UTILITY IMPROVEMENTS
WATER LINE A
PLAN AND PROFILE
STA 1+00 TO STA 5+00

FAN JOB NO. SAN16188
DATE 07/07/17
DESIGNED ABC
DRAWN SB
CHECKED ABC

NO.	ISSUE	BY	DATE
1	ADDENDUM NO. 1	ABC	7/21/17

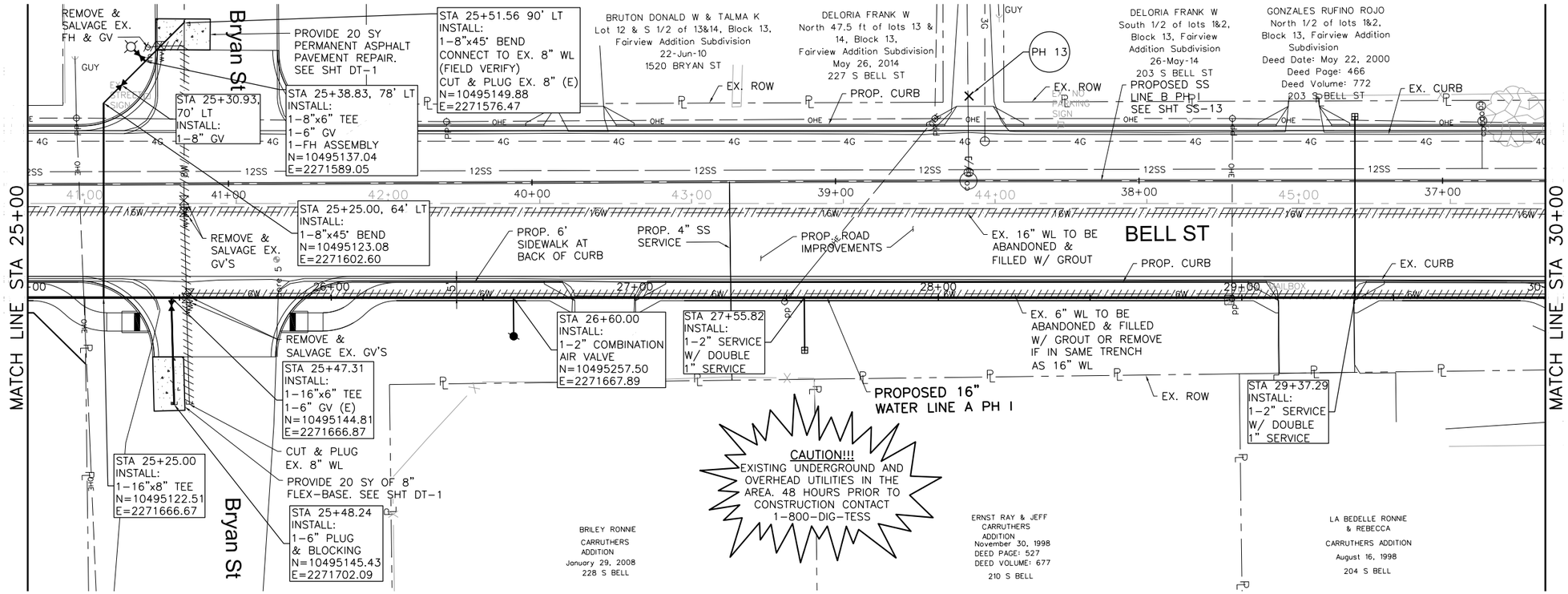
FILE NAME WATER LINE A.dwg

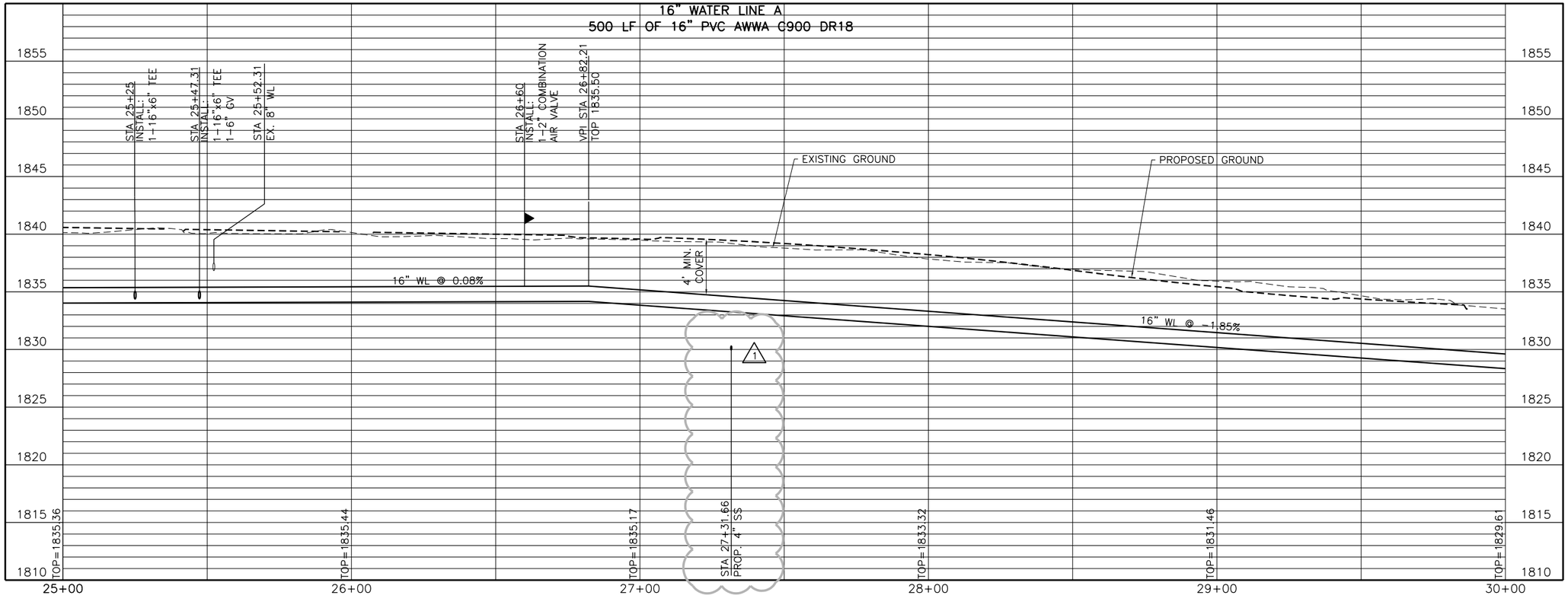
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET W-2
SEQ. 101

ACAD Rel: 21.0s (LMS Tech)
Filename: N:\WTU\Drawings\WATER LINE A.dwg
Last Saved: 7/26/2017 3:08 PM Saved By: sb

Plot Date: 7/27/2017 12:00 PM Plot By: sb Filename: N:\WTU\Drawings\WATER LINE A.dwg





NORTH

0 20' 40'
SCALE IN FEET
HORIZONTAL

0 5' 10'
SCALE IN FEET
VERTICAL

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

STATE OF TEXAS
AARON B. CONINE
109794
LICENSED PROFESSIONAL ENGINEER
26 Jul 2017

FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone - (817) 735-7300
Fax - (817) 735-7491
Web - www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE I

BELL ST. ROADWAY & UTILITY IMPROVEMENTS

WATER LINE A

PLAN AND PROFILE
STA 25+00 TO STA 30+00

NO.	ISSUE	BY	DATE
1	ADDENDUM NO. 1	ABC	7/24/17

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

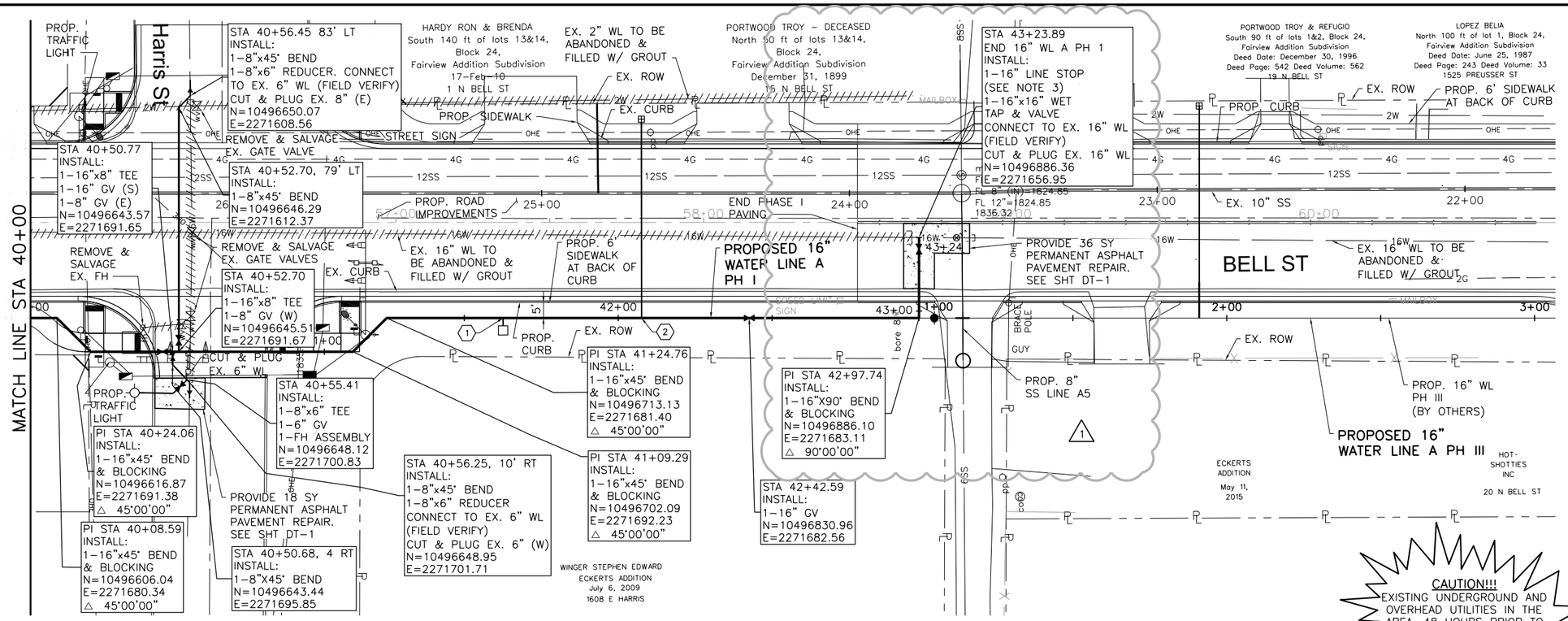
FAN JOB NO. SAN16188
DATE 07/07/17
DESIGNED ABC
DRAWN SB
REVISED -
CHECKED ABC
FILE NAME WATER LINE A.dwg

SHEET W-7
SEQ. 106

100% SUBMITTAL

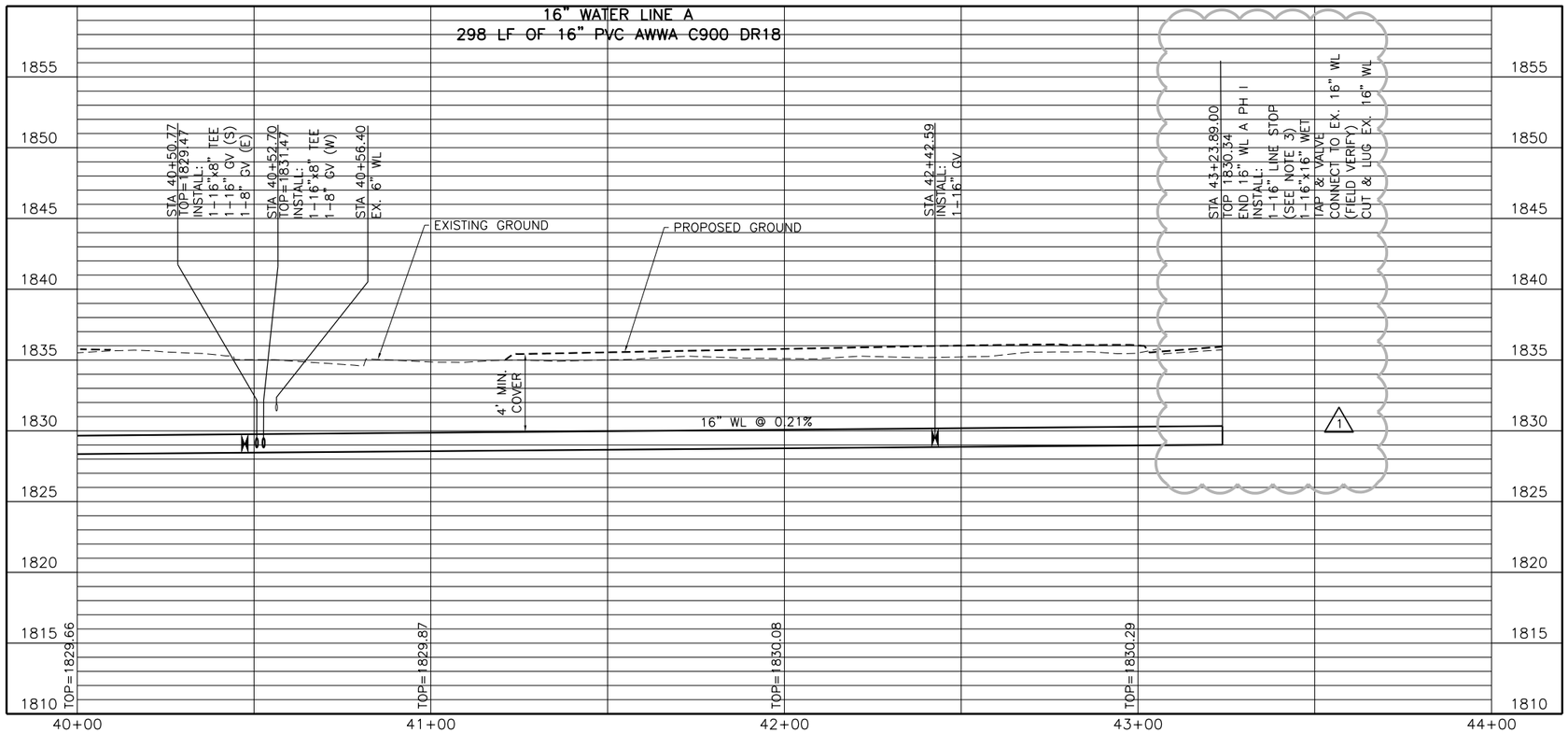
ACAD Rel: 21.0s (LMS Tech)
Filename: N:\WTU\Drawings\WATER LINE A.dwg
Last Saved: 7/24/2017 9:59 AM Saved By: sb

Plot Date: 7/24/2017 10:43 AM Plot By: sb Filename: N:\WTU\Drawings\WATER LINE A.dwg



NOTES BY SYMBOL "⬡"

1. STA 41+60.93
   INSTALL:
   1-1" WATER SERVICE
2. STA 42+05.93
   1-2" WATER SERVICE
   W/ DOUBLE 1" SERVICE
3. LINE STOP AND PLUG SHALL BE INSTALLED AFTER PROPOSED 16" WATER LINE A HAS BEEN BROUGHT INTO SERVICE TO INCLUDE ASSOCIATED DISTRIBUTION LINE CONNECTION. ⚠1



0 20' 40'
SCALE IN FEET HORIZONTAL

0 5' 10'
SCALE IN FEET VERTICAL

100% SUBMITTAL

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

AARON B. CONINE
109794
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
26 Jul 2017

FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone (817) 735-7300
Fax (817) 735-7491
Web - www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE I
BELL ST. ROADWAY & UTILITY IMPROVEMENTS
WATER LINE A
PLAN AND PROFILE
STA 40+00 TO END

NO.	ISSUE	BY	DATE
1	ADDENDUM NO. 1	ABC	7/21/17

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

FAN JOB NO. SAN16188
DATE 07/07/17
DESIGNED ABC
DRAWN SB
REVISED
CHECKED ABC
FILE NAME WATER LINE A.dwg

SHEET W-10
SEQ. 109

ACAD Rel: 21.0s (LMS Tech)
Filename: N:\WTU\Drawings\WATER LINE A.dwg
Last Saved: 7/26/2017 1:29 PM Saved By: sb

Plot Date: 7/26/2017 3:07 PM Plot By: sb Filename: N:\WTU\Drawings\WATER LINE A.dwg

TOWN & COUNTRY FOOD
STORES INC
N/A
December 31, 1899
635 S BELL ST

EX. 16" WL TO BE ABANDONED & FILLED WITH GROUT

PROP. 16" WATER LINE A

BELL STREET CROSSING ADDN
December 31, 1899 2501
LEXINGTON

CAUTION!!!
EXISTING UNDERGROUND AND OVERHEAD UTILITIES IN THE AREA. 48 HOURS PRIOR TO CONSTRUCTION CONTACT 1-800-DIG-TESS

EX. 16" WL TO BE ABANDONED & FILLED WITH GROUT

STA 2+78.01, 52.64' LT
INSTALL:
1-2"x2" TEE
RECONNECT TO
EX. METER & 2" WL
N=10492900.42
E=2271923.81

PI STA 3+78.99
INSTALL:
1-8"x45° BEND
& BLOCKING
N=10492907.32
E=2272000.35
△ 45°00'00"

STA 3+84.86
END 8" WL
INSTALL:
1-8"x8" TAPPING
SLEEVE & VALVE (W)
N=10492907.30
E=2272006.21

NOTE:

1. TOP OF PROPOSED 8" WATER LINE SHALL BE 30" UNDER EXISTING GROUND PER CITY OF SAN ANGELO STANDARDS.
2. LINE STOP AND PLUG SHALL BE INSTALLED AFTER WATER LINE A AND B HAVE BEEN BROUGHT INTO SERVICE.
3. IF IN-LINE VALVES ARE FUNCTIONAL, LINE STOP WILL NOT BE REQUIRED.

1

NORTH
0 20' 40'
SCALE IN FEET
HORIZONTAL

Rio Concho Dr

BELL ST

EX. TRAFFIC SIGNAL

REMOVE & REPLACE EX. "SOLICITOR RULES" SIGN

REMOVE & REPLACE EX. SPEED LIMIT SIGN

PROTECT SIGN

INSTALL:
1-16" LINE STOP.
CUT & PLUG EX.
16" WL.
(SEE NOTE 2 & 3)

1

EX. 8" WL TO REMAIN IN SERVICE

7' BACK OF CURB TO CENTERLINE PROP. PIPE

PI STA 0+54.05
INSTALL:
1-8"x45° BEND
& BLOCKING
N=10492848.25
E=2271700.01
△ 45°44'19"

PROTECT SPORTS COMPLEX SIGN

PI STA 0+20.00
INSTALL:
1-8"x45° BEND
& BLOCKING
N=10492823.92
E=2271676.20
△ 45°00'00"

STA 0+00.00 8" WL RIO CONCHO=
STA 2+37.98 16" WL A
CONNECT PROP. 8" WL
TO 16"x8" TEE
INSTALL:
1-8" GV (E)
N=10492823.70
E=2271656.20

CITY OF SAN ANGELO

CITY OF SAN ANGELO

STA 2+57.70
INSTALL:
1-1" WATER SERVICE
RECONNECT TO EX. WM
N=10492847.82
E=2271903.66

STA 2+78.01
INSTALL:
1-8"x2" TEE
N=10492847.78
E=2271923.97

PI STA 2+94.56
INSTALL:
1-45° BEND
& BLOCKING
N=10492847.74
E=2271940.52
△ 45°00'00"

0+00 1+00 2+00 3+00 4+00

19+00

3+85

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

STATE OF TEXAS
AARON B. CONINE
109794
LICENSED
PROFESSIONAL ENGINEER
27 Jul 2017

FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone - (817) 735-7300
Fax - (817) 735-7491
Web - www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE I

BELL ST. ROADWAY & UTILITY IMPROVEMENTS

WATER LINE B

8 INCH WATER LINE

NO.	ISSUE	BY	DATE
1	ADDENDUM NO. 1	ABC	7/27/17

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

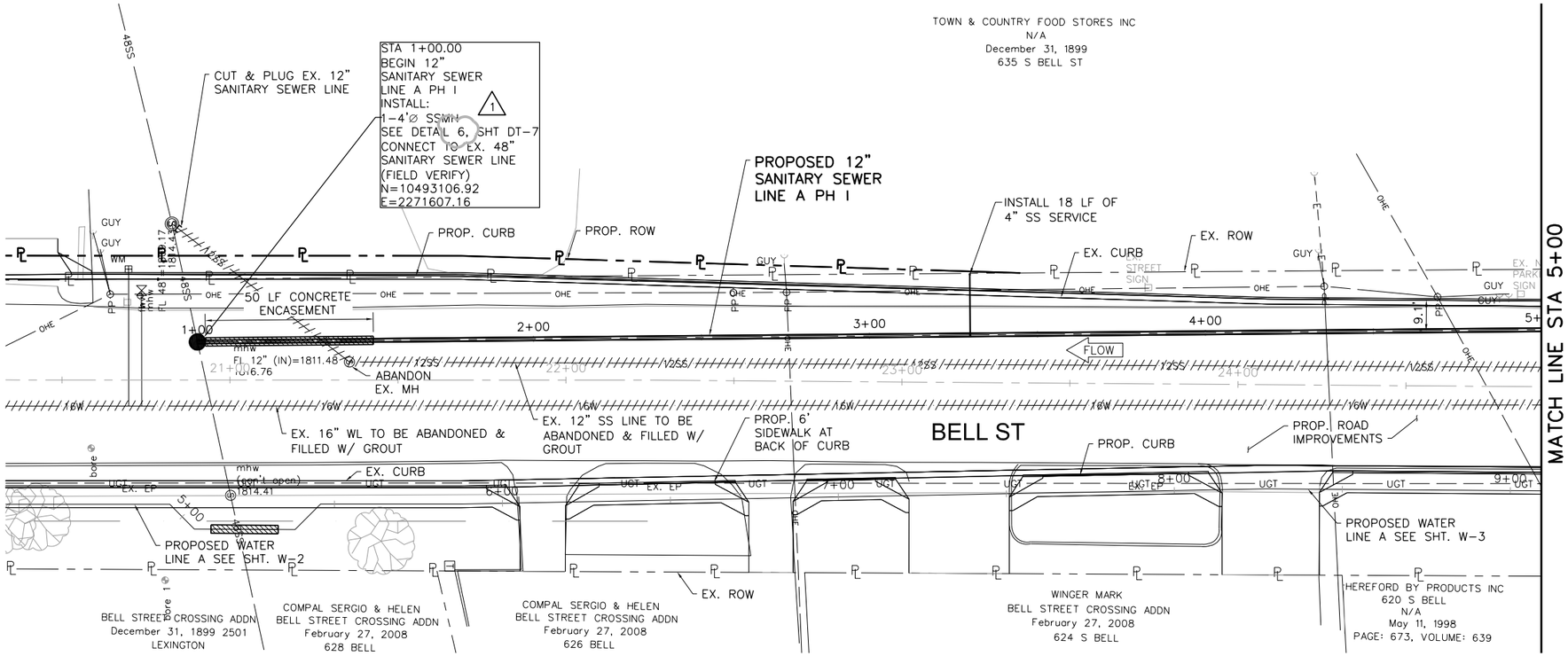
F&N JOB NO. SAN16188
DATE 07/07/17
DESIGNED ABC
DRAWN SB
REVISED -
CHECKED ABC
FILE NAME C-PPL-PL-WTRL01.dwg

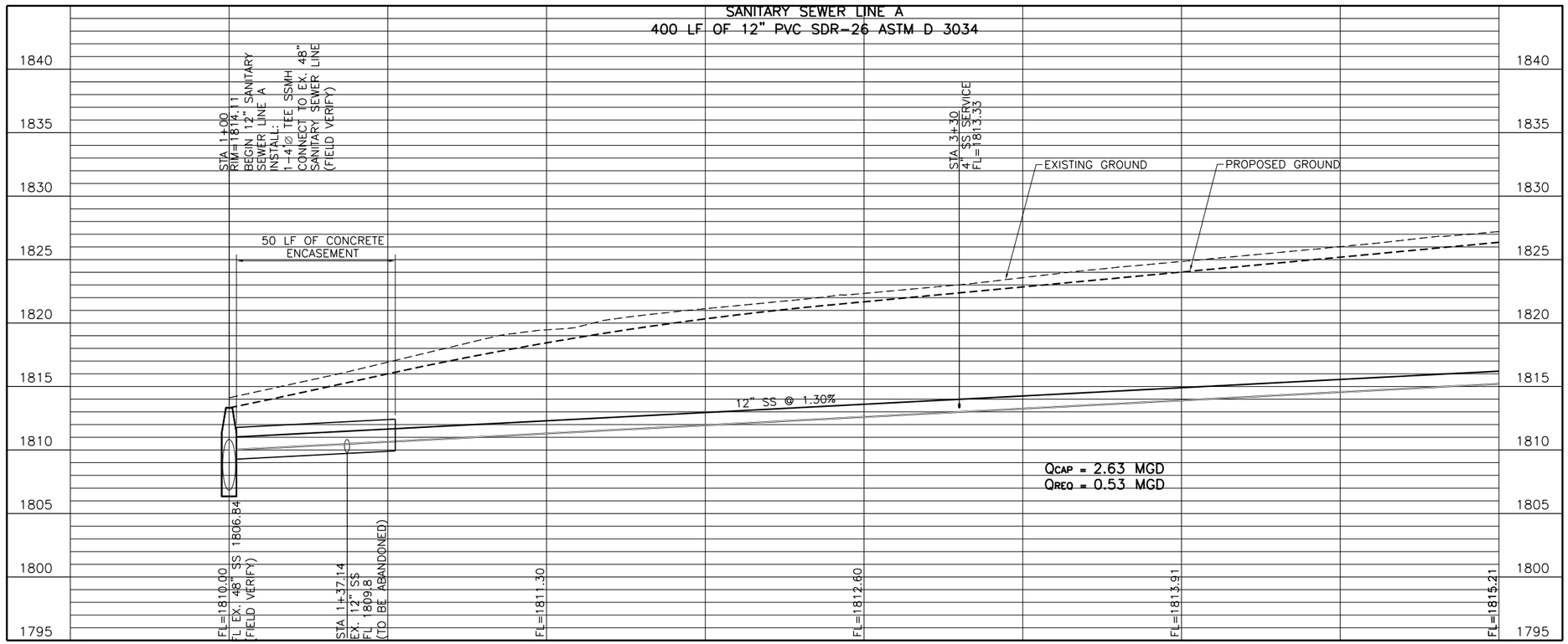
SHEET W-11
SEQ. 110

100% SUBMITTAL

ACAD Rel: 21.0s (LMS Tech)
Filename: N:\WTU\Drawings\C-PPL-PL-WTRL01.dwg
Last Saved: 7/26/2017 2:37 PM Saved By: sb

Plot Date: 7/27/2017 11:50 AM Plot By: sb Filename: N:\WTU\Drawings\C-PPL-PL-WTRL01.dwg





CAUTION!!!
EXISTING UNDERGROUND AND OVERHEAD UTILITIES IN THE AREA. 48 HOURS PRIOR TO CONSTRUCTION CONTACT 1-800-DIG-TESS

NORTH

0 20' 40'
SCALE IN FEET
HORIZONTAL

0 5' 10'
SCALE IN FEET
VERTICAL

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

STATE OF TEXAS
AARON B. CONINE
109794
PROFESSIONAL ENGINEER
26 Jul 2017

FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone: (817) 735-7300
Fax: (817) 735-7491
Web - www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE I
BELL ST. ROADWAY & UTILITY IMPROVEMENTS
SANITARY SEWER LINE A
PLAN & PROFILE
STA 1+00 TO STA 5+00

NO.	ISSUE	BY	DATE
1	ADDENDUM NO. 1	ABC	7/24/17

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

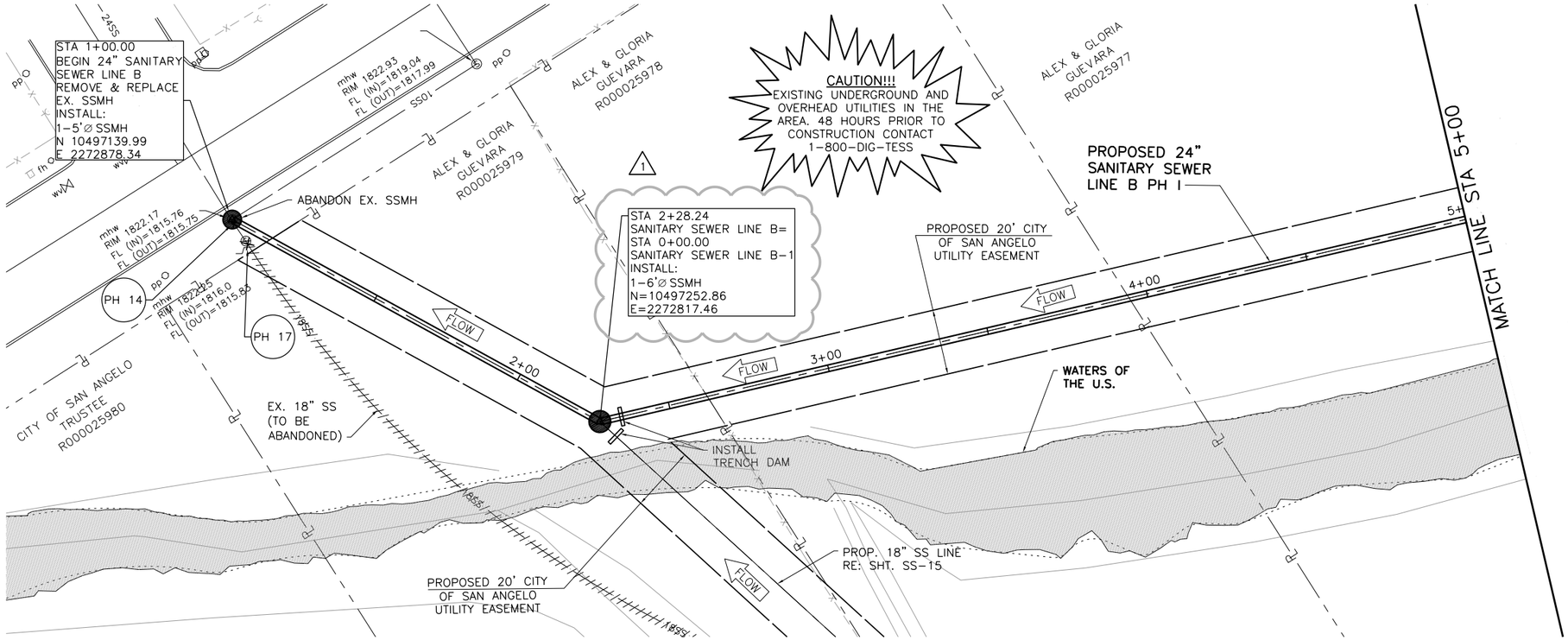
F&N JOB NO. SAN16188
DATE 07/07/17
DESIGNED ABC
DRAWN SB
REVISED
CHECKED ABC
FILE NAME WASTEWATER LINE A PH I.dwg

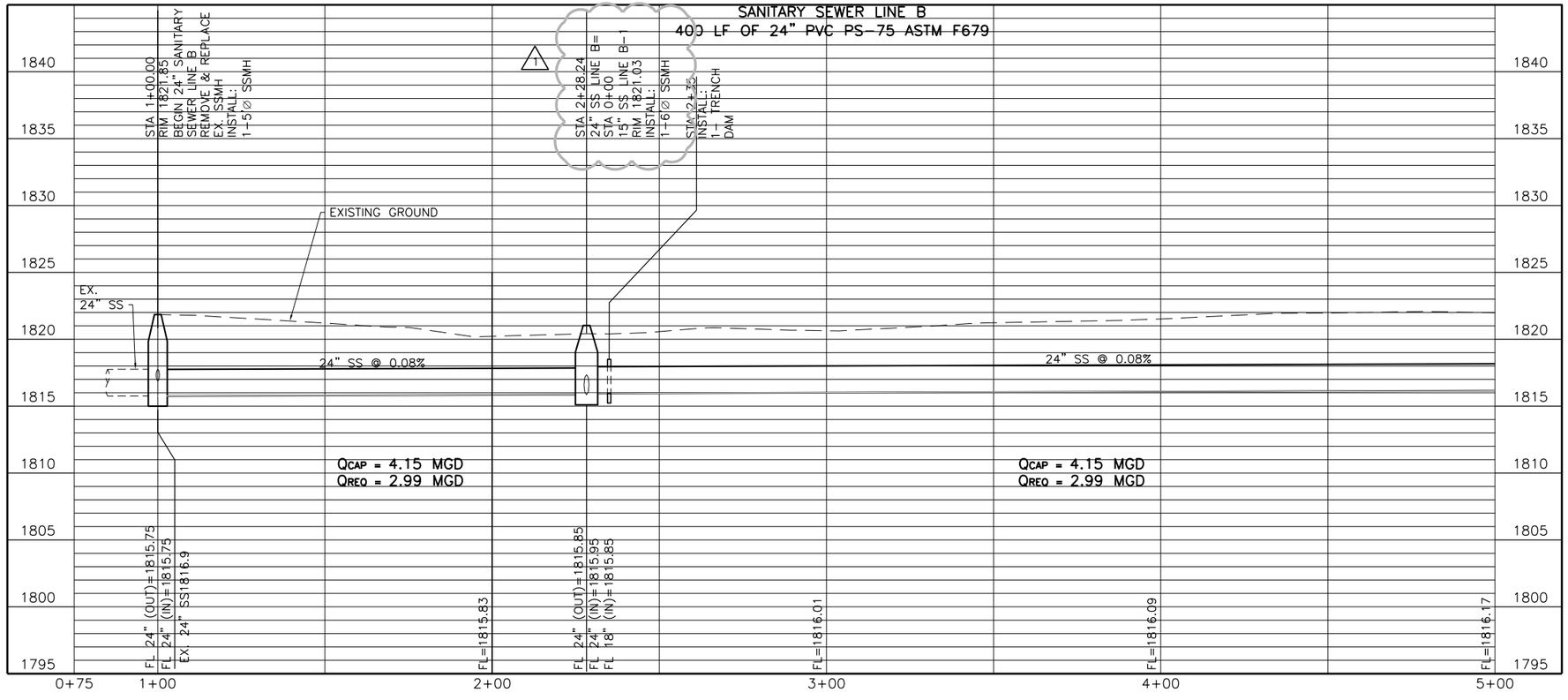
SHEET SS-2
SEQ. 112

100% SUBMITTAL

ACAD Rel: 21.0s (LMS Tech)
Filename: N:\WTU\Drawings\WASTEWATER LINE A PH I.dwg
Last Saved: 7/24/2017 9:59 AM Saved By: sb

Plot Date: 7/24/2017 2:39 PM Plot By: sb Filename: N:\WTU\Drawings\WASTEWATER LINE A PH I.dwg





Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

STATE OF TEXAS
AARON B. CONINE
109794
LICENSED PROFESSIONAL ENGINEER
26 Jul 2017

NORTH
0 20' 40'
SCALE IN FEET
HORIZONTAL
0 5' 10'
SCALE IN FEET
VERTICAL

FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone (817) 735-7300
Fax (817) 336-2181
Web - www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE I

BELL ST. ROADWAY & UTILITY IMPROVEMENTS

SANITARY SEWER LINE B

PLAN AND PROFILE
STA 1+00 TO STA 5+00

NO.	ISSUE	BY	DATE
1	ADDENDUM NO. 1	ABC	7/25/17

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

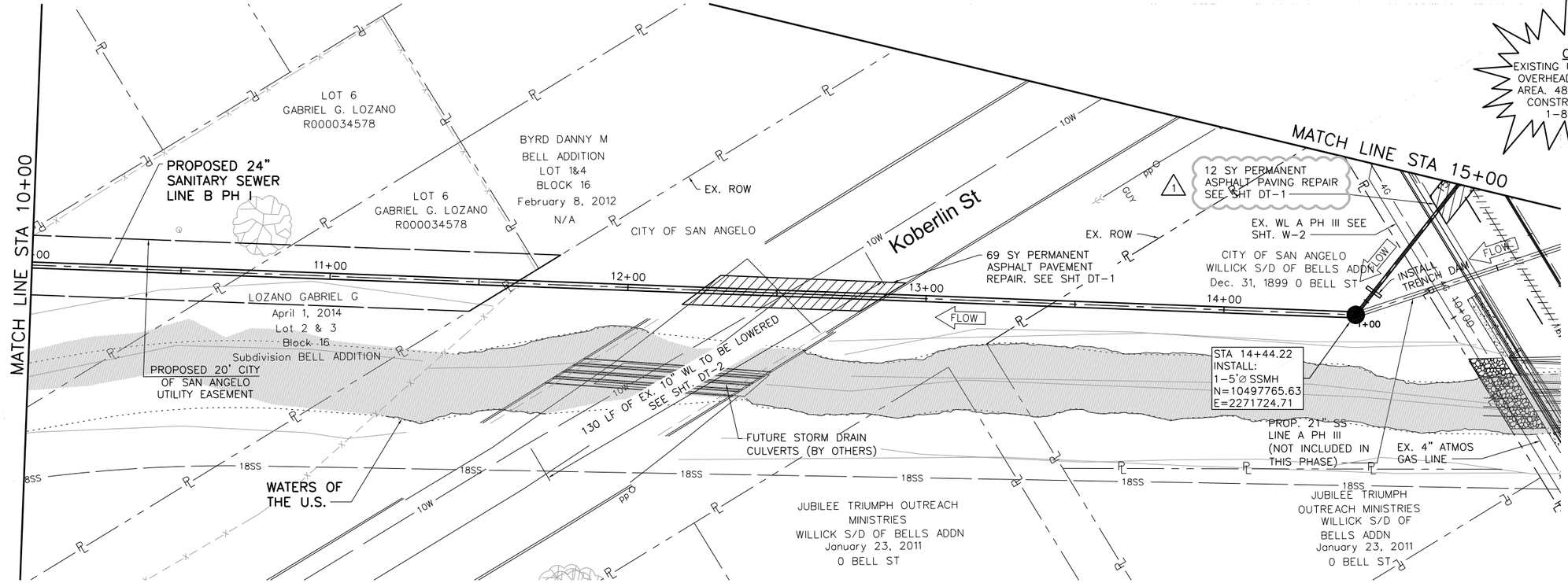
FAN JOB NO. SAN16188
DATE 07/07/17
DESIGNED ABC
DRAWN SB
REVISED 7/25/17
CHECKED ABC
FILE NAME WASTEWATER LINE B PH I.DWG

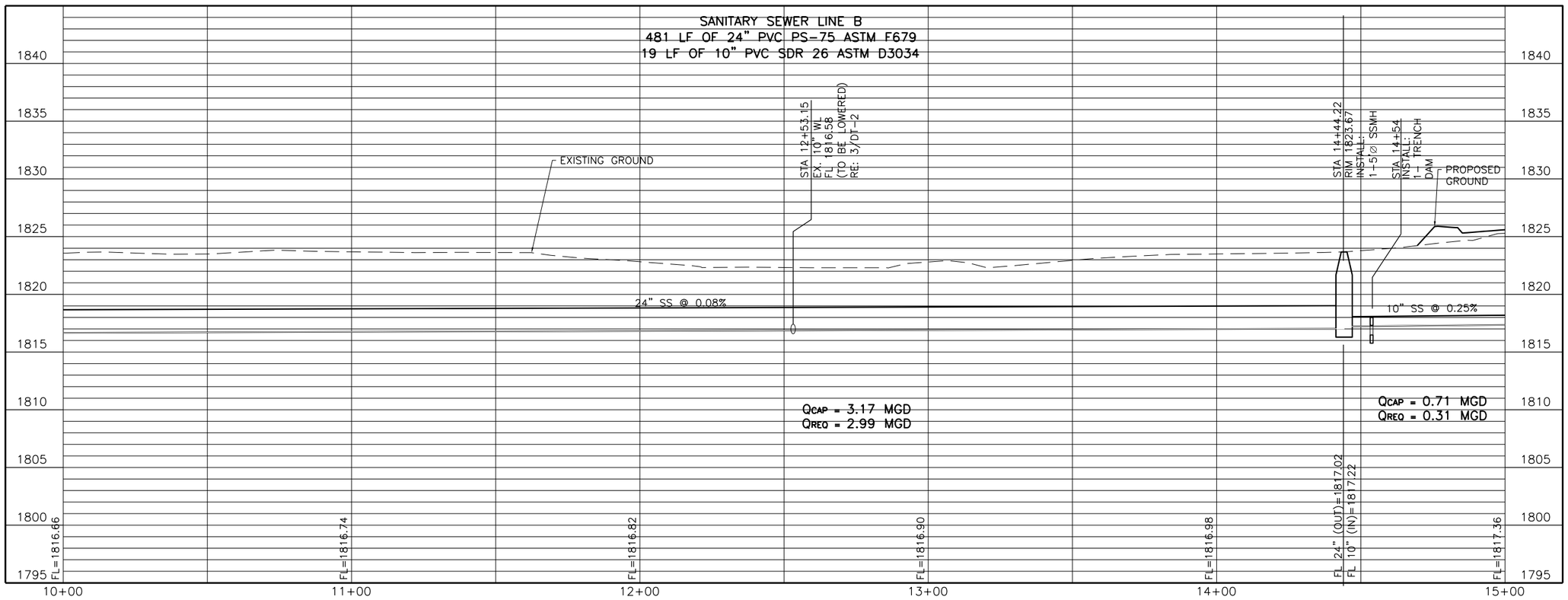
SHEET SS-6
SEQ. 116

100% SUBMITTAL

ACAD Rel: 21.0s (LMS Tech)
Filename: N:\WTU\Drawings\WASTEWATER LINE B PH I.DWG
Last Saved: 7/25/2017 4:33 PM Saved By: sb

Plot Date: 7/25/2017 4:40 PM Plot By: sb Filename: N:\WTU\Drawings\WASTEWATER LINE B PH I.DWG





CAUTION!!!
EXISTING UNDERGROUND AND OVERHEAD UTILITIES IN THE AREA. 48 HOURS PRIOR TO CONSTRUCTION CONTACT 1-800-DIG-TESS

NORTH
0 20' 40'
SCALE IN FEET HORIZONTAL
0 5' 10'
SCALE IN FEET VERTICAL

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

STATE OF TEXAS
AARON B. CONINE
109794
LICENSED PROFESSIONAL ENGINEER
26 Jul 2017

FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone (817) 735-7300
Fax (817) 735-7491
Web - www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE I
BELL ST. ROADWAY & UTILITY IMPROVEMENTS
SANITARY SEWER LINE B
PLAN AND PROFILE
STA 10+00 TO STA 15+00

F&N JOB NO. SAN16188
DATE 07/07/17
DESIGNED ABC
DRAWN SB
CHECKED ABC
REVISED
DATE
FILE NAME WASTEWATER LINE B PH I.DWG

NO.	ISSUE	BY	DATE
1	ADDENDUM NO. 1	ABC	7/21/17

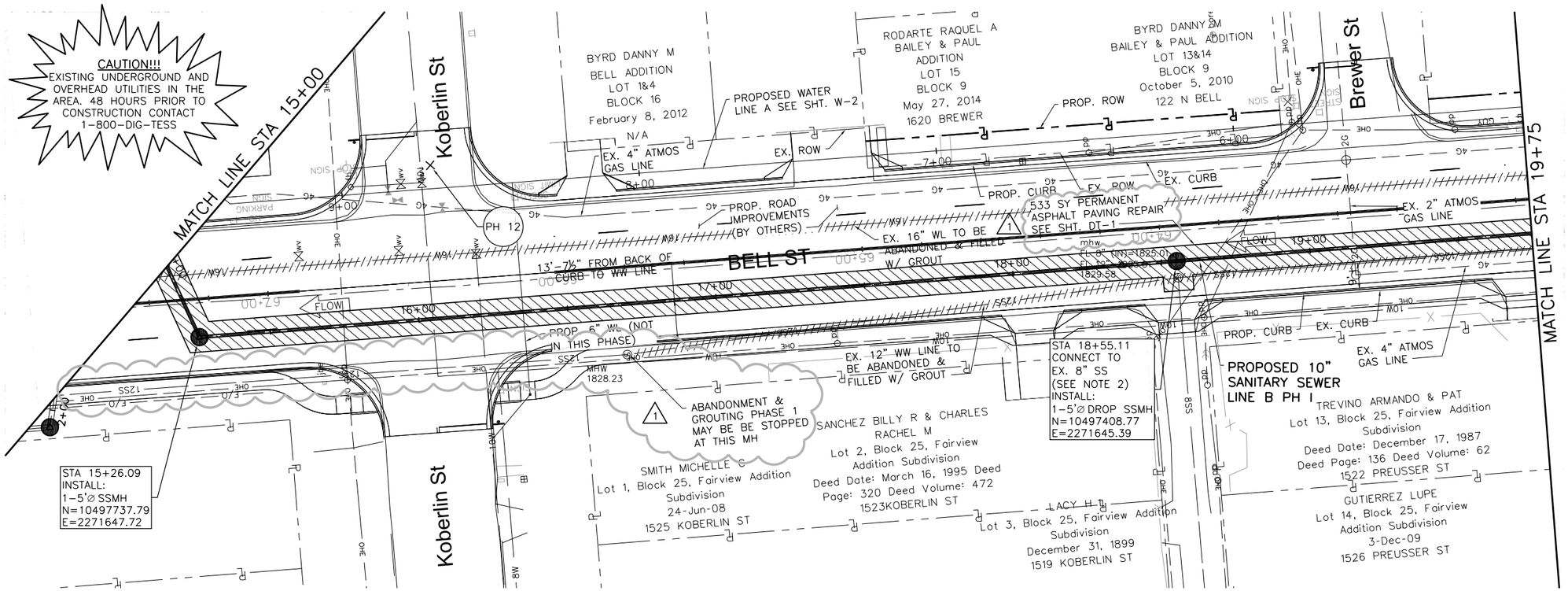
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

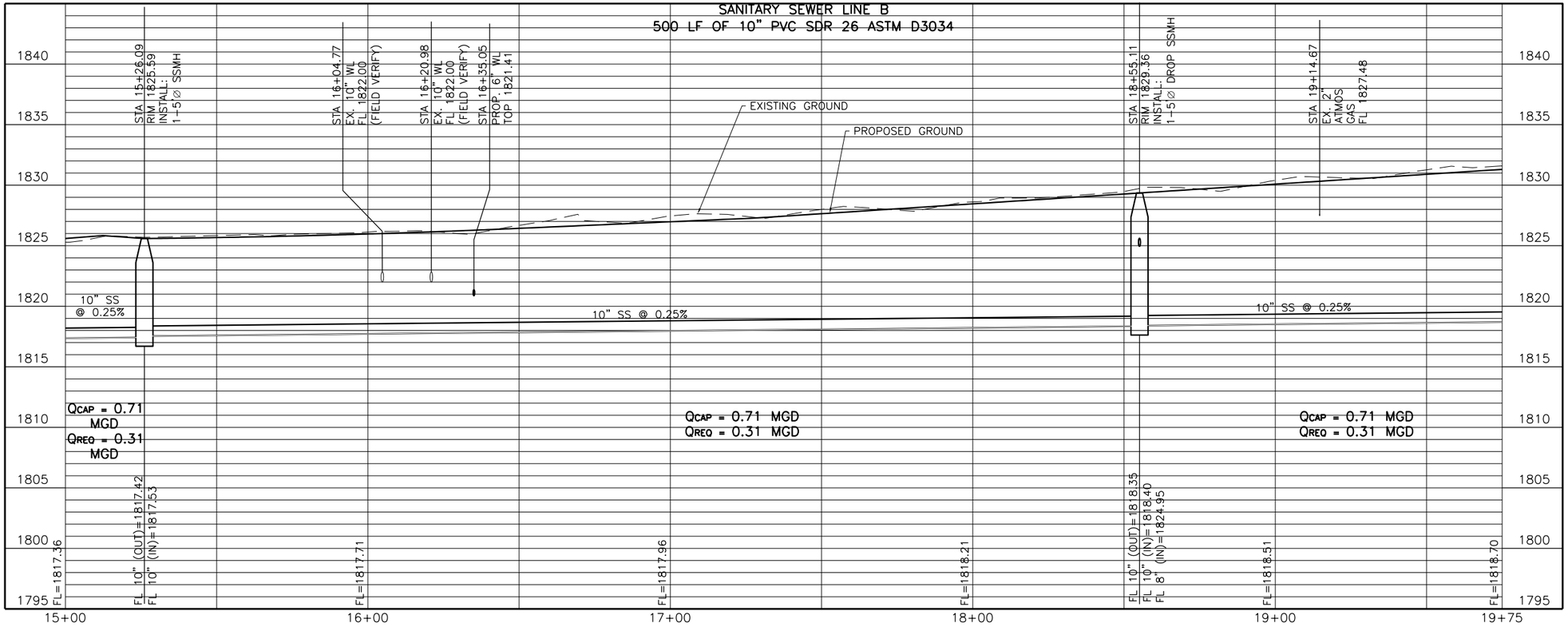
SHEET SS-8
SEQ. 118

100% SUBMITTAL

ACAD Rel: 21.0s (LMS Tech)
Filename: N:\WTU\Drawings\WASTEWATER LINE B PH I.DWG
Last Saved: 7/21/2017 2:56 PM Saved By: sb

Plot Date: 7/21/2017 3:27 PM Plot By: sb Filename: N:\WTU\Drawings\WASTEWATER LINE B PH I.DWG





NOTES:

1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO BEGINNING OF CONSTRUCTION.
2. CONTRACTOR TO MATCH EXISTING GRADE OF 8" SANITARY SEWER AT RECONNECTION.
3. ALL PAVING, SIDEWALK AND WATER LINE IMPROVEMENTS ON THIS SHEET ARE NOT PART OF THIS PHASE.

NORTH

0 20' 40'
SCALE IN FEET HORIZONTAL

0 5' 10'
SCALE IN FEET VERTICAL

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144
STATE OF TEXAS
AARON B. CONINE
109794
PROFESSIONAL ENGINEER
26 Jul 2017

FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone (817) 735-7300
Fax (817) 735-7491
Web - www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE I

BELL ST. ROADWAY & UTILITY IMPROVEMENTS

SANITARY SEWER LINE B

PLAN AND PROFILE STA 15+00 TO STA 20+00

NO.	ISSUE	BY	DATE
1	ADDENDUM NO. 1	ABC	7/21/17

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

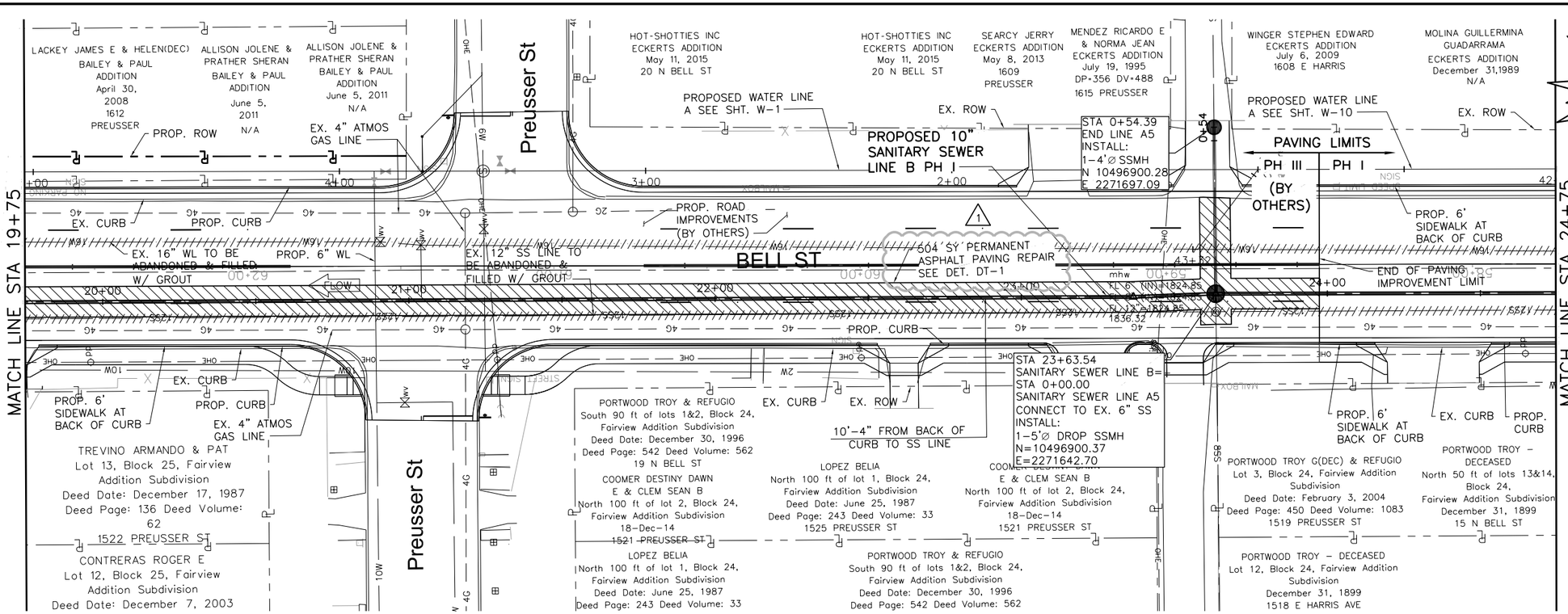
F&N JOB NO.	SAN16188
DATE	07/07/17
DESIGNED	ABC
DRAWN	SB
CHECKED	ABC
FILE NAME	WASTEWATER LINE B PH I.DWG

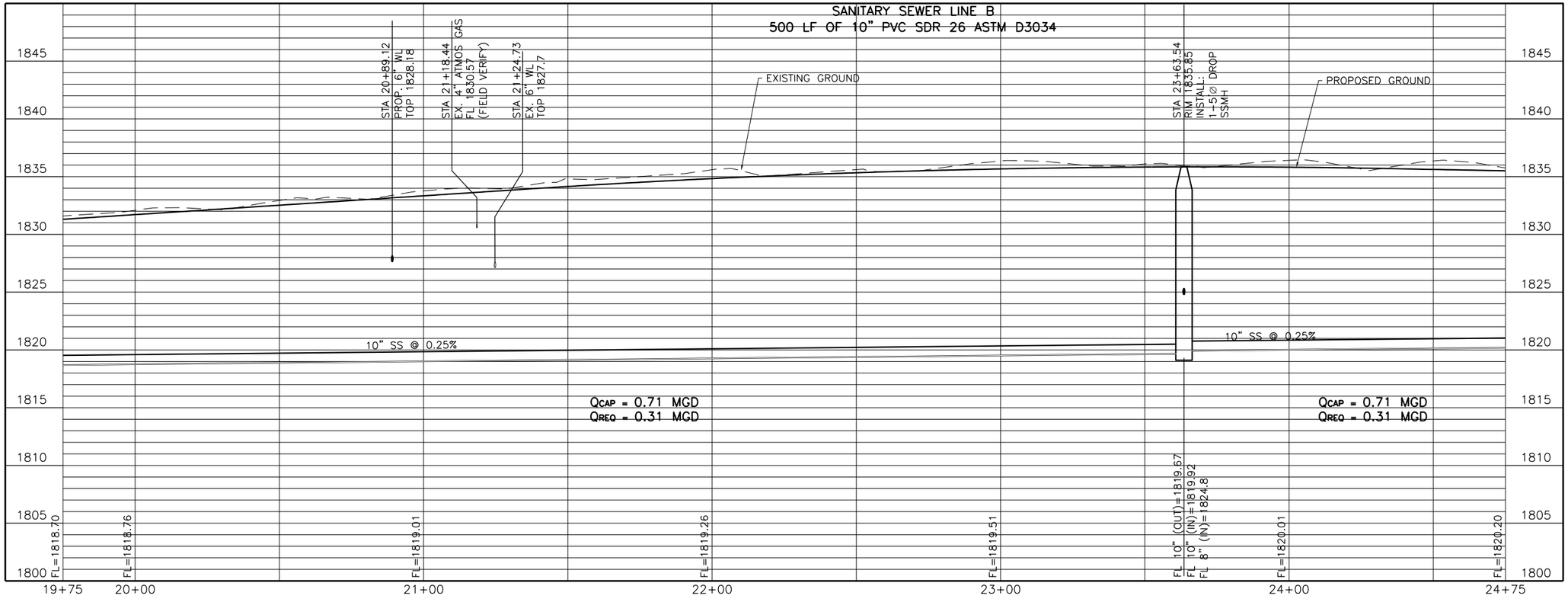
SHEET SS-9
SEQ. 119

100% SUBMITTAL

ACAD Rel: 21.0s (LMS Tech)
Filename: N:\WTU\Drawings\WASTEWATER LINE B PH I.DWG
Last Saved: 7/25/2017 5:18 PM Saved By: sb

Plot Date: 7/26/2017 8:16 AM Plot By: sb Filename: N:\WTU\Drawings\WASTEWATER LINE B PH I.DWG





CAUTION!!!
EXISTING UNDERGROUND AND OVERHEAD UTILITIES IN THE AREA. 48 HOURS PRIOR TO CONSTRUCTION CONTACT 1-800-DIG-TESS

NORTH

0 20' 40'
SCALE IN FEET HORIZONTAL

0 5' 10'
SCALE IN FEET VERTICAL

NOTES:

1. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO BEGINNING OF CONSTRUCTION.
2. CONTRACTOR TO MATCH EXISTING GRADE OF 8" SANITARY SEWER AT RECONNECTION.
3. ALL PAVING, SIDEWALK AND WATER LINE IMPROVEMENTS SHOWN NORTH OF THE PHASING LIMITS LINE AT STA 23+97.39 ARE NOT INCLUDED IN THIS PHASE.

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

STATE OF TEXAS
AARON B. CONINE
109794
PROFESSIONAL ENGINEER
26 Jul 2017

FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone (817) 273-3300
Fax (817) 273-3451
Web - www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE I
BELL ST. ROADWAY & UTILITY IMPROVEMENTS
SANITARY SEWER LINE B
PLAN AND PROFILE
STA 20+00 TO STA 25+00

NO.	ISSUE	BY	DATE
1	ADDENDUM NO. 1	ABC	7/21/17

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

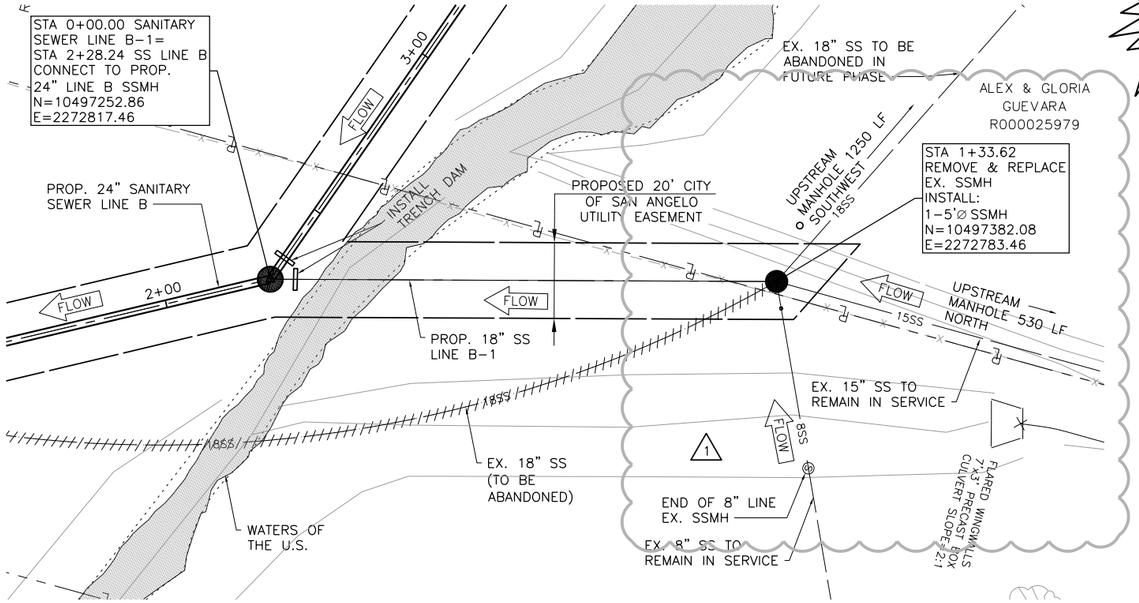
F&N JOB NO. SAN16188
DATE 07/07/17
DESIGNED ABC
DRAWN SB
CHECKED ABC
FILE NAME WASTEWATER LINE B PH I.DWG

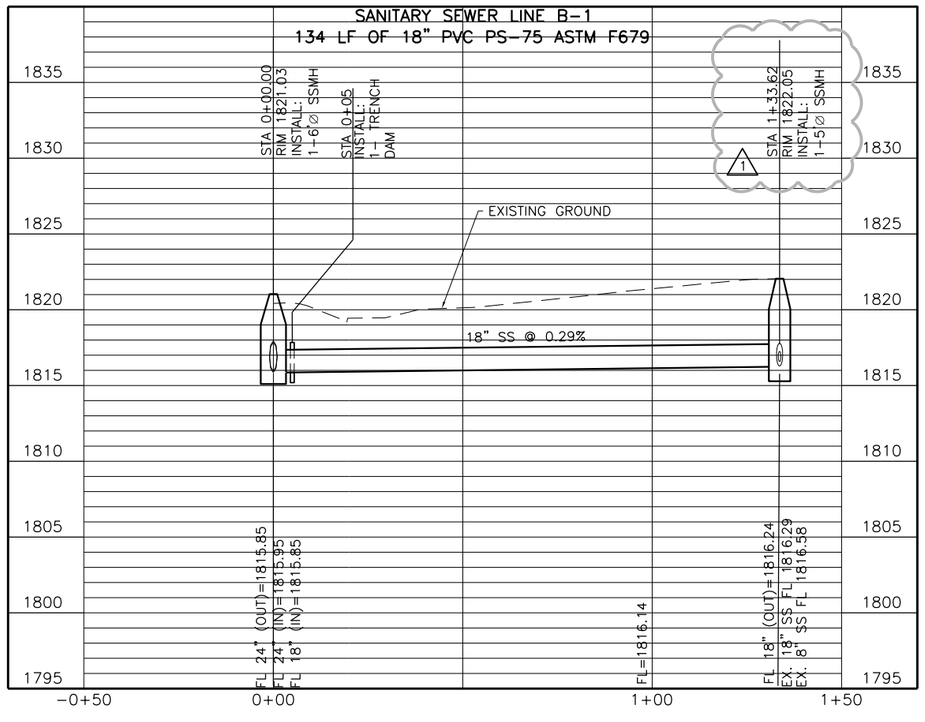
SHEET SS-10
SEQ. 120

100% SUBMITTAL

ACAD Rel: 21.0s (LMS Tech)
Filename: N:\WTU\Drawings\WASTEWATER LINE B PH I.DWG
Last Saved: 7/21/2017 2:30 PM Saved By: sb

Plot Date: 7/21/2017 2:36 PM Plot By: sb Filename: N:\WTU\Drawings\WASTEWATER LINE B PH I.DWG





CAUTION!!!
EXISTING UNDERGROUND AND OVERHEAD UTILITIES IN THE AREA. 48 HOURS PRIOR TO CONSTRUCTION CONTACT 1-800-DIG-TESS

NORTH
0 20' 40'
SCALE IN FEET
HORIZONTAL
0 5' 10'
SCALE IN FEET
VERTICAL

100% SUBMITTAL

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144
STATE OF TEXAS AARON B. CONINE 109794 LICENSED PROFESSIONAL ENGINEER
27 Jul 2017
FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone (817) 735-7300
Fax (817) 735-7491
Web - www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE I
BELL ST. ROADWAY & UTILITY IMPROVEMENTS
SANITARY SEWER LINE B-1
STA 0+00 TO END

NO.	ISSUE	BY	DATE
1	ADDENDUM NO. 1	ABC	7/21/17

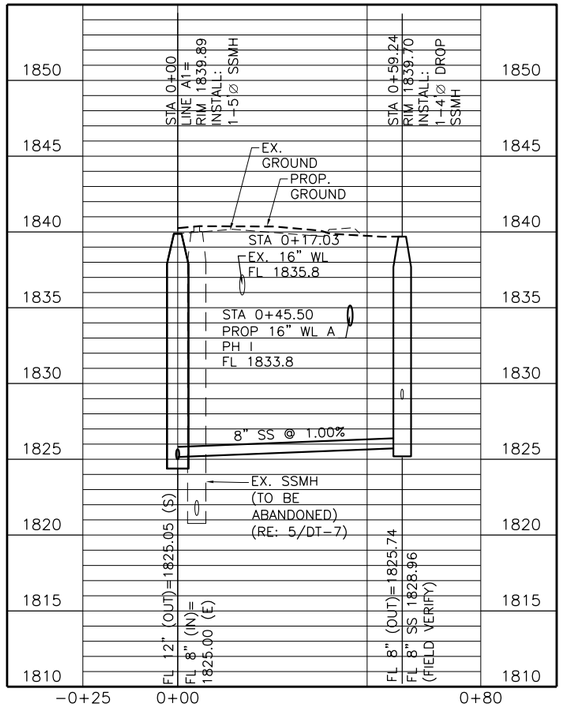
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

F&N JOB NO. SAN16188
DATE 07/07/17
DESIGNED ABC
DRAWN SB
REVISED
CHECKED ABC
FILE NAME WASTEWATER LINE B PH I.DWG

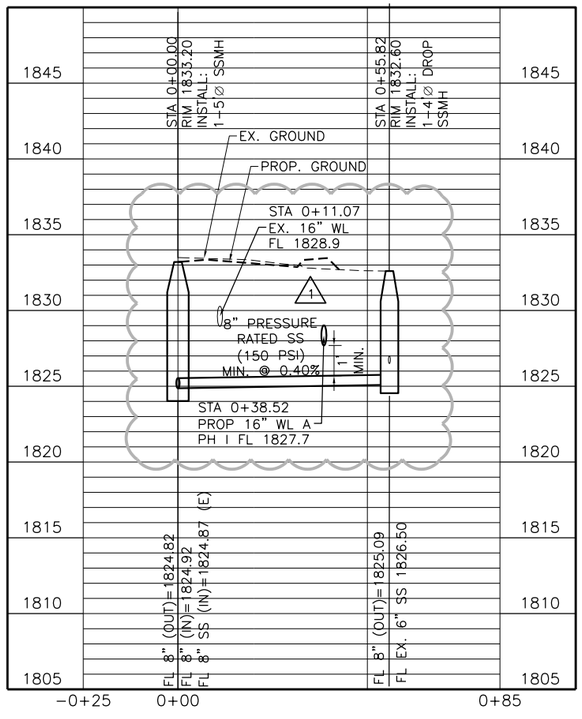
SHEET SS-15
SEQ. 133

ACAD Rel: 21.0s (LMS Tech)
Filename: N:\WTU\Drawings\WASTEWATER LINE B PH I.DWG
Last Saved: 7/26/2017 8:28 AM Saved By: sb

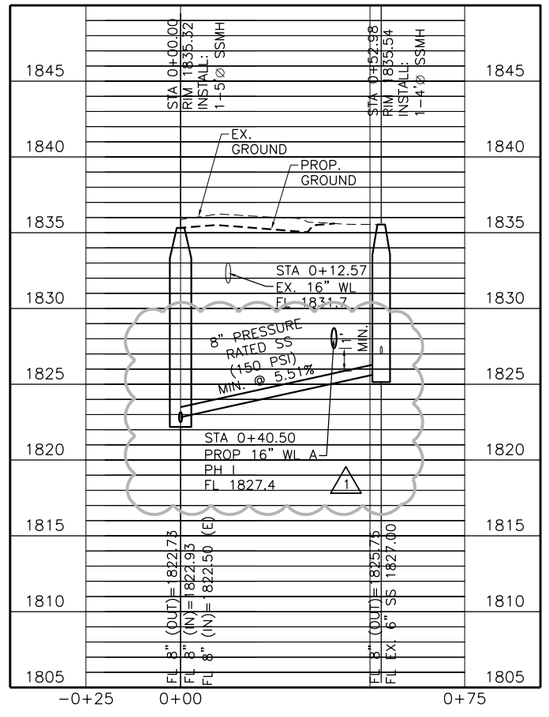
Plot Date: 7/27/2017 8:55 AM Plot By: sb Filename: N:\WTU\Drawings\WASTEWATER LINE B PH I.DWG



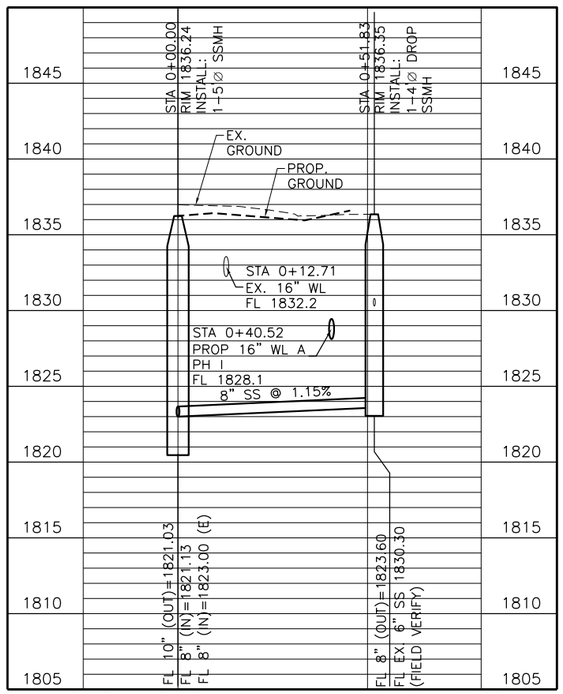
1 SS-5 SANITARY SEWER LINE A1



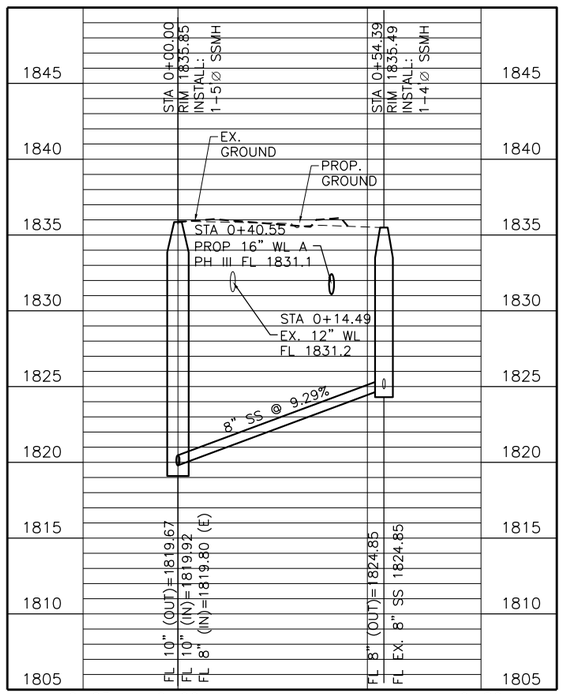
2 SS-13 SANITARY SEWER LINE A2



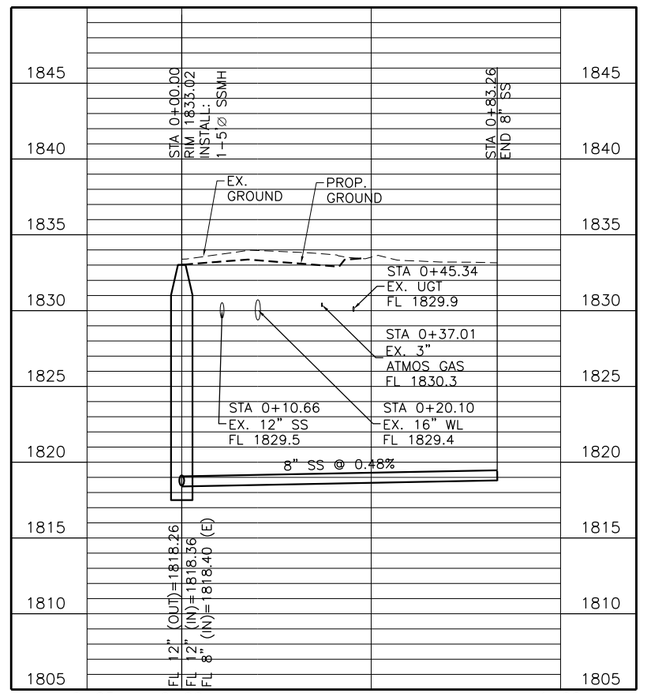
3 SS-12 SANITARY SEWER LINE A3



4 SS-11 SANITARY SEWER LINE A4



5 SS-10 SANITARY SEWER LINE A5



6 SS-3 SANITARY SEWER LINE A6

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

STATE OF TEXAS
AARON B. CONINE
109794
LICENSED
PROFESSIONAL ENGINEER
26 Jul 2017

FREESE NICHOLS

4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone: (817) 735-7300
Fax: (817) 735-7491
Web – www.freese.com

NORTH

0 20' 40'
SCALE IN FEET
HORIZONTAL

0 5' 10'
SCALE IN FEET
VERTICAL

CAUTION!!!
EXISTING UNDERGROUND AND OVERHEAD UTILITIES IN THE AREA. 48 HOURS PRIOR TO CONSTRUCTION CONTACT 1-800-DIG-TESS

CITY OF SAN ANGELO, TEXAS
PHASE I

BELL ST. ROADWAY & UTILITY IMPROVEMENTS

SANITARY SEWER :LINE A & B

PROFILES
PROFILE LINE A1 – A6

F&N JOB NO. SAN16188
DATE 07/07/17
DESIGNED ABC
DRAWN SB
CHECKED ABC
FILE NAME WASTEWATER LINE A PH I.dwg

NO.	ISSUE	BY	DATE
1	ADDENDUM NO. 1	ABC	7/24/17

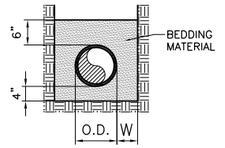
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET SS-16
SEQ. 126

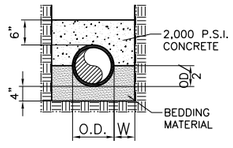
100% SUBMITTAL

ACAD Rel: 21.0s (LMS Tech)
Filename: N:\WTU\Drawings\WASTEWATER LINE A PH I.dwg
Last Saved: 7/24/2017 9:53 AM Saved By: sb

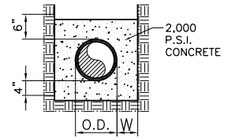
Plot Date: 7/24/2017 9:55 AM Plot By: sb Filename: N:\WTU\Drawings\WASTEWATER LINE A PH I.dwg



GRAVEL EMBEDMENT



CONCRETE CAP



CONCRETE ENCASEMENT

STANDARD TRENCH WIDTH	
PIPE SIZE	W
16" OR LESS	6"
GREATER THAN 16"	AS SPECIFIED BY PIPE MFG. & APPROVED BY CITY ENGINEER

NOTES:

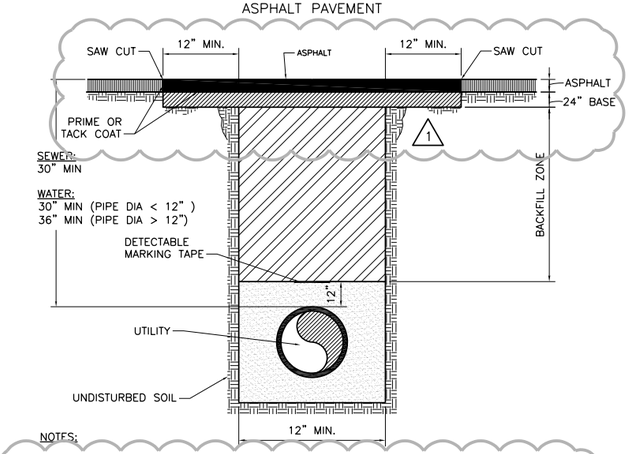
1. BEDDING MATERIAL FOR THE INSTALLATION OF WATER AND SEWER MAINS SHALL BE CRUSHED STONE OR PEA GRAVEL THAT WILL REMAIN FIRM AND NOT PERMIT DISPLACEMENT OF THE PIPE EITHER DURING PIPE LAYING OR BACKFILLING OR FOLLOWING THE COMPLETION OF CONSTRUCTION.
2. BEDDING MATERIAL SHALL BE FROM AN APPROVED BEDDING MATERIAL SOURCE PER THE LIST OF APPROVED BEDDING SUPPLIERS OR BE APPROVED BY THE CITY ENGINEER.
3. TRENCH SPOILS ARE NOT ACCEPTABLE FOR "EMBEDMENT ZONE MATERIAL"

1 — PIPE EMBEDMENT ZONE WATER AND SEWER MAINS

NOT TO SCALE JUNE 2016 W-BED-1

UTILITY TRENCH SECTION

ASPHALT PAVEMENT

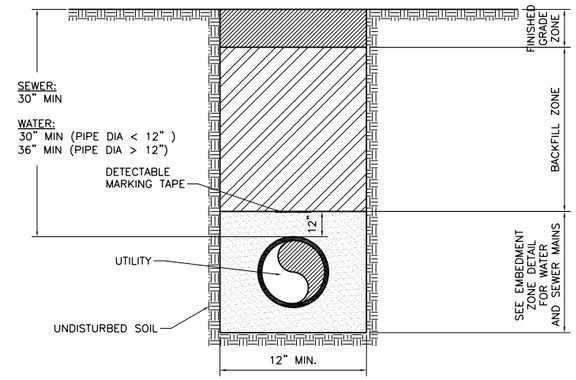


NOTES:

ASPHALT:	2" LAYER TYPE D, TxDOT HOT MIX OR TYPE D, TxDOT HOT MIX – COLD LAID (MUST HAVE PRIOR CITY APPROVAL) 4" LAYER TYPE B, TxDOT HOT MIX
PRIME COAT:	TXDOT MC-30 OR AE-P ASPHALT AT THE RATE OF 0.25 TO 0.35 GALLON PER SQUARE YARD OF SURFACE
TACK COAT:	SHALL MEET THE REQUIREMENTS OF TXDOT ITEM 300 "ASPHALTS, OILS, AND EMULSIONS".
BASE:	FLEXIBLE BASE PER CITY OF SAN ANGELO SPECIFICATIONS COMPACTED IN 6" HORIZONTAL LAYERS. MINIMUM DENSITY 95% MODIFIED PROCTOR. FLOWABLE FILL (CLSM) MAY BE USED IN LIEU OF FLEX-BASE.
BACKFILL ZONE:	WHERE NATIVE PULVERIZED OR GRANULAR MATERIAL IS AVAILABLE FROM EXCAVATION WHICH IS FREE OF SHARP EDGED STONES, OR STONES LARGER THAN 3" IN DIAMETER, CLAY, ORGANIC MATTER, OR OTHER UNSUITABLE SUBSTANCES, HAS A PI<= 20 AND LL<=40, AND MEETS THE APPROVAL OF THE CITY. SUCH MATERIAL MAY BE USED FOR BACKFILL MATERIAL AS INSTRUCTED BY THE OWNER.
1	
COVER:	WATER OR SEWER MAINS AND SERVICES WITH LESS THAN 30" OF COVER AT ANY LOCATION SHALL REQUIRE C.O.S.A. APPROVAL PRIOR TO CONSTRUCTION

4 — UTILITY TRENCH SECTION ASPHALT PERMANENT PAVEMENT REPAIR

1"=10' JUNE 2016 W-UTR-ASP



NOTES:

BACKFILL ZONE:

OPTION #1: WHERE PULVERIZED OR GRANULAR MATERIAL IS AVAILABLE FROM EXCAVATION WHICH IS FREE OF SHARP EDGED STONES, OR STONES LARGER THAN 3" IN DIAMETER, CLAY, ORGANIC MATTER, OF OTHER UNSUITABLE SUBSTANCES, HAS A PI<=20 AND LL<=40, AND MEETS THE APPROVAL OF THE CITY SUCH MATERIAL MAY BE USED FOR BACKFILL MATERIAL AS INSTRUCTED BY THE OWNER. BACKFILL SHALL BE COMPACTED TO DENSITIES EQUAL TO OR GREATER THAN THAT OF SURROUNDING SOIL.

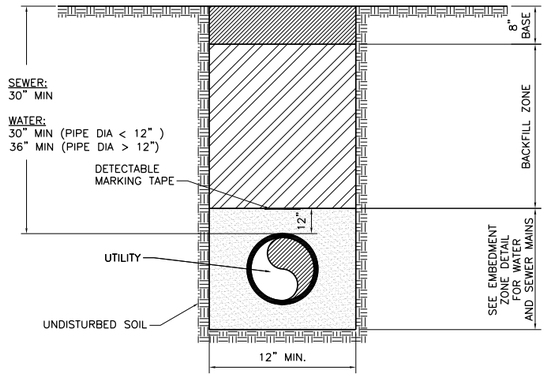
OPTION #2: FLEXIBLE BASE PER CITY OF SAN ANGELO SPECIFICATIONS COMPACTED IN 6" HORIZONTAL LAYERS TO MINIMUM DENSITY 95% MODIFIED PROCTOR.

FINISHED GRADE ZONE:

BACKFILL SHALL MATCH EXISTING GROUND CONDITIONS (SEE OPTIONS BELOW) OR AS DIRECTED BY THE OWNER.
OPTION A: UTILIZE BACKFILL ZONE MATERIAL FROM OPTION #1
OPTION B: 6" TOP SOIL.
OPTION C: 8" FLEXIBLE BASE
COVER:
WATER OR SEWER MAINS AND SERVICES WITH LESS THAN 30" OF COVER AT ANY LOCATION SHALL REQUIRE C.O.S.A. APPROVAL PRIOR TO CONSTRUCTION.

2 — UTILITIY TRENCH SECTION OTHER UNPAVED AREAS

1"=10' JUNE 2016 W-UTR-OUA

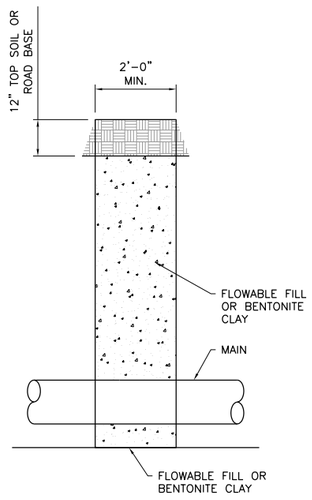


NOTES:

BASE:	FLEXIBLE BASE PER CITY OF SAN ANGELO SPECIFICATIONS. COMPACTED IN 6" LAYERS. MINIMUM DENSITY 95% MODIFIED PROCTOR.
BACKFILL ZONE:	WHERE PULVERIZED OR GRANULAR MATERIAL IS AVAILABLE FROM EXCAVATION WHICH IS FREE OF SHARP EDGED STONES, OR STONES LARGER THAN 3" IN DIAMETER, CLAY, ORGANIC MATTER, OR OTHER UNSUITABLE SUBSTANCES, HAS A PI<= 20 AND LL<=40, AND MEETS THE APPROVAL OF THE CITY. SUCH MATERIAL MAY BE USED FOR BACKFILL MATERIAL AS INSTRUCTED BY THE OWNER.
COVER:	WATER OR SEWER MAINS AND SERVICES WITH LESS THAN 30" COVER AT ANY LOCATION SHALL REQUIRE C.O.S.A. APPROVAL PRIOR TO CONSTRUCTION.

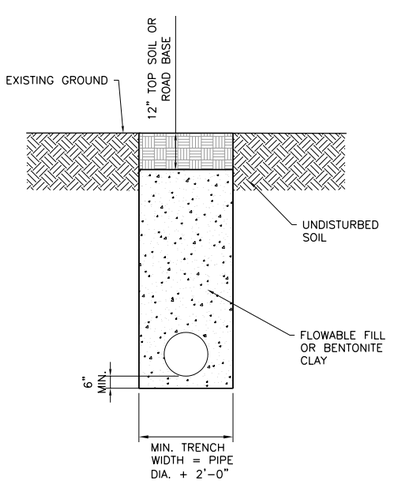
3 — UTILITIY TRENCH SECTION UNPAVED STREETS, ALLEYS AND DRIVEWAYS

1"=10' JUNE 2016 W-UTR-USA



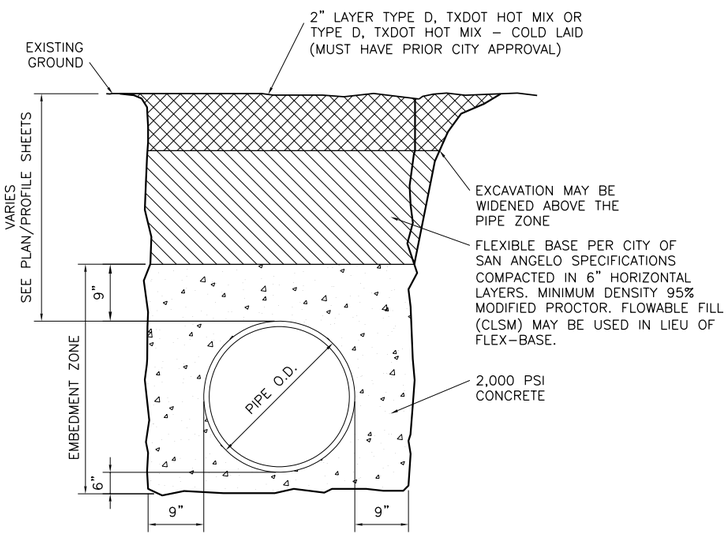
5 — TRENCH CHECK DAM PROFILE

NOT TO SCALE



6 — TRENCH CHECK DAM SECTION

NOT TO SCALE



7 — TYPICAL CONCRETE ENCASEMENT

NOT TO SCALE

100% SUBMITTAL

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

STATE OF TEXAS — LICENSED — 109794 — PROFESSIONAL ENGINEER — 26 Jul 2017

FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone – (817) 735-7300
Fax – (817) 735-7491
Web – www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE I
BELL ST. ROADWAY & UTILITY IMPROVEMENTS
WATER & SANITARY SEWER DETAILS
TRENCH DETAILS

NO.	ISSUE	BY	DATE
1	ADDENDUM NO. 1	ABC	7/21/17

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

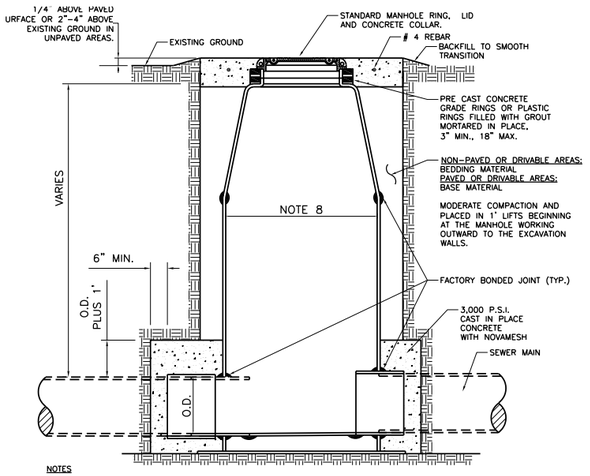
F&N JOB NO.	SAN16188
DATE	07/07/17
DESIGNED	DGS
DRAWN	SB
REVISED	-
CHECKED	ABC
FILE NAME	CV-PPL-DT-DET01.dwg

SHEET DT-1

SEQ. 127

ACAD Rel: 21.0s (LMS Tech)
Filename: N:\WTU\Drawings\CV-PPL-DT-DET01.dwg
Last Saved: 7/24/2017 9:47 AM Saved By: sb

Plot Date: 7/24/2017 2:34 PM Plot By: sb Filename: N:\WTU\Drawings\CV-PPL-DT-DET01.dwg

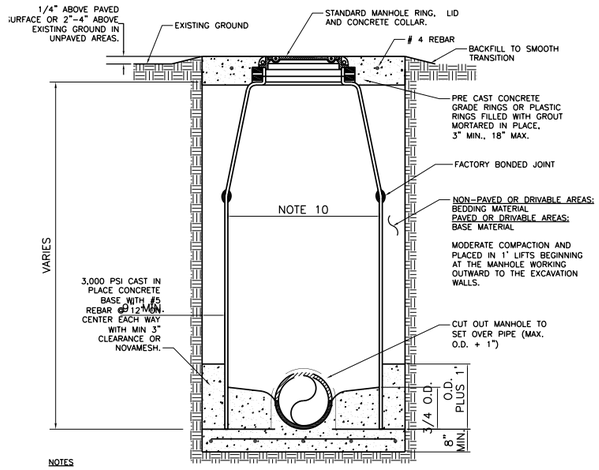


NOTES

1. CONTRACTOR SHALL VERIFY MANHOLE DEPTHS, INLET AND OUTLET ELEVATIONS.
2. MANHOLE FLOOR SHALL BE FACTORY INSTALLED INTEGRAL FIBERGLASS BENCH AND INVERT AREA. CONCRETE IS NOT ALLOWED.
3. ALL INLETS AND OUTLETS SHALL BE BONDED INTO THE MANHOLE RISER BY THE MANUFACTURER.
4. CONCRETE SHALL BE PLACED A MINIMUM OF 6" BEYOND AND 1' ABOVE ALL CONNECTIONS.
5. MANHOLES SHALL BE STUBBED OUT WITH SUITABLE SIZE PIPE WHEREVER FUTURE EXTENSION OF THE SEWER IS ANTICIPATED.
6. STUB-OUTS SHALL EXTEND BEYOND THE EDGE OF EXISTING OR PROPOSED PAVING.
7. MANHOLES LOCATED WITHIN A 100-YEAR FLOOD PLAIN OR ANY AREA SUBJECT TO STORMWATER INFILTRATION SHALL INCORPORATE A WATERTIGHT, BOLT-DOWN RING AND LID AND AN INFLOW PREVENTION DEVICES (IPDs).
8. MANHOLE SPACING, DIAMETER AND DEPTHS SHALL BE AS FOLLOWS:
9. MINIMUM ELEVATION DIFFERENCE ACROSS MANHOLE INVERTS SHALL BE AS FOLLOWS:

PIPE DIAMETER	MANHOLE DEPTH	MANHOLE DIAMETER	MAX. SPACING BETWEEN MANHOLES
15" OR SMALLER	0-16'	48"	500'
15" OR SMALLER	OVER 16'	60"	500'
OVER 15"	ALL DEPTHS	60"	800'

1 — FIBERGLASS MANHOLE – TYPE A
1"=10' JUNE 2016 W-SA-MH-A



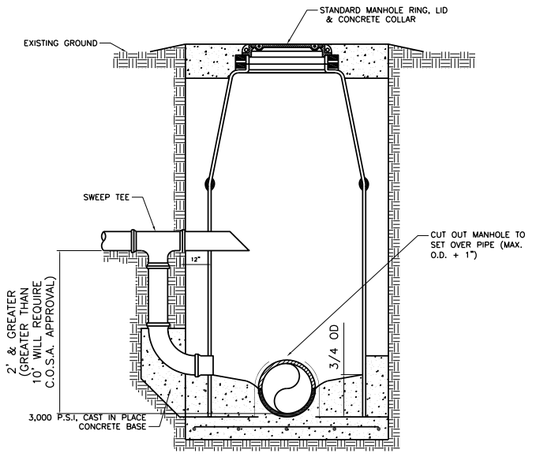
NOTES

1. CONTRACTOR SHALL VERIFY MANHOLE DEPTHS, INLET AND OUTLET ELEVATIONS.
2. MANHOLE CUTOUT TO BE MADE AT TIME OF INSTALLATION.
3. CONCRETE BASE TO BE POURED IN PLACE IN TRENCH AND MANHOLE TO BE INSTALLED BY INSERTING INTO WET CONCRETE BASE.
4. FLOW LINE INVERT MAY BE CHANNEL FORMED IN CONCRETE FLOOR OR PIPE SECTION WITH TOP CUT OUT.
5. SEAL CONCRETE TO PIPE WITH ELASTOMERIC GASKET SEAL.
6. CONCRETE SHALL BE PLACED A MINIMUM OF 6" BEYOND AND 1' ABOVE ALL CONNECTIONS.
7. MANHOLES SHALL BE STUBBED OUT WITH SUITABLE SIZE PIPE WHEREVER FUTURE EXTENSION OF THE SEWER IS ANTICIPATED.
8. STUB-OUTS SHALL EXTEND BEYOND THE EDGE OF EXISTING OR PROPOSED PAVING.
9. MANHOLES LOCATED WITHIN A 100-YEAR FLOOD PLAIN OR ANY AREA SUBJECT TO STORMWATER INFILTRATION SHALL INCORPORATE A WATERTIGHT, BOLT-DOWN RING AND LID AND AN INFLOW PREVENTION DEVISES (IPDs).
10. MANHOLE SPACING, DIAMETER AND DEPTH SHALL BE AS FOLLOWS:
11. MINIMUM ELEVATION DIFFERENCE ACROSS MANHOLE INVERTS SHALL BE AS FOLLOWS:

PIPE DIAMETER	MANHOLE DEPTH	MANHOLE DIAMETER	MAX. SPACING BETWEEN MANHOLES
15" OR SMALLER	0-16'	48"	500'
15" OR SMALLER	OVER 16'	60"	500'
OVER 15"	ALL DEPTHS	60"	800'

DEFLECTION ANGLE BETWEEN INLET / OUTLET	MIN. ELEVATION DIFFERENCE
LESS THAN 30°	0.10'
GREATER THAN 30°	0.20'

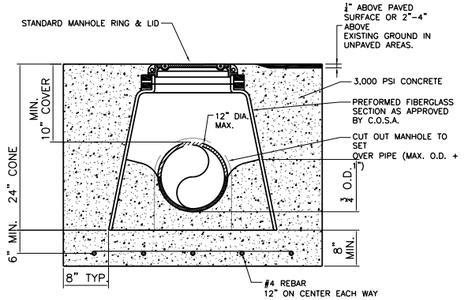
2 — FIBERGLASS MANHOLE – TYPE B
1"=10' JUNE 2016 W-SA-MH-B



NOTES

1. CONSTRUCTION OF THE DROP MANHOLE IS IDENTICAL WITH THE STANDARD MANHOLES A, B AND PRECAST CONCRETE MANHOLE IN EVERY RESPECT EXCEPT THE METHOD OF ENTRANCE OF THE SEWAGE FROM THE LATERALS SHALL BE CONSTRUCTED AS SHOWN ABOVE.
2. WHEN ENTERING AN EXISTING MANHOLE WITH A NEW LINE AND THE DIFFERENCE IN ELEVATION OF THE TWO INVERTS EXCEEDS 2' THE METHOD OF ENTRANCE SHALL BE AS ABOVE.
3. BACKFILL SHALL BE COMPACTED IN 6" HORIZONTAL LAYERS MINIMUM DENSITY 95% MODIFIED PROCTOR.

3 — DROP MANHOLE
1"=10' JUNE 2016 W-SA-MH-D

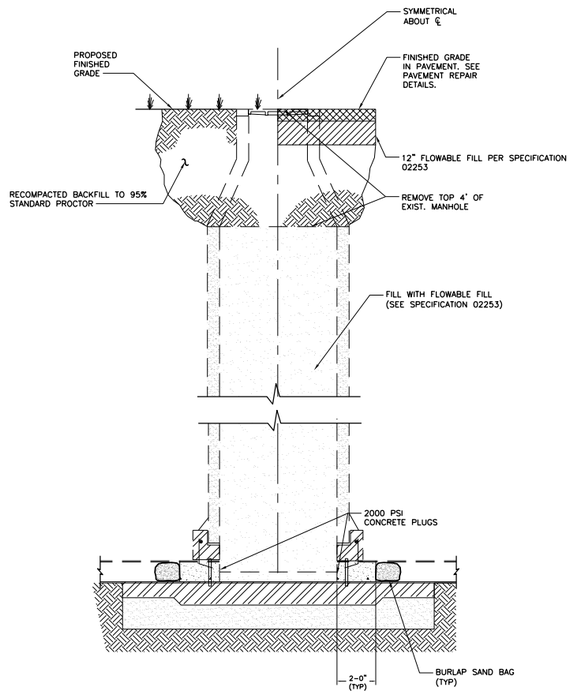


NOTES

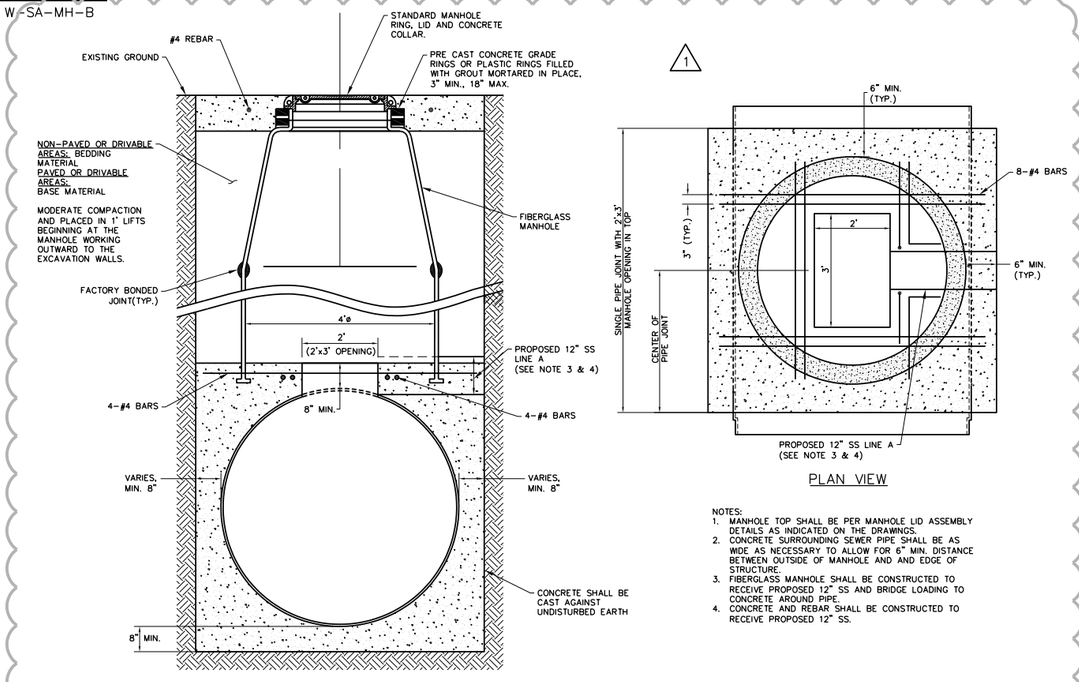
1. DETAIL IS APPLICABLE FOR COVER LESS THAN 30" BUT A MINIMUM OF 10" AND FOR MAINS 12" OR SMALLER.
2. MANHOLES LOCATED WITHIN A 100-YEAR FLOOD PLAIN OR ANY AREA SUBJECT TO STORMWATER INFILTRATION SHALL INCORPORATE A WATERTIGHT, BOLT-DOWN RING AND LID AND AN INFLOW PREVENTION DEVICES (IPDs).
3. MINIMUM ELEVATION DIFFERENCE ACROSS MANHOLE INVERTS SHALL BE AS FOLLOWS:
4. THIS IS A NONE TRAFFIC RATED MANHOLE AND APPROVED ON A CASE BY CASE BASIS BY C.O.S.A. PRIOR TO CONSTRUCTION.

DEFLECTION ANGLE BETWEEN INLET / OUTLET	MIN. ELEVATION DIFFERENCE
LESS THAN 30°	0.10'
GREATER THAN 30°	0.20'

4 — SHALLOW MANHOLE
1"=10' JUNE 2016 W-SA-MH-S



5 — MANHOLE ABANDONMENT DETAIL
NOT TO SCALE



NOTES:
1. MANHOLE TOP SHALL BE PER MANHOLE LID ASSEMBLY DETAILS AS INDICATED ON THE DRAWINGS.
2. CONCRETE SURROUNDING SEWER PIPE SHALL BE AS WIDE AS NECESSARY TO ALLOW FOR 6" MIN. DISTANCE BETWEEN OUTSIDE OF MANHOLE AND AND EDGE OF STRUCTURE.
3. FIBERGLASS MANHOLE SHALL BE CONSTRUCTED TO RECEIVE PROPOSED 12" SS AND BRIDGE LOADING TO CONCRETE AROUND PIPE.
4. CONCRETE AND REBAR SHALL BE CONSTRUCTED TO RECEIVE PROPOSED 12" SS.

6 — MANHOLE FOR CORRECTION TO EXISTING 48" SS MAIN
NOT TO SCALE

100% SUBMITTAL

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144
26 Jul 2017
FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone – (817) 735-7300
Fax – (817) 735-7491
Web – www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE I
BELL ST. ROADWAY & UTILITY IMPROVEMENTS
WATER & SANITARY SEWER DETAILS
MANHOLE DETAILS

NO.	ISSUE	BY	DATE
1	ADDENDUM NO. 1	ABC	7/24/17

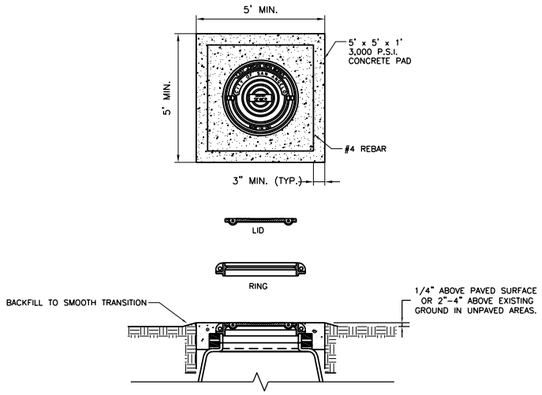
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

FAN JOB NO. SAN16188
DATE 07/07/17
DESIGNED DGS
DRAWN SB
REVISED 7/24/17
CHECKED ABC
FILE NAME CV-PPL-DT-DET01.dwg

SHEET DT-7
SEQ. 133

ACAD Rel: 21.0s (LMS Tech)
Filename: N:\WTU\Drawings\CV-PPL-DT-DET01.dwg
Last Saved: 7/24/2017 9:41 AM Saved By: sb

Plot Date: 7/24/2017 9:44 AM Plot By: sb Filename: N:\WTU\Drawings\CV-PPL-DT-DET01.dwg

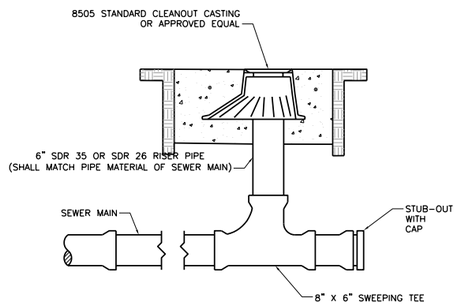


NOTES:

1. MANHOLE RING (V-1420) & LID (V-1430) SHALL BE EAST JORDAN IRON WORKS OR APPROVED EQUAL WITH "CITY OF SAN ANGELO" CUSTOM LETTERING.
2. WATER TIGHT, BOLT-DOWN SPECIFIED RING (V-1420) & LID (V-1430) SHALL BE EAST JORDAN IRON WORKS OR APPROVED EQUAL WITH AN INFLOW PREVENTION DEVICE (IPD).
3. MANHOLE RING & LID SHALL BE MACHINE FITTED WITH TWO (2) PICK BAR SLOTS.
4. MANHOLE RING AND COVER SHALL BE CAST IRON, MEETING THE LATEST REVISION OF ASTM A-48 CLASS 30 WITH A HIGHWAY LOAD RATING OF H-20.
5. MANHOLES LOCATED WITHIN A 100-YEAR FLOOD PLAIN OR ANY AREA SUBJECT TO STORMWATER INFILTRATION SHALL INCORPORATE A WATERTIGHT, BOLT-DOWN RING AND LID AND AN INFLOW PREVENTION DEVICES (IPDs).
6. MANHOLES LOCATED WITHIN UNDEVELOPED AREAS, AGRICULTURAL FIELDS, OR ANY AREA SUBJECT TO BEING OVERGROWN OR OTHERWISE OBSCURED SHALL INCORPORATE A BOLLARD AT EACH CORNER OF THE CONCRETE COLLAR, FOUR (4) TOTAL.

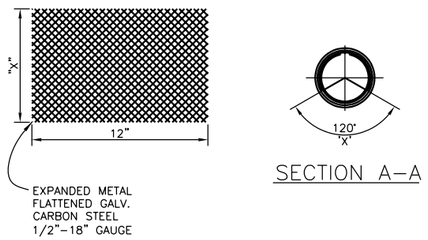
1 – SEWER MANHOLE RING & LID WITH CONCRETE COLLAR

NOT TO SCALE JUNE 2016 W-SA-LID

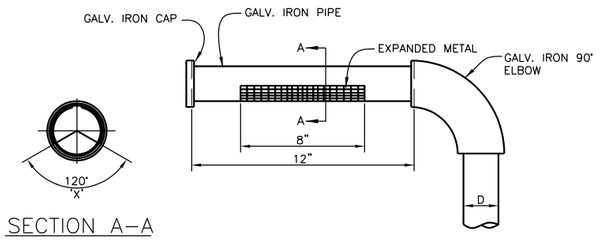


2 – SEWER MAIN CLEANOUT

NOT TO SCALE JUNE 2016 W-SA-CO

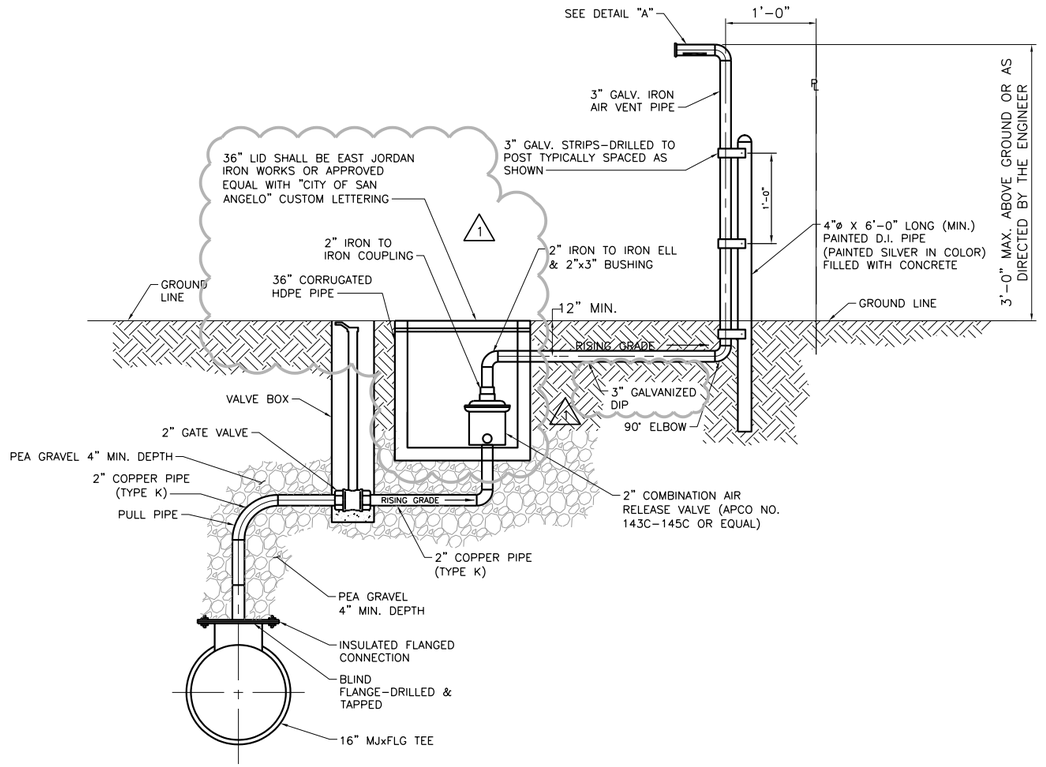


NOTE: EXPANDED METAL PIPE SHALL BE TACK WELDED



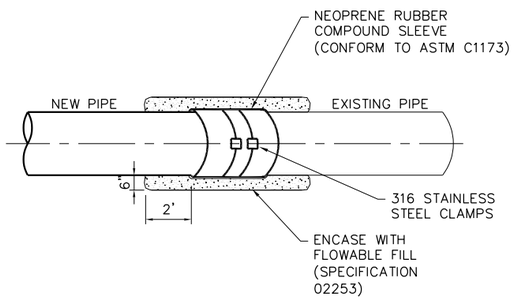
SECTION A-A

DETAIL "A"
NOT TO SCALE



3 – COMBINATION AIR & VACUUM RELEASE VALVE AND METER BOX DETAIL

NOT TO SCALE



4 – SANITARY SEWER SLEEVE DETAIL

NOT TO SCALE

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

STATE OF TEXAS
109794
REGISTERED
PROFESSIONAL
ENGINEER
26 Jul 2017

FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone – (817) 735-7300
Fax – (817) 735-7491
Web – www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE I
BELL ST. ROADWAY & UTILITY IMPROVEMENTS
WATER & SANITARY SEWER DETAILS
MISCELLANEOUS WASTEWATER DETAILS

NO.	ISSUE	BY	DATE
1	ADDENDUM NO. 1	ABC	7/21/17

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1

FAN JOB NO. SAN16188
DATE 07/07/17
DESIGNED DGS
DRAWN SB
REVISED -
CHECKED ABC
FILE NAME CV-PPL-DT-DET01.dwg

SHEET DT-8
SEQ. 134

100% SUBMITTAL

ACAD Rel: 21.0s (LMS Tech)
Filename: N:\WTU\Drawings\CV-PPL-DT-DET01.dwg
Last Saved: 7/21/2017 3:32 PM Saved By: sb

Plot Date: 7/21/2017 3:33 PM Plot By: sb Filename: N:\WTU\Drawings\CV-PPL-DT-DET01.dwg