INTERLOCAL AGREEMENT BY AND BETWEEN
THE CITY OF PLANO, TEXAS AND
NORTH TEXAS MUNICIPAL WATER DISTRICT
FOR REPAIR OF GABION STRUCTURE – ARBOR HILLS NATURE PRESERVE

THIS AGREEMENT is made and entered on _____, 2026 (the "Effective Date") by and between the **CITY OF PLANO, TEXAS**, a home-rule municipal corporation, hereinafter referred to as "Plano," and **NORTH TEXAS MUNICIPAL WATER DISTRICT**, a political subdivision of the State of Texas hereinafter referred to as "NTMWD" or "District," as follows:

W I T N E S S E T H:

WHEREAS, Plano is a political subdivision and NTMWD is a political subdivision of the State of Texas within the meaning of Interlocal Cooperation Act, Texas Government Code, Chapter 791, as amended (the "Act"); and

WHEREAS, the Act provides authority for entities such as Plano and NTMWD to enter into interlocal agreements with each other to perform governmental functions and services as set forth in the Act; and

WHEREAS, NTMWD owns and maintains a gabion structure in need of repair at the Arbor Hill Nature Preserve; and

WHEREAS, Plano is currently performing erosion control work at Arbor Hills Nature Preserve through its contractor, Austin Filter Systems, Inc., pursuant to Contract No. PKR-D-00003 2025-0393-B, executed on September 4, 2025 (the "Contract"); and

WHEREAS, NTMWD has requested Plano include the needed repairs of NTMWD's gabion structure to the Contract and Plano has agreed to do so, subject to reimbursement of those costs by NTMWD.

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

I.
AMENDMENT OF CONTRACT AND REIMBURSEMENT BY NTMWD

1.1 Plano Responsibilities. Plano agrees to amend the Contract to repair the gabion structure around the NTMWD manhole and perform all the necessary work as described in the scope of service attached to this Agreement as Attachment A. Plano shall provide a copy of the change order to the Contract to NTMWD after execution. Plano shall also provide a copy of the final completion of the work under the proposed change order to the District.

1.2 NTMWD Responsibilities. NTMWD agrees to pay Plano Eighty Thousand Five Hundred Thirty-Eight and 00/100 Dollars ($80,538.00) for the services to be performed pursuant to the proposed change order to the Contract, payment to be made by the District to Plano within fifteen (15) days of the Effective Date of this Agreement.

II.
GENERAL PROVISIONS

2.1 Term of Agreement. This Agreement shall be in force and effect from the Effective Date until all obligations contemplated herein are completed.

2.2 Address and Notice. Unless otherwise provided in this Agreement, any notice, communication, request, reply, or advice (herein severally and collectively, for convenience called "Notice") herein provided or permitted to be given, made, or accepted by any party must be in writing and may be given or served in any reasonable manner necessary to reach each of the other parties. Notice sent by certified or registered mail, postage prepaid, return receipt requested, shall be deemed to have been received on the second mail delivery day following the day on which it was posted. Notice by any other method shall be effective when received. For the purpose of Notice, the addresses of the parties shall be, until changed as hereafter provided, as follows:

Jennafer P. Covington	Mark D. Israelson
Executive Director/General Manager	City Manager
North Texas Municipal Water District	City of Plano, Texas
501 East Brown Street	1520 K Avenue
P.O. Box 2408	P.O. Box 860358
Wylie, TX 75098	Plano, TX 75086-0358

Any party may change the address for notice by giving notice of such change in accordance with the provisions of this section.

2.3 State and Federal Laws, Rules, Order, or Regulations. This Agreement is subject to all applicable Federal and State Laws and applicable permits, ordinances, rules, orders, and regulations of any local, State, or Federal Governmental Authority having or asserting jurisdiction, but nothing contained herein shall be construed as a waiver of any right to question or contest any such law, ordinance, order, rule, or regulation in any forum having jurisdiction.

2.4 Liability. The parties agree and acknowledge that each party is not an agent of the other party and that each party is responsible for its acts, forbearances, negligence and deeds, and for those of its agents or employees in conjunction with each party's performance under this Agreement.

2.4 Assignment. This Agreement shall not be assignable by either party in whole or in part without the written consent of the non-assigning party, which consent shall not be unreasonably withheld.

2.5 Governing Law. The validity of this Agreement and of any of its terms or provisions, as well as the rights and duties hereunder, shall be governed by the Laws of the State of Texas.

2.6 Venue. It is specifically agreed by the parties to this Agreement, that Collin County, Texas is the place of performance of this Agreement; and in the event that any legal proceeding is brought to enforce this Agreement or any provisions hereof, the same shall be brought in Collin County, Texas.

2.7 General. The provisions of this Agreement are severable, and if any provision or part of this Agreement or the application thereof to any person or circumstance shall ever be held

by any court of competent jurisdiction to be invalid or unconstitutional for any reason, the remainder of this Agreement and the application of such provision or part of this Agreement to other persons or circumstances shall not be affected thereby.

2.8 Immunity. It is expressly understood and agreed that, in the execution of this Agreement, neither Party waives, nor shall be deemed hereby to have waived any immunity or defense that would otherwise be available to it against claims arising in the exercise of governmental powers and functions. By entering into this Agreement, the Parties do not create any obligations, expressed or implied, other than those set forth herein, and this Agreement shall not create any rights in parties not signatories hereto.

2.9 Entire Agreement. This Agreement embodies the entire agreement between the Parties and may only be modified in writing executed by both Parties.

2.10 Governmental Functions. The Parties acknowledge and agree that the performance by NTMWD and Plano of their respective obligations under this Agreement constitute governmental functions.

IN WITNESS WHEREOF, the Parties hereto acting under authority of their respective governing bodies have caused this Agreement to be duly executed in several counterparts, each of which shall constitute an original.

NORTH TEXAS MUNICIPAL WATER DISTRICT

Date: _____ By: _____
Jennafer P. Covington
EXECUTIVE DIRECTOR/GENERAL MANAGER

CITY OF PLANO, TEXAS

Date: _____ By: _____
Mark D. Israelson
CITY MANAGER

APPROVED AS TO FORM:

_____
for Paige Mims, CITY ATTORNEY

ATTACHMENT “A”

MEMORANDUM

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TO: NTMWD - Amin Tehrani PhD, PE; Scott Hoelzle PE

CC: City of Plano - Courtney Vanous, MES, REM, CESSWI

FROM: Stephen Norair II, PG; Jonathan Swchwartzenberg, PE, CFM; Keith Byrne, PE, CFM

SUBJECT: Design Recommendation - Arbor Hills Gabion Drop Structure Repair & Improvement

DATE: 12/22/2025

PROJECT: NTD25058/PLA24018

Introduction

The gabion drop structure located within Arbor Hills Nature Preserve serves as a vital protection measure for pipe segments and a manhole associated with Indian Creek Trunk I Sewer (MXLOCATIONS WWPI39545, WWPI39550, and WWMH39545). This structure is in poor condition and repairs to this structure are currently proposed by repairing the gabion drop structure back to its initial condition and placing additional rock riprap on the downstream extent of the structure. This memo provides design recommendations for the repair and improvement to this gabion drop structure.

Existing Condition

The gabion drop structure located in Arbor Hills Nature Preserve is in poor condition and needs to be repaired to continue providing protection to an Indian Creek Trunk Sewer manhole and upstream sewer line. This structure is also holding the upstream channel elevation. If this structure continues to degrade, the manhole and/or sewer line could be impacted, and instabilities could migrate upstream through the watershed and causing long-term channel downcutting and widening.

The following observations were made during a site visit performed on July 15th, 2025 and December 18th, 2025, about the condition of the structure. Photos and their location of observed conditions are shown in Attachment 1.

- Multiple gabion baskets and blankets have been breached and have damaged, misshapen, or protruding wire.
- Ballast/rock is missing from multiple baskets and blankets.
- The gabion channel bottom is uneven due to differential settling of the baskets and damage/removal of material.
- Damage to the baskets and missing ballast is most prominent on the downstream extent of the structure on the channel bottom.
- Surface drainage and overbank flow are flanking around the outside of the structure on the left and right streambanks. Return flow to the channel has caused erosion behind the terminal gabion baskets. The terminal gabion baskets have rotated and are leaning away from the channel where material has been removed.

- A large fallen tree/woody debris is present on the upstream side of the gabion structure and has punctured the gabion. Collected debris could cause local scour on streambanks upstream of the structure.
- Scour was observed on the left streambank downstream of the structure on the outside of the stream bend, this is associated with meander migration.
- The channel bottom has downcut approximately 3 feet to marl bedrock since the structure was constructed according to available as-builts. The terminal gabion at the downstream extent of the structure is being undermined.

It should be noted that the original construction plan set (Attachment 2) and the constructed gabion structure have slight discrepancies due to change orders that occurred during the initial construction efforts. Two major differences were discovered:

- The construction plan set shows the gabion mattresses filled with grouted rock riprap. This material was not adequate so gabion rock was used as ballast (the same ballast material as the gabion baskets).
- The location and extents of gabion baskets and gabion mattress used within the structure.

Gabion Structure Repair Materials

The proposed repairs and improvements include repairing and/or replacing the damaged gabion mattress and baskets in the structure.

Repairing gabion mattresses and baskets shall include the following:

- Torn wire mesh to be restitched using galvanized/PVC coated lacing wire
- Damaged sections of gabion to be patched with new panels that are to be connected with lacing wire or hog rings
- Patches to overlap a minimum of 3 inches and secured with spiral binders, lacing wire or hog rings.

The gabion rock used for the ballast material should match the specifications from the original construction plan set (the original construction plan set is provided in Attachment A; gabion rock specifications can be found on page 19). The estimated volume of gabion rock is shown in **Table 1**.

Additional Rock Riprap Size Gradation & Volume

A combination of methods were used to calculate the rock riprap size gradation for the additional rock riprap protection measures. The results from each method were considered to decide the rock riprap size gradations needed. The variables used in the equations were informed by channel dimensions measured during the site visit, the available gabion structure's construction plan set, results from the effective hydraulic model/hydrologic analysis performed during the downstream Arbor Hills Nature Preserve Erosion Control, Pedestrian Bridge (Project No. PKR-D-00003) improvements project currently under construction. These methods include:

- The ARS Rock Chute Method (NRCS, 1998). This method uses an equation designed for sizing rock riprap on steep high-energy sections of channel.
- The Shields Entrainment Formula for largest moveable grain size in stream channels (Rosgen, 1996).
- Comparison of the rock riprap gradations used in the streambank protection components of the downstream erosion control project.

- Fundamental stream restoration and sediment transport concepts (e.g., stream bed material/rock riprap protection measures are less mobile when there is minimal void space between grains, scour pool formation below structures, and stream bed friction effects on particle entrainment).

The proposed rock riprap gradations and volume of rock required is shown in **Table 1**. The stone gradations that will be used match the sizes used in the Pedestrian Bridge project, so that the material can be readily sourced by the on-site contractor. It should be noted that these rock riprap gradations will be used to create a custom rock riprap mix before being placed. This process is described below.

Table 1. Rock Riprap Size Gradations used in Gabion Drop Structure Repair and Improvements

Stone Class	D15 (in)	D50 (in)	D75 (in)	D100 (in)	Volume Required (Cu Yd)
Gabion Stone (Ballast)	GABION BASKETS (CONT.) 4. The rock (gabion stone) shall be clean, hard, durable washed limestone, 4" to 8" in size, and of such quality that they shall not disintegrate on exposure to water or weathering during the life of the structure. Stone fill shall meet the quality requirements (ASTM C 33) and freezing and thawing requirements (ASTM D 5312) for the region of the United States in which the structure will be constructed. Prior to placing stone, samples shall be delivered to the site and shall approved for gradation and appearance by the Engineer. *Excerpt from Gabion Drop Structure Construction Plans regarding gabion basket ballast specifications.				25
Rock Riprap Type "E"	9.0	18.0	23.4	28.8	95
Rock Riprap Type "F"	3.0	6.0	7.8	9.6	19
Stone Bed Material (ASHTO #57 or Similar)	0.33	0.66	0.85	1.5	20

Design Approach

The design approach to repair and improve the gabion drop structure is listed below. These items are also shown on **Exhibits 1,** which overlays the additional rock riprap protection measures over the construction detail from the original gabion drop structure plan set, which overlay the proposed improvements over site photos. The proposed repairs do not address the fundamental stresses that are inherent to this reach of stream. It is suggested that the site be monitored and it should be expected that repairs will be needed in the future.

1. Repair damaged gabion basket and mattress wiring and replace missing ballast as needed. Replace failed gabion mattresses and basket. If a void is present beneath replaced gabion mattresses or basket fill voids with gabion ballast. The location of the gabion structure repairs are shown on **Exhibit 1.**

2. Prepare the left and right streambanks for the placement of rock riprap by clearing brush and any debris. Large trees (>6") to remain in place.

3. The rock riprap protection used is called “Void Filled Rock Riprap”. This material created on site by mixing the gradations shown on **Table 1**. On-site mixing of larger and smaller gradations results in a rock riprap where the grains can lock together to provide a more erosion resistant protection measure than traditional rock riprap which contains pore space between individual grains.

   The Void Filled Rock Riprap used is created by:

   a. Void Filled Mix #1 – To make Void Filled Mix #1, mix:
      i. 2 loader buckets of Rock Riprap Type “E”
      ii. 1 loader bucket of Rock Riprap Type “F”
      iii. 1 loader bucket of Stone Bed Material (ASHTO #57)
   b. The resulting mix has minimal voids between individual grains.

4. Place Void Filled Mix #1 (described in Step 3) along the stream thalweg:
   a. Void Filled Mix #1 should extend across 15’ for approximately 15 feet downstream of gabion structure.
   b. The top of the void filled rock riprap shall match gabion structure elevation (+/-4").
   c. The void filled rock riprap in the stream shall have a minimum thickness of 4'.
   d. At the end of the stream protection embed the void filled rock riprap a minimum 4' below the thalweg of the stream to lock into place.

5. Place Void Filled Mix #1 over the prepared left and right streambank:
   a. Void Filled Mix #1 should extend from the toe of the streambank and tie into the top of the streambank and wrap around the gabion basket as shown in **Exhibit 1.**
   b. Void Filled Mix #1 should begin at the downstream edge of the gabion structure and continue downstream as shown in **Exhibit 1.**
   c. The Void Filled Mix #1 should have a minimum thickness of 4 feet.

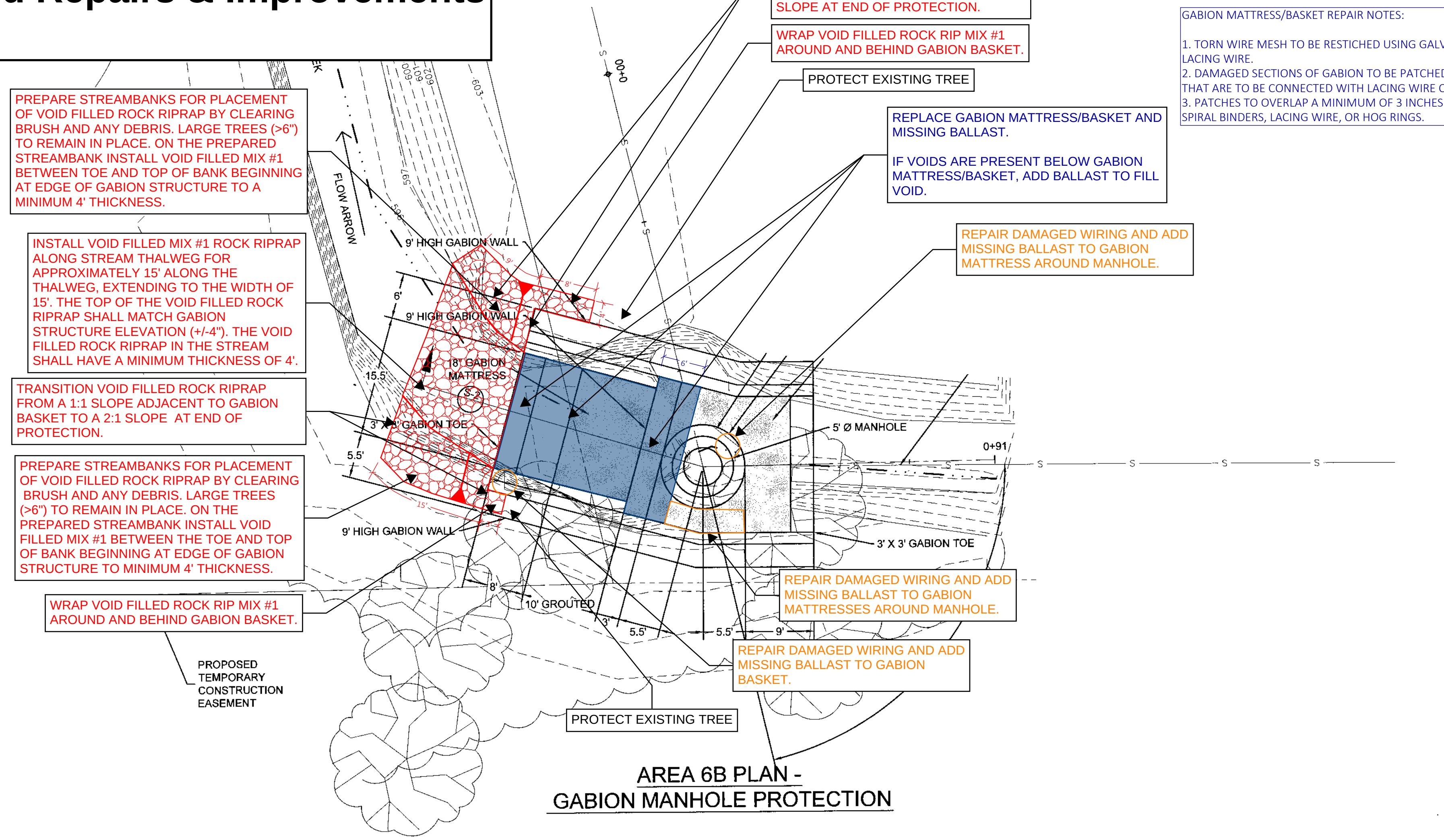
404 Considerations

Projects which result in the discharge of dredged or fill materials into waters of the U.S. require authorization from the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act. It is the opinion of FNI that the placement of fill associated with the proposed repair and maintenance of the existing gabion basket drop structure would be covered under Nationwide Permit (NWP) 3, *Maintenance.* NWP 3 allows for the repair, rehabilitation, or replacement of previously authorized, currently serviceable structures or fill that are not being put to a new use. The planned activities are limited to in-kind repairs with minor deviations necessary to meet safety standards and would not result in new stream channelization or stream relocation and include minimal expansion of the existing structures footprint (< 0.01 acre). The proposed project area appears to have been thoroughly disturbed by the installation of the existing drop structure; therefore, the project would not impact the habitat of federally listed threatened and endangered species or cultural resources. Consequently, it is FNI's opinion that the proposed scope of work does not trigger the requirement of a pre-construction notification (PCN) or project specific coordination with the USACE, provided the work remains within the parameters described by the design approach above and complies with all terms and conditions of NWP 3.

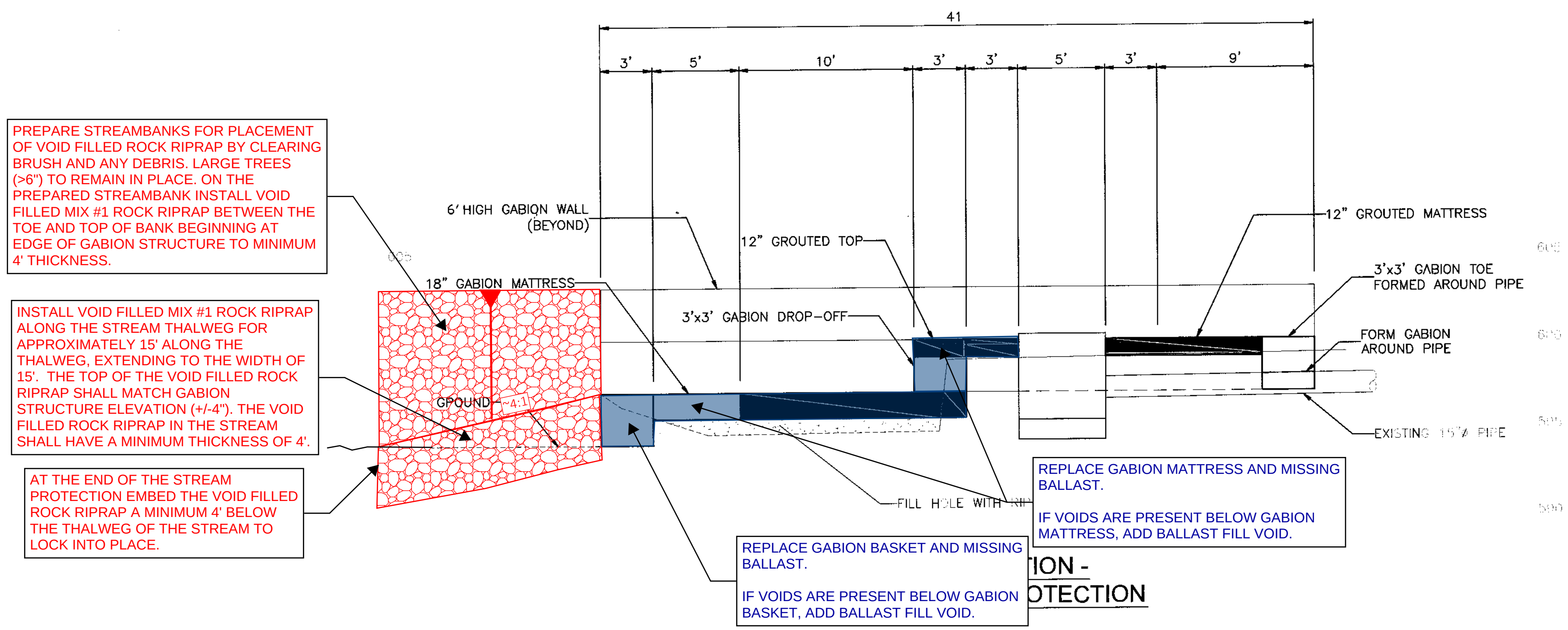
Exhibit 1 - Proposed Repairs & Improvements
N.T.S.

GABION MATTRESS/BASKET REPAIR NOTES:

1. TORN WIRE MESH TO BE RESTICHED USING GALVANIZED/PVC COATED LACING WIRE.
2. DAMAGED SECTIONS OF GABION TO BE PATCHED WITH NEW PANELS THAT ARE TO BE CONNECTED WITH LACING WIRE OR HOG RINGS.
3. PATCHES TO OVERLAP A MINIMUM OF 3 INCHES AND SECURED WITH SPIRAL BINDERS, LACING WIRE, OR HOG RINGS.



AREA 6B PLAN - GABION MANHOLE PROTECTION



...ION - ...OTECTION

HORIZONTAL SCALE IN FEET: 20' 0 20' 40'

VERTICAL SCALE IN FEET: 5' 0 5' 10'

LEGEND

SEWER LINE	—S—
MANHOLE	Ⓢ
CONTOUR	— 600 —
FLOW DIRECTION	←
EXISTING EASEMENT	— — —
CONCRETE REMOVAL	

NOTES

1. THE CONTRACTOR SHALL ESTABLISH BYPASS OF THE EXISTING STREAM FLOW BY CONSTRUCTING A COFFERDAM AND BYPASS PUMPING.
2. THE CONTRACTOR SHALL TAKE CARE IN REMOVING EXISTING CONCRETE ENCASING THE EXISTING SEWER PIPE.
3. ONCE PIPE IS EXPOSED, CONTRACTOR SHALL BYPASS PUMP EXISTING SEWER FLOWS (MAX 7 CFS), CONSTRUCT NEW MANHOLE, AND INSTALL NEW PIPE.
4. CONTRACTOR SHALL COAT NEW MANHOLES WITH RAVENS COATING OR ENGINEER APPROVED EQUAL.
5. INSTALL GASKETED RING AND COVERS, AND BOLTED MANHOLE LID.
6. THE MAXIMUM FLOW FROM THE EXISTING SEWER PIPE FOR BYPASS PUMPING PURPOSES IS APPROXIMATELY 7 CFS.

Texas811 Know what's below. Call before you dig.

MARK | REVISION | DATE

P:\CIVIL 3D PROJECTS\NT005\SHEETS\PLAN_SITE-6.DWG: AREA 6B PLAN AND PROFILE 10/7/2010-10:30 AM

DRAWING PATHNAME: LAYOUT: PLOT DATE TIME

SHEET NAME: AREA 6B PLAN AND PROFILE

PROJECT NAME: NORTH TEXAS MUNICIPAL WATER DISTRICT MCKINNEY-PROSPER INTERCEPTOR AND INDIAN CREEK TRUNK SEWER IMPROVEMENTS

DRAWN BY: JDB | DESIGNED BY: SSH | LATEST REVISION: 11/5/2014 | KSA JOB NO: NT.005

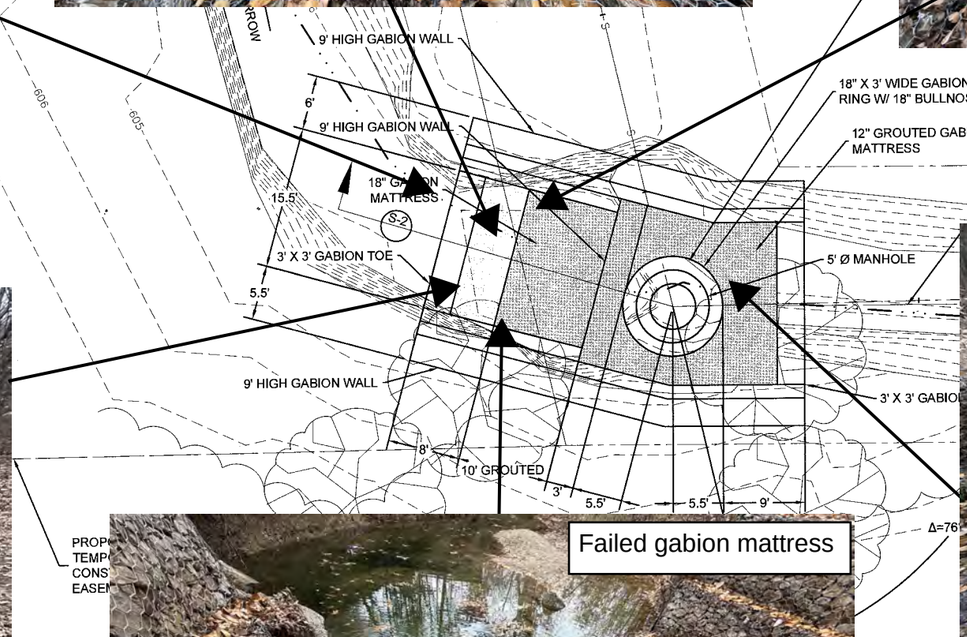
KSA ENGINEERS

8875 Synergy Dr. McKinney, Texas 75070 T.972-542-2995 F.972-542-6750 www.ksaeng.com

SHEET NO. 11 OF 13

Damaged/failed gabion mattresses and gabions.

Damaged gabion mattresses and gabions.
Scour on downstream left bank.



Scour on downstream edges of structure.
Failed gabion mattress

Failed gabion mattress

Damaged gabion mattresses and gabions

Attachment 1 - Observed Site Conditions

NORTH TEXAS MUNICIPAL WATER DISTRICT

CONSTRUCTION PLANS FOR

MCKINNEY - PROSPER INTERCEPTOR AND INDIAN CREEK TRUNK SEWER IMPROVEMENTS

PROJECT NO. 220

KSA
ENGINEERS

8875 Synergy Dr. McKinney, Texas 75070
T.972-542-2995 F.972-542-6750
www.ksaeng.com
TBPE Firm Registration No. F-1356

STATE OF TEXAS
CHRISTOPHER LEPPERT
112342
LICENSED
PROFESSIONAL ENGINEER
11-4-2014

GENERAL NOTES

1. TRAFFIC CONTROL DEVICES SHALL BE FURNISHED AND MAINTAINED BY THE CONTRACTOR THROUGHOUT THIS PROJECT IN ACCORDANCE WITH THE LATEST VERSION OF THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (TX MUTCD) AND AS REQUIRED BY TXDOT FOR CONSTRUCTION ON STATE RIGHT-OF-WAY.

2. CONTRACTOR WILL BE RESPONSIBLE FOR SETUP AND MAINTENANCE OF ALL TRAFFIC CONTROL DEVICES INCLUDING BUT NOT LIMITED TO FLAGMEN, TRAFFIC CONES, TRAFFIC BARRELS, FLASHING BARRICADES, TEMPORARY PAVEMENT STRIPING, CONSTRUCTION SIGNS, ETC. ALL TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH TX MUTCD.

3. LOCATION, DEPTH, AND SIZES OF EXISTING UTILITIES, WHETHER SHOWN ON THESE DRAWINGS OR NOT, SHALL BE VERIFIED PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL ANTICIPATE ALL UNDERGROUND OBSTRUCTIONS SUCH AS, BUT NOT LIMITED TO, WATER MAINS, GAS LINES, STORM AND SANITARY SEWERS, TELEPHONE, ELECTRIC LIGHT, POWER DUCTS, CONCRETE, AND DEBRIS. ANY SUCH LINES OR OBSTRUCTIONS INDICATED ON THE DRAWINGS SHOW ONLY THE APPROXIMATE LOCATIONS AND SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR. THE OWNER AND ENGINEER WILL ENDEAVOR TO FAMILIARIZE THE CONTRACTOR WITH ALL KNOWN UTILITIES AND OBSTRUCTIONS, BUT THIS SHALL NOT RELIEVE THE CONTRACTOR FROM FULL RESPONSIBILITY IN ANTICIPATING ALL UNDERGROUND OBSTRUCTIONS WHETHER OR NOT SHOWN ON THE DRAWINGS.

4. ALL EXISTING UTILITIES AND SERVICES WHICH MAY BE ENCOUNTERED IN THE WORK SHALL BE MAINTAINED IN PROPER WORKING ORDER WITHOUT INTERRUPTION OF SERVICE. WITH THE CONSENT OF THE ENGINEER AND THE UTILITY OWNER, SUCH SERVICE CONNECTIONS MAY BE TEMPORARILY INTERRUPTED TO PERMIT THE CONTRACTOR TO REMOVE DESIGNATED LINES OR TO MAKE TEMPORARY CHANGES IN THE LOCATIONS OF SERVICES. THE COST OF MAKING ANY CHANGES OR TEMPORARY INTERRUPTIONS SHALL BE AT THE CONTRACTOR'S EXPENSE.

5. ALL PORTIONS OF PAVEMENT NOT DESIGNATED FOR RECONSTRUCTION THAT ARE DAMAGED BY CONSTRUCTION SHALL BE REPAIRED TO ORIGINAL OR BETTER CONDITION ACCORDING TO THE STANDARD DESIGN AND PROCEDURES OF THE CITY, COUNTY OR STATE ENTITY HAVING JURISDICTION OVER THE PARTICULAR WORK. ALL AREAS OF PAVEMENT REPAIR SHALL BE REMOVED AFTER SAW CUTTING THE EXISTING PAVEMENT TO FULL DEPTH. DIRECT PAYMENT WILL NOT BE MADE FOR SAWCUTS.

6. THE EXISTING PAVEMENT MAY NOT SUPPORT CONSTRUCTION TRAFFIC. THE CONTRACTOR SHALL LIMIT LOAD AS NECESSARY TO PREVENT DAMAGE TO THE EXISTING PAVEMENT, OR SHALL INCLUDE IN HIS BID ADEQUATE BUDGET TO REPAIR DAMAGE TO ANY EXISTING PAVEMENT SURFACES.

7. CONSTRUCTION EQUIPMENT AND VEHICLES SHALL TRAVEL A MINIMUM AMOUNT ON NEWLY CONSTRUCTED PAVEMENTS SO THAT THE NEWLY CONSTRUCTED AREAS WILL NOT BE DAMAGED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OF ANY DAMAGE TO THE NEWLY CONSTRUCTED PAVEMENTS AT THE CONTRACTOR'S EXPENSE.

8. ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE REPAIRED TO ORIGINAL OR BETTER CONDITION.

9. ALL WASTE MATERIAL SHALL BE PROPERLY DISPOSED OF OFF-SITE AT NO COST TO THE OWNER.

10. EXCAVATED MATERIALS NOT MEETING SPECIFICATIONS FOR PROPOSED CONSTRUCTION MATERIALS SHALL BE CONSIDERED WASTE AND SHALL BE PROPERLY DISPOSED OF OFF-SITE AT NO COST TO THE OWNER.

11. CONTRACTOR SHALL RESTORE ALL WORK AREAS AND RE-ESTABLISH PROPER DRAINAGE. FINISHED GROUND SHALL NOT CONTAIN ANY MORE ROCK OR DEBRIS THAN THE SURROUNDING UNDISTURBED GROUND AND NO ROCK GREATER THAN 2".

12. PROPER SITE DRAINAGE SHALL BE MAINTAINED DURING CONSTRUCTION SO THAT PONDING OF SURFACE RUNOFF DOES NOT OCCUR AND CAUSE CONSTRUCTION DELAYS, INHIBIT SITE ACCESS, OR DAMAGE PRIVATE PROPERTY.

13. CONTRACTOR SHALL PROVIDE SILT FENCE OR OTHER NECESSARY METHODS TO KEEP SILT MATERIAL FROM WASHING OFF-SITE.

14. CONTRACTOR SHALL KEEP DIRT, MUD AND DEBRIS OFF THE HIGHWAY WITHIN THE PROJECT VICINITY. CONTRACTOR SHALL IMMEDIATELY CLEAN DIRT, MUD AND DEBRIS FROM HIGHWAY AS SOON AS IT IS NOTICED BY THE CONTRACTOR OR NOTIFIED BY THE ENGINEER OR OWNER (NO DIRECT PAY).

15. TOPSOIL SHALL BE STOCKPILED AND REPLACED TO A MINIMUM DEPTH OF 4 INCHES.

16. CONTRACTOR SHALL REVEGETATE TURF IN ALL AREAS WHERE EXISTING TURF IS DISTURBED BY CONSTRUCTION ACTIVITIES. REVEGETATION SHALL BE OF LIKE KIND AND WEED FREE.

17. EXISTING IMPROVEMENTS INCLUDING, BUT NOT LIMITED TO FENCES, PAVEMENT, UTILITY PIPELINES, OIL AND GAS PIPELINES, DRAINAGE STRUCTURES, LANDSCAPING FEATURES, SHRUBS AND FLOWERS, SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR IN THE SAME LOCATION, AND IN A CONDITION WHICH IS EQUAL TO OR BETTER THAN THE ORIGINAL CONDITION. NO SEPARATE PAYMENT SHALL BE MADE FOR THESE ITEMS EXCEPT AS PROVIDED IN THE BID PROPOSAL.

18. ALL EXISTING PAVEMENT SHALL BE SAWCUT TO ENSURE A STRAIGHT SMOOTH SURFACE. ALL CUTS SHALL BE SAWCUT IN STRAIGHT PERPENDICULAR LINES, UNLESS INDICATED DIFFERENTLY IN THE PLANS (NO DIRECT PAY).

19. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LAWS AND REGULATIONS REGARDING WATER OR STORM WATER POLLUTION AND EROSION CONTROL. THE CONTRACTOR SHALL MINIMIZE TURBIDITY IN WATERWAYS DURING ALL PHASES OF THE PROJECT BY EMPLOYING ADEQUATE METHODS TO CONTROL SILT RUNOFF OR DISPERSION IN WATERWAYS. CONTROL OF TURBIDITY SHALL INCLUDE NEAR AND LONG TERM EROSION FROM FILL, SPOIL, AND/OR DEVEGETATED AREAS DURING AND FOLLOWING THE COMPLETION OF CONSTRUCTION.

20. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN ALL HORIZONTAL AND VERTICAL CONSTRUCTION STAKING AS REQUIRED FOR THE PROJECT DEVELOPMENT.

21. CONTRACTOR SHALL PROVIDE THE OWNER A VIDEO ON DVD DOCUMENTING THE EXISTING CONDITION OF THE PROJECT SITE PRIOR TO START OF ANY CONSTRUCTION.

22. THE CONTRACTOR SHALL SUBMIT FOR APPROVAL A PLAN SHOWING PROPOSED PARKING AND STORAGE LOCATIONS. THIS PLAN WILL HAVE TO BE APPROVED BY THE OWNER AND ENGINEER PRIOR TO COMMENCING WORK. THE CONTRACTOR SHALL PARK ALL EQUIPMENT IN THE STORAGE AREA WHEN NOT IN USE.

23. ALL WORK WILL BE ACCOMPLISHED DURING NORMAL DAYTIME WORKING HOURS ONLY (7AM - 6PM) OR AS APPROVED BY THE ENGINEER.

24. STOCKPILE LOCATION SHALL BE ADJUSTED IN THE FIELD AND COORDINATED WITH THE OWNER AND THE ENGINEER. STOCKPILE SHALL NOT CREATE ANY PONDING OF WATER OR ALTER DRAINAGE PATTERNS.

25. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND ACQUIRING AN ACCEPTABLE WATER SOURCE AS REQUIRED FOR CONSTRUCTION.

26. THE CONTRACTOR SHALL MAINTAIN A CLEAN SAFE CONSTRUCTION WORK AREA. THE CONTRACTOR SHALL PERFORM CLEANUP OPERATIONS ON A DAILY BASIS.

27. THE CONTRACTOR SHALL NOT DEVIATE FROM THE APPROVED CONSTRUCTION PHASING PLAN WITHOUT FIRST OBTAINING APPROVAL FROM THE ENGINEER.

28. THE CONTRACTOR SHALL HAVE SUFFICIENT EQUIPMENT AND PERSONNEL ON SITE TO ACCOMPLISH EFFICIENT AND PROMPT CONSTRUCTION OF THE VARIOUS WORK ITEMS, INCLUDING WORK ON MORE THAN ONE WORK ITEM SIMULTANEOUSLY.

29. NO TRENCHES IN OR DIRECTLY ADJACENT TO OPERATIONAL PAVEMENT SHALL REMAIN OPEN OVERNIGHT OR WHEN THE CONTRACTOR FINISHES WORK FOR THE DAY IN THE AREA. TRENCHES NOT BACKFILLED SHALL BE COVERED WITH STEEL PLATES.

30. WORK CANNOT COMMENCE UNTIL:

A. ALL SAFETY EQUIPMENT FOR PERSONNEL AND CONSTRUCTION EQUIPMENT IS IN PLACE AND OPERABLE.

B. A NOTICE TO PROCEED HAS BEEN ISSUED TO THE CONTRACTOR.

31. ALL MATERIAL SUBMITTALS FOR ITEMS TO BE USED IN CONSTRUCTION OF THE PROJECT SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO COMMENCEMENT OF WORK.

32. A COMPLETE PROJECT SCHEDULE SHALL BE PROVIDED AT THE PRE-CONSTRUCTION MEETING AND PRESENTED AND EXPLAINED BY THE CONTRACTOR TO THE MEETING ATTENDEES.

33. THE CONTRACTOR IS RESPONSIBLE FOR THE LOCATION AND RESTRICTIONS FOR SERVICING AND MAINTAINING EQUIPMENT AND DISPOSAL OF USED LUBRICANTS, ETC. ACCORDING TO THE PERTINENT LAW AND REGULATIONS.

34. PROVIDE FLAGMAN FOR ARBOR HILLS NATURE PRESERVE HIKE AND BIKE TRAILS WHILE CONSTRUCTION EQUIPMENT AND MATERIALS ARE BEING MOVED TO AND FROM THE CONSTRUCTION SITE.

35. THE CONTRACTOR SHALL RESTORE ALL AREAS USED TO ACCESS EACH SITE, ALL TEMPORARY CONSTRUCTION AREAS, AND ALL STAGING AREAS TO CONDITIONS EXISTING BEFORE CONSTRUCTION COMMENCED. RESTORATION INCLUDES THE REGRADING OF RUTS FROM EQUIPMENT; REPLACEMENT OF GRASS, SHRUBS, AND TREES; AND THE REPAIR OF FENCES, GATES, AND PAVEMENT TO OWNER'S SATISFACTION. RESTORATION OF SEEDING SHOULD BE PER SPECIFICATION 02936.

SHEET LIST TABLE

BYPASS PUMPING NOTES

A BYPASS PUMPING PLAN SHALL BE PREPARED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO IMPLEMENTING THE BYPASS PLAN PER SPECIFICATION 01506 BYPASS PUMPING. THE BYPASS PLAN SHALL CONTAIN THE MINIMUM INFORMATION REQUIRED, SUCH THAT THE ENGINEER HAS INFORMATION NECESSARY TO EVALUATE AND PRIORITIZE A RESPONSE TO EMERGENCY CONDITIONS. THE MINIMUM INFORMATION INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING:

1. A MAP WITH THE EXACT LOCATION OF MANHOLES TO BE PLUGGED,
2. MAP WITH EXACT LOCATION OF BYPASS SUCTION AND DISCHARGE,
3. A MAP IDENTIFYING THE LOWEST TWO MANHOLES
4. VALVE TYPE, IDENTIFIED ON BYPASS MAP,
5. BYPASS PUMPING PLAN, INCLUDING A CONTINGENCY PLAN,
6. IDENTIFY HOW THE BYPASS PUMPS WILL BE MONITORED AND CONTROLLED
7. EQUIPMENT - PUMP TYPE, PUMP CAPACITY, PIPE TYPE, PIPE DIAMETER, PIPE LENGTH
8. SEWER SPILL/SEWER OVERFLOW RESPONSE PLAN
9. HYDROGRAPH, ESTIMATED HOURS OF NON-OPERATION POSSIBLE.

MARK	REVISION	DATE

P:\DWG_2D PROJECTS\NT005\SHEETS\
NT005_GENERAL NOTES.DWG\ GENERAL NOTES-SHEET INDEX:
10/7/2010 10:30 AM
DRAWING PATHNAME\ LAYOUT\ PLOT DATE-TIME

SHEET NAME: GENERAL NOTES AND SHEET INDEX

PROJECT NAME: NORTH TEXAS MUNICIPAL WATER DISTRICT
MCKINNEY-PROSPER INTERCEPTOR AND INDIAN CREEK TRUNK SEWER IMPROVEMENTS

DRAWN BY:	DESIGNED BY:	LATEST REVISION:	KSA JOB NO:
JDB	SSH	11/5/2014	NT 005

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11-4-2014

SEAL:
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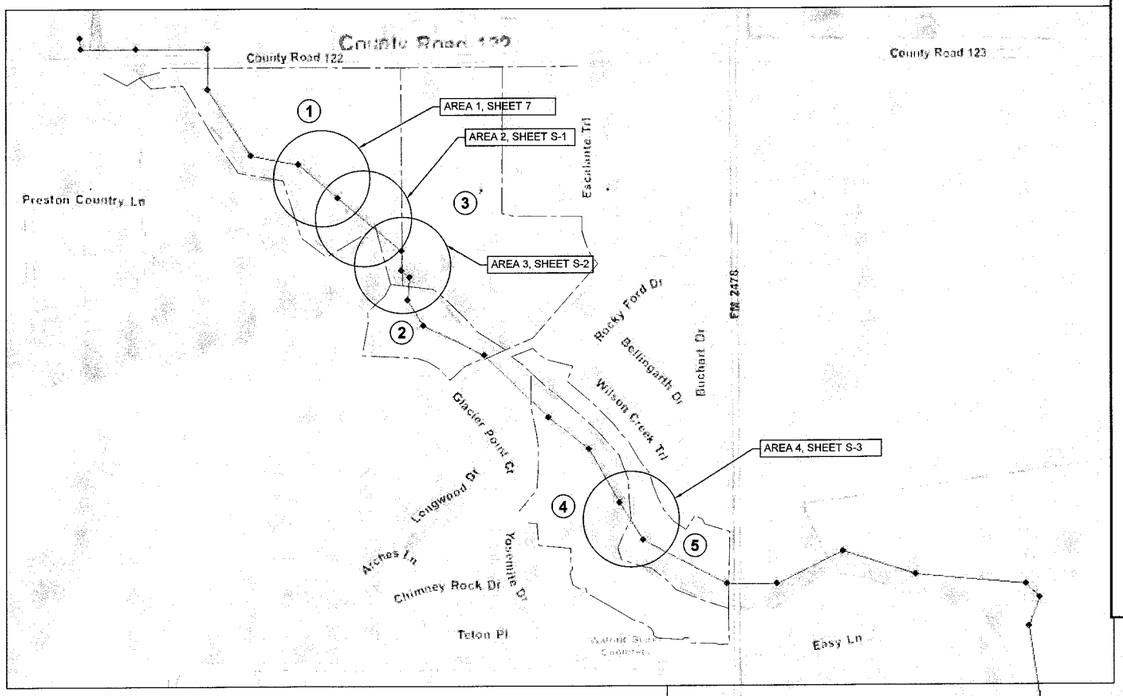
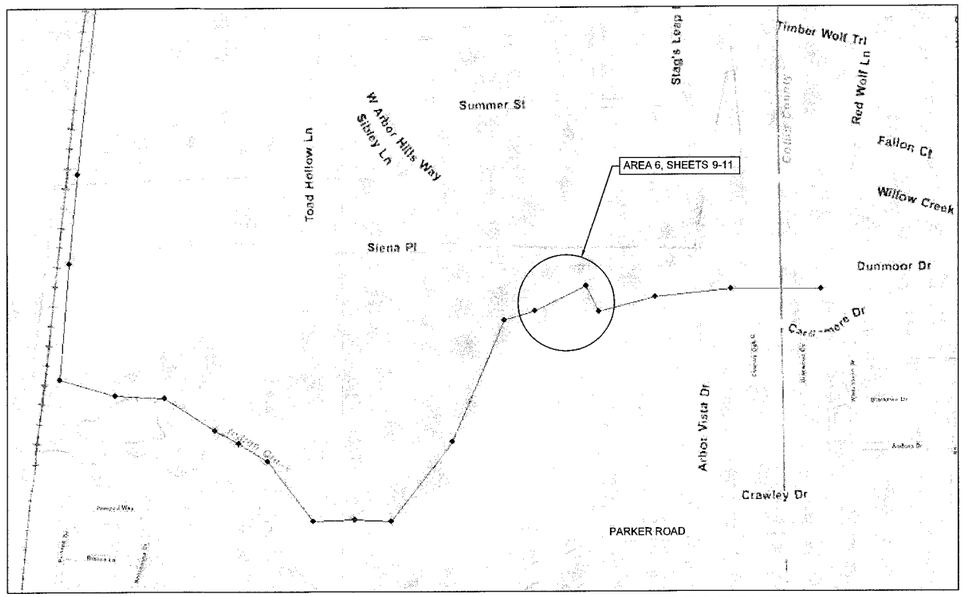
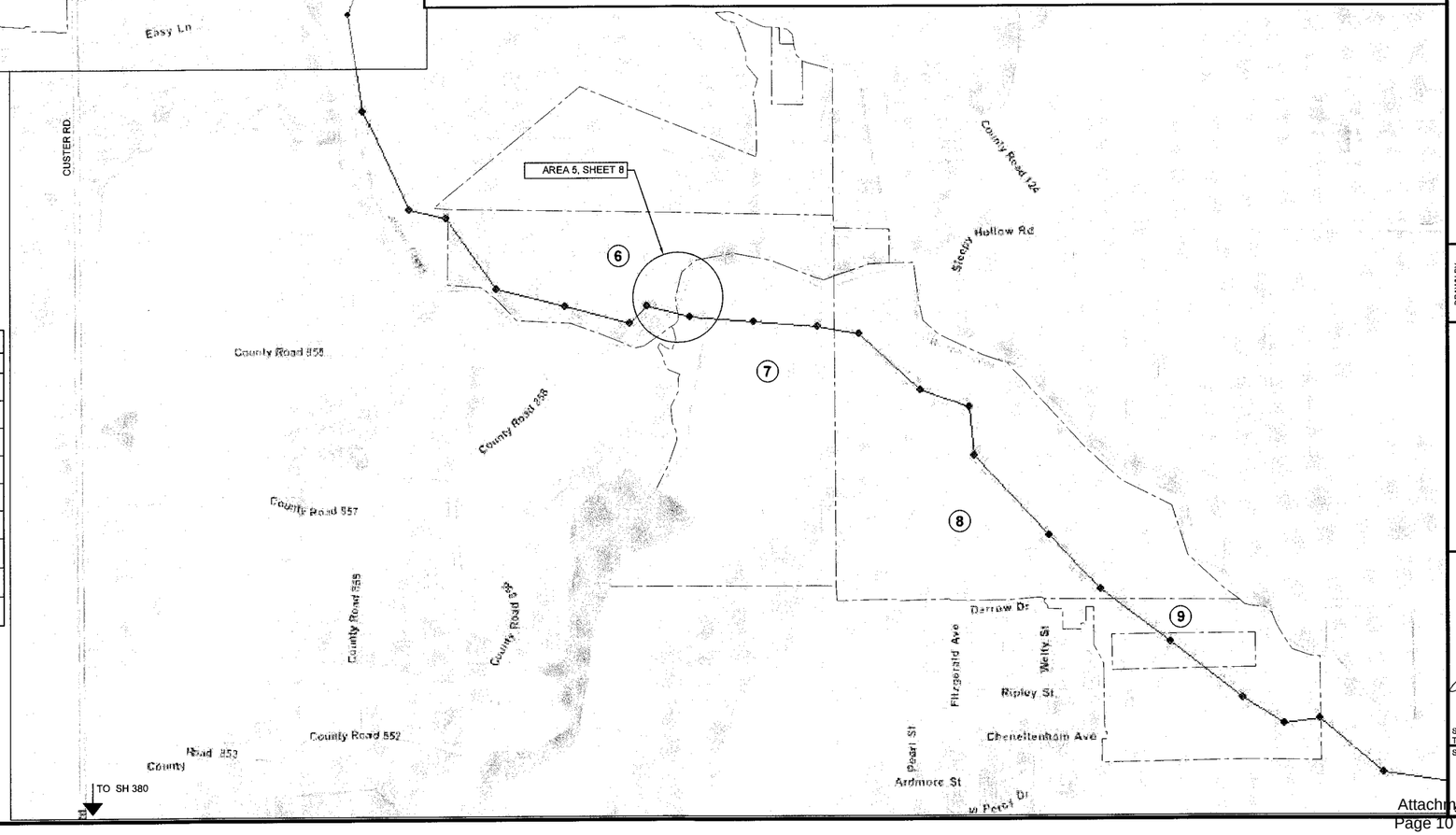
SHEET NO.
2 SHEET OF 13





AREA 6 - ARBOR HILLS NATURE PRESERVE
PLANO, TEXAS



PROPERTY OWNER MAP				
PARCEL #	OWNER	PROPERTY ID	LEGAL DESCRIPTION	Acres
1	HAROLD PATIN, ETUX MAUREEN	2123606	ABS A0600 LARKIN MCCARTY SURVEY, TRACT 2	29.2255
2	TOWN OF PROSPER	2645753	WHITLEY PLACE #1, BLK AA, LOT 45X, PARKLAND	
3	CLARK PROPERTIES, LP	2663845	ABS A0600 LARKIN MCCARTY SURVEY, TRACT 1	53.0185
4	CC JOINT VENTURES, LTD	2655305	WHITLEY PLACE #2, TRACT B, BLK A, LOT 1	19.7370
5	TOWN OF PROSPER	2645605	WHITLEY PLACE #1, BLK E, LOT 16X, PARKLAND	
6	380 NORTH MCKINNEY, LLC	973361	ABS A0204 GEORGE CRUTCHFIELD SURVEY TRACT 1	41.5000
7	SLC MCKINNEY PARTNERS, LP C/O SOUTHERN LAND COMPANY, LLC	973370	ABS A0204 GEORGE CRUTCHFIELD SURVEY TRACT 2	69.4000
8	SLC MCKINNEY PARTNERS, LP C/O SOUTHERN LAND COMPANY, LLC	2634125	ABS A0204 GEORGE CRUTCHFIELD SURVEY TRACT 19	87.9042
9	SLC MCKINNEY PARTNERS, LP C/O SOUTHERN LAND COMPANY, LLC	2634126	ABS A0200 MEREDAY ASHLOCK SURVEY TRACT 20	40.9937

AREAS 1-5 - PROSPER, TEXAS

MARK	REVISION	DATE

P:\CIVIL 3D PROJECTS\NT005\SHEETS\ PLAN_KEY-MAP DWG: KEY MAP - 10/7/2016 10:30 AM

DRAWING PATH/NAME/LAYOUT: PLOT DATE/TIME:

KEY MAP

SHEET NAME:

NORTH TEXAS MUNICIPAL WATER DISTRICT
MCKINNEY-PROSPER INTERCEPTOR AND INDIAN CREEK TRUNK SEWER IMPROVEMENTS

PROJECT NAME:

DRAWN BY:	DESIGNED BY:	LATEST REVISION:	KSA JOB NO.:
JDB	SSH	6/16/2014	NT.005

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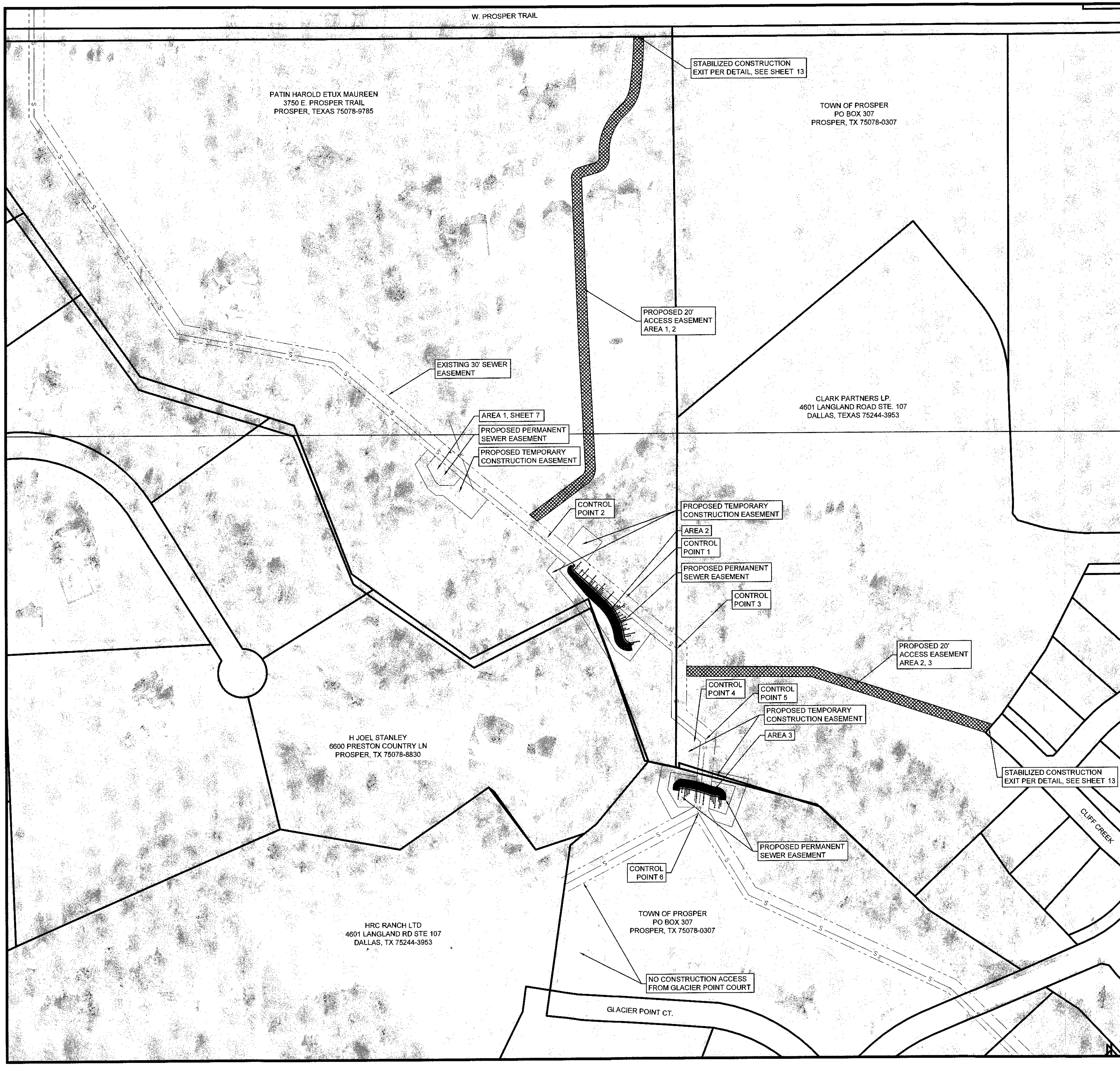
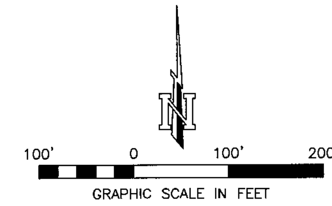
SHEET NO.
3 OF 13





CONTROL POINT COORDINATE TABLE			
CONTROL POINT NO.	DESCRIPTION	NORTHING	EASTING
1	NAIL	7140206.43	2506528.11
2	NAIL	7140326.82	2506371.73
3	MANHOLE	7140103.36	2506629.43
4	NAIL	7139916.51	2506663.98
5	MANHOLE	7139921.92	2506686.82
6	MANHOLE	7139774.91	2506671.56
7	NAIL	7138328.09	2508103.09
8	TPT	7138251.90	2508164.51
9	MANHOLE	7138214.94	2508190.48

MARK | REVISION | DATE

P:\CIVIL 3D PROJECTS\NT005\SHEETS\AREA_EASEMENTS.DWG, AREA 1 2 AND 3 EASEMENTS 10/7/2010 10:30 AM
DRAWING PATHNAME/LAYOUT: PLOT DATE/TIME

SHEET NAME:
AREA 1, 2 AND 3 EASEMENTS

PROJECT NAME:
NORTH TEXAS MUNICIPAL WATER DISTRICT
MCKINNEY-PROSPER INTERCEPTOR AND INDIAN CREEK TRUNK SEWER IMPROVEMENTS

DRAWN BY: JDB
DESIGNED BY: SSH
LATEST REVISION: 11/5/2014
KSA JOB NO.: NT.005

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Christopher Leppert
11-4-2014

SEAL:
TBPE Firm Registration No. F-1356

SHEET NO.
4 OF 13

50' 0 50' 100'

GRAPHIC SCALE IN FEET

CONTROL POINT COORDINATE TABLE			
CONTROL POINT NO.	DESCRIPTION	NORTHING	EASTING
1	NAIL	7140206.43	2506528.11
2	NAIL	7140326.82	2506371.73
3	MANHOLE	7140103.36	2506629.43
4	NAIL	7139916.51	2506663.98
5	MANHOLE	7139921.92	2506686.82
6	MANHOLE	7139774.91	2506671.56
7	NAIL	7138328.09	2508103.09
8	TPT	7138251.90	2508164.51
9	MANHOLE	7138214.94	2508190.48

NOTES:

1. AREA 4 SHOULD BE COMPLETED IN 45 DAYS, START TO FINISH. INCLUDING RESTORATION OF TEMPORARY AND ACCESS EASEMENTS.

MARK	REVISION	DATE

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DRAWING PATHNAME/LAYOUT: PLOT DATE-TIME

SHEET NAME: AREA 4 EASEMENT

PROJECT NAME: NORTH TEXAS MUNICIPAL WATER DISTRICT MCKINNEY-PROSPER INTERCEPTOR AND INDIAN CREEK TRUNK SEWER IMPROVEMENTS

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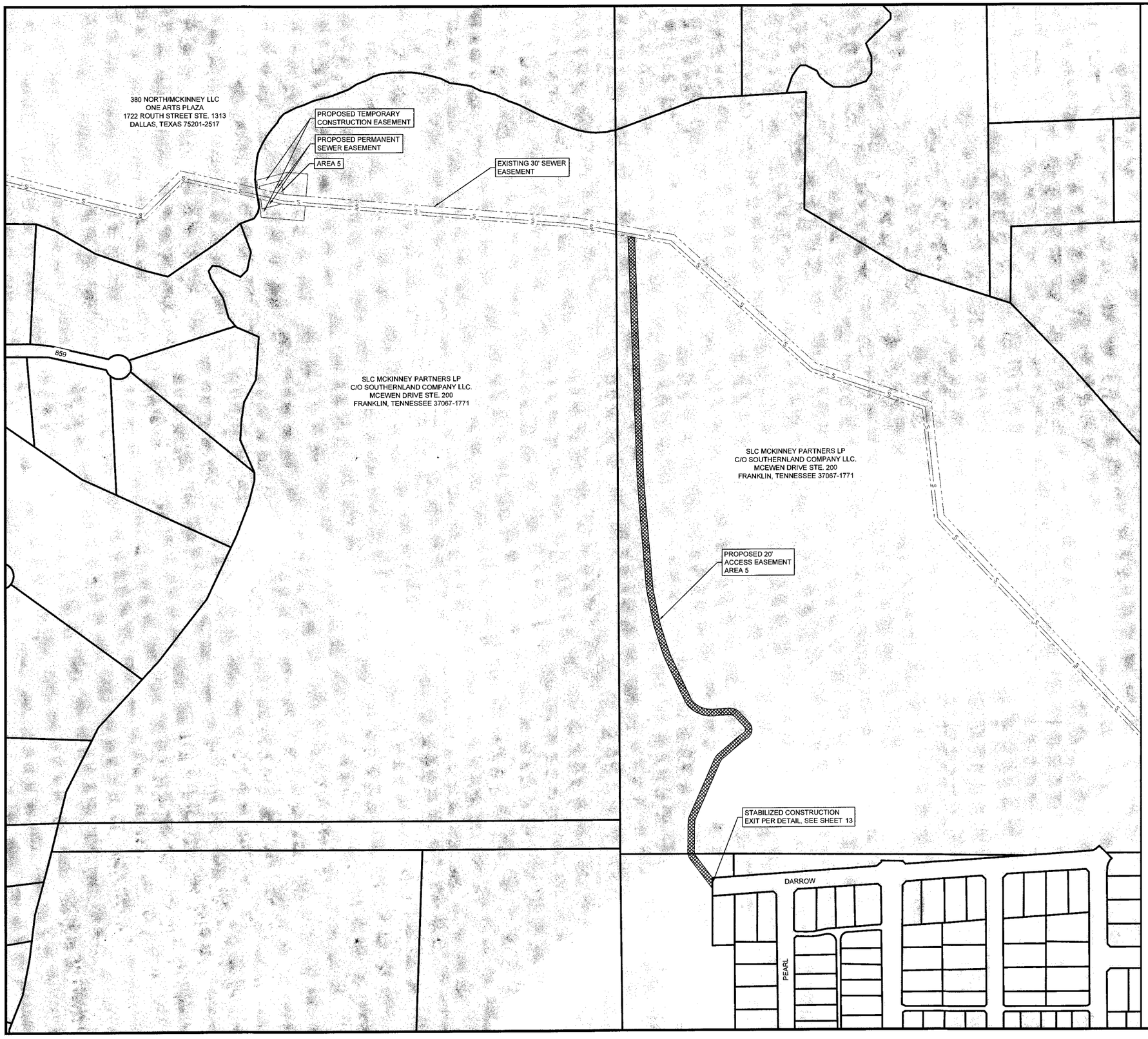
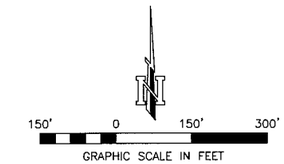
5 SHEET | 13 OF





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DRAWING PATH/NAME LAYOUT: PLOT DATE: TIME

AREA 5 EASEMENT

SHEET NAME:

NORTH TEXAS MUNICIPAL WATER DISTRICT
MCKINNEY-PROSPER INTERCEPTOR AND INDIAN CREEK TRUNK SEWER IMPROVEMENTS

PROJECT NAME:

DRAWN BY:	DESIGNED BY:	LATEST REVISION:	KSA JOB NO:
JDB	SSH	11/5/2014	NT 005

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SHEET NO.
6 SHEET 13 OF

20' 0 20' 40'
HORIZONTAL SCALE IN FEET

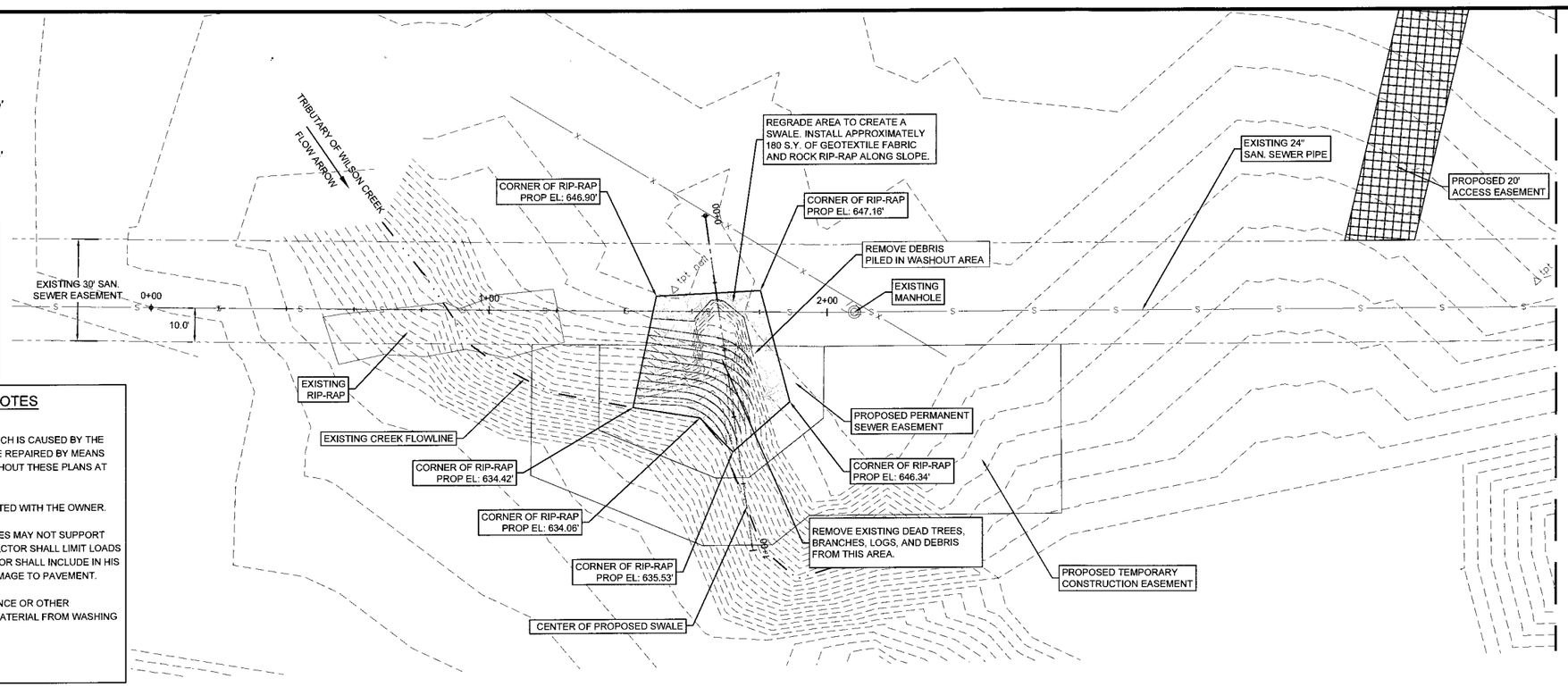
5' 0 5' 10'
VERTICAL SCALE IN FEET

LEGEND

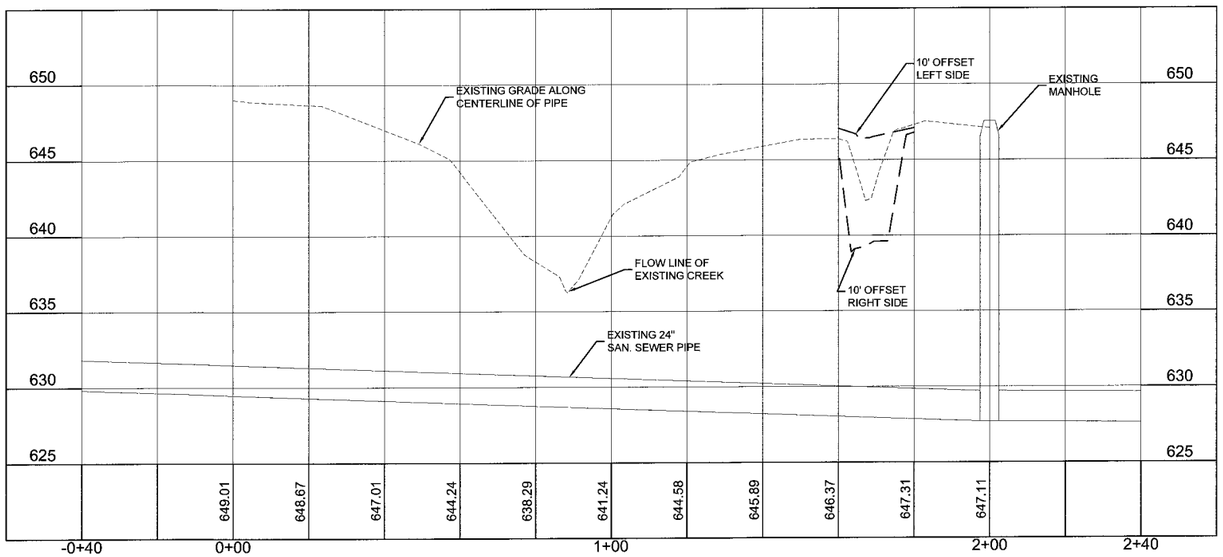
- SEWER LINE — S —
- MANHOLE Ⓢ
- CONSTRUCTION FENCE — x —
- SITE ACCESS ROUTE ←
- EASEMENT - - -
- ACCESS EASEMENT

ACCESS ROUTE NOTES

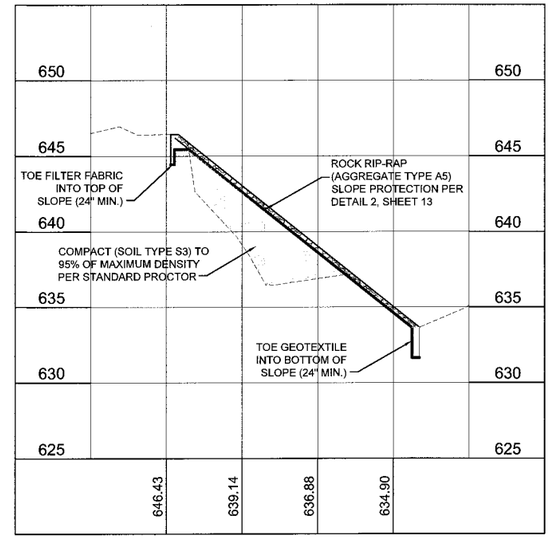
1. DAMAGE TO EXISTING PAVEMENTS WHICH IS CAUSED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED BY MEANS AND METHODS AS INDICATED THROUGHOUT THESE PLANS AT NO EXPENSE TO THE OWNER.
2. ACCESS ROUTES SHALL BE COORDINATED WITH THE OWNER.
3. THE PAVEMENT ON THE ACCESS ROUTES MAY NOT SUPPORT CONSTRUCTION TRAFFIC. THE CONTRACTOR SHALL LIMIT LOADS AS NECESSARY TO PREVENT DAMAGE OR SHALL INCLUDE IN HIS BID ADEQUATE BUDGET TO REPAIR DAMAGE TO PAVEMENT.
4. CONTRACTOR SHALL PROVIDE SILT FENCE OR OTHER NECESSARY METHODS TO KEEP SILT MATERIAL FROM WASHING OFFSITE.



MCKINNEY - PROSPER INTERCEPTOR



CENTER OF PROPOSED SWALE



MARK	REVISION	DATE

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AREA 1 PLAN AND PROFILE: 10/7/2010-10:39 AM
DRAWING PATH/NAME/LAYOUT: PLOT DATE/TIME

AREA 1 PLAN AND PROFILE

SHEET NAME:

NORTH TEXAS MUNICIPAL WATER DISTRICT
MCKINNEY-PROSPER INTERCEPTOR AND INDIAN CREEK TRUNK SEWER IMPROVEMENTS

PROJECT NAME:

DRAWN BY:	JDB
DESIGNED BY:	SSH
LATEST REVISION:	11/3/2014
KSA JOB NO.:	NT.005

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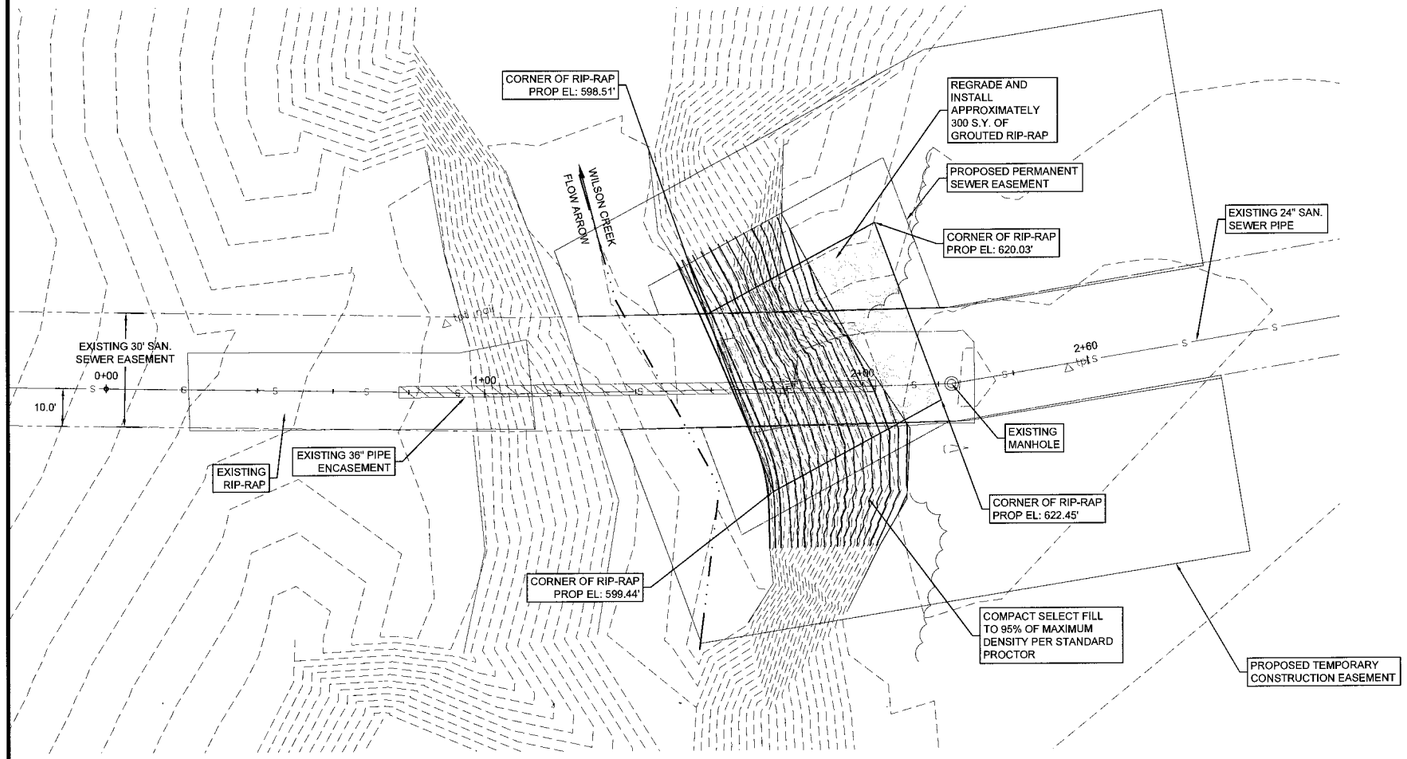
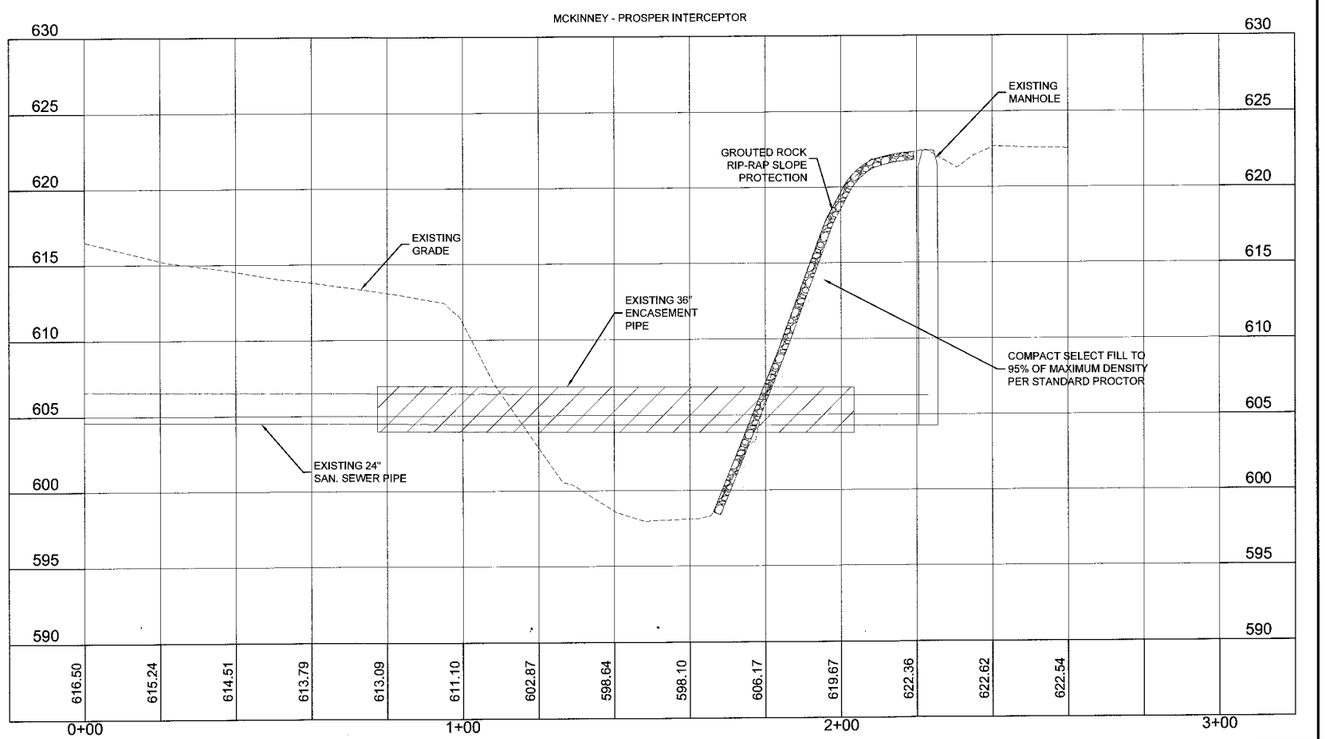
SHEET NO.
7 | 13
SHEET OF





LEGEND

SEWER LINE	S
MANHOLE	S
CONSTRUCTION FENCE	X
SITE ACCESS ROUTE	
EASEMENT	
ACCESS EASEMENT	

ACCESS ROUTE NOTES

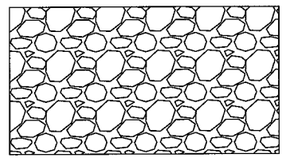
1. DAMAGE TO EXISTING PAVEMENTS WHICH IS CAUSED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED BY MEANS AND METHODS AS INDICATED THROUGHOUT THESE PLANS AT NO EXPENSE TO THE OWNER.
2. ACCESS ROUTES SHALL BE COORDINATED WITH THE OWNER.
3. THE PAVEMENT ON THE ACCESS ROUTES MAY NOT SUPPORT CONSTRUCTION TRAFFIC. THE CONTRACTOR SHALL LIMIT LOADS AS NECESSARY TO PREVENT DAMAGE OR SHALL INCLUDE IN HIS BID ADEQUATE BUDGET TO REPAIR DAMAGE TO PAVEMENT.
4. CONTRACTOR SHALL PROVIDE SILT FENCE OR OTHER NECESSARY METHODS TO KEEP SILT MATERIAL FROM WASHING OFFSITE.

20' 0 20' 40'
HORIZONTAL SCALE IN FEET

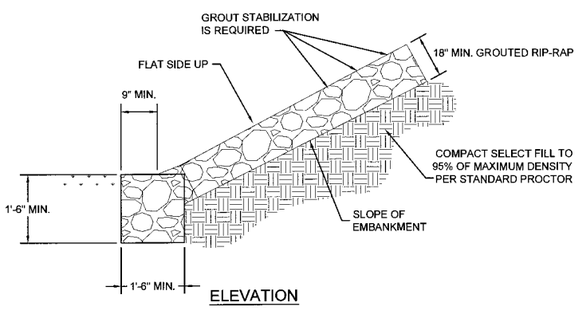
5' 0 5' 10'
VERTICAL SCALE IN FEET

NOTE:

ROCK RIP-RAP SHALL BE STONES BETWEEN 50 AND 250 LB. WITH A MINIMUM OF 50% OF THE STONES HEAVIER THAN 100 LB. (AGGREGATE TYPE A5). GROUT SHALL BE CONCRETE/GROUT FILL PER SPECIFICATION 03315.



PLAN
N.T.S.



ELEVATION
N.T.S.

STONE RIP-RAP-GROUTED
N.T.S.

MARK	REVISION	DATE

P:\CIVIL 3D PROJECTS\NT005\SHEETS\ PLAN_SITE-5.DWG:
AREA 5 PLAN AND PROFILE: 10/7/2010-10:30 AM
DRAWING PATHNAME/LAYOUT: PLOT DATE-TIME

AREA 5 PLAN AND PROFILE

SHEET NAME:

NORTH TEXAS MUNICIPAL WATER DISTRICT
MCKINNEY-PROSPER INTERCEPTOR
AND INDIAN CREEK TRUNK SEWER
IMPROVEMENTS

PROJECT NAME:

DRAWN BY:	JDB
DESIGNED BY:	SSH
LATEST REVISION:	5/6/2014
KSA JOB NO.:	NT.005

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SHEET NO.
8 SHEET 13 OF

BENCHMARKS

BM#1:
N= 7068732.757
E= 2474630.635
ELEV= 622.306

BM#2:
N= 7069007.906
E= 2474766.702
ELEV= 609.168

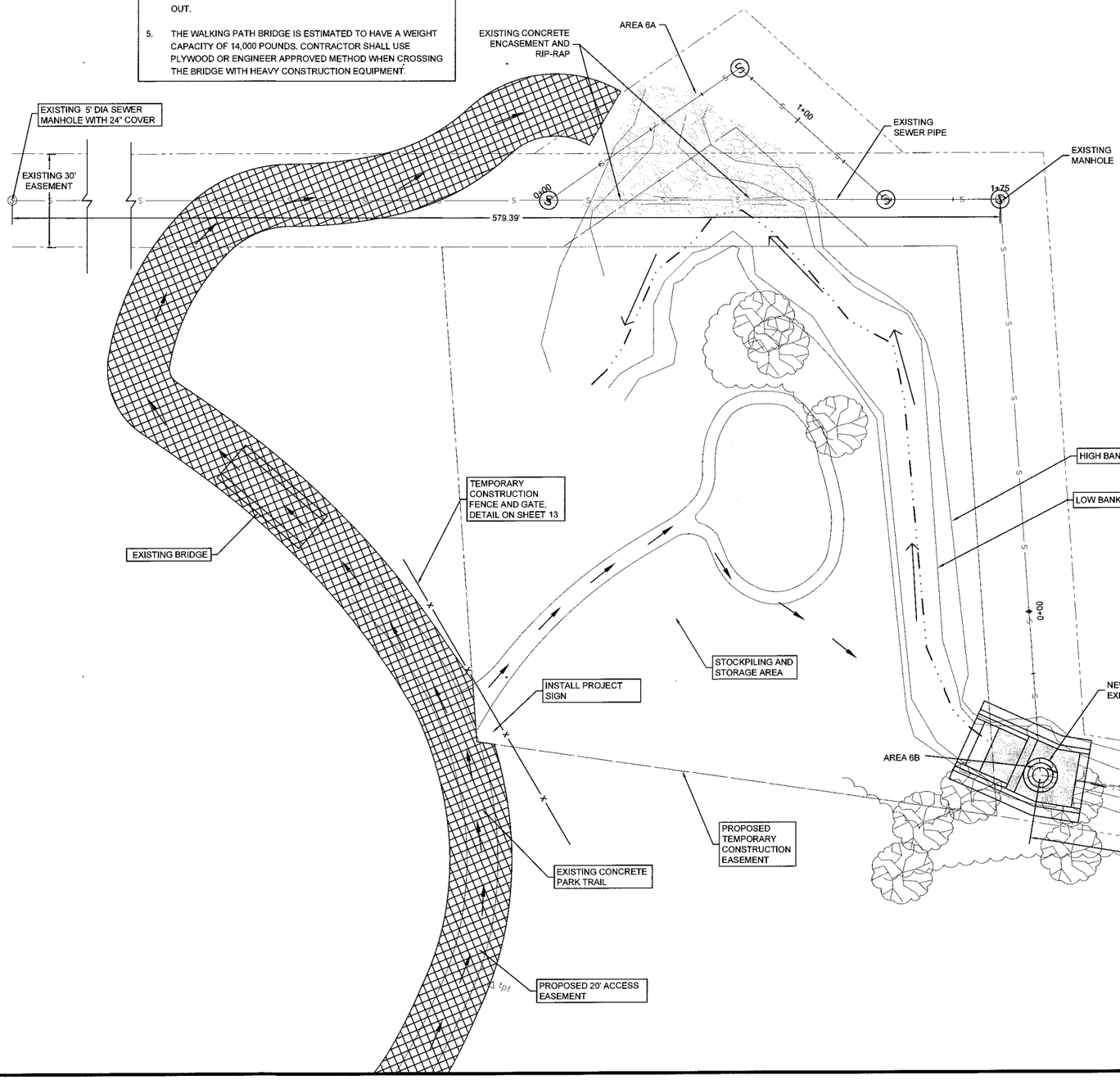
ACCESS ROUTE NOTES

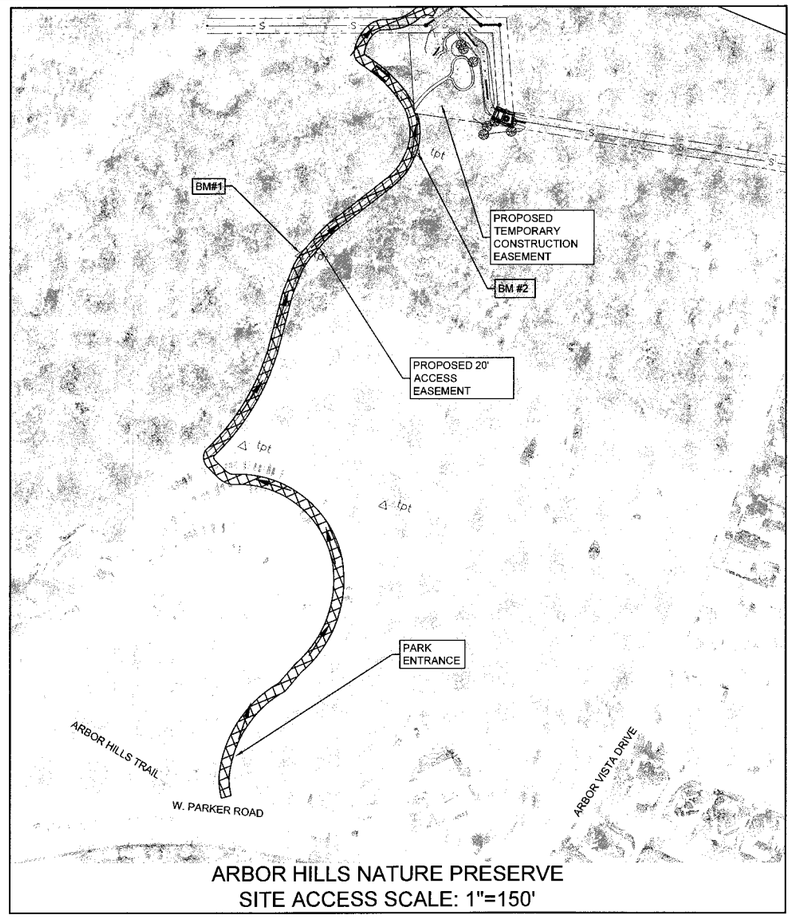
1. DAMAGE TO EXISTING PAVEMENTS WHICH IS CAUSED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED BY MEANS AND METHODS AS INDICATED THROUGHOUT THESE PLANS AT NO EXPENSE TO NTMWD OR THE CITY OF PLANO.
2. ACCESS ROUTES SHALL BE COORDINATED WITH THE CITY OF PLANO AND NTMWD.
3. THE PAVEMENT ON THE ACCESS ROUTES MAY NOT SUPPORT CONSTRUCTION TRAFFIC. THE CONTRACTOR SHALL LIMIT LOADS AS NECESSARY TO PREVENT DAMAGE OR SHALL INCLUDE IN HIS BID ADEQUATE BUDGET TO REPAIR DAMAGE TO PAVEMENT.
4. CONTRACTOR SHALL PROVIDE SILT FENCE OR OTHER NECESSARY METHODS TO KEEP SILT MATERIAL FROM WASHING OUT.
5. THE WALKING PATH BRIDGE IS ESTIMATED TO HAVE A WEIGHT CAPACITY OF 14,000 POUNDS. CONTRACTOR SHALL USE PLYWOOD OR ENGINEER APPROVED METHOD WHEN CROSSING THE BRIDGE WITH HEAVY CONSTRUCTION EQUIPMENT.

20' 0 20' 40'
GRAPHIC SCALE IN FEET

LEGEND

- SEWER LINE — S —
- MANHOLE Ⓢ
- CONSTRUCTION FENCE — X —
- SITE ACCESS ROUTE
- EASEMENT
- ACCESS EASEMENT





ARBOR HILLS NATURE PRESERVE
SITE ACCESS SCALE: 1"=150'

MARK	REVISION	DATE

P:\CIVIL 3D PROJECTS\NT005\SHEETS\ PLAN_SITE-6.DWG
AREA 6 SITE PLAN 10/7/2016 10:39 AM
DRAWING PATH/NAME/LAYOUT: PLOT DATE-TIME

AREA 6 SITE PLAN

SHEET NAME:

NORTH TEXAS MUNICIPAL WATER DISTRICT
MCKINNEY-PROSPER INTERCEPTOR AND INDIAN CREEK TRUNK SEWER IMPROVEMENTS
PROJECT NAME:

DRAWN BY:	DESIGNED BY:	LATEST REVISION:	KSA JOB NO.:
JDB	SSH	11/5/2014	NT 005

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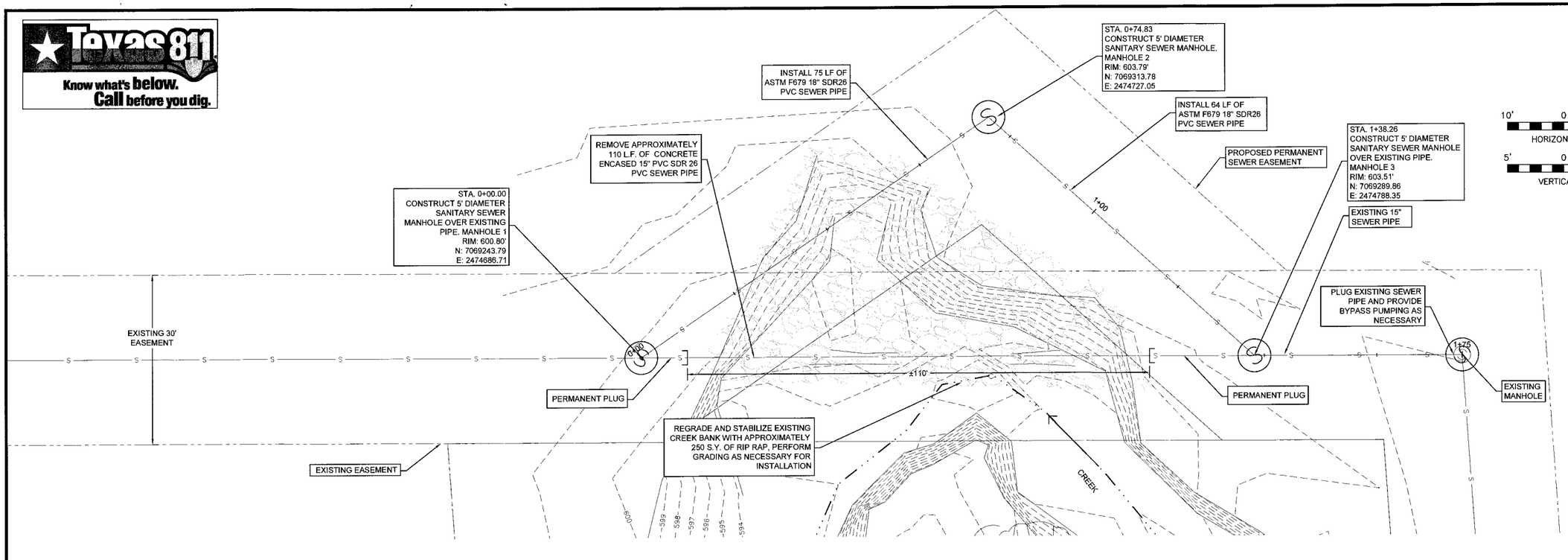
SHEET NO.
9 SHEET | 13 OF

Know what's below. Call before you dig.



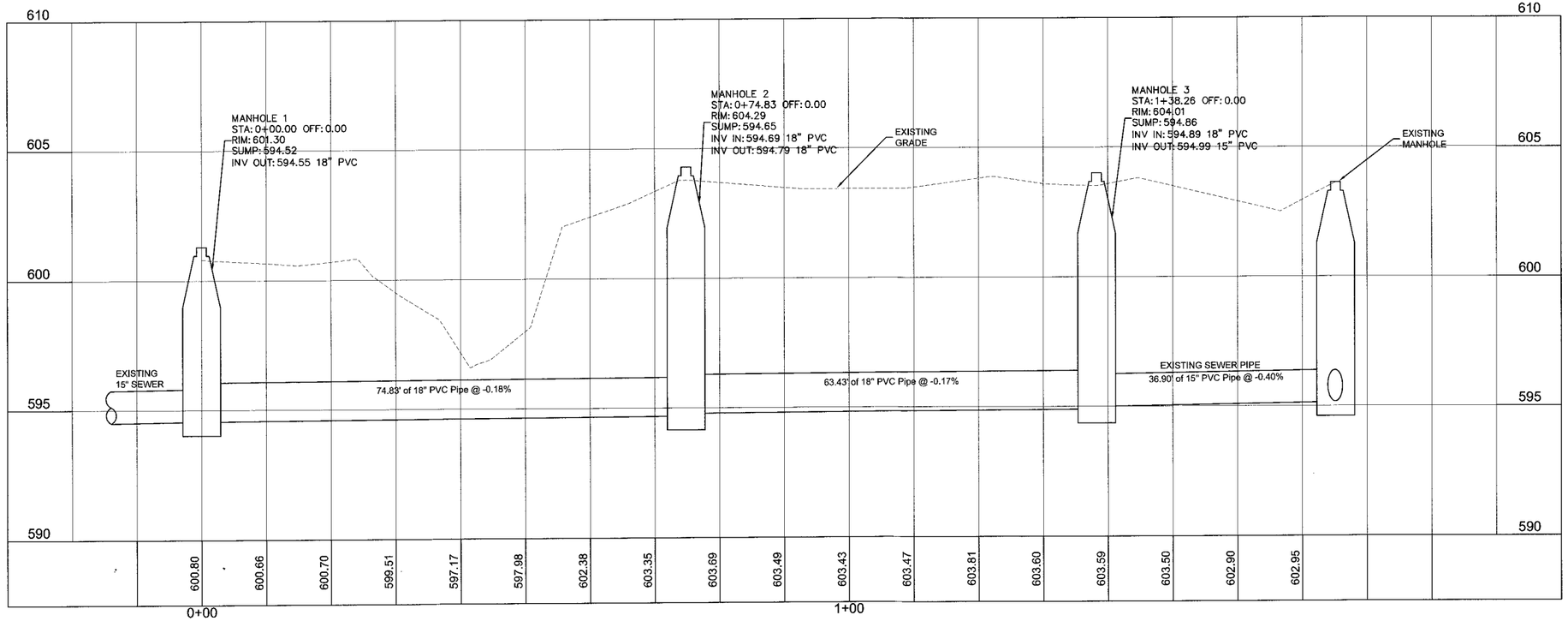
LEGEND

- SEWER LINE —S—
- MANHOLE (S)
- CONTOUR
- FLOW DIRECTION
- EXISTING EASEMENT

NOTES

1. THE CONTRACTOR SHALL MINIMIZE BYPASS PUMPING BY CONSTRUCTING MANHOLES 1, 2, AND 3 WHILE THE EXISTING SANITARY SEWER PIPE IS IN SERVICE.
2. AFTER PROPOSED MANHOLES AND PIPING IS CONSTRUCTED, THE CONTRACTOR SHALL ESTABLISH BYPASS PUMPING, TAKE FLOW OUT OF EXISTING SEWER PIPE, AND MAKE CONNECTIONS TO MANHOLES 1 AND 3. THE EXISTING SEWER PIPE BETWEEN MANHOLES 1 AND 3 SHALL BE ABANDONED AND REMOVED.
3. CONTRACTOR SHALL PLUG AND GROUT ABANDONED SEWER PIPE OPENINGS AND FORM CONCRETE BENCH AND CHANNEL WITHIN THE MANHOLES.
4. CONTRACTOR SHALL COAT NEW MANHOLES WITH RAVENS COATING OR ENGINEER APPROVED EQUAL.
5. INSTALL GASKETED RING AND COVERS, AND BOLTED MANHOLE LID.
6. THE MAXIMUM FLOW FROM THE EXISTING SEWER PIPE FOR BYPASS PUMPING PURPOSES IS APPROXIMATELY 7 CFS.

INDIAN CREEK TRUNK SEWER



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DRAWING PATHNAME LAYOUT: PLOT DATE=TIME

AREA 6A PLAN AND PROFILE

SHEET NAME:

NORTH TEXAS MUNICIPAL WATER DISTRICT
MCKINNEY-PROSPER INTERCEPTOR AND INDIAN CREEK TRUNK SEWER IMPROVEMENTS
PROJECT NAME

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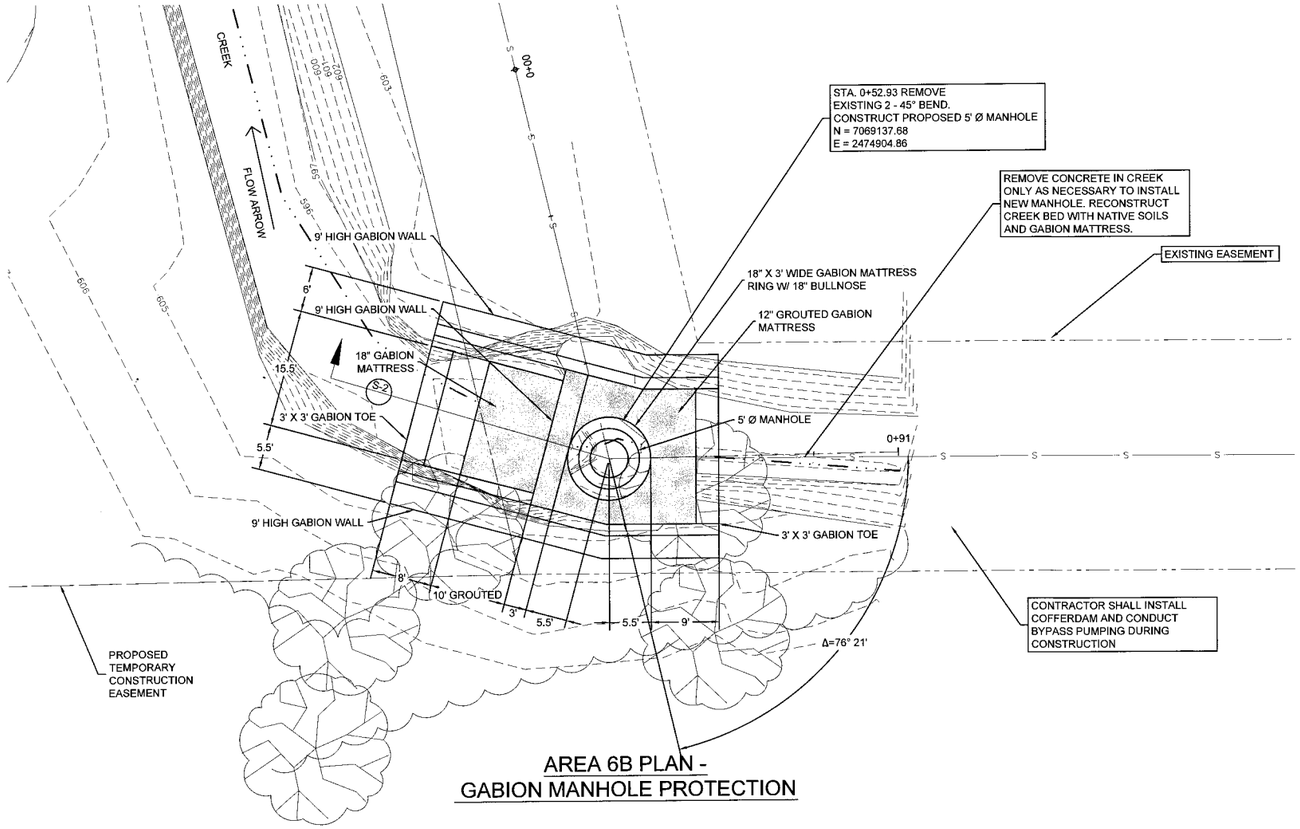
SHEET NO.
10 | 13
SHEET OF



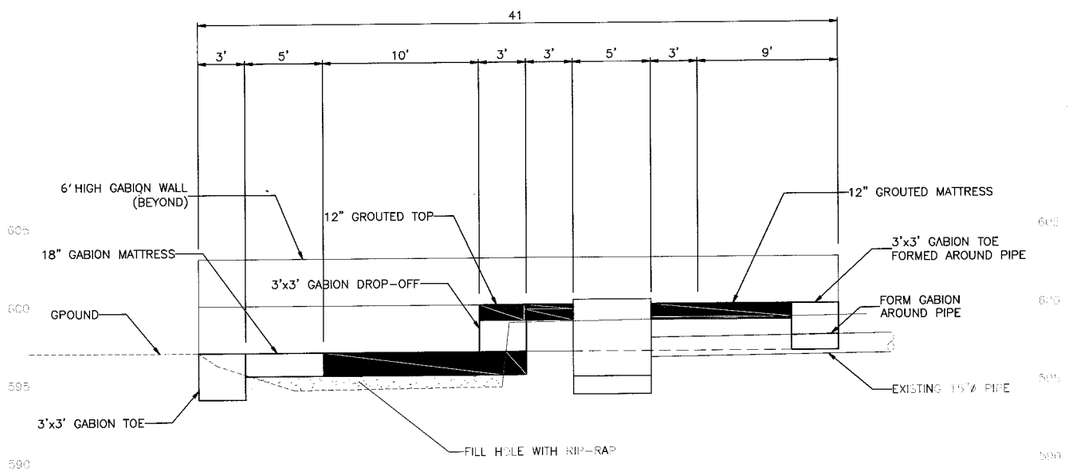
AREA 6B PLAN - GABION MANHOLE PROTECTION

20' 0 20' 40'
HORIZONTAL SCALE IN FEET

5' 0 5' 10'
VERTICAL SCALE IN FEET

LEGEND

SEWER LINE	S
MANHOLE	S
CONTOUR	600
FLOW DIRECTION	
EXISTING EASEMENT	
CONCRETE REMOVAL	



S-2 AREA 6B SECTION - GABION MANHOLE PROTECTION

NOTES

1. THE CONTRACTOR SHALL ESTABLISH BYPASS OF THE EXISTING STREAM FLOW BY CONSTRUCTING A COFFERDAM AND BYPASS PUMPING.
2. THE CONTRACTOR SHALL TAKE CARE IN REMOVING EXISTING CONCRETE ENCASING THE EXISTING SEWER PIPE.
3. ONCE PIPE IS EXPOSED, CONTRACTOR SHALL BYPASS PUMP EXISTING SEWER FLOWS (MAX 7 CFS), CONSTRUCT NEW MANHOLE, AND INSTALL NEW PIPE.
4. CONTRACTOR SHALL COAT NEW MANHOLES WITH RAVENS COATING OR ENGINEER APPROVED EQUAL.
5. INSTALL GASKETED RING AND COVERS, AND BOLTED MANHOLE LID.
6. THE MAXIMUM FLOW FROM THE EXISTING SEWER PIPE FOR BYPASS PUMPING PURPOSES IS APPROXIMATELY 7 CFS.

Texas 811
Know what's below. Call before you dig.

MARK	REVISION	DATE

P:\CIVIL_3D PROJECTS\NT1005\SHEETS\ PLAN_SITE-5.DWG:
AREA 6B PLAN AND PROFILE: 10/7/2010-10:30 AM
DRAWING PATHNAME\ LAYOUT: PLOT DATE-TIME

SHEET NAME: AREA 6B PLAN AND PROFILE

PROJECT NAME: NORTH TEXAS MUNICIPAL WATER DISTRICT MCKINNEY-PROSPER INTERCEPTOR AND INDIAN CREEK TRUNK SEWER IMPROVEMENTS

DRAWN BY:	DESIGNED BY:	LATEST REVISION	KSA JOB NO.:
JDB	SSH	11/5/2014	NT.005

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www.ksaeng.com

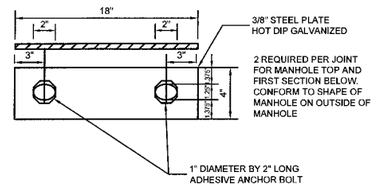
STATE OF TEXAS
CHRISTOPHER LEPPERT
112342
LICENSED
PROFESSIONAL ENGINEER
11-4-2014

SEAL:
TBPE Firm Registration No. F-1356

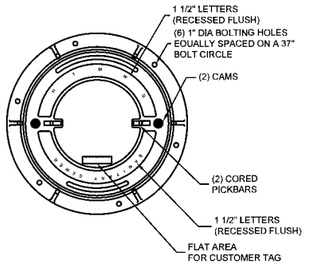
SHEET NO.
11 | 13
SHEET OF

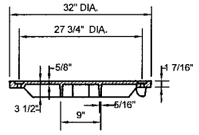
CONCRETE MANHOLE GENERAL NOTES:

1. MANHOLE SHALL BE CAST IN PLACE OR PRECAST. PRECAST RISERS, CONES, FLOORS, GRADE RINGS, AND RINGS AND COVERS SHALL BE MANUFACTURED ACCORDING TO THE MOST RECENT ASTM C-478 SPECIFICATIONS.
2. ALL MANHOLE CONSTRUCTION SHALL BE WATERTIGHT. JOINTS SHALL BE RUBBER GASKET MANHOLE SECTIONS WITH PROFILE JOINT AND FORSHEDA 114 JOINT SEALS.
3. MANHOLE SHALL BE PLUMB TO WITHIN 1/8" FOR EVERY 5 FT. OF VERTICAL DEPTH, PRECAST OR CAST IN PLACE.
4. EXTERIOR MANHOLE WATERPROOFING SHALL BE ONE HEAVY COAT OF TAR PAINT SUCH AS " TNEMEC 465" OR APPROVED EQUIVALENT.
5. COAT THE INSIDE OF ALL MANHOLES WITH RAVEN LINING OR APPROVED ALTERNATE PER SPECIFICATIONS.

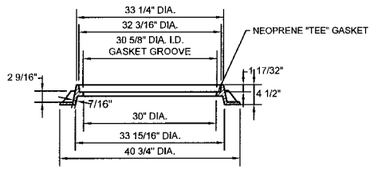


JOINT RESTRAINER FOR PRECAST MANHOLE DETAIL
N.T.S.



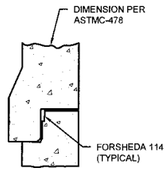


PLAN



SECTION

SEALED MANHOLE RING AND COVER
N.T.S.

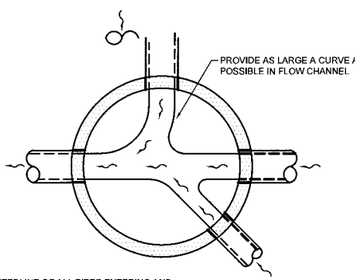


48" PROFILE JOINT DETAIL

TYPICAL MANHOLE JOINT
N.T.S.

NOTE:

COVERS AND FRAMES SHALL BE MANUFACTURED FROM DUCTILE IRON AND GRAY IRON, RESPECTIVELY, AND HAVE MINIMUM CLEAR OPENING OF 30" DIAMETER. EAST JORDAN IRON WORKS, 1480 OR ENGINEER APPROVED EQUAL.

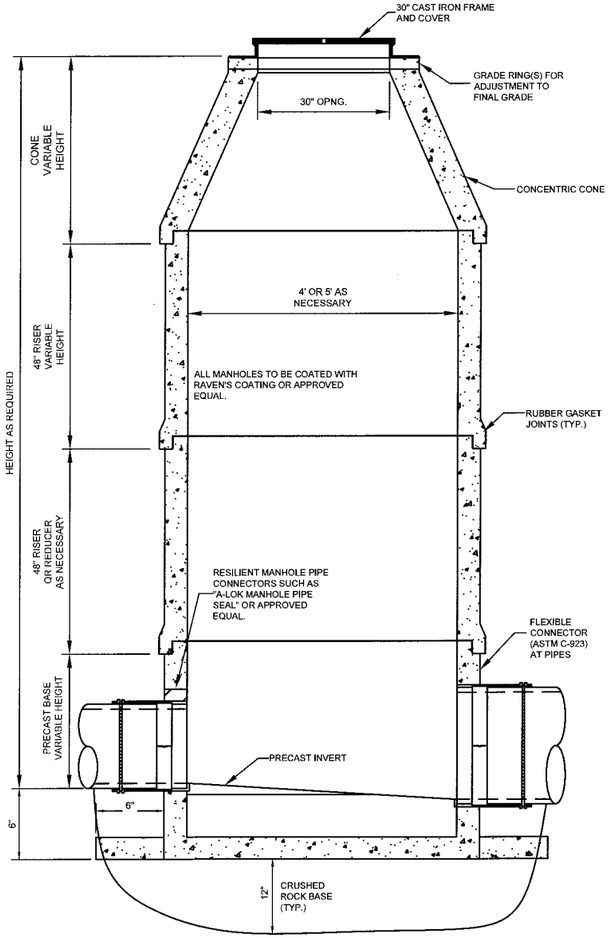


48" O-RING JOINT DETAIL

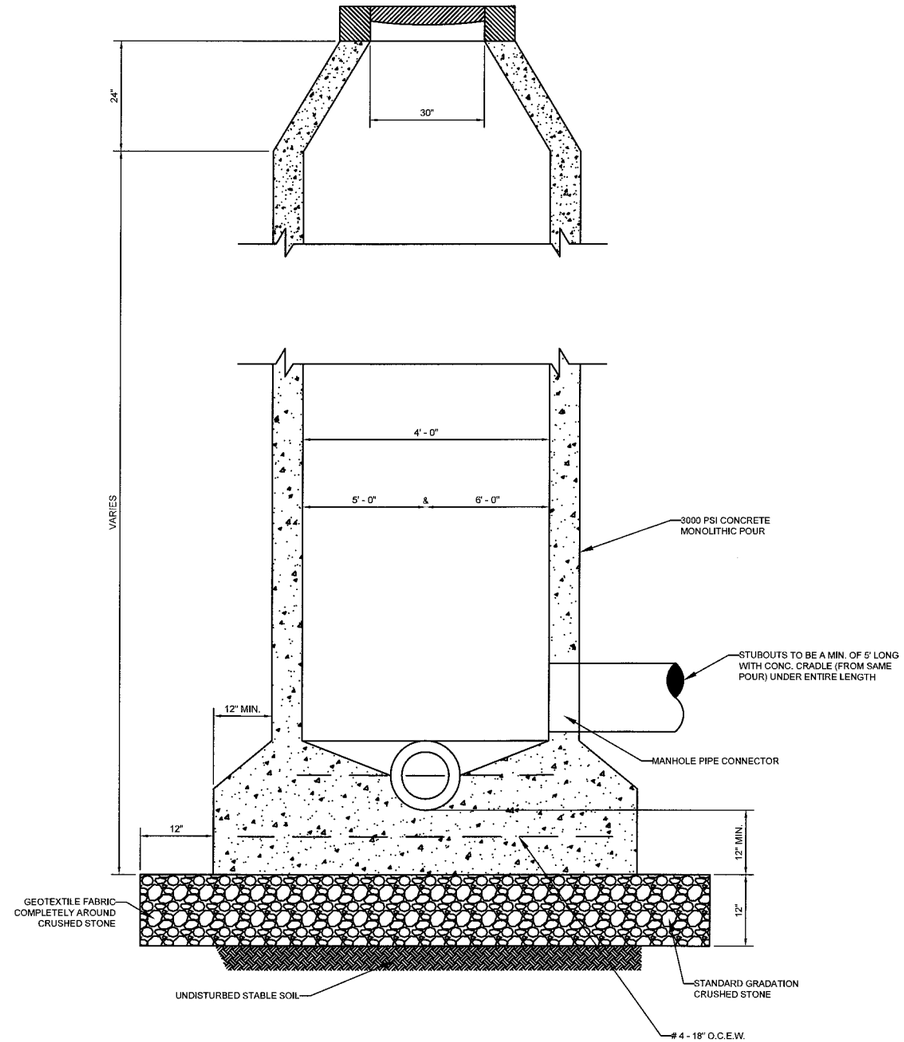
NOTES:

1. CENTERLINE OF ALL PIPES ENTERING AND LEAVING MANHOLE SHALL PASS THROUGH CENTER OF MANHOLE.
2. CONSTRUCT FLOW CHANNEL FOR ALL PIPES ENTERING MANHOLE; MAINTAIN A CONSTANT GRADE THROUGHOUT EACH INVERT.
3. GROUT FILLET MANHOLE INVERTS FOR PIPES ENTERING MANHOLE WITHOUT DROP CONNECTION.

MANHOLE BOTTOM DETAIL
N.T.S.



PRECAST MANHOLE
N.T.S.



STANDARD CAST-IN-PLACE MANHOLE (TYPE 1 MANHOLE)
N.T.S.

MARK	REVISION	DATE

P:\CIVIL 3D PROJECTS\NT0059\SHEETS\ DTLS_EROSN.DWG
MANHOLE DETAILS. 10/7/2014 10:30 AM
DRAWING PATH/NAME/LAYOUT. PLOT DATE=TIME

MANHOLE DETAILS

SHEET NAME:

NORTH TEXAS MUNICIPAL WATER DISTRICT
MCKINNEY-PROSPER INTERCEPTOR AND INDIAN CREEK TRUNK SEWER IMPROVEMENTS

PROJECT NAME:

DRAWN BY:	DESIGNED BY:	LATEST REVISION:	KSA JOB NO.:
JDB	SSH	11/5/2014	NT.005

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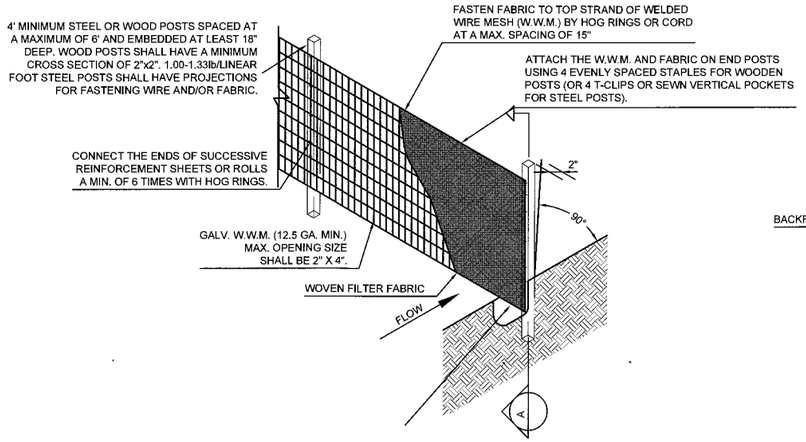
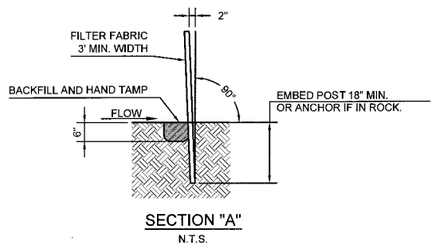
12-4-2014

SEAL:
TBPE Firm Registration No. F-1356

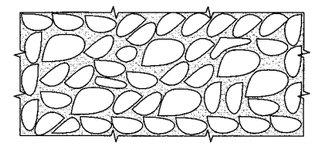
SHEET NO.
12 | 13
SHEET OF





SECTION "A"
N.T.S.

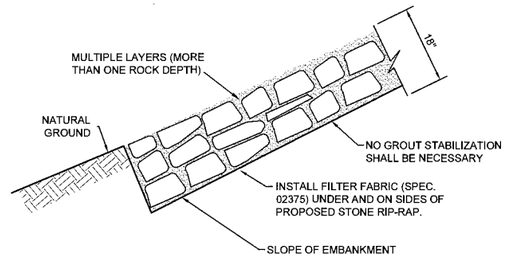
1 TEMPORARY FILTER FABRIC FENCE
N.T.S.



PLAN

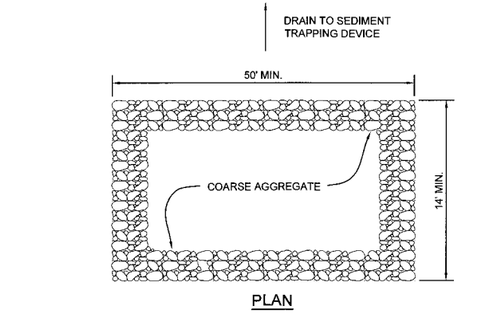
NOTE:

ROCK RIP-RAP SHALL BE STONES BETWEEN 50 AND 250 LB. WITH A MINIMUM OF 50% OF THE STONES HEAVIER THAN 100 LB. (AGGREGATE TYPE A5)

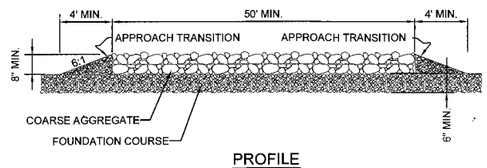


ELEVATION

2 ROCK RIP-RAP - DRY
N.T.S.



PLAN

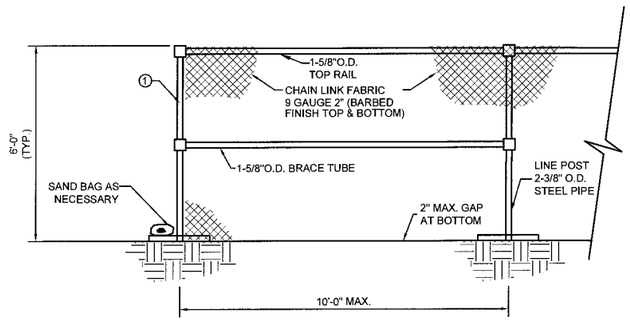


PROFILE

STABILIZED CONSTRUCTION EXIT NOTES:

1. THE COARSE AGGREGATE SHOULD BE OPEN GRADED WITH A NOMINAL SIZE OF 3" TO 5" AND SHALL BE APPROVED BY THE ENGINEER.
2. PRIOR TO INSTALLING COURSE AGGREGATE, STABILIZED CONSTRUCTION ENTRANCE SHALL BE LINED WITH GEOTEXTILE FABRIC.
3. THE APPROACH TRANSITIONS SHOULD BE NO STEEPER THAN 6:1 AND CONSTRUCTED AS DIRECTED BY THE ENGINEER.
4. THE FOUNDATION COURSE SHALL BE FLEXIBLE BASE OR OTHER MATERIAL AS APPROVED BY THE ENGINEER.
5. THE CONSTRUCTION EXIT SHALL BE GRADED TO ALLOW DRAINAGE TO A SEDIMENT TRAPPING DEVICE.
6. UPON COMPLETION OF CONSTRUCTION, CONTRACTOR SHALL REMOVE STABILIZED CONSTRUCTION EXIT AND GRADE AREA TO DRAIN.

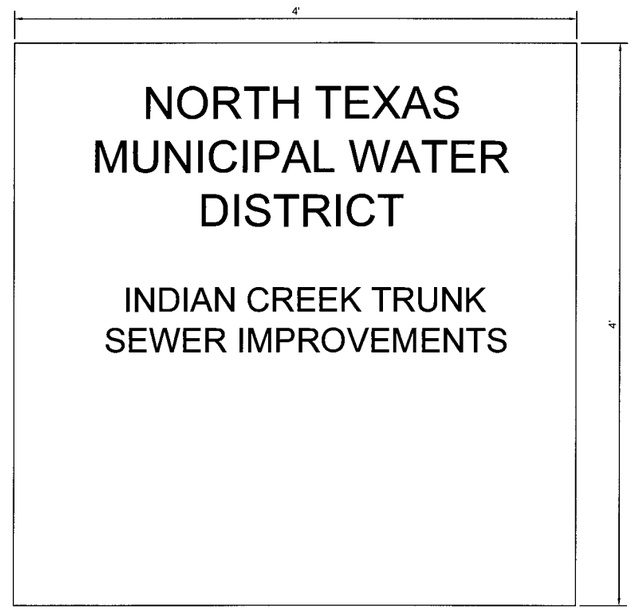
3 STABILIZED CONSTRUCTION ENTRANCE/EXIT
N.T.S.



NOTES:

1. END CORNER OF PULL POST (STEEL) 3" O.D. PULL POST TO HAVE EQUAL BRACING ON BOTH SIDES.

4 ILLUSTRATIVE SECURITY FENCE DETAIL
N.T.S.



PROJECT SIGN*

NOTES:

1. ACTUAL WORDING ON SIGN SHALL BE COORDINATED WITH CITY OF PLANO PARKS AND RECREATION DEPARTMENT AND APPROVED BY THE ENGINEER.

MARK	REVISION	DATE

P:\CIVIL 3D PROJECTS\NTD05\SHEETS\ITI S_EROSN.DWG
MISCELLANEOUS DETAILS 10/7/2015 - 10:30 AM
DRAWING PATHNAME LAYOUT: PLOT DATE-TIME

SHEET NAME:
MISCELLANEOUS DETAILS

PROJECT NAME:
NORTH TEXAS MUNICIPAL WATER DISTRICT
MCKINNEY-PROSPER INTERCEPTOR AND INDIAN CREEK TRUNK SEWER IMPROVEMENTS

DRAWN BY:	DESIGNED BY:	LATEST REVISION:	KSA JOB NO.:
JDB	SSH	11/5/2014	NT.005

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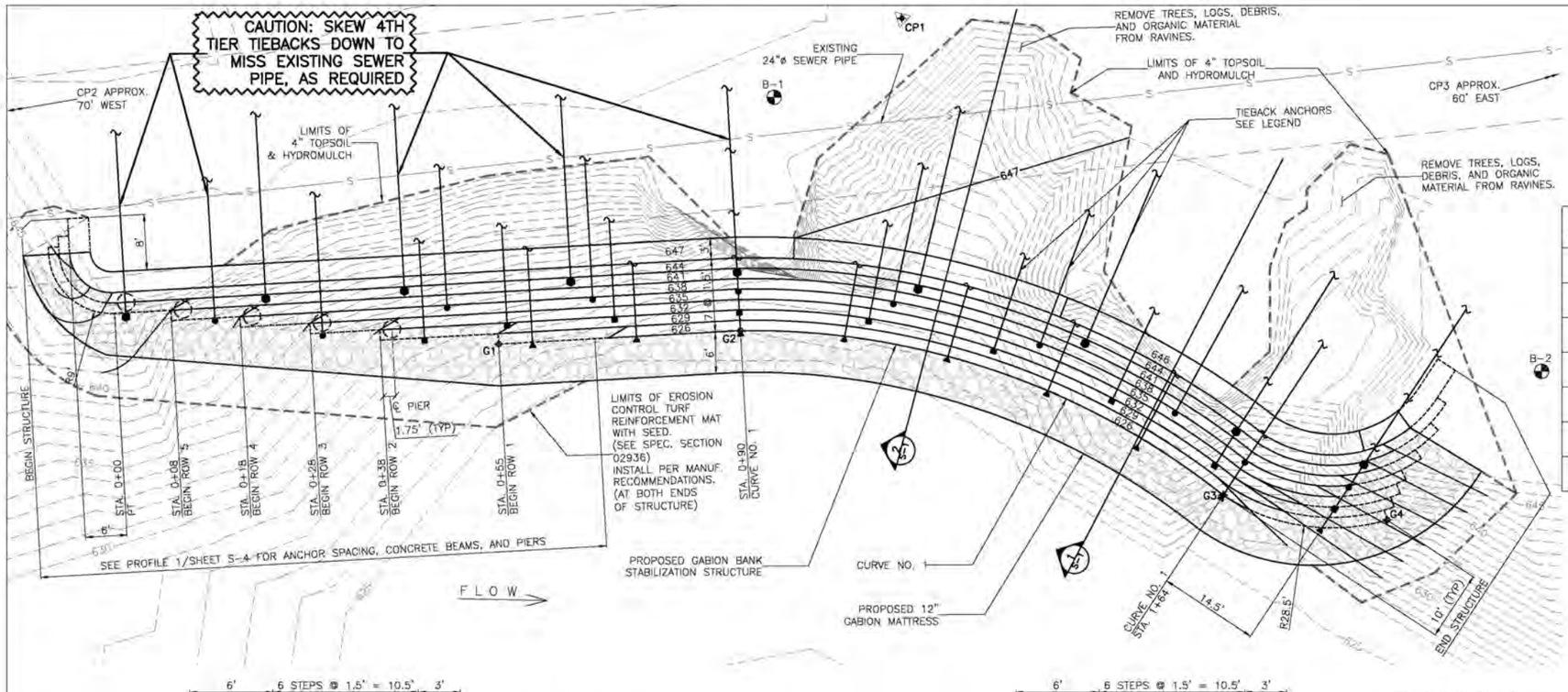
STATE OF TEXAS
CHRISTOPHER LEPPERT
112342
LICENSED PROFESSIONAL ENGINEER
11-7-2014

SEAL:
TBPE Firm Registration No. F-1356

SHEET NO.
13 | 13
SHEET OF



LEGEND

- EXISTING CONTOUR
- 630 FINISHED CONTOUR
- 1ST TIER TIEBACK @ 15' O.C.
- 2ND TIER TIEBACK @ 18' O.C.
- 3RD TIER TIEBACK @ 21' O.C.
- 4TH TIER TIEBACK @ 24' O.C.
- COORDINATE POINT
- 30"ø CONCRETE PIER

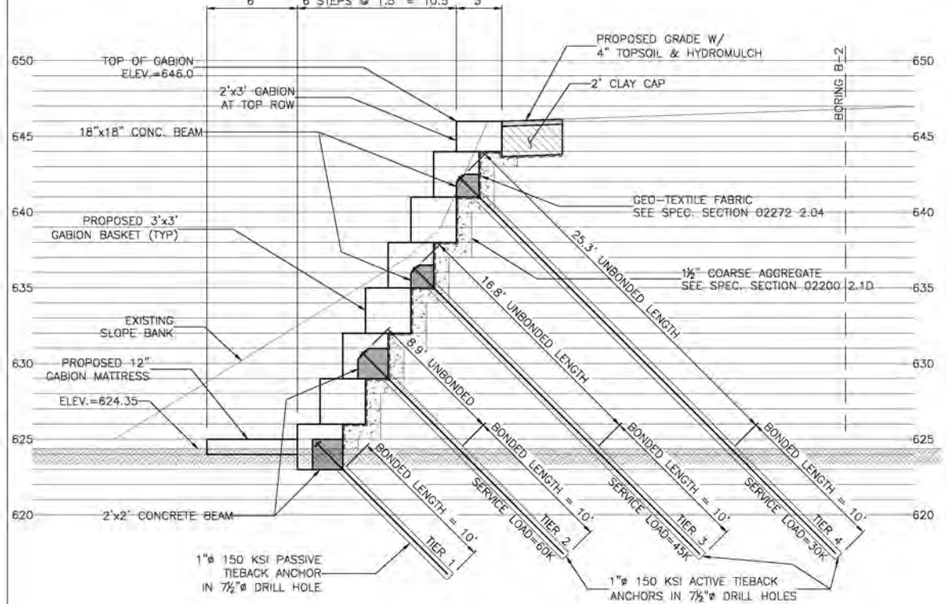
CURVE DATA @ FACE OF GABION STRUCTURE	
ITEM	CURVE NO. 1
Δ	39.4168°
L	74.95'
R	108.94'
CH	73.48'
START	STA. 0+90
END	STA. 1+64

GABION LAYOUT COORDINATE TABLE			
POINT NO.	NORTHING	EASTING	DESC.
CP1	7140206.43	2506528.11	SET NAIL
CP2	7140326.82	2506371.73	SET NAIL
CP3	7140103.36	2506629.43	MANHOLE
G1	7140215.47	2506454.00	ROW 1 GABION FACE
G2	7140191.82	2506479.62	ROW 1 GABION FACE
G3	7140125.37	2506510.98	ROW 1 GABION FACE
G4	7140105.92	2506524.82	ROW 1 GABION FACE

AREA 2 - GABION EROSION CONTROL STRUCTURE

SCALE: 1" = 10'-0" (22"x34" SHEET SIZE)

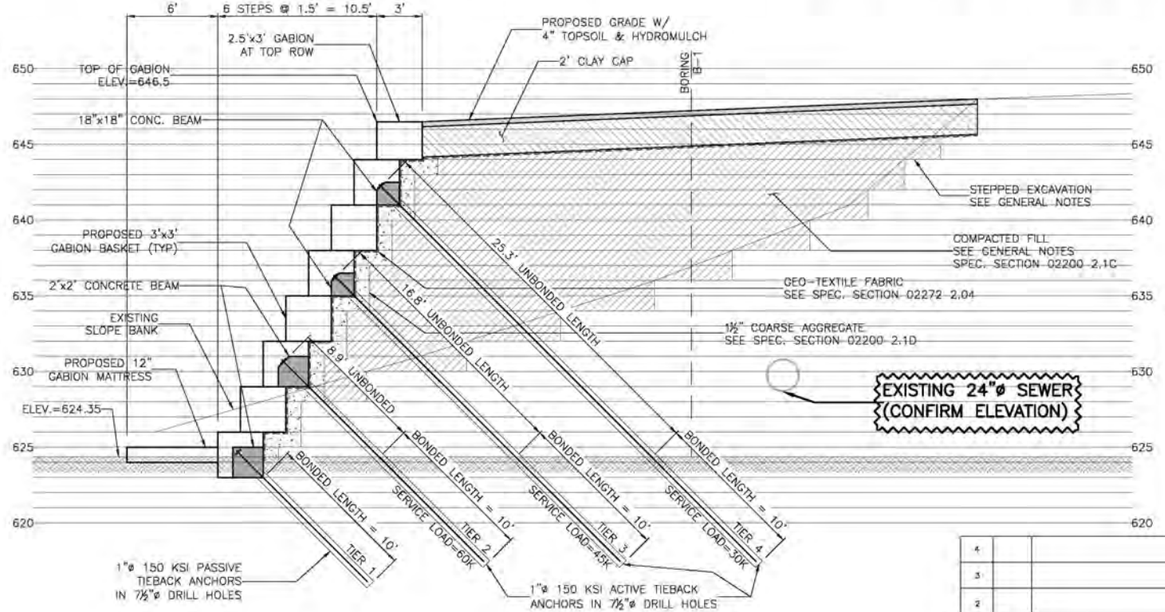
10 5 0 10 20
GRAPHIC SCALE IN FEET



1 AREA 2 - SECTION AT STA. 1+49 GABION EROSION CONTROL STRUCTURE

SCALE: 1" = 5'-0" (22"x34" SHEET SIZE)

5 2.5 0 5 10
GRAPHIC SCALE IN FEET



2 AREA 2 - SECTION AT STA. 1+17 GABION EROSION CONTROL STRUCTURE

SCALE: 1" = 5'-0" (22"x34" SHEET SIZE)

5 2.5 0 5 10
GRAPHIC SCALE IN FEET

FOR BIDDING

STATE OF TEXAS
GLENN W. CAMPBELL
79883
REGISTERED PROFESSIONAL ENGINEER
11/4/2014

NO.	DATE	ADDENDUM	APPROV.
4			
3			
2			
1			

NORTH TEXAS MUNICIPAL WATER DISTRICT
MCKINNEY-PROSPER INTERCEPTOR AND INDIAN CREEK TRUNK SEWER IMPROVEMENTS

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F 469-374-0811
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TX Firm Reg. No. F-1817

KSA ENGINEERS
8875 SYNERGY DRIVE
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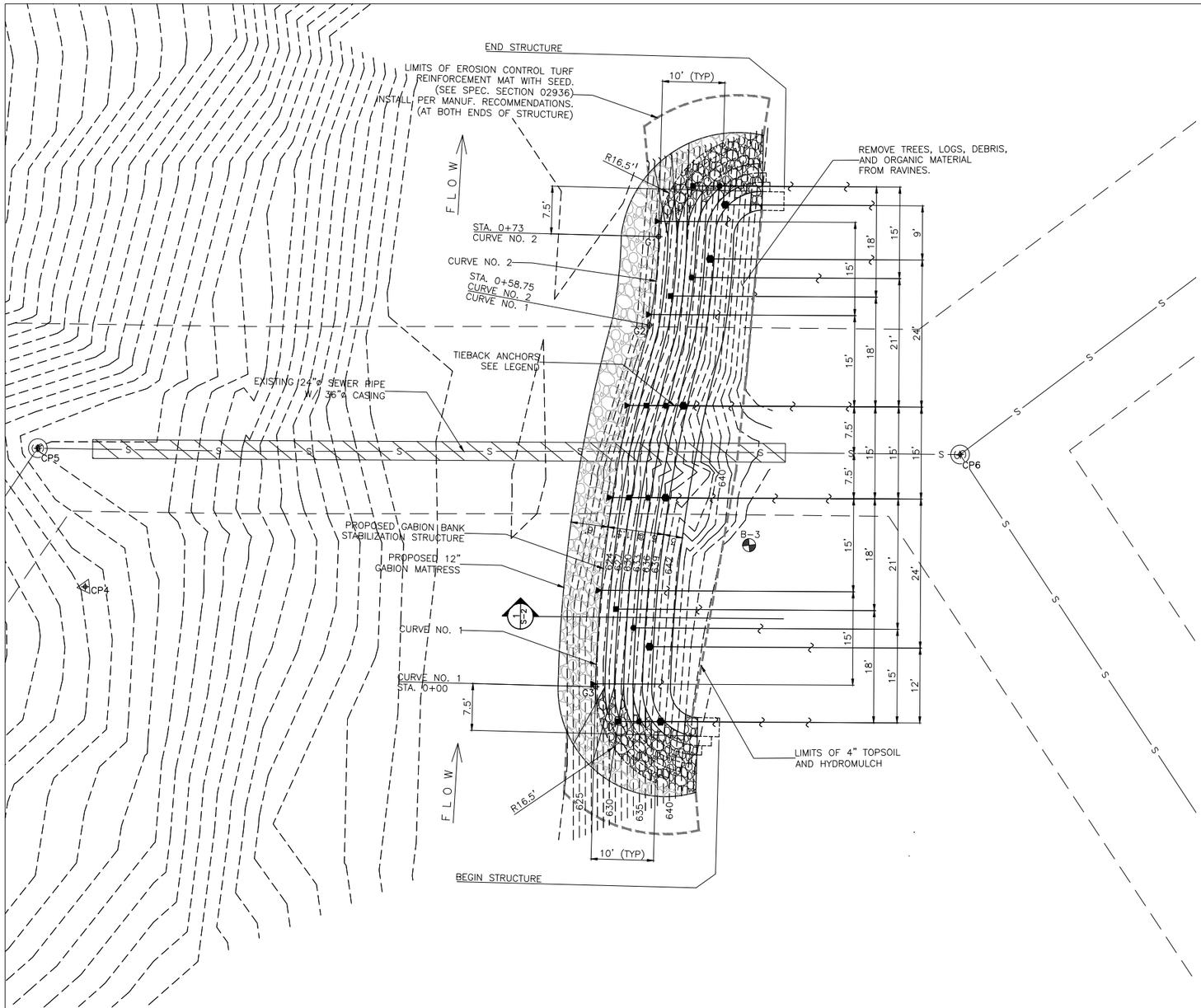
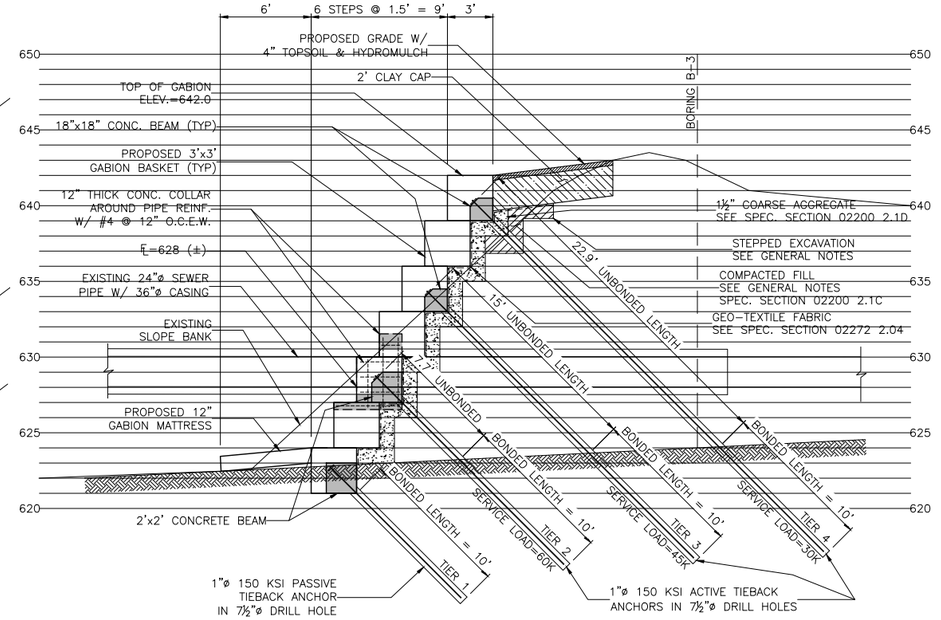
TEL: 972-542-2965
FAX: 972-542-6750
WWW.KSAENG.COM

Unit		Scale: AS SHOWN	Date 11/4/2014
Designed GWC		Checked GWC	Job No. 30030
Drawn IMH		Approved	Sheet No. S-1





AREA 3 - SECTION
GABION EROSION CONTROL STRUCTURE

1

SCALE: 1" = 5'-0"
(22"x34" SHEET SIZE)

5 2.5 0 5 10
GRAPHIC SCALE IN FEET

AREA 3 - PLAN
GABION EROSION CONTROL STRUCTURE

NORTH

SCALE: 1" = 10'-0"
(22"x34" SHEET SIZE)

10 5 0 10 20
GRAPHIC SCALE IN FEET

LEGEND	
— — —	EXISTING CONTOUR
—630—	FINISHED CONTOUR
▶ ~	1ST TIER TIEBACK @ 15' O.C.
■ ~	2ND TIER TIEBACK @ 18' O.C.
● ~	3RD TIER TIEBACK @ 21' O.C.
⬢ ~	4TH TIER TIEBACK @ 24' O.C.
⊕	COORDINATE POINT

CURVE DATA @ FACE OF GABION STRUCTURE		
ITEM	CURVE NO. 1	CURVE NO. 2
Δ	14.0426°	9.7281°
L	58.75'	14.27'
R	239.77'	84.03'
CH	58.62'	14.25'
START	STA. 0+00	STA. 0+58.75
END	STA. 0+58.75	STA. 0+73

GABION LAYOUT COORDINATE TABLE			
POINT NO.	NORTHING	EASTING	DESC.
CP4	7139916.51	2506663.98	SET NAIL
CP5	7139921.92	2506686.82	MANHOLE
CP6	7139774.91	2506671.56	MANHOLE
G1	7139819.64	2506710.99	ROW 1 GABION FACE
G2	7139822.44	2506697.02	ROW 1 GABION FACE
G3	7139836.65	2506640.15	ROW 1 GABION FACE

FOR BIDDING

STATE OF TEXAS
GLENN W. CAMPBELL
79683
REGISTERED
PROFESSIONAL ENGINEER
11/4/2014

NO.	DATE	ADDENDUM	APPROV.
4			
3			
2			
1			

NORTH TEXAS MUNICIPAL WATER DISTRICT
MCKINNEY-PROSPER INTERCEPTOR AND
INDIAN CREEK TRUNK SEWER IMPROVEMENTS

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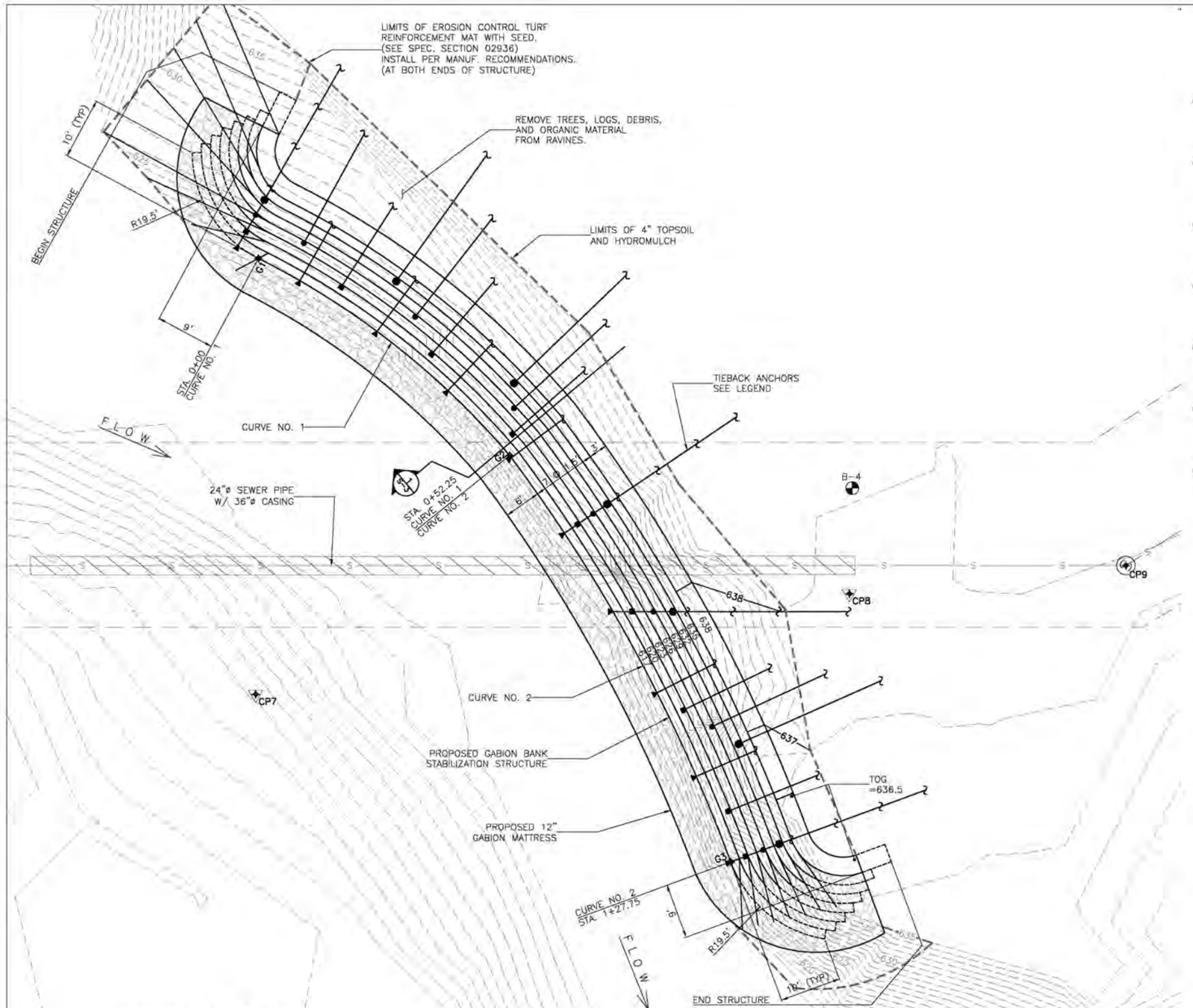
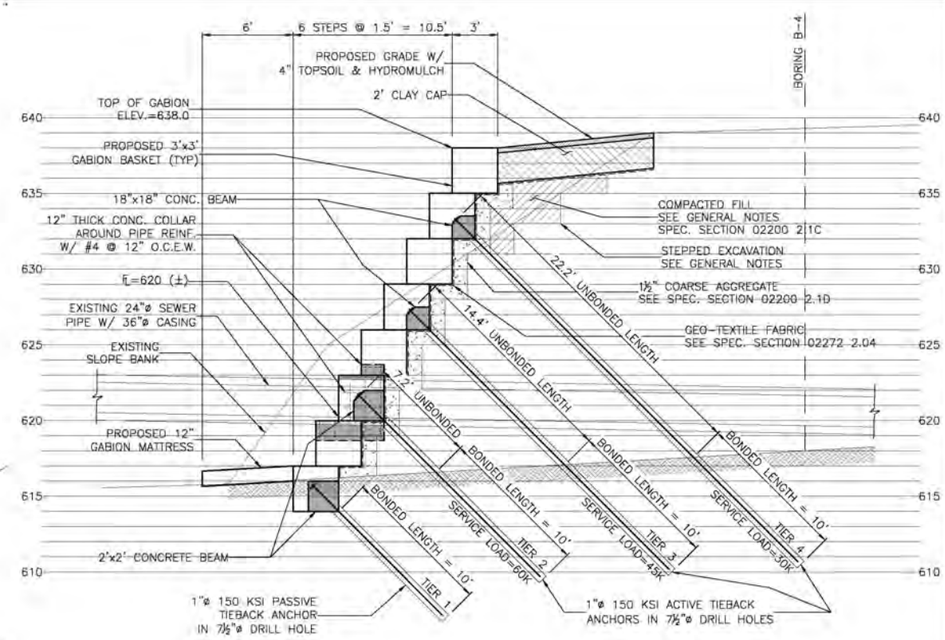
Unit	.	Scale:	AS SHOWN	Date	11/4/2014
Designed	GWC	Checked	GWC	Job No.	30030
Drawn	IMH	Approved		Sheet No.	S-2A





AREA 4 - SECTION
GABION EROSION CONTROL STRUCTURE

1

SCALE: 1" = 5'-0"
(22"x34" SHEET SIZE)

5 2.5 0 5 10
GRAPHIC SCALE IN FEET

AREA 4 - PLAN
GABION EROSION CONTROL STRUCTURE

NORTH

SCALE: 1" = 10'-0"
(22"x34" SHEET SIZE)

10 5 0 10 20
GRAPHIC SCALE IN FEET

NOTE:
STRUCTURES IN THIS AREA (AREA 4) SHALL BE COMPLETED IN TOTALITY, INCLUDING RESTORATION OF TEMPORARY ACCESS EASEMENTS, WITHIN 45 DAYS OF BEGINNING CONSTRUCTION. SEE SPEC SECTION 01 35 00 SPECIAL PROCEDURES, 1.01 B.

LEGEND

- EXISTING CONTOUR
- 630 FINISHED CONTOUR
- 1ST TIER TIEBACK @ 15' O.C.
- 2ND TIER TIEBACK @ 18' O.C.
- 3RD TIER TIEBACK @ 21' O.C.
- 4TH TIER TIEBACK @ 24' O.C.
- COORDINATE POINT

CURVE DATA @ FACE OF GABION STRUCTURE

ITEM	CURVE NO. 1	CURVE NO. 2
Δ	23.0331°	16.6338°
L	52.24'	75.44'
R	129.95'	259.86'
CH	51.89'	75.18'
START	STA. 0+00	STA. 0+52.25
END	STA. 0+52.25	STA. 1+27.75

GABION LAYOUT COORDINATE TABLE

POINT NO.	NORTHING	EASTING	DESC.
CP7	7138328.09	2508103.09	SET NAIL
CP8	7138251.90	2508164.51	TPT
CP9	7138214.94	2508190.48	MANHOLE
G1	7138362.32	2508165.13	ROW 1 GABION FACE
G2	7138311.05	2508157.15	ROW 1 GABION FACE
G3	7138247.44	2508117.08	ROW 1 GABION FACE

FOR BIDDING

STATE OF TEXAS
GLENN W. CAMPBELL
79583
REGISTERED
PROFESSIONAL ENGINEER
11/4/2014

NO.	DATE	ADDENDUM	APPROV.
4			
3			
2			
1			

NORTH TEXAS MUNICIPAL WATER DISTRICT
MCKINNEY-PROSPER INTERCEPTOR AND
INDIAN CREEK TRUNK SEWER IMPROVEMENTS

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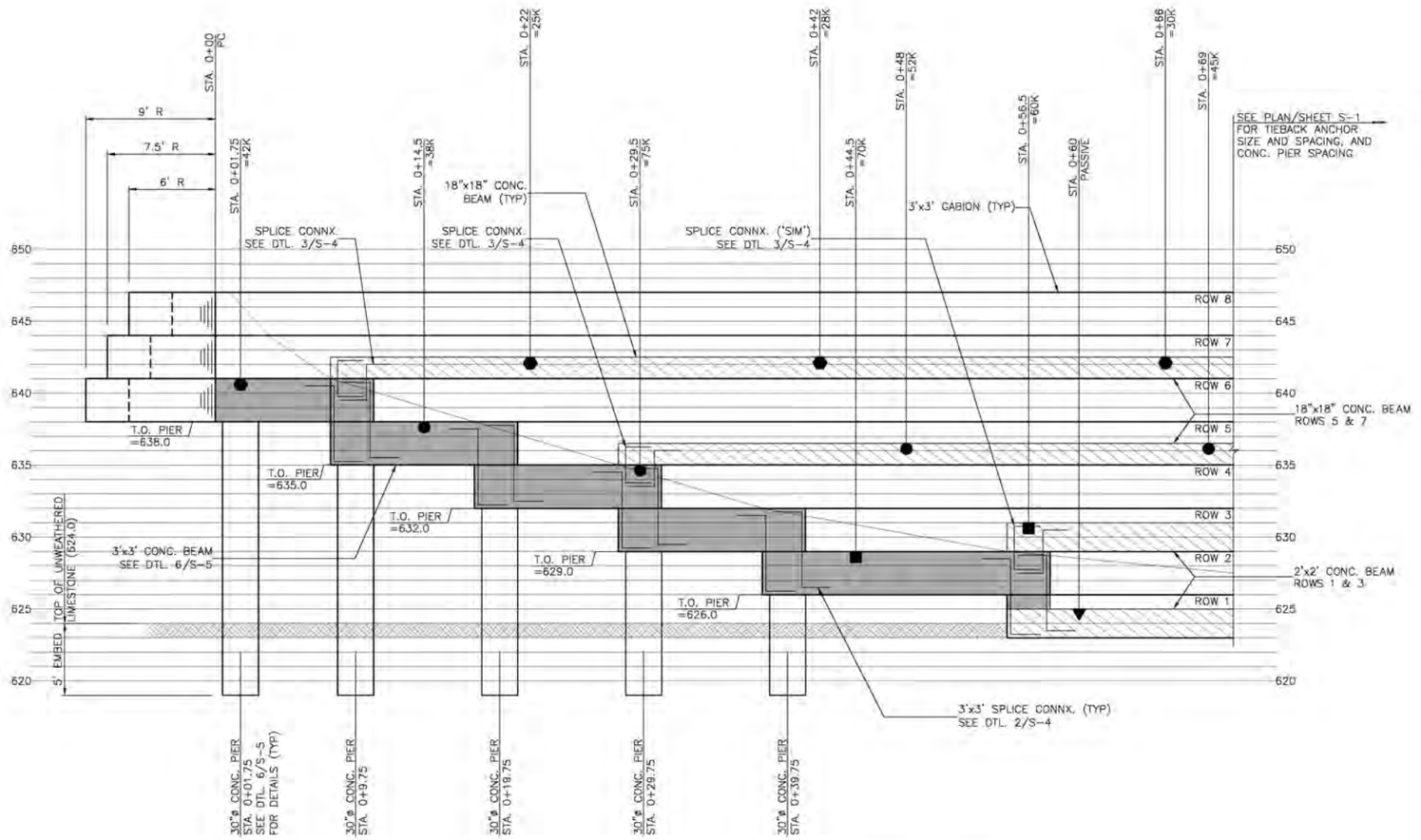
Unit		Scale:	AS SHOWN	Date	11/4/2014
Designed	GWC	Checked	GWC	Job No.	30030
Drawn	IMH	Approved		Sheet No.	

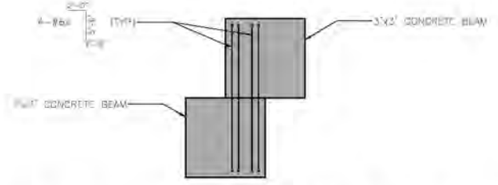


1 AREA 2 - PROFILE
GABION EROSION CONTROL STRUCTURE

SCALE: 1" = 5'-0"
(22"x34" SHEET SIZE)

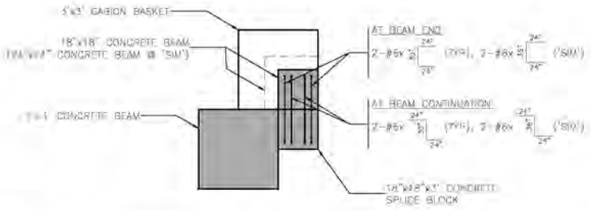
5 2.5 0 5 10
GRAPHIC SCALE IN FEET

LEGEND
▼ 1ST TIER TIEBACK
■ 2ND TIER TIEBACK
● 3RD TIER TIEBACK
⬢ 4TH TIER TIEBACK



2 3'-BEAM TO 3'-BEAM SPLICE DETAIL

SCALE: NTS



3 3'-BEAM TO 18" OR 24"-BEAM SPLICE DETAIL

SCALE: NTS

FOR BIDDING

STATE OF TEXAS
GLENN W. CAMPBELL
79883
REGISTERED PROFESSIONAL ENGINEER
11/4/2014

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MCKINNEY–PROSPER INTERCEPTOR AND
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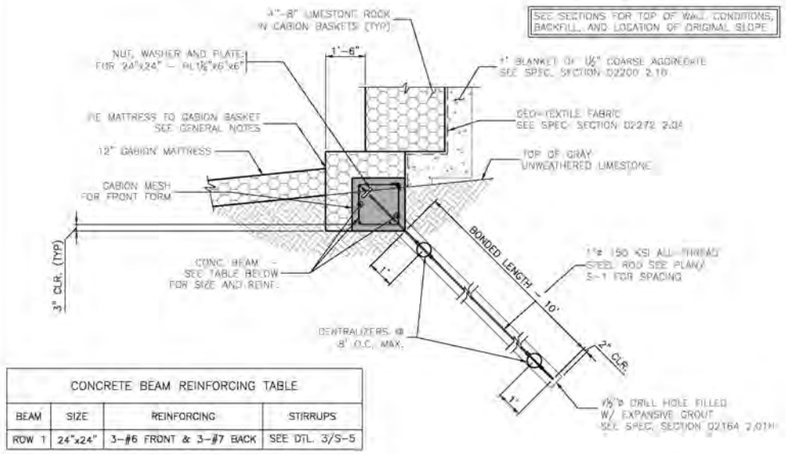
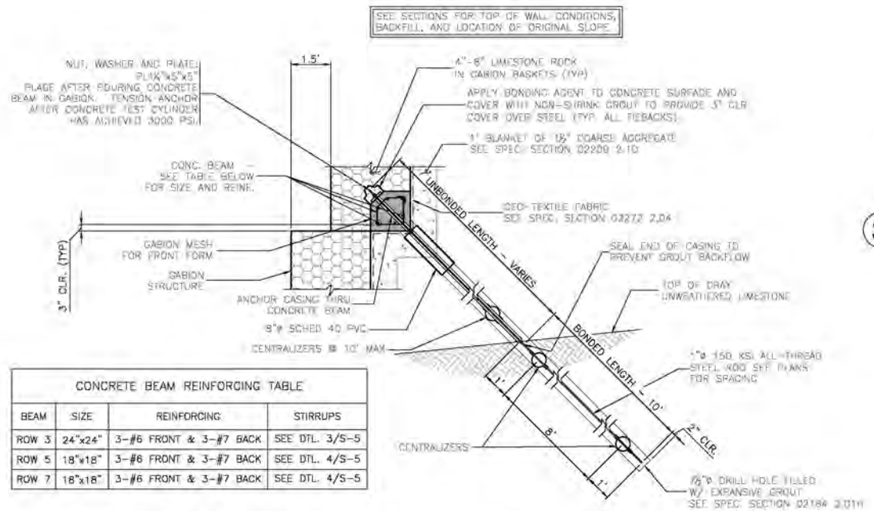
Unit:		Scale:	AS SHOWN	Date:	11/4/2014
Designed:	GWC	Checked:	GWC	Job No.:	30030
Drawn:	MH	Approved:		Sheet No.:	S-4



CONCRETE BEAM REINFORCING TABLE			
BEAM	SIZE	REINFORCING	STIRRUPS
ROW 1	24"x24"	3-#6 FRONT & 3-#7 BACK	SEE DTL. 3/S-5

1 TYPICAL DETAIL - PASSIVE ANCHOR (BOTTOM ROW)

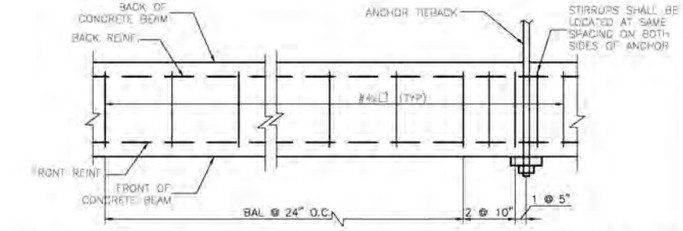
SCALE: NTS



CONCRETE BEAM REINFORCING TABLE			
BEAM	SIZE	REINFORCING	STIRRUPS
ROW 3	24"x24"	3-#6 FRONT & 3-#7 BACK	SEE DTL. 3/S-5
ROW 5	18"x18"	3-#6 FRONT & 3-#7 BACK	SEE DTL. 4/S-5
ROW 7	18"x18"	3-#6 FRONT & 3-#7 BACK	SEE DTL. 4/S-5

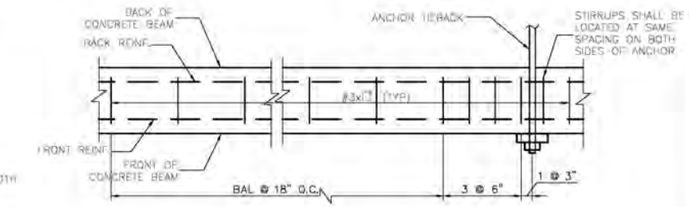
2 TYPICAL DETAIL - ACTIVE ANCHOR (MID ROWS)

SCALE: NTS



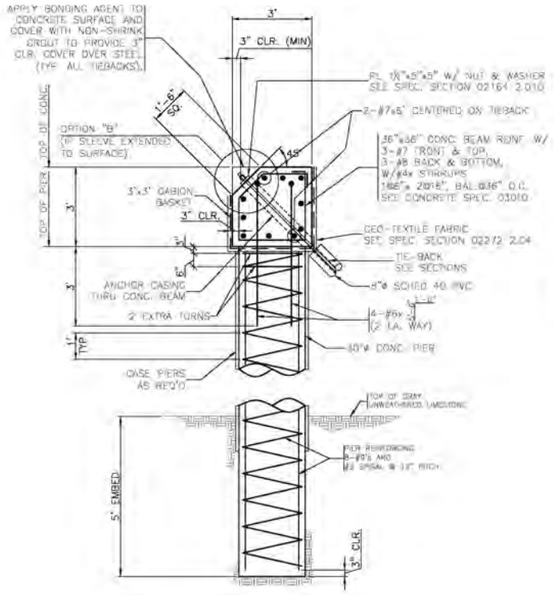
3 24"x24" CONCRETE BEAM STIRRUP DIAGRAM

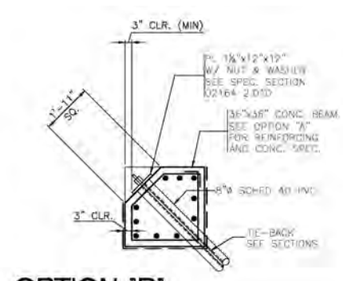
SCALE: NTS



4 18"x18" CONCRETE BEAM STIRRUP DIAGRAM

SCALE: NTS

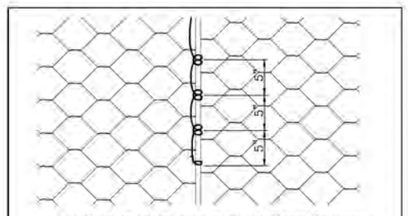




OPTION "B"

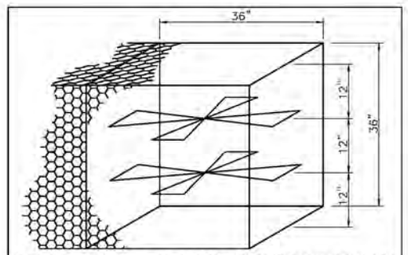
6 36"x36" CONCRETE BEAM AND PIER

SCALE: NTS



GABIONS MUST BE TIED IN THIS MANNER AT EACH STEP OF CONSTRUCTION.
1. INITIAL ASSEMBLY
2. TYING TO ADJACENT GABIONS ALONG ALL CONTACT EDGES
4. TYING OF LID TO SIDES
5. RE-TYING OF THE CUT GABION

TYING PATTERN

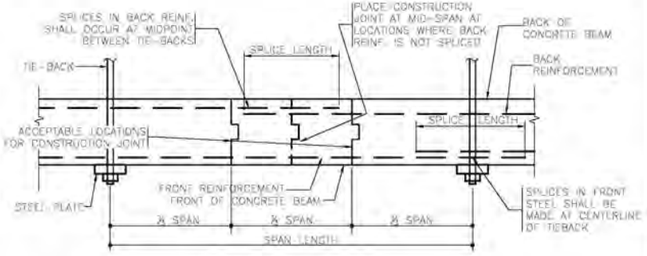


INNER TIE WIRES SHALL BE PLACED HORIZONTALLY IN EACH CELL EVERY 12" OF VERTICAL HEIGHT CONNECTING THE FRONT AND BACK FACES AND ANY UNSUPPORTED FACE LENGTHWISE.

INNER TIE WIRE METHOD

7 GABION TYING DIAGRAM

SCALE: NTS



5 CONST. JOINT AND SPLICING DIAGRAM

SCALE: NTS

FOR BIDDING

STATE OF TEXAS
GLENN W. CAMPBELL
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Designed	GWC	Checked	GWC	Job No.	30030
Drawn	IMH	Approved		Sheet No.	S-5

GENERAL NOTES

1. Contractor shall verify all dimensions at the site.

2. Contractor shall precisely locate existing underground sanitary sewer pipelines, and any other underground utilities prior to start of construction.

3. All barricades, warning signs, lights, devices, etc. for the guidance and protection of traffic and pedestrians must conform to the installation shown in the 1980 Texas Manual of Uniform Traffic Control Devices, as currently amended, Texas Department of Transportation.

4. Contractor shall submit SWPPP to Engineer prior to beginning construction.

5. Work in Floodplain: Contractor shall be required to monitor weather forecasts and prepare and submit to the Engineer a safety plan for emergency evacuation of Construction Site during storm events.

FOUNDATIONS

1. Establish bottom of Gabion Structure at the elevations indicated on the construction drawings.

2. Engineering design based on findings and parameters in the Geotechnical Report by Reed Engineering Group; 2424 Stutz Drive, Suite 400; Dallas, TX 75235; tel: 214–350–5600; project no. 18682; dated May 16, 2013.

EARTHWORK, CRUSHED STONE

1. All vegetation and topsoil containing organic matter shall be removed from construction areas at the start of earth work construction.

2. Excavated benches shall be cut into the existing embankment in steps as shown on the section details so that backfill can be placed on level, continuous surfaces. Soils exposed at the surface shall be scarified to a depth of 6 inches and recompacted to between 92 and 98 percent of the maximum density as determined by ASTM D–698, "Standard Proctor". The moisture content shall range from optimum to +4 percentage points above optimum.

3. Site excavated soils shall be used for fill and be placed in maximum loose lifts of 8 inches and compacted to the moisture density requirements outlined above.

4. Crushed stone Aggregate shall consist of clean, free–draining durable rock meeting ASTM C–33, Size 467 (1½"). Crushed stone Aggregate shall be placed in maximum 8 inch loose lifts and compacted to a minimum of 60 percent of the relative density as determined by ASTM D–4254. Thickness of crushed stone blanket shall be 1'–0".

5. The clay cap above the crushed stone filter shall consist of clay or silty clay with a minimum of 70% passing the number 200 sieve, shall have a minimum Plasticity Index of 25, and shall be compacted between a minimum of 92% and a maximum of 98% of Standard Proctor Density with a moisture content between optimum and +4 percentage points above optimum.

GABION BASKETS

1. General: Gabion structures shall consist of rectangular, compartmented wire baskets filled with stone used to build earth retaining and erosion control structures. Where mattress or other types of structures are indicated, the same requirements as those for gabion structures shall apply.

2. Construction: Gabion baskets shall be of single unit construction; the base, end, and sides are to be either woven into a single unit, or one edge of these members connected to the base section of the unit in such a manner that strength and flexibility at the point of connection is at least equal to that of the mesh. Where the length of the gabion basket exceeds its horizontal width, the gabion basket shall be divided into compartments of approximately equal size by diaphragms, using the same mesh and gauge as the body of the gabion, into cells whose length does not exceed the horizontal width. The diaphragms shall be secured in proper position on the base in such a manner that no additional tying is necessary. Mesh opening of the gabions shall be approximately 3¼" X 4½" and shall be fabricated in a uniform hexagonal shaped, double twisted, non–raveling pattern.

3. All Gabion baskets and mattresses shall be P.V.C. coated.

GABION BASKETS (CONT.)

4. The rock (gabion stone) shall be clean, hard, durable washed limestone, 4" to 8" in size, and of such quality that they shall not disintegrate on exposure to water or weathering during the life of the structure. Stone fill shall meet the quality requirements (ASTM C 33) and freezing and thawing requirements (ASTM D 5312) for the region of the United States in which the structure will be constructed. Prior to placing stone, samples shall be delivered to the site and shall approved for gradation and appearance by the Engineer.

5. All wire used in the construction of gabions, including tie wire, shall conform to ASTM A853–91 and ASTM A–641. Minimum zinc coating shall be tested in accordance with ASTM A–90–91.

6. Wire used in the construction of PVC coated gabions, with a thickness of 12" or greater, shall meet the requirements of galvanized gabions and the following:

	Nominal Diameter	Weight of Zinc	PVC Coating
Mesh Wire	0.1063"	0.80 oz./sq.ft.	Nom. 0.02165" Min. 0.015"
Selvedge Wire	0.1338"	0.85 oz./sq.ft.	Nom. 0.02165" Min. 0.015"
Tie Wire	0.866"	0.70 oz./sq.ft.	Nom. 0.02165" Min. 0.015"

7. Spenax high tensile rings may be used as an alternate fastening method in place of the tie wire lacing method as shown in the plans and specifications. Rings shall be placed using a Spenax Pneumatic tool or Spenax hand tool. Overlap of completed rings shall be ½" minimum with not more than one inch total overlap. Spacing of the rings shall not exceed four inches.

8. For use with PVC coated gabions, rings shall be Spenax brand 11SB–0040 stainless steel rings with the following properties:
Diameter – 0.120" stainless steel wire per ASTM 313, Type 302, Class I
Tensile Strength – 260,000 PSI – 280,000 PSI per ASTM E 8/TP2004.

9. For Gabions, Spenax rings may be used in place of the tie wire on gabions at any point of contact between adjacent gabions where a ½" overlap of the Spenax ring can be obtained except where the attachment of gabions is end to end at the selvedged joint.

CONCRETE

1. All concrete shall be of hardrock aggregate and shall develop a minimum compressive strength of 3,600 psi at 28 days. High/early strength concrete may be used for concrete beams at Contractor's option.

2. All concrete shall have a maximum slump of five inches. The water/cement ratio specified shall not be exceeded to arrive at an acceptable slump for workability purposes.

3. All concrete shall be designed, mixed, transported, and placed in accordance with the latest specifications of the North Central Texas Council of Governments Public Works Construction Standards, Latest Edition.

4. Maximum size of coarse aggregate shall be 1½".

REINFORCEMENT

1. All beam stirrups and #3 bars shall conform to ASTM Specification A615, Grade 40. All other reinforcing steel shall conform to ASTM A615, Grade 60. Foreign steel is acceptable if mill certificates of compliance with ASTM are provided.

2. All reinforcement shall be designed and detailed in accordance with the latest edition of the ACI "Manual of Standard Practice for Detailing Concrete Structures" (ACI 315).

3. Hook all beam bars (in beam supporting lateral loads) at discontinuous ends.

4. All hooks shall be ACI Standard 90 degree hooks unless detailed otherwise.

5. All reinforcing bar bends shall be made cold. Grade 60 bars may not be re–bent in the field.

6. Reinforcement shall be supported to provide the following minimum concrete cover:

Cast against and permanently exposed to earth – 3 inches
Formed, exposed to earth or weather – 2 inches

REINFORCEMENT (CONT.)

7. All bar lengths and dimensions are out–to–out and do not include hooks and bends.

8. Stirrups of the size and spacing sheduled shall provide the cover listed above. Hooks on stirrups shall be 90 degrees and shall have 4" minimum extensions.

9. Where splices occur in beam reinforcing, front face of beam bars shall be spliced at the center line of supports (tiebacks), and bars at the back face of beam shall be spliced by lapping at the centerline of span. Splices for front and back of beam bars shall be a length equal to an ACI Class B tension splice for the bar sizes used per the chart below:

BAR SIZE	FRONT BARS	BACK BARS
#3	1'–0"	1'–4"
#4	1'–4"	1'–10"
#5	1'–8"	2'–3"
#6	2'–1"	2'–3"
#7	2'–10"	4'–0"
#8	3'–9"	5'–3"

10. Construction joints in concrete beams shall be placed at either of the third points of the span, shall be vertical, and shall be keyed to the next pour.

TESTING

1. Testing Laboratory: The Contractor shall utilize a testing laboratory, acceptable to the Engineer, to perform lab tests of the concrete in the beams, and field and lab tests of the fill materials and operations. Testing shall be paid for by Contractor.

2. Concrete: Testing laboratory will perform sampling and testing during concrete placement, which shall include the following:
a. Sampling: ASTM C 172.
b. Slump: ASTM C 143, one test for each load at point of discharge.
c. Air Content: ASTM C 173, one for each set of compressive strength specimens.
d. Compressive Strength: ASTM C 39, one set for each 50 cu. yds. or fraction thereof for each class of concrete, 1 specimen tested at 7 days, 2 specimens tested at 28 days. This testing does not relieve contractor of responsibility of providing concrete in compliance with specifications. Contractor may perform additional testing as necessary, at no expense to Owner, to ensure quality of concrete. When the total quantity of a given class of concrete is less than 50 cu. yds., strength tests may be waived by the Engineer if field experience indicates evidence of satisfactory strength. Test results will be reported in writing to Owner, Engineer, Contractor, and concrete producer on same day tests are made.

3. Slope Stability Structure Backfill: The contractor shall perform field density and moisture content tests on each lift at the rate of one test per lift per 200 lf of structure.

4. General Backfill: The contractor shall perform field density and moisture content tests of earthwork on each lift of general fill at the rate of one test per 5,000 sf (min).

5. Notification: The contractor shall notify the testing laboratory of the progress of the work in adequate time to allow scheduling of personnel. The testing laboratory will be responsible for verbally informing the Contractor of the test results immediately upon completion, so unnecessary delay is eliminated and unsatisfactory work is not covered up. Continued progress of the work shall not relieve the contractor of the responsibility of complying with the specification requirements. The testing laboratory shall notify the contractor and the engineer in writing of the test results.

DRILLED PIERS

1. Drilled piers are to be founded as shown on the drawing.

2. The bottom of all piers shall be smooth, dry and free of all loose material before pouring concrete.

3. Drilled piers shall be concreted within four (4) hours of excavation.

4. The Contractor shall verify the depth of the pier prior to cutting pier reinforcing cages. Pier steel shall be delivered to the job site in standard 60 foot lengths and cut as required.

5. Continuous inspection of pier drilling operations by a Geotechnical or Structural Engineer is required to assure proper bearing stratum is penetrated, that the pier holes are clean and dry at time of concreting, and proper concreting procedures are used in constructing the piers.

6. Case piers as required.

FOR BIDDING

STATE OF TEXAS
GLENN W. CAMPBELL
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Unit	.	Scale: AS SHOWN	Date 11/4/2014
Designed	GWC	Checked GWC	Job No. 30030
Drawn	IMH	Approved	Sheet No. S-6

TIEBACK ANCHORS

1. Complete rock anchor assemblies shall consist of the following components, which shall be of a quality as manufactured by Dywidag Systems International, USA, Inc., or approved equal:

2. The anchor tendon shall be a solid rod, which shall be high tensile steel 150 ksi continuous coil threadbar (size as indicated on construction drawings). The anchor rod may be of more than one section in length, the sections being interconnected by threaded tubular couplings of sufficient strength and thread engagement with the anchor rod sections to transfer 100% of the ultimate strength of the rock anchor. Rods shall be protected from dirt, rust, or deleterious substances. Rods with heavy corrosion or pitting shall not be used. Rods shall be stored and handled in such a manner as to avoid damage or corrosion.

3. Each rock anchor shall be capable of developing 95% of the guaranteed minimum ultimate tensile strength of the steel.

4. Each high strength steel tieback rod shall be treated with an electrostatically applied epoxy (powdered epoxy) coating per ASTM A775. The epoxy coating shall:
   a. Be resistant to chemical attacks from the grout and the environment.
   b. Completely and uniformly coat the tendon, and be free of holes, voids, and cracks.
   c. Be resistant to abrasion and impact.
   d. Be resistant to handling and installation damage.
   e. Enable the tendon to develop adequate bond with the grout without creeping.
   f. Be capable of elongating with the tendon without debonding.
   g. Be between 5 and 12 mils (0.13 and 0.30 mm) thick, inclusive, after curing.

5. Steel Rods, Plates, and Nuts used in the tieback assembly shall be epoxy coated per ASTM A–775 or hot–dip galvanized per ASTM A–153.

6. The bearing plate shall be fabricated from 36 ksi steel and shall be capable of developing 95% of the guaranteed minimum ultimate tensile strength of the steel.

7. Threaded steel tubular couplings shall be capable of developing 100% of the ultimate strength of the anchor rod steel.

8. Threaded steel anchor nuts shall be capable of developing 100% of the ultimate strength of the anchor rod steel.

9. Steel or plastic centralizers shall be fabricated from material which is not detrimental to the anchor rod steel. The centralizer shall position the rod in the drill hole so a minimum of 0.5 inch of grout cover is provided. Centralizers shall be spaced on the anchor rod as shown on the contract drawings.

10. Grout for rock anchors shall be expansive (non–shrink) grout providing a typical vertical expansion on not less than +0.04% at 28 days, and shall provide a minimum compressive strength of 3,500 psi at 7 days and 5,500 psi at 28 days (Corps of Engineers Test Method CRD–C–621).

11. Water for mixing grout shall be potable.

12. The casing, sheath or bond breaker shall be either a steel, pvc, polyethylene, or polypropylene pipe or tube. The casing material shall be capable of withstanding damage during shipping, handling, and installation. The material is subject to the approval of the engineer.

13. Grease: Grease shall be injected between the casing and the anchor rod and shall be formulated to provide lubrication and inhibit corrosion. The chlorides, nitrates, and sulfides present in the grease shall not exceed the following limits:
   a. Chlorides 10 ppm
   b. Nitrates 10 ppm
   c. Sulfides 10 ppm

14. The down hole end of the casing unbonded length shall be sealed with tape, heat shrinkable tubes, or other means subject to the approval of the Engineer. A plastic trumpet or other suitable sealing device shall be used to make the transition from the bearing plate to the corrosion protective casing over the unbonded length. A tight fitting seal shall be provided at the end of the trumpet.

TIEBACK ANCHORS (CONT.)

15. Core drilling, rotary drilling, or percussion drilling may be used to drill tieback anchor holes. Hole diameters shall be as shown on the construction drawings.

16. The grout shall have a maximum water to cement ratio of 0.20. The grouting equipment shall include a mixer capable of producing a grout free of lumps and undispersed cement. The grouting equipment shall be sized to enable the rock anchor to be grouted in one continuous operation. Mixing and storage times shall not cause excessive temperature build up in the grout. The mixer should be capable of continuously agitating the grout.

17. Grout shall be injected from the lowest point of the rock anchor. The grout may be placed using grout tubes or casings. The grout can be placed before or after insertion of the rod. The quantity of the grout per hole shall be calculated and recorded to insure that the minimum bonded length is provided.

18. The tieback shall remain undisturbed for a minimum of 7 days or until the grout has cured. A minimum of 7 days after placement and after the concrete beam through which the rod penetrates has been placed and reached sufficient concrete strength, a hydraulic type jack with pressure gauge and minimum capacity of 80 tons shall be used for testing.

19. Ten percent of the rock anchors shall be performance tested to 1.33 times the service load. The remainder of all rock anchors shall be proof tested to 1.20 times the service load. The service and test loads for the rock anchors are included on the construction drawings.

20. Performance Test: The first three rock anchor tiebacks constructed (and one every ten thereafter, 2 tiebacks) shall be incrementally loaded to performance test capacity (1.33 times the service load) according to the Tieback Performance Test Schedule included on Sheet S–7). During the load hold, the movements of the tieback shall be recorded at 0, 1, 2, 3, 4, 5, 7, and 10 minutes. If the change in movement between 1 and 10 minutes exceeds 0.04 inches (1 mm), then the movement shall be observed for a total of 60 minutes in order to determine the creep rate. If the observation period is extended to 60 minutes, then the movements shall also be recorded at 15, 20, 25, 30, 45, and 60 minutes. The observation period begins when the jack begins to apply load to the tieback. The load should be raised from the previous increment in less than 60 seconds, and the one minute reading is taken one minute after the jacking force begins to be applied.

21. Proof Test: The remaining 90 percent of the tieback rods shall be incrementally loaded to proof test capacity (1.20 times the service load) according to the Tieback Proof Test Schedule on Sheet S–7. The tieback rod shall be incrementally loaded and the elastic movement recorded at 0.25, 0.50, 0.75, 1.00, and 1.20 times the service load. The elastic movement shall be recorded every minute for 5 minutes at 1.20 times the service load. Movement of the proof test load between 1 and 5 minutes shall be less than 0.03 inches. If movement is greater than 0.03 inches during the 5 minute period, the load should be maintained until the creep rate can be determined.

22. "Lock–Off" of the Tieback: After all the test results have been recorded and the tieback has been successfully tested, the jack force shall be reduced to apply the service load to the rock anchor ("lock–off" load), the nut and washer secured to the concrete beam, and the jack removed.

23. Allowable Elastic Movements: To verify that the specified unbonded length of the tieback rod has been provided, the minimum elastic movement of the rod must exceed 0.8 times the calculated elastic elongation of the unbonded length. To verify that the specified bonded length of the tieback rod has been provided, the maximum elastic movement of the rod shall be less than the calculated elastic elongation of the unbonded length plus half of the bonded length.

24. Concrete for the beams shall be of hardrock aggregate and shall develop a minimum compressive strength of 3,600 psi prior to stressing the steel tieback rods. Concrete for beams shall develop a minimum compressive strength of 3,600 psi at 7 days in the event the anchors are stressed 7 days following the placement of the beams. No tieback may be stressed prior to a test cylinder break achieving a concrete strength equal to or greater than 3,600 psi, and prior to 7 days following placement of concrete.

TESTING

1. Coordinate with Owner's Representative.

TEST LOADS

Service loads for all tiebacks are shown on Sections on sheets S–1, S–2, and S–3 and on Profile on sheet S–4.

DESIGN VALUES

1. Lateral earth pressure = 55 pcf EFP
2. Pull–out for unweathered limestone = 7.0 ksf
3. Coefficient of friction = 0.45

TIEBACK PERFORMANCE TEST SCHEDULE
10 Minute Observation Period

Load Increment	Basis of Load (P_{DL} = Design Load)	Load (Kips)	Observation Period (min.)	Jack Pressure (psi)	Movement (inches)	Remarks
						Tieback No. _____ Date:
TS	(1)					* *
P_1	0.25 P_{DL}					*
TS						* *
P_1	0.25 P_{DL}					
P_2	0.50 P_{DL}					*
TS						* *
P_1	0.25 P_{DL}					
P_2	0.50 P_{DL}					
P_3	0.75 P_{DL}					*
TS						* *
P_1	0.25 P_{DL}					
P_2	0.50 P_{DL}					
P_3	0.75 P_{DL}					
P_4	1.00 P_{DL}					*
TS						* *
P_1	0.25 P_{DL}					
P_2	0.50 P_{DL}					
P_3	0.75 P_{DL}					
P_4	1.00 P_{DL}					
P_5	1.20 P_{DL}					*
TS						* *
P_1	0.25 P_{DL}					
P_2	0.50 P_{DL}					
P_3	0.75 P_{DL}					*
P_4	1.00 P_{DL}					
P_5	1.20 P_{DL}					
P_6	1.33 P_{DL}		1			*
P_6	1.33 P_{DL}		2			
P_6	1.33 P_{DL}		3			
P_6	1.33 P_{DL}		4			
P_6	1.33 P_{DL}		5			
P_6	1.33 P_{DL}		7			
P_6	1.33 P_{DL}		10			
P_5	1.20 P_{DL}					
P_4	1.00 P_{DL}					*
Lock-Off						*

(1) TS is the alignment load. It is normally between 10% of the design load and it is maintained in order to keep the testing equipment aligned. The actual value of this load depends upon the type of tendon and the weight of the jack.

(2) 1 ton = 8.9 kN, 1 inch = 25.4 mm 1 psi = 6.9 kPa

* Total Movement readings
* * Residual anchor movement readings

TIEBACK PROOF TEST SCHEDULE
5 Minute Observation Period

Load Increment	Basis of Load (P_{DL} = Design Load)	Load (Kips)	Observation Period (min.)	Jack Pressure (psi)	Movement (inches)	Remarks
						Tieback No. _____ Date:
TS	Alignment Load					
P_1	0.25 P_{DL}					
P_2	0.50 P_{DL}					
P_3	0.75 P_{DL}					
P_4	1.00 P_{DL}					
P_5	1.20 P_{DL}		1			
P_5	1.20 P_{DL}		2			
P_5	1.20 P_{DL}		3			
P_5	1.20 P_{DL}		4			
P_5	1.20 P_{DL}		5			
P_4	1.00 P_{DL}					
Lock-Off						

FOR BIDDING

STATE OF TEXAS
GLENN W. CAMPBELL
79683
REGISTERED PROFESSIONAL ENGINEER
11/4/2014

NO.	DATE	ADDENDUM	APPROV.
4			
3			
2			
1			

NORTH TEXAS MUNICIPAL WATER DISTRICT
MCKINNEY–PROSPER INTERCEPTOR AND
INDIAN CREEK TRUNK SEWER IMPROVEMENTS

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Unit	.	Scale:	AS SHOWN	Date	11/4/2014
Designed	GWC	Checked	GWC	Job No.	30030
Drawn	IMH	Approved		Sheet No.	S–7