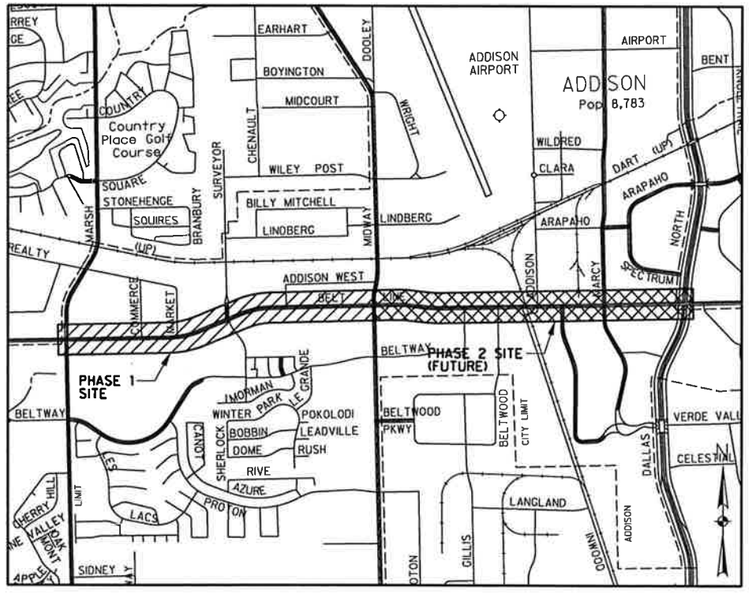
PLANS FOR THE CONSTRUCTION OF
BELT LINE ROAD UNDERGROUND ELECTRICAL
PHASE 1 - FROM MARSH LANE TO MIDWAY ROAD

INFRASTRUCTURE OPERATIONS & SERVICES #14-10

FEBRUARY 2014



VICINITY MAP
NOT TO SCALE

HALFF®
1201 NORTH BOWSER ROAD
RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200
FAX (214) 739-0095
FIRM REGISTRATION NUMBER: 312

STATE OF TEXAS
M.E. ROMANOWSKI
56306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant .P.E. 2/4/14 Date

THE SEALS APPEARING ON THIS CONSTRUCTION SET WERE AUTHORIZED BY M.E. ROMANOWSKI (56306), RYAN D. LEWIS (95767), MANUS CHAIPRASERT (94658), K.T. KUNZ (58430), CHARLIE BARTHELL MORAN, III (101189), AND S.P. BOOTH (94903) ON 02/04/2014. ALTERATION OF SEALED DOCUMENTS WITHOUT PROPER NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT. THE RECORD COPY OF THIS DRAWING IS ON FILE AT THE OFFICES OF HALFF ASSOCIATES, INC 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081. TBPE FIRM #F-312.

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STATE OF TEXAS
M.E. ROMANOWSKI
56306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant .P.E. 1/29/14 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

INDEX OF SHEETS

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL: (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
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GENERAL NOTES

1. All work shall conform to the requirements of the Town of Addison and shall be in accordance with the Town of Addison standard details and specifications for construction. All work not covered in the contract documents and the Town of Addison standard details and specifications for construction shall be governed by the North Central Texas Council of Governments Standard Specifications for Public Works Construction, Fourth Edition, dated 2004, including all amendments. See electrical duct bank notes for duct bank specifications.

2. Existing utility locations shown are generally schematic in nature and may not accurately reflect the size and location of each particular utility. Existing utilities shown are based on available record drawings and surface appurtenance field ties only. Some utility lines and surface locations may not be shown. The contractor shall assume responsibility for actual field location and protection of existing utilities whether shown or not. The Contractor shall also assume responsibility for repairs to existing utilities, whether shown or not, damaged by the Contractors activities. Differences in horizontal or vertical location of existing utilities shall not be basis for additional compensation to the Contractor. All valves & manholes shall be adjusted to new finished grade.

3. The Contractor shall protect existing property monumentation and primary control. Any such points which the Contractor believes will be destroyed shall have offset points established by the Contractor prior to construction. Any monumentation destroyed by the Contractor shall be reestablished at Contactor's expense by a registered professional land surveyor.

4. Topographic survey information shown on the plans is provided for informational purposes. The Contractor shall be responsible for verifying that the information shown is correct, and shall notify the engineer immediately of any errors, discrepancies or omissions to the survey information provided. Any costs incurred as a result of not confirming the actual topographies and facilities shall be borne by the Contractor. Topographic survey provided does not include existing trees in the median of Belt Line Rd. (See notes 19 and 20 with regard to protection of these trees.)

5. It shall be the responsibility of the Contractor to: A.) Prevent any damage to private property and property owner's poles, fences, shrubs, etc. B.) Protect all underground utilities. C.) Notify all utility companies at least 48 hours prior to excavation in accordance with Texas Law D.) Field verify horizontal and vertical location of all utilities in the vicinity of construction activities prior to start of construction. The Contractor shall notify Engineer of any previously unidentified potential conflicts that may exist between the existing utilities and construction plans.

6. Any damage that may occur to real property or existing improvements, including existing private and public landscape irrigation systems, shall be restored by the Contractor to at least the same condition that the real property or existing improvements were in prior to the damages. This restoration shall be subject to the property Owner's approval; moreover, this restoration shall not be a basis for additional compensation to the Contactor or a time extension. The Contractor must furnish a letter to the Town, signed by the property owner that states repairs are satisfactory.

7. The Contractor shall maintain drainage at all times during construction. Ponding of water in streets, drives, trenches, etc. will not be allowed.

8. The Contractor shall maintain existing sanitary sewer and water service at all times during construction unless approved by Town of Addison in advance.

9. The Contractor is responsible for coordination with utility companies and adjustment of existing sanitary sewer manholes, cleanouts, water meters, water valves, fire hydrants and other utility appurtenances to finished grade as required at no additional cost to the Town of Addison.

10. The Contactor shall excavate and field locate the horizontal and vertical location of existing water lines, sanitary sewer lines and storm drain lines at all proposed electrical duct bank and water crossing locations utilizing provided project control. Field verification shall be performed by the Contactor prior to beginning construction of the proposed electrical duct bank and water improvements. The Contractor shall immediately notify the Engineer of any discrepancies identified between the Contractor's field verified existing utility and existing storm drain location and the existing utility and existing storm drain location represented on the drawings.

    The Contractor shall give all franchise utilities 48 hours advance notice before construction in areas where utilities are present. Utility contacts include but are not limited to:

ATMOS	- BOBBY ROGERS - bobby.rogers@atmosenergy.com
AT&T	- CHAD COOPER - cc8956@att.com
ONCOR	- LARRY BALDWIN - larry.baldwin@oncor.com
TIME WARNER	- DAVID CHENEY - david.cheney@twcable.com
FIBERLIGHT	- MIKE BITSCHE - mike.bitsche@fiberlight.com
DIGTESS	- CONTRACTOR - fax@digtess.org

11. Areas of the site that will underlie fill shall be scarified to a depth of 6 inches and recompacted in accordance with embankment specifications.

12. Pedestrian and vehicular traffic flow, safety and access shall be maintained during all phases of construction. Barricading and traffic control during construction shall be the responsibility of the contractor and shall conform to the Texas Manual on Uniform Traffic Control Devices, Part 6 in particular. Traffic flow and access shall be maintained during all phases of construction unless otherwise noted on the traffic control plan. The Contractor is responsible for providing traffic safety measures for work on the project. The Contractor shall assume full responsibility for public safety in the construction area for the duration of construction activities.

13. The Contractor shall abide by all applicable federal, state, and local laws governing excavation. The Contractor shall provide detailed plans and specifications for trench safety systems that comply with applicable laws governing excavation. These plans shall be sealed by an Engineer experienced in the design of trench safety systems licensed in the State of Texas. The Contractor shall submit completed trench safety plan to the Engineer prior to commencing work. The Contractor shall be solely responsible for all aspects of work related to excavation.

14. The Contractor shall remove from the project area all surplus material. This work shall be incidental and not a separate pay item. Surplus materials from excavation including dirt, trash, rock measuring greater than 9" in the largest dimension, etc. shall be properly disposed of at a site acceptable to the Town of Addison if within the Town limits. If the location is not within the Town limits, the Contractor shall provide a letter stating so. No excess excavated material shall be deposited in low areas or along natural drainage ways without written permission from the affected property owner and the Town of Addison. If the Contractor places excess material in these areas without written permission, he will be responsible for all damages resulting from such fill and he shall remove the material at his own cost.

15. The Contractor shall sweep streets once a week and prior to known pending major rain events.

16. Bidders shall make any investigation of existing subsurface conditions as deemed necessary at no expense to the Town of Addison. Neither the Town of Addison nor the Engineer will be responsible in any way for additional compensation for excavation work performed under this contract due to the Contractor's assumptions pertaining to subsurface conditions.

17. Basic horizontal and vertical control points will be established or designated by Halff Associates, Inc. These points shall be used as a datum for the work. All additional survey work shall be performed by a competent surveyor employed by the contractor.

18. The Contractor will furnish to the Town of Addison the name of an OSHA-certified competent person to be on the project at all times during ongoing construction activities.

19. Trees shall only be removed if designated on the plans. The Contractor shall stake limits of proposed grading prior to clearing operations and identify (by flagging) adjacent trees that are to remain outside of these limits for Town review and approval. The Contactor shall provide the Town 72 hours advance notice of when trees will be flagged and ready for review. All cleared material shall be promptly removed from the site and properly disposed. Stockpiling of cleared material will not be allowed. Burning of cleared material is prohibited. The Contractor is directed to NCTCOG specification Item 3.2 for additional requirements. The clearing and removal of shrubs and other objectionable material shall not be paid for directly but shall be considered subsidiary to other pay items.
    If, in the opinion of the Engineer, a tree that is to remain requires protecting from construction, it shall be protected in accordance with note 20.

20. Where trees, plants, shrubbery, etc. are adjacent to the line of work and are not to be removed or removed and replaced, the Contractor shall protect such trees, plants, shrubbery, etc. If such trees, plants, shrubbery, etc. could be damaged by machinery, etc., orange safety fencing with steel T-posts having a minimum height of 3' and as approved by the Town shall be utilized for protection as long as they do not block drivers' sight lines. Hand excavation may also be required in vicinity of trees, plants, shrubbery, etc. that are to remain. The Contractor shall not permit machinery or employees to scrape, tear the limbs from, damage or attach guy cables to existing trees that are to remain in place. The Contractor shall be responsible for all damages to adjacent trees, plants, shrubbery, etc. that are to remain and any such damage shall be remedied to the satisfaction of the Town.

21. The Contractor shall coordinate the protection of existing franchise utilities and appurtenances including existing utility poles in the vicinity of construction operations whether utilities are shown in the Contract Documents or not. Any damage incurred to existing franchise utilities, appurtenances, power poles, etc. by construction related activities shall be the sole responsibility of the Contractor.

22. Only Town staff will be allowed to operate existing water line valves. Contractor shall coordinate with Dave Wilde or Jose Flores at 972-450-2847 for water valve closures and openings.

23. Contractor is responsible for condition of removed signs. Removed signs to be reinstalled must be in same or better condition when reinstalled.

24. The Contractor shall cease all construction operations immediately if a suspected archeological object/artifact is uncovered during construction. The Contractor shall immediately contact THC and the Town. Project work shall not recommence until proper permits are in place and provided to the Town. No additional contract days or additional remobilization expenses will be provided or paid for by the Town to the Contractor for time incurred.

25. The Contractor shall comply with the Migratory Bird Treaty Act.

26. The Town has informed all franchise utilities of this project and has provided them plans. The Town has also worked with the franchise utilities in planning the relocation of their conflicting lines and facilities. The Contractor is responsible to continue coordination directly with the franchise utilities to ensure that any utilities in conflict are adjusted or relocated in accordance with contractor's construction schedule. No additional contract days or additional remobilization expenses will be provided or paid for by the Town to the Contractor for time incurred for franchise utility adjustment.

27. Inspection of the proposed construction will be provided and paid for by the Town of Addison and also by Oncor Electric Delivery. The Contractor shall provide assistance by providing excavation, trench safety, or other work necessary to facilitate inspection activities, and shall give sufficient notice well in advance of pending construction activities to the Town of Addison and Oncor Electric Delivery for scheduling of inspection services.

28. All dimensions are to the face of curb unless otherwise noted.

29. Contractor shall provide a pre-construction video of entire project area to document current condition of Belt Line Road and business frontage.

M.E. ROMANOWSKI 96306 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

Signature of Registrant ,P.E. Date 10/24/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

GENERAL NOTES

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 GNTS 01	GN-1

Duct Bank General Notes

1. All work shall be performed in accordance with the standard Specifications for Contractor Installed Manholes and Concreted Encased Conduit Systems as established by Oncor Electric Delivery, latest editions, and any and all applicable Specifications and requirements of the Town of Addison.

   Oncor Specifications include the following: DDS-4 "Specifications for Electrical Underground Distribution Systems from Padmounted Transformation, Secondary Service Accounts", DCS-5 "Specifications for Contractor Installed Manholes and Concrete Encased Conduit Systems", and Oncor Underground Distribution Construction Standard drawings 205-465, 205-475, 205-485 and 205-490. The Oncor Standard Drawings shall take precedence over the omission of or conflict with information in the DDS-4 or DCS-5 sheets.

2. All applicable codes and ordinances shall be followed in the construction of the manhole and conduit line system. Included but not limited to are the following:

   - Local Town of Addison building codes
   - The National Electric Code (NESC)
   - OSHA requirements. Any conflict or omission shall not relieve the contractor or responsibility of complying with OSHA requirements.
   - Local Town of Addison location and coordination Policy (if applicable).
   - The American Concrete Institute (ACI).
   - The American Society for Testing and Materials (ASTM).
   - Local, City, State and Federal Environmental Regulations
   - Texas Engineering Practice Act and Rules Concerning The Practice of Engineering and Professional Engineering Licensure.

3. The contractor shall locate and protect all existing utilities, whether indicated on the design drawing or discovered during the work. The contractor shall immediately notify the Engineer and Oncor's authorized representative when any utility not previously indicated or inaccurately indicated on the design drawing is discovered.

4. The contractor shall supply all materials for this job including manholes, necks, frames and covers, con-seal, ground rods, PVC Conduct, PVC Bends, PVC couplings, tie-wraps, conduit spacers, PVC adhesive, concrete select backfill, pull ropes, pre-cast switchgear or transformer pads, electric cable markers, manhole ladder rungs, etc., per Oncor Electric Delivery specifications unless otherwise specified on the Drawings.

5. Concrete encased duct structure installation shall be performed as follows:

   - All conduits shall be concreted encased with a minimum of 3" of concrete. The top conduits of any duct structure shall have 6" minimum cover. Refer to Oncor details and construction drawings for duct section. All concrete encasement shall have a pattern finish.
   - Concrete should be 5 sack, Portland Type 1 cement, ¾ maximum size aggregate 3000 PSI at 28 days. The slump of the concrete may be increased by the contractor with the approval by Oncor inspector, in order to facilitate a wetter mix to insure total encasement of the duct. However, the slump should not be increased to the point where the ultimate yield strength of the concrete is jeopardized.
   - All concrete shall be installed by the use of Hopper, Trimmie, Chute, or pump truck unless otherwise specified by Oncor Electric Delivery inspector. At no time shall concrete be placed with a front-end loader or by similar method.
   - Concrete encased conduit shall be held down with screw jacks or equivalent means installed at intervals not exceeding 20' along the duct line. Any instance of floating or racking of conduits shall be immediately reported to Oncor Delivery Company Inspector or Designated Company Representative.
   - Conduit for encasement shall be NEMA TC-6, DB-60, ASTM F-512, rated for 90 degrees centigrade. All bends, elbows and couplings shall be schedule 40 PVC with a minimum radius 36".
   - Spacers shall be snap lock type conduit per Oncor details. Purpose-designed base, intermediate and top conduit spaces shall be used.
   - Finish backfill should be placed in level, uniform lifts with each lift compacted to the minimum dry density within the compaction soil moisture ranges recommended. The loose lift thickness should not exceed six (6) inches. Each layer should be properly placed, mixed, spread, and compacted to between Ninety-five (95) and one hundred (100) of standard proctor density at 0% to 3% of optimum moisture content as determined by ASTM D698.
   - When complete, each conduit installed will be checked by pulling both a disk mandrel and a conduit swab through the entire length of conduit.
   - Duct spacers are to provide 3 inches of vertical and horizontal separation between conduits.
   - Red powder concrete dye is to be placed on the duct encasement cap immediately after the concrete pour has taken place to aid with future location of primary duct.
   - Conduits for incomplete duct lines (stubs) are to remain exposed from the encasements for future retrieval. The ends shall be capped watertight and have an electronic marker installed.
   - Each conduit of an encased duct is to have a 6000 pound pull tape installed for future cable pulling.

6. Concrete manhole installation shall be performed as follows:

   - Precast type unless otherwise noted, should be supplied by approved supplier and shall consist of two or three precast concrete sections with each section having a maximum weight of 15,000 lbs.
   - 18 inches minimum pea gravel of cushion shall be installed in the bottom of excavated area prior to the manhole installation. Sand base may be used with prior Oncor approval.
   - Select backfill should be installed around all manholes in maximum 1 ft. lifts and compacted to 95% minimum.
   - Contractor shall install the frame/cover and neck. Construction plans show the approximate entrance elevation; however it is the contractor's responsibility to install the necessary amount of neck to bring the top of the cover to 2" above finished grade (or flush with street grade when cover is in street). Saw cutting or grout fill may be required to obtain the appropriate entrance elevation.
   - The contractor shall supply 8' x 5/8" copper clad ground rod, weld type, in each manhole at each sleeved location (minimum three). Ground rod shall be vertically driven into undisturbed soil. If rock is encountered, grounding shall be as directed by Oncor Electric Delivery inspector. All ground rods shall be installed prior to placement of top manhole section (due to height limitations). In no case shall ground rods be cut.
   - The contractor shall install concrete pad around all manhole entrances in all non-paved areas. See standard detail drawings for reinforced steel requirements and dimensions.
   - All joints between manhole sections shall be made watertight at the time of initial installation.
   - Do not remove the "knock out" membranes of any unused terminator position. Duct plugs should be installed in all conduits that are unoccupied by cable.
   - Final slope across top of manhole shall provide for a 2" minimum drop to drain water from top of manhole.

   The Oncor Electric Delivery inspector is to inspect all manhole installations prior to the placing of backfill and all conduit installations prior to the placement of concrete.

   Concrete shall not be placed when the temperature is below 40 degrees Fahrenheit and falling, but may be placed when the temperature is above 35 degrees Fahrenheit and rising. The temperature reading shall be taken in the shade and way from artificial heat.

   The contractor shall provide verification of completion and compliance of any and all required tests to the satisfaction of Oncor Electric Delivery.

   The contractor shall contact Oncor Electric Delivery to request a final walk-through inspection of the electric duct bank infrastructure work.

7. Oncor Electric Delivery inspector shall be notified a minimum of 2 hours prior to the delivery of concrete and shall be presented during placement.

8. Contractor shall submit a written request to the appropriate Oncor Electric Delivery authorized *personnel prior to any modification to the original design drawings that will change the number* of bends or add 10 percent or more to the overall conduit length found on the original design plan. This written request must be provided prior to implementation of changes. This requirement includes the addition of bends as necessary to properly align conduits entering and exiting proposed equipment pads.

   No separate payment shall be made for the cost of additional bends as necessary to properly align conduits entering and exiting equipment pads, such cost shall be included in the pad costs.

9. Equipment pads shall be installed per DDS-4 specifications. Piers and beams are required on all equipment pads unless waived by company inspector. If required, stabilization method(s) will be determined by the company inspector. The depth shall extend to rock or a change in soil conditions sufficient to bear the load of pad and equipment, and to prevent settlement due to undercutting for conduit bend installation or washing due to drainage.

10. The Contractor shall fully comply with and supplement the proposed Storm Water Pollution Prevention Plan, as necessary, while conducting his activities on this project.

11. The Contractor shall make necessary provisions for the support and protection of all light poles, fences, trees, shrubs, utility services building foundations and all other utilities and structures both above and below the ground, the cost of which shall be included in the contract amount. These include, but are not limited to existing light poles and foundations in the median.

12. The Contractor shall schedule and coordinate his work with trenching operations for other utilities including telecommunications services.

13. Contractor shall maintain a minimum of 1 foot of clearance from outside of utility to outside of duct bank at all locations where the proposed duct bank crosses existing or proposed utilities.

14. Contractor shall move existing underground electric illumination lines in the vicinity of proposed manholes, as necessary, prior to installation of proposed manholes.

15. The unit price for transformer and switchgear pads to include all duct bank bends necessary (but not shown on the plans), to adjust duct bank alignment at pads to proper connection points. Oncor to provide location points.

16. Contractor to perform duct bank construction as needed at connection points to existing electric lines. Contractor will be required to meet the scheduling requirements of Oncor. Such requirements will include scheduling during off peak electrical demand hours and as such, may include night time construction.

17. When working near energized overhead lines the contractor shall meet all state and federal requirements for distance of equipment and personnel from energized conductors.

18. Oncor does not permit utility poles to be supported during construction. To prevent undermining poles, the minimum distance between the nearest edges of pole and duct bank shall be 5 feet.

Boring Notes

1. Contractor shall procure all shoring material, fabricated where required, necessary to complete the project as indicated on the plans. All shoring material shall remain the property of the contractor.
2. Contractor shall weld all sections of the steel encasement.
3. Contractor shall provide and install the appropriate number and size of conduits (Schedule 40 PVC Water Pipe) and grout injection pipes in the steel encasement, using spacers, banding, and grout.
4. Contractor shall take all precautions necessary to ensure the integrity of the conduits during backfill and grouting.
5. Spacers are to provide 3 inches of vertical and horizontal separation between conduits.
6. The contractor will provide steel encasement, bore spacers.
7. Steel encasement pipe size and spacer design shall be approved by Oncor for each bore.
8. Contractor shall take all precautions necessary to ensure the integrity of the conduits during backfill and grouting, including at a minimum plumbing the six inch (6") schedule 40 water pipe within the steel encasement with a circulatory system designed for a minimum change-over of water every hour for a 48-hour time period.
9. Contractor shall provide and install the appropriate number of six inch (6") conduits (schedule 40 pvc water pipe) and three inch (3") grout injection pipes in the steel encasement, using spacers, banding, and grout.
10. Contractor shall weld all sections of casing together
11. Weld a 3" X3" X ¼" thick steel "L" angel into the bottom of the bore casing and grind smooth to form a continuous rail on which the bore spacers will travel to prevent spiraling.
12. Fill annular space between conduits with concrete grout from the following choices: TXI90032LE or Southern Star. No substitute on aloud without prior Oncor approval and formal submission of thermal resistivity test.

Electrical and Franchise Utility Duct Bank Notes

1. The Contractor shall verify the location and number of all existing active utility, electrical and telecommunications services and construct new facilities up to the existing points of connection. The Contractor shall schedule the final connections with the utility company. The connection shall be phased as follows:

   - The utility company will de-energize the existing service.
   - The contractor will connect to existing conduits as directed by utility owner.
   - The utility will transfer/restore service.
   - The contractor will be required to meet the scheduling requirements of the utility. Such requirements will include scheduling during peak hours including night time construction to minimize disruption of service.
   - The contractor will be on call during all transfers of service to facilitate any "civil" work that may be required to complete the connections.

Water/Wastewater General Notes

1. The Contractor shall verify the location and number of existing active water services affected by construction and shall maintain existing water service at all times. If necessary, the Contractor shall provide for temporary water to affected services until the new water main has been tested, approved and accepted by the Town of Addison. The Contractor shall coordinate with the Town of Addison regarding shutdown of any active water main or service and shall reconnect water services to new water mains as necessary. No Separate Pay Item.
2. The Contractor shall coordinate all water main tie-ins with the Town of Addison prior to making tie-ins.
3. The Contractor shall ensure that fire hydrants are accessible to fire trucks at all times and that existing water main valves are accessible to Town of Addison personnel at all times. The Contractor shall sequence his construction such that no more than one fire hydrant is out of service at any given time and shall notify the Town of Addison when a fire hydrant is taken out of service.
4. The Contractor shall verify the location and number of existing sanitary sewer services affected by construction and shall maintain existing sanitary sewer service and flow at all times. The Contractor shall reconnect sanitary sewer laterals to new sanitary sewer mains as necessary. Dye testing may be required at no additional cost to the owner. No Separate Pay Item.
5. The removal of existing valves, manholes, and other water and sanitary sewer appurtenances necessary for the construction and installation of the improvements shown on the project plans is considered incidental unless noted otherwise.
6. Water main construction to comply with TCEQ regulations.

DRAWINGS AND NOTES REVIEWED AND APPROVED BY ONCOR ELECTRIC DELIVERY

JAMES FANGUE, P.E. — DATE 1/28/14

STATE OF TEXAS — CHARLIE BARTHELL MORAN III — 101189 — LICENSED PROFESSIONAL ENGINEER

Signature of Registrant — P.E. 1-22-14 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

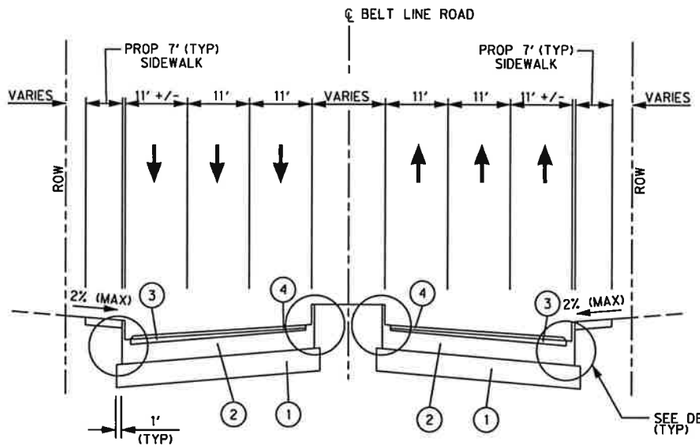
BELT LINE ROAD
UNDERGROUND ELECTRICAL

GENERAL NOTES

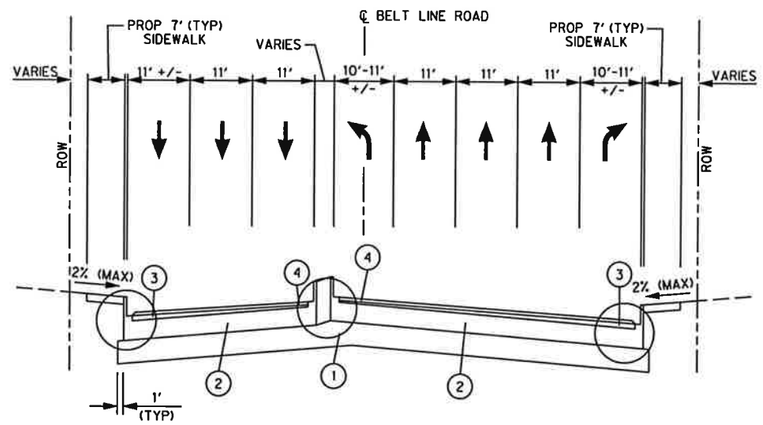
HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0886

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 GNTS 02	GN-2

SHEET 4 OF 235



TYPICAL SECTION AT MIDBLOCK
N.T.S.



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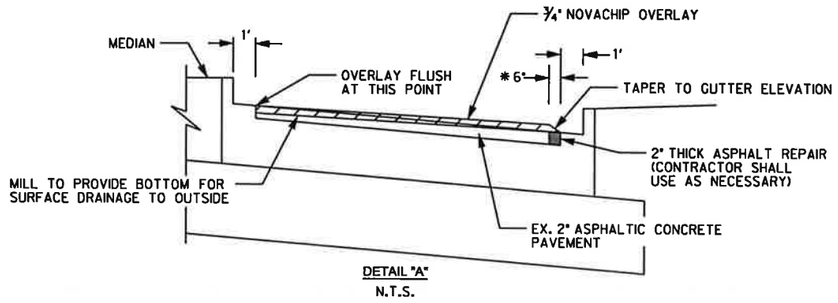

DETAIL "A"
N.T.S.

* TAPER LENGTH MAY NEED TO BE EXTENDED AT CROSS WALK LOCATIONS TO ENSURE FINAL PAVEMENT CROSS SLOPE IS LESS THAN 8.33%

NOTES:
- DIMENSIONS ARE TO FACE OF CURB.

LEGEND

1. EXISTING 6" SOIL-LIME BASE TREATMENT
2. EXISTING 8" JOINTED REINFORCED CONCRETE PAVEMENT
3. EXISTING 2" ASPHALTIC CONCRETE PAVEMENT
4. PROPOSED 3/4" NOVACHIP OVERLAY (SEE DETAIL "A" FOR MILLING INFORMATION)

SHEET 5 OF 235

STATE OF TEXAS — M.E. ROMANOWSKI — 56308 — LICENSED PROFESSIONAL ENGINEER

Signature of Registrant, P.E. Date 10/23/13

FIRM REGISTRATION NUMBER: 312

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TYPICAL SECTIONS

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
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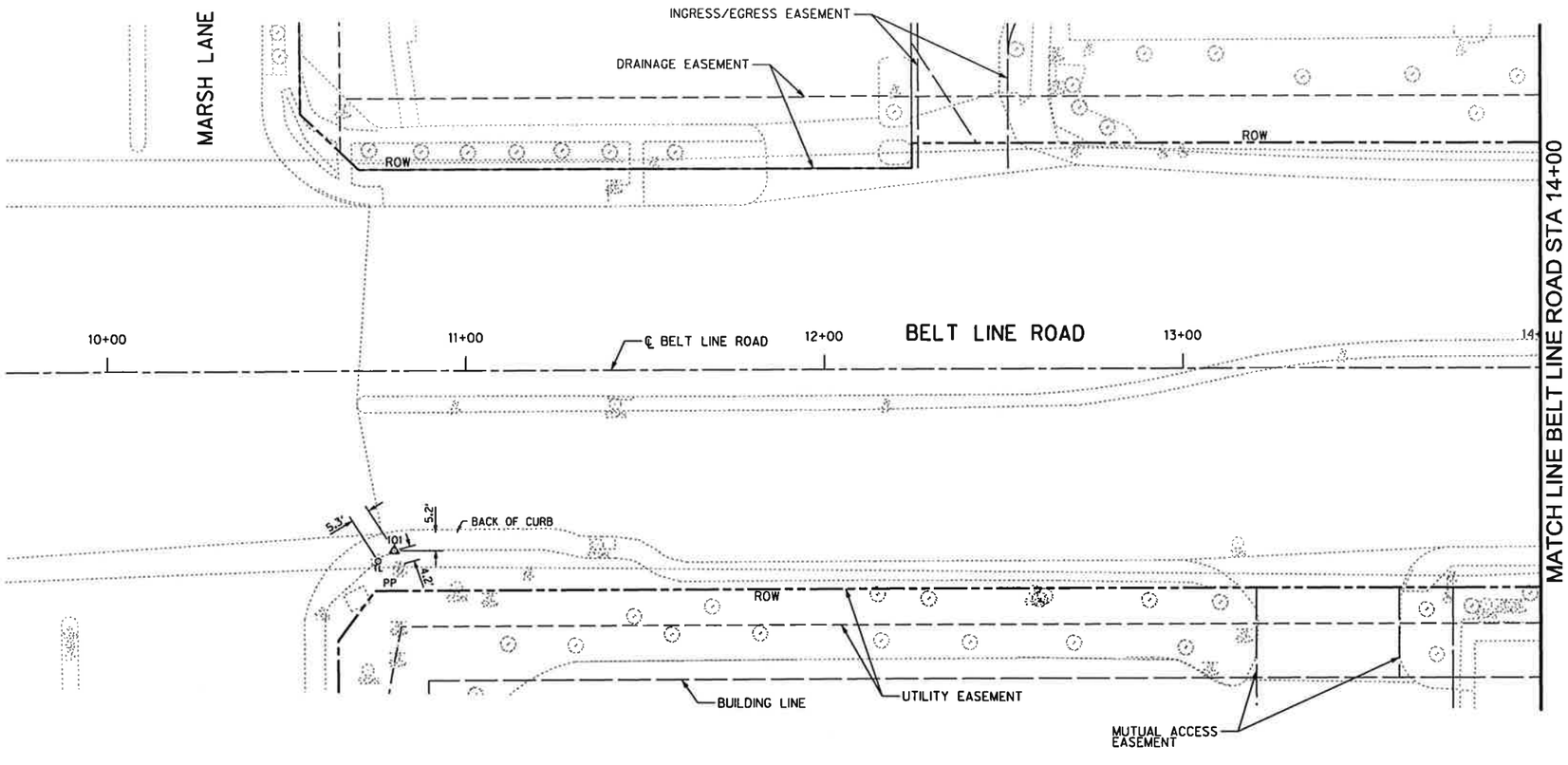

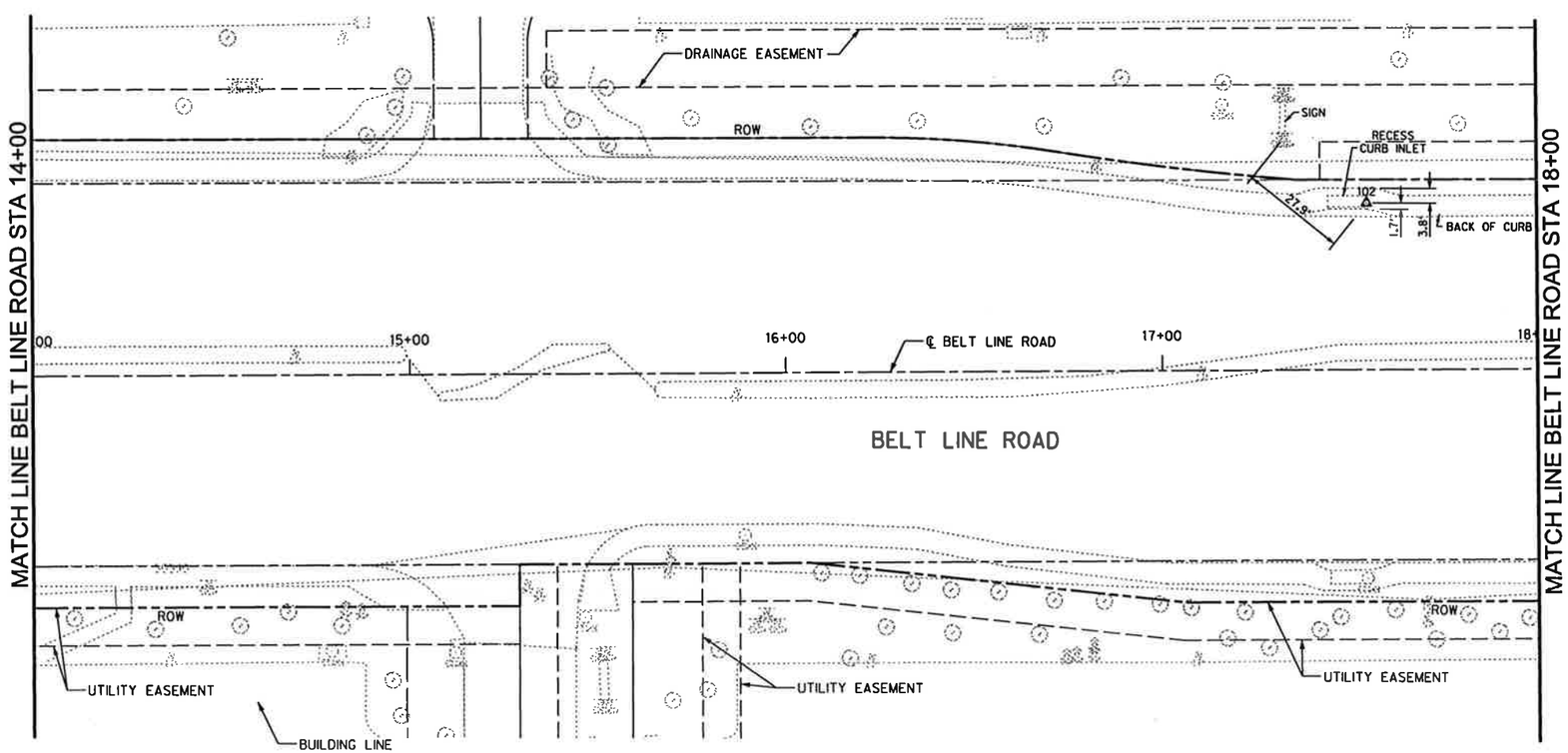

0 10 20 30 40 60
SCALE IN FEET

Point #	Northing	Easting	Elevation	Description
101	7,034,565.789	2,473,248.251	570.06	"X" cut on sidewalk @ SE corner of Beltline @ Marsh
102	7,034,664.469	2,473,922.534	573.18	"X" cut on curb inlet in front of 3761 Beltline (Addison Plaza Strip)

LEGEND:

STMH	STORM SEWER MANHOLE
RCP	REINFORCED CONCRETE PIPE
COMM	COMMUNICATION VAULT
BOLL	TRAFFIC BOLLARD
TL	TRAFFIC SIGNAL LIGHT
PP	POWER POLE
TSB	TRAFFIC SIGNAL BOX
SSMH	SANITARY SEWER MANHOLE
SSCO	SANITARY SEWER CLEANOUT
ICV	IRRIGATION CONTROL VALVE
TMH	TELEPHONE MANHOLE
EM	ELECTRICAL METER
LP	LIGHT POLE
WM	WATER METER
WV	WATER VALVE
FH	FIRE HYDRANT
EB	ELECTRICAL BOX
TS	TRAFFIC SIGN
FOS	FIBER OPTIC SIGN
GL	GROUND LIGHT
—E—	OVERHEAD ELECTRICAL LINE

NOTES:
1. BASIS OF BEARING: COORDINATES ARE BASED ON THE SURFACE ADJUSTED VALUES OF TOWN OF ADDISON SURVEY CONTROL POINT NUMBERS COA-3, COA-4, COA-5, COA-10, & COA-11 USING TXDOT DALLAS COUNTY SCALE FACTOR 1.000136506.

2. VERTICAL DATUM: ELEVATIONS WERE DERIVED FROM TOWN OF ADDISON SURVEY CONTROL POINT NUMBERS COA-3, COA-5, & COA-11.

3. ALL VALUES SHOWN HEREON ARE IN US SURVEY FEET.

STATE OF TEXAS REGISTERED JASON A. JERNIGAN 6023 PROFESSIONAL LAND SURVEYOR

The undersigned certifies to the locations and descriptions of the survey control information shown hereon only. This is not a professional boundary surveying product. Boundary, easement, and right-of-way information is shown for reference only.

Jason A. Jernigan RPLS No. 6023 OCT. 25, 2013

TBPLS FIRM NO. 10029600

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

SURVEY CONTROL
BELT LINE RD STA 10+00 TO STA 18+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 SURV 01	SC-1

SHEET 6 OF 235

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PROJECT # 29350
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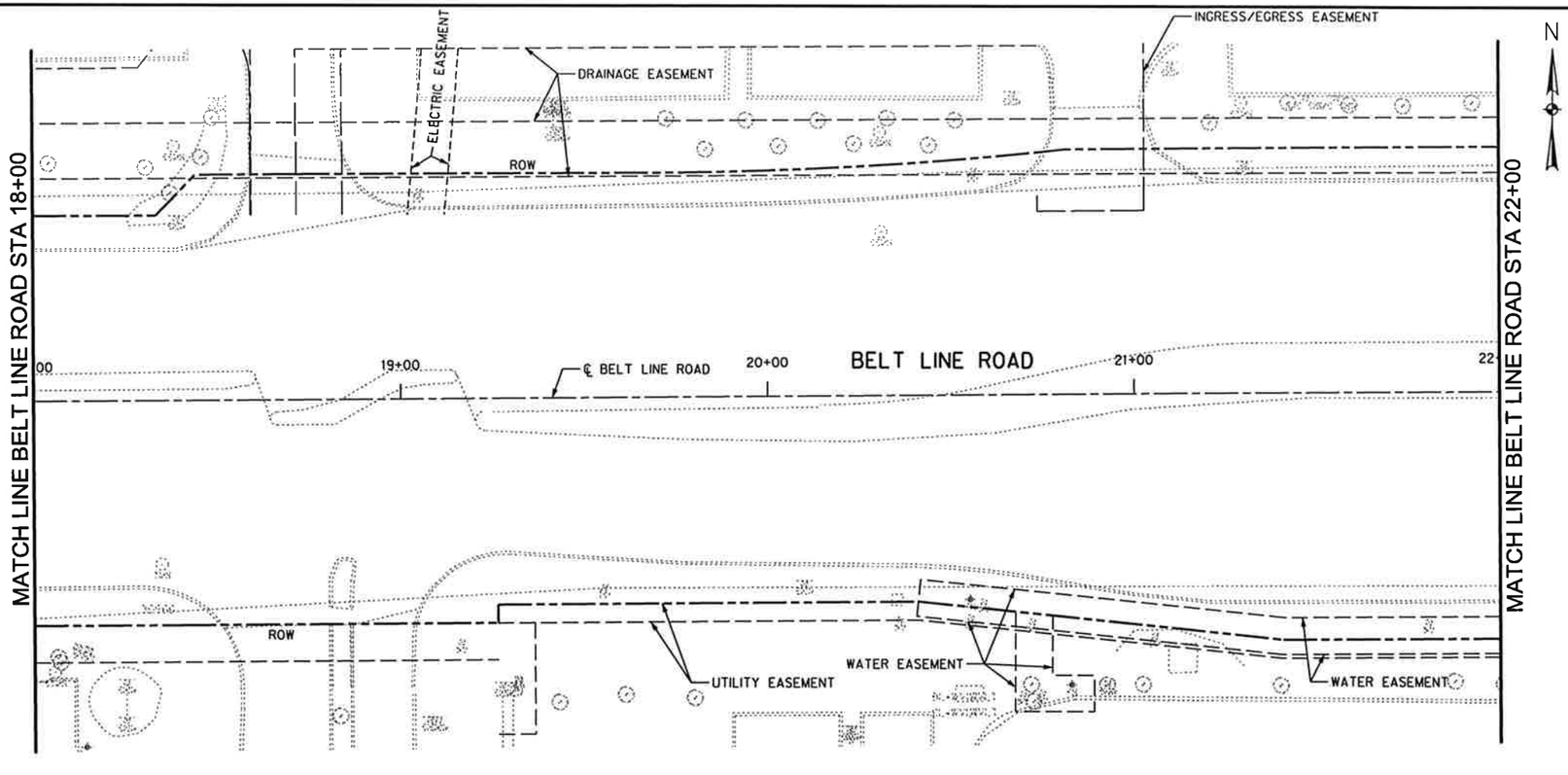

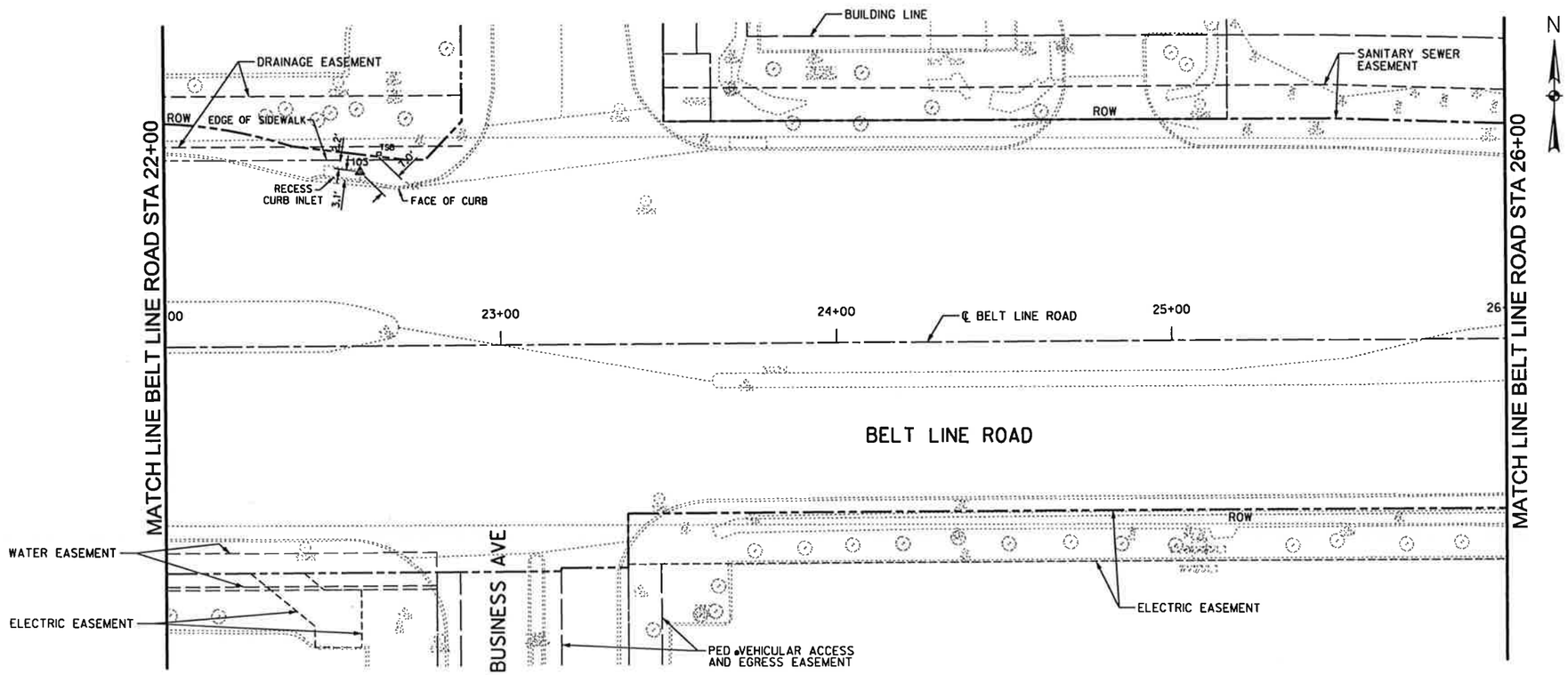

0 10 20 30 40 60
SCALE IN FEET

Point #	Northing	Easting	Elevation	Description
103	7,034,676.458	2,474,426.300	577.57	"X" cut on curb inlet in front of McDonald's (NE corner of inlet)

LEGEND:

STMH	STORM SEWER MANHOLE
RCP	REINFORCED CONCRETE PIPE
COMM	COMMUNICATION VAULT
BOLL	TRAFFIC BOLLARD
TL	TRAFFIC SIGNAL LIGHT
PP	POWER POLE
TSB	TRAFFIC SIGNAL BOX
SSMH	SANITARY SEWER MANHOLE
SSCO	SANITARY SEWER CLEANOUT
ICV	IRRIGATION CONTROL VALVE
TMH	TELEPHONE MANHOLE
EM	ELECTRICAL METER
LP	LIGHT POLE
WM	WATER METER
WV	WATER VALVE
FH	FIRE HYDRANT
EB	ELECTRICAL BOX
TS	TRAFFIC SIGN
FOS	FIBER OPTIC SIGN
GL	GROUND LIGHT
—E—	OVERHEAD ELECTRICAL LINE

NOTES:
1. BASIS OF BEARING: COORDINATES ARE BASED ON THE SURFACE ADJUSTED VALUES OF TOWN OF ADDISON SURVEY CONTROL POINT NUMBERS COA-3, COA-4, COA-5, COA-10, & COA-11 USING TXDOT DALLAS COUNTY SCALE FACTOR 1.000136506.

2. VERTICAL DATUM: ELEVATIONS WERE DERIVED FROM TOWN OF ADDISON SURVEY CONTROL POINT NUMBERS COA-3, COA-5, & COA-11.

3. ALL VALUES SHOWN HEREON ARE IN US SURVEY FEET.

STATE OF TEXAS REGISTERED JASON A. JERNIGAN 6023 PROFESSIONAL LAND SURVEYOR

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Jason A. Jernigan RPLS No. 6023 OCT. 25, 2013

TBPLS FIRM NO. 10029600

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

SURVEY CONTROL
BELT LINE RD STA 18+00 TO STA 26+00

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
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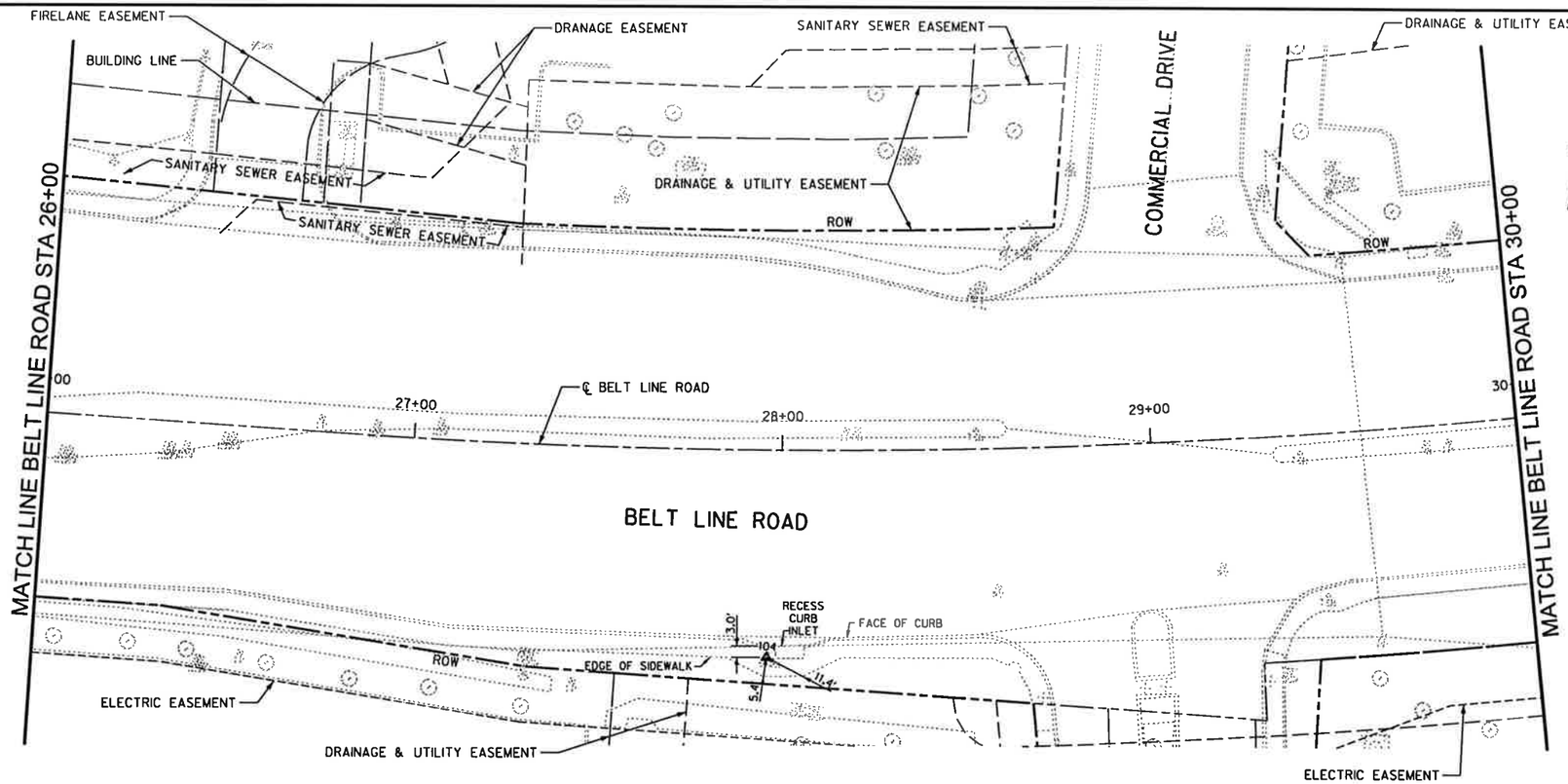

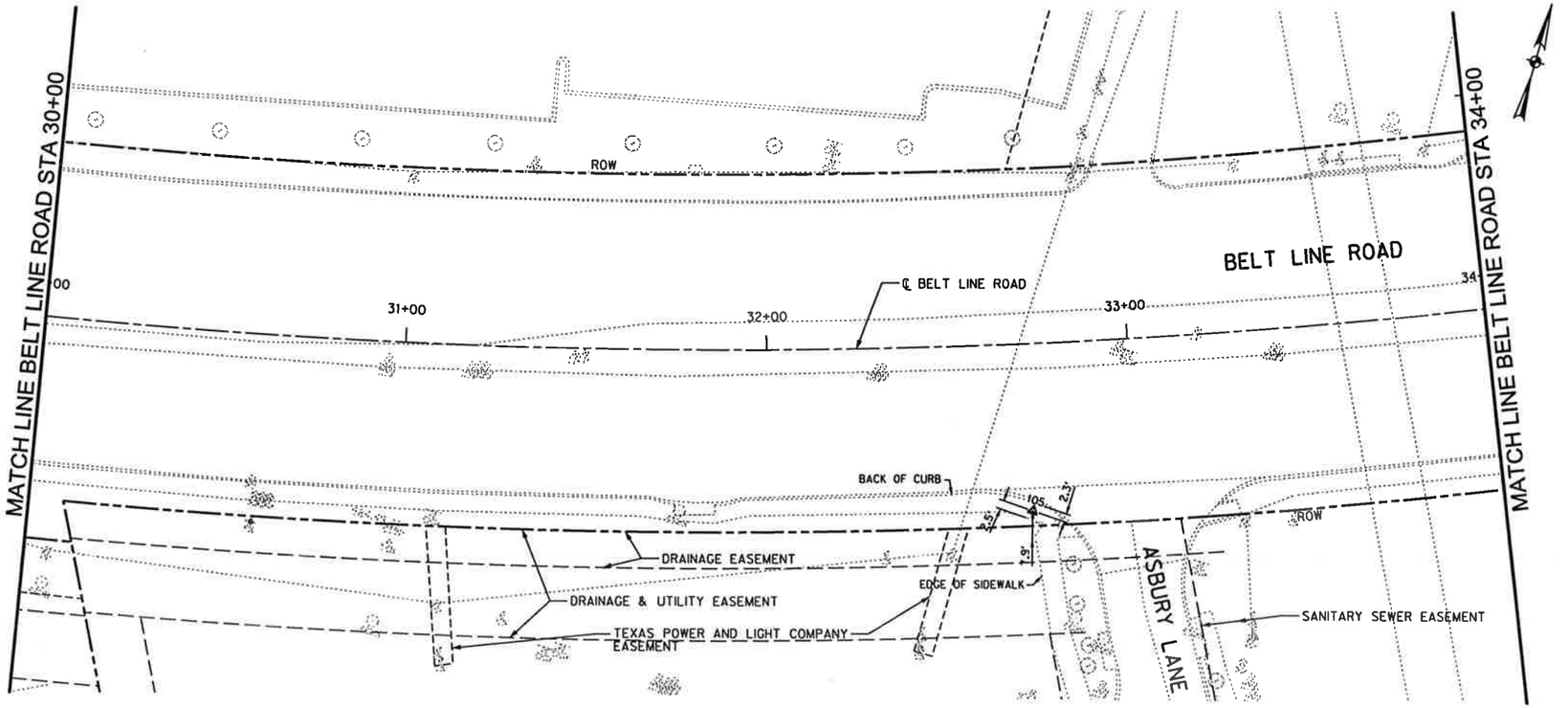

0 10 20 30 40 60
SCALE IN FEET

Point #	Northing	Easting	Elevation	Description
104	7,034,577.225	2,474,968.203	580.37	"X" cut on curb inlet W of Commercial
105	7,034,681.956	2,475,444.151	587.02	"X" cut on sidewalk W of Asbury Ln.

LEGEND:

STMH	STORM SEWER MANHOLE
RCP	REINFORCED CONCRETE PIPE
COMM	COMMUNICATION VAULT
BOLL	TRAFFIC BOLLARD
TL	TRAFFIC SIGNAL LIGHT
PP	POWER POLE
TSB	TRAFFIC SIGNAL BOX
SSMH	SANITARY SEWER MANHOLE
SSCO	SANITARY SEWER CLEANOUT
ICV	IRRIGATION CONTROL VALVE
TMH	TELEPHONE MANHOLE
EM	ELECTRICAL METER
LP	LIGHT POLE
WM	WATER METER
WV	WATER VALVE
FH	FIRE HYDRANT
EB	ELECTRICAL BOX
TS	TRAFFIC SIGN
FOS	FIBER OPTIC SIGN
GL	GROUND LIGHT
—E—	OVERHEAD ELECTRICAL LINE

NOTES:
1. BASIS OF BEARING: COORDINATES ARE BASED ON THE SURFACE ADJUSTED VALUES OF TOWN OF ADDISON SURVEY CONTROL POINT NUMBERS COA-3, COA-4, COA-5, COA-10, & COA-11 USING TXDOT DALLAS COUNTY SCALE FACTOR 1.000136506.

2. VERTICAL DATUM: ELEVATIONS WERE DERIVED FROM TOWN OF ADDISON SURVEY CONTROL POINT NUMBERS COA-3, COA-5, & COA-11.

3. ALL VALUES SHOWN HEREON ARE IN US SURVEY FEET.

STATE OF TEXAS REGISTERED JASON A. JERNIGAN 6023 PROFESSIONAL LAND SURVEYOR

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Jason A. Jernigan TBPLS No. 6023 OCT. 25, 2013

TBPLS FIRM NO. 10029600

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

SURVEY CONTROL
BELT LINE RD STA 26+00 TO STA 34+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 SURV 03	SC-3

SHEET 8 OF 235

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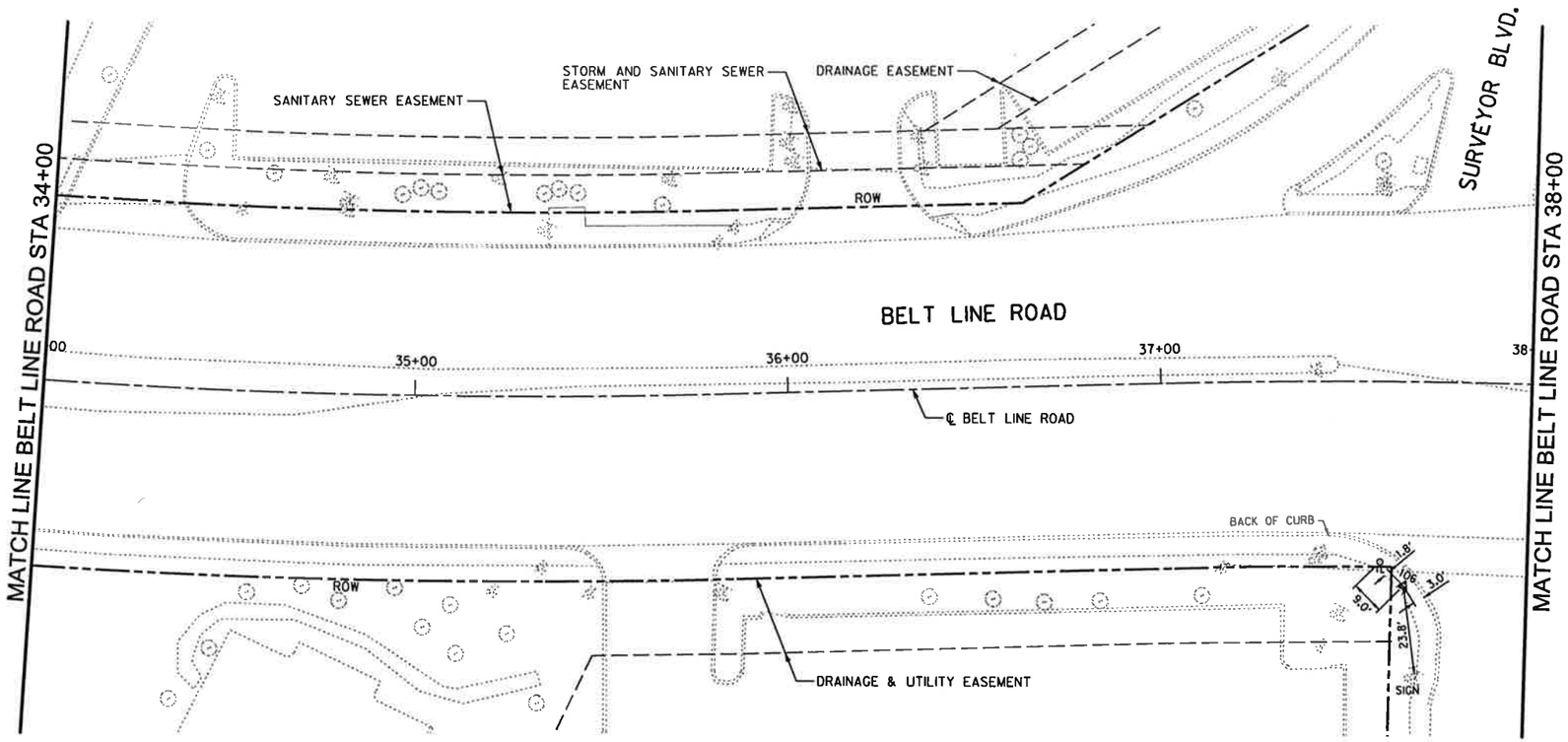

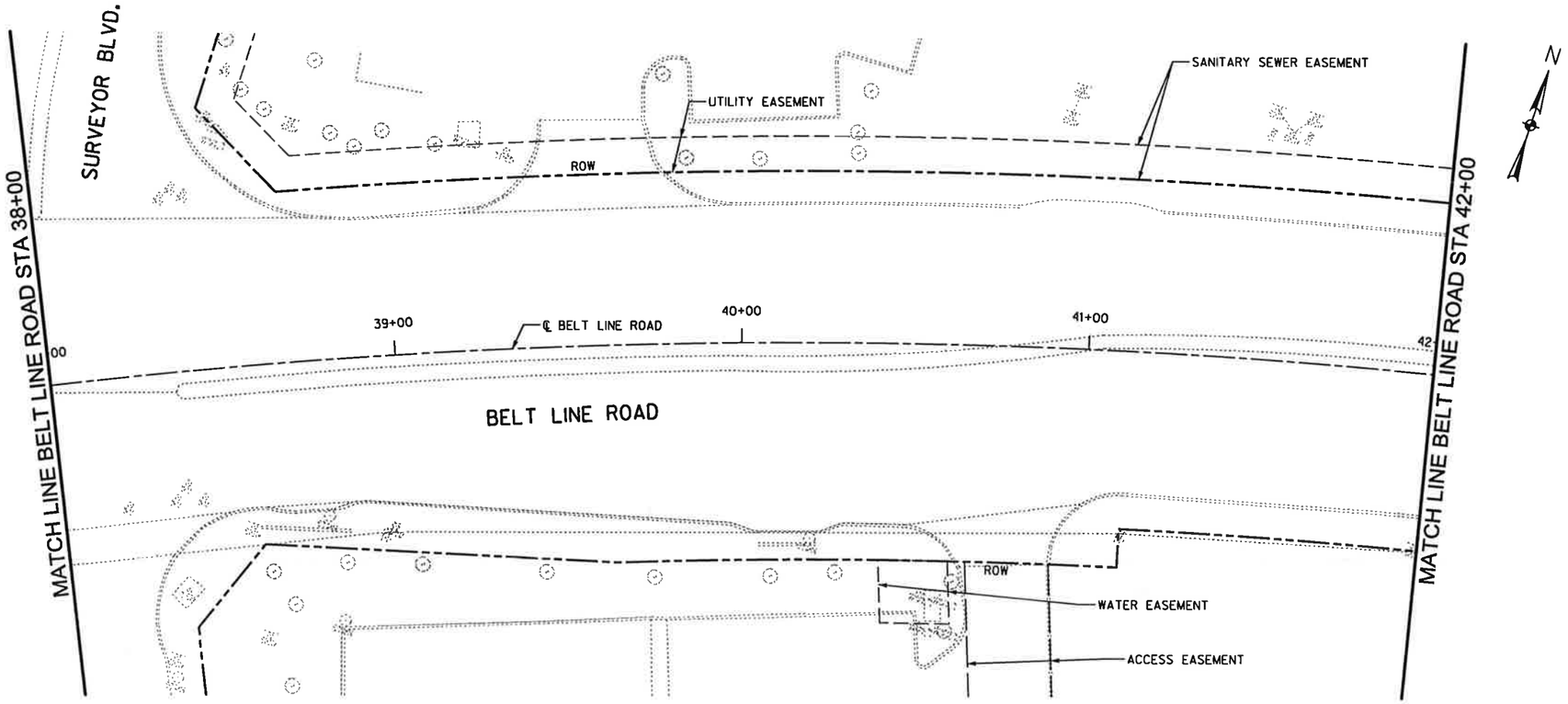

0 10 20 30 40 60
SCALE IN FEET

Point #	Northing	Easting	Elevation	Description
106	7,034,881.556	2,475,902.115	594.70	"X" cut on sidewalk @ SW corner of Beltline Rd @ Surveyor Blvd.

LEGEND:

STMH	STORM SEWER MANHOLE
RCP	REINFORCED CONCRETE PIPE
COMM	COMMUNICATION VAULT
BOLL	TRAFFIC BOLLARD
TL	TRAFFIC SIGNAL LIGHT
PP	POWER POLE
TSB	TRAFFIC SIGNAL BOX
SSMH	SANITARY SEWER MANHOLE
SSCO	SANITARY SEWER CLEANOUT
ICV	IRRIGATION CONTROL VALVE
TMH	TELEPHONE MANHOLE
EM	ELECTRICAL METER
LP	LIGHT POLE
WM	WATER METER
WV	WATER VALVE
FH	FIRE HYDRANT
EB	ELECTRICAL BOX
TS	TRAFFIC SIGN
FOS	FIBER OPTIC SIGN
GL	GROUND LIGHT
—E—	OVERHEAD ELECTRICAL LINE

NOTES:
1. BASIS OF BEARING: COORDINATES ARE BASED ON THE SURFACE ADJUSTED VALUES OF TOWN OF ADDISON SURVEY CONTROL POINT NUMBERS COA-3, COA-4, COA-5, COA-10, & COA-11 USING TXDOT DALLAS COUNTY SCALE FACTOR 1.000136506.

2. VERTICAL DATUM: ELEVATIONS WERE DERIVED FROM TOWN OF ADDISON SURVEY CONTROL POINT NUMBERS COA-3, COA-5, & COA-11.

3. ALL VALUES SHOWN HEREON ARE IN US SURVEY FEET.

STATE OF TEXAS REGISTERED JASON A. JERNIGAN 6023 PROFESSIONAL LAND SURVEYOR

The undersigned certifies to the locations and descriptions of the survey control information shown hereon only. This is not a professional boundary surveying product. Boundary, easement, and right-of-way information is shown for reference only.

Jason A. Jernigan RPLS No. 6023 OCT. 25, 2013

TBPLS FIRM NO. 10029600

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

SURVEY CONTROL
BELT LINE RD STA 34+00 TO STA 42+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 SURV 04	SC-4

SHEET 9 OF 235

USER: dh1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 SURV 04.dgn
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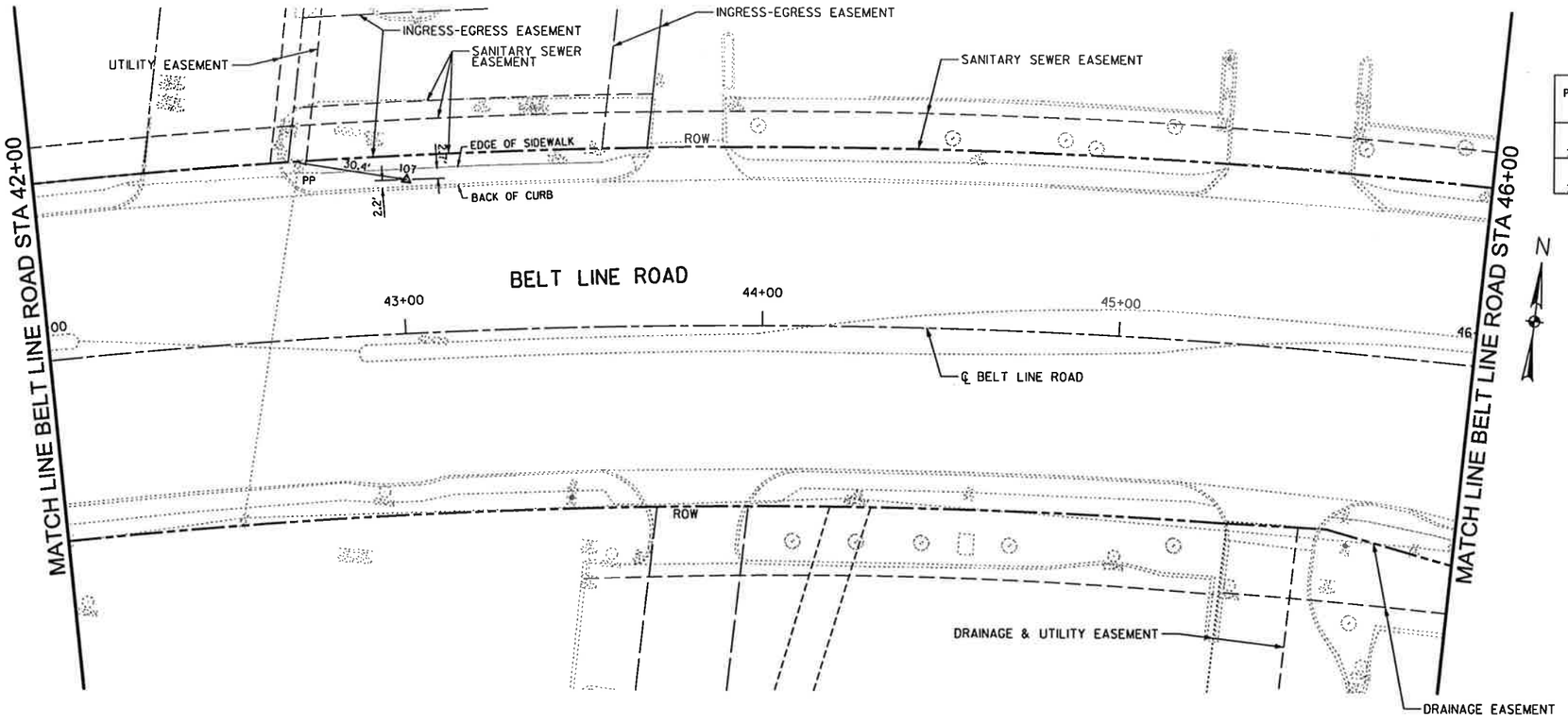
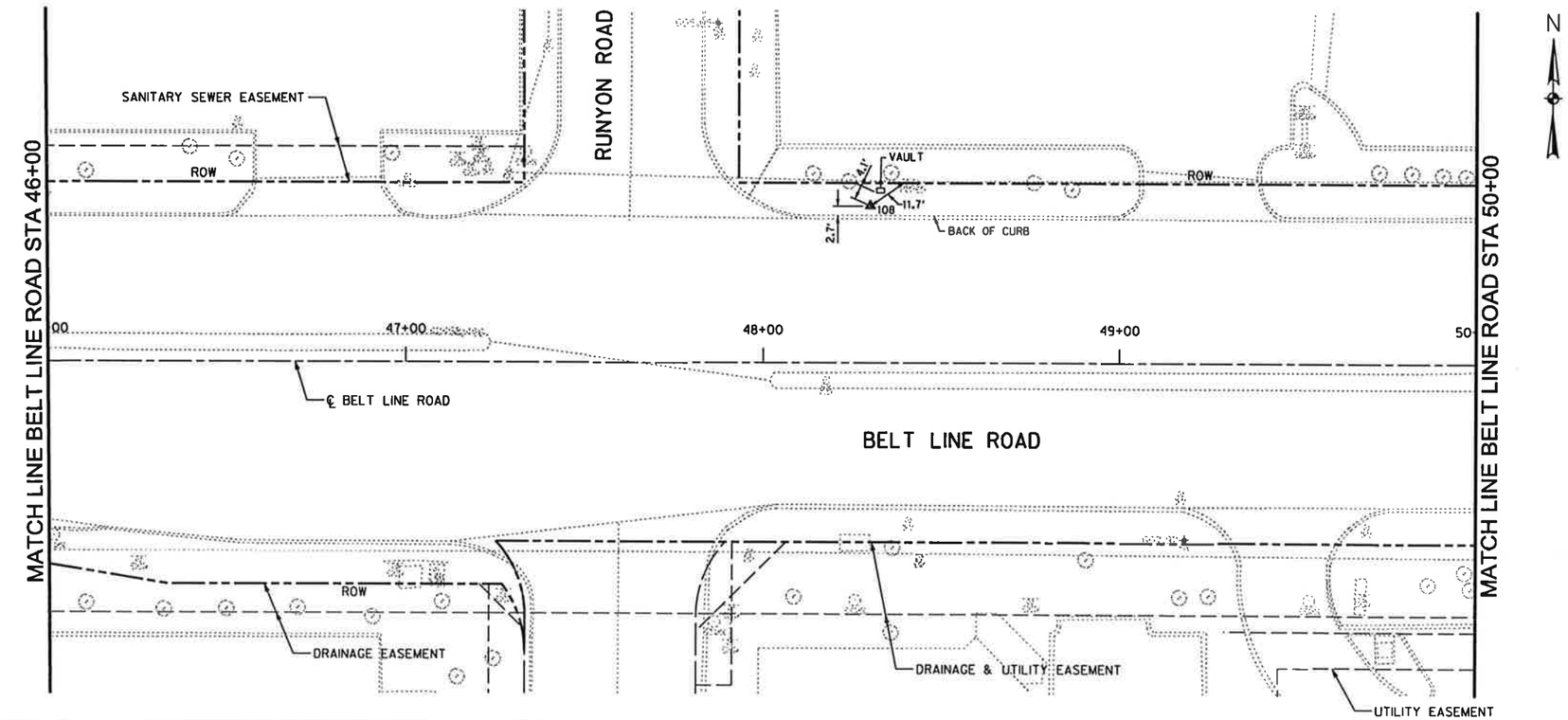
DATE: 10/24/2013





0 10 20 30 40 60
SCALE IN FEET

Point #	Northing	Easting	Elevation	Description
107	7,035,134.831	2,476,380.729	599.22	"X" cut on sidewalk in front of 4019 Beltline (Motor City Auto Care) 35' +/- E of driveway
108	7,035,163.363	2,476,913.975	605.99	"X" cut on sidewalk in front of 4101 Beltline (Flavors Indian Restaurant) just south of communication vault

LEGEND:

STMH	STORM SEWER MANHOLE
RCP	REINFORCED CONCRETE PIPE
COMM	COMMUNICATION VAULT
BOLL	TRAFFIC BOLLARD
TL	TRAFFIC SIGNAL LIGHT
PP	POWER POLE
TSB	TRAFFIC SIGNAL BOX
SSMH	SANITARY SEWER MANHOLE
SSCO	SANITARY SEWER CLEANOUT
ICV	IRRIGATION CONTROL VALVE
TMH	TELEPHONE MANHOLE
EM	ELECTRICAL METER
LP	LIGHT POLE
WM	WATER METER
WV	WATER VALVE
FH	FIRE HYDRANT
EB	ELECTRICAL BOX
TS	TRAFFIC SIGN
FOS	FIBER OPTIC SIGN
GL	GROUND LIGHT
—E—	OVERHEAD ELECTRICAL LINE

NOTES:
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STATE OF TEXAS REGISTERED JASON A. JERNIGAN 6023 PROFESSIONAL LAND SURVEYOR

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Jason A. Jernigan RPLS No. 6023 OCT. 25, 2013

TBPLS FIRM NO. 10029600

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

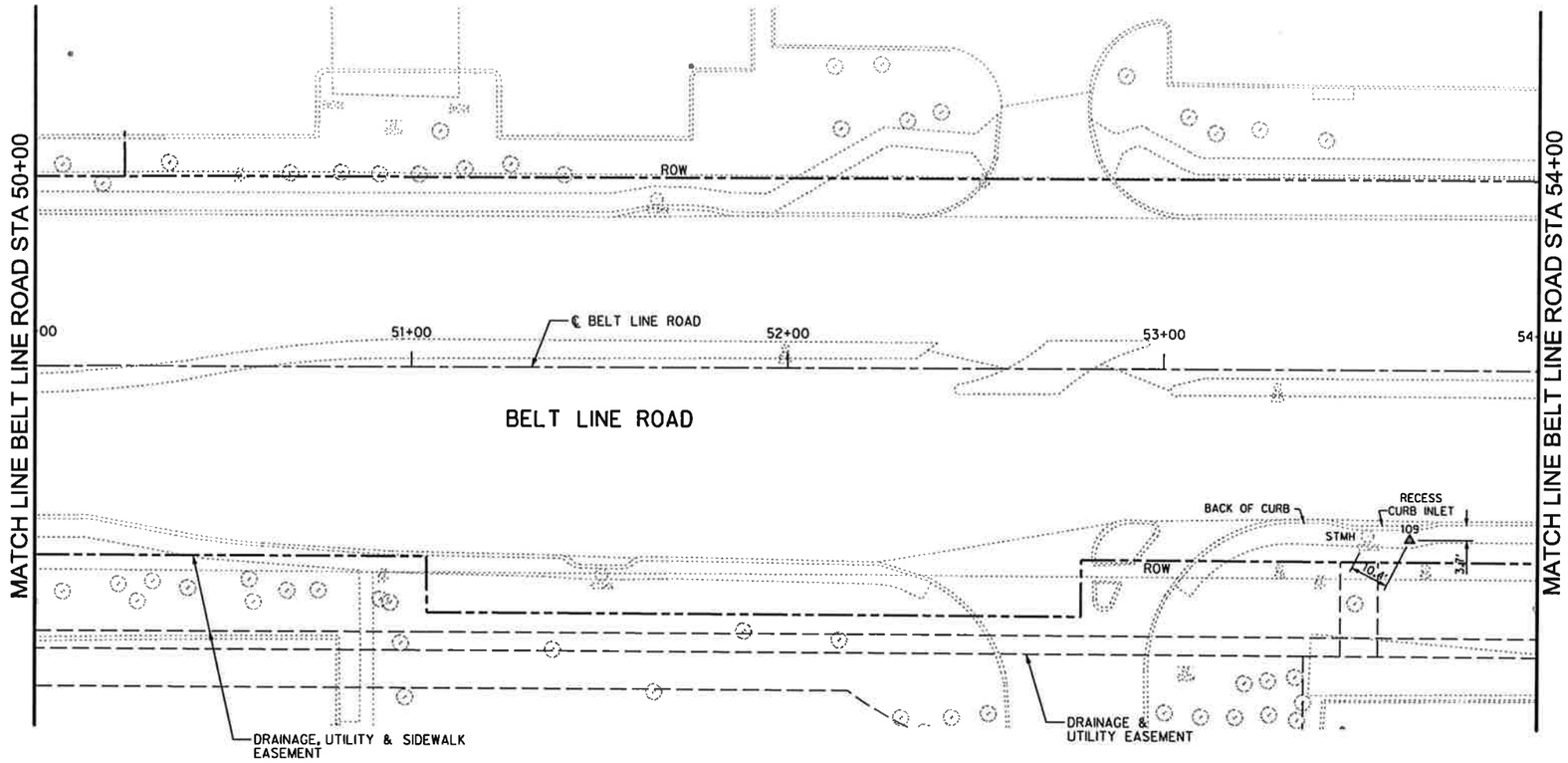
SURVEY CONTROL
BELT LINE RD STA 42+00 TO STA 50+00

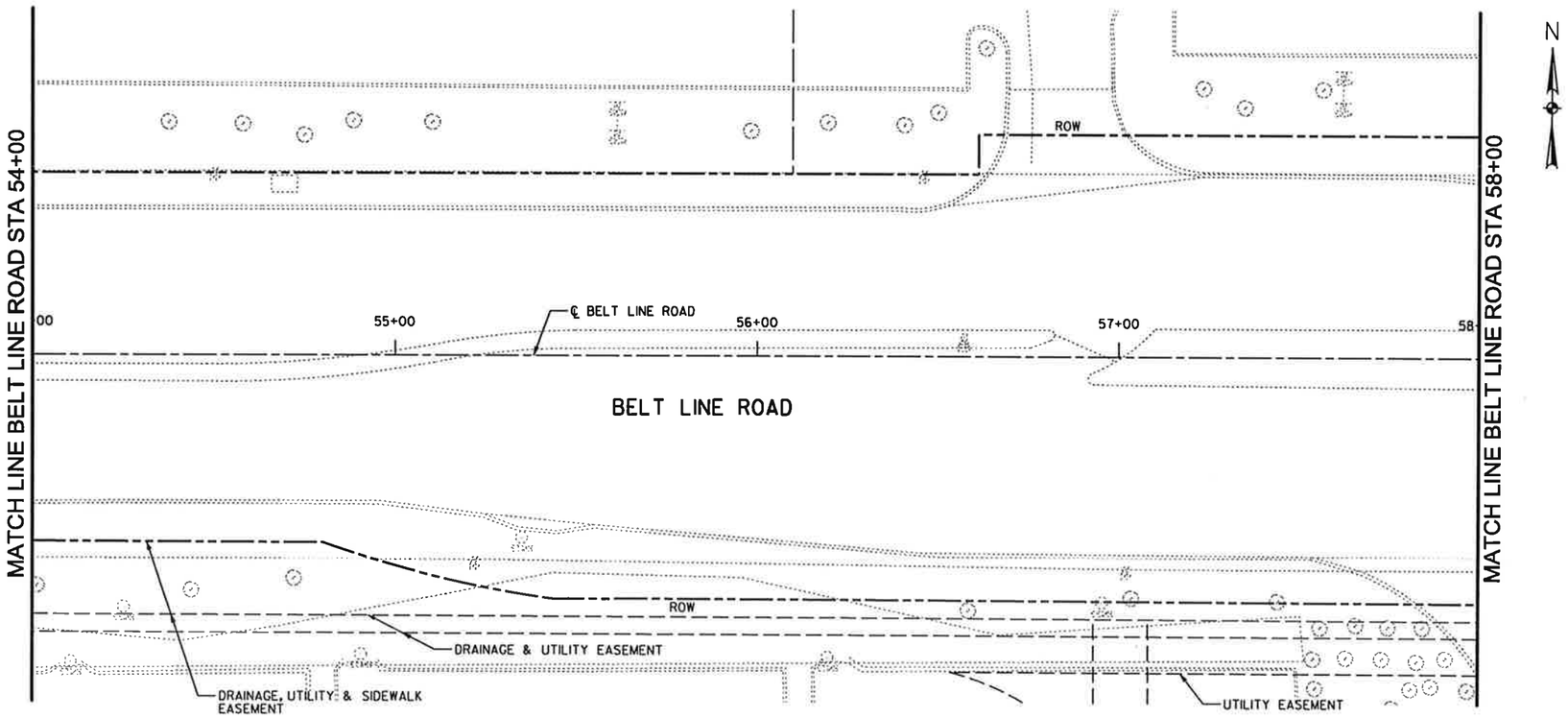
HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275 TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 SURV 05	SC-5

SHEET 10 OF 235

USER: dh1299 OFFICE: RCH PROJECT # 29350 FILE: 29350 SURV 05.dgn TIME: 3:11:48 PM DATE: 10/24/2013





N

0 10 20 30 40 60
SCALE IN FEET

Point #	Northing	Easting	Elevation	Description
109	7,035,076.188	2,477,450.058	611.74	2" brass disk stamped "TXDOT COA-11 GPS" on curb inlet in front of Sams Club 5.5' S of edge of asphalt, 2' N of edge of sidewalk, & 27' NE of power pole

LEGEND:

STMH	STORM SEWER MANHOLE
RCP	REINFORCED CONCRETE PIPE
COMM	COMMUNICATION VAULT
BOLL	TRAFFIC BOLLARD
TL	TRAFFIC SIGNAL LIGHT
PP	POWER POLE
TSB	TRAFFIC SIGNAL BOX
SSMH	SANITARY SEWER MANHOLE
SSCO	SANITARY SEWER CLEANOUT
ICV	IRRIGATION CONTROL VALVE
TMH	TELEPHONE MANHOLE
EM	ELECTRICAL METER
LP	LIGHT POLE
WM	WATER METER
WV	WATER VALVE
FH	FIRE HYDRANT
EB	ELECTRICAL BOX
TS	TRAFFIC SIGN
FOS	FIBER OPTIC SIGN
GL	GROUND LIGHT
—E—	OVERHEAD ELECTRICAL LINE

NOTES:
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2. VERTICAL DATUM: ELEVATIONS WERE DERIVED FROM TOWN OF ADDISON SURVEY CONTROL POINT NUMBERS COA-3, COA-5, & COA-11.

3. ALL VALUES SHOWN HEREON ARE IN US SURVEY FEET.

STATE OF TEXAS
REGISTERED
JASON A. JERNIGAN
6023
PROFESSIONAL
LAND SURVEYOR

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Jason A. Jernigan RPLS No. 6023 OCT. 25, 2013

TBPLS FIRM NO. 10029600

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

SURVEY CONTROL
BELT LINE RD STA 50+00 TO STA 58+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-8200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 SURV 06	SC-6

SHEET 11 OF 235

PROJECT # 29350 OFFICE: RCH USER: ah1299
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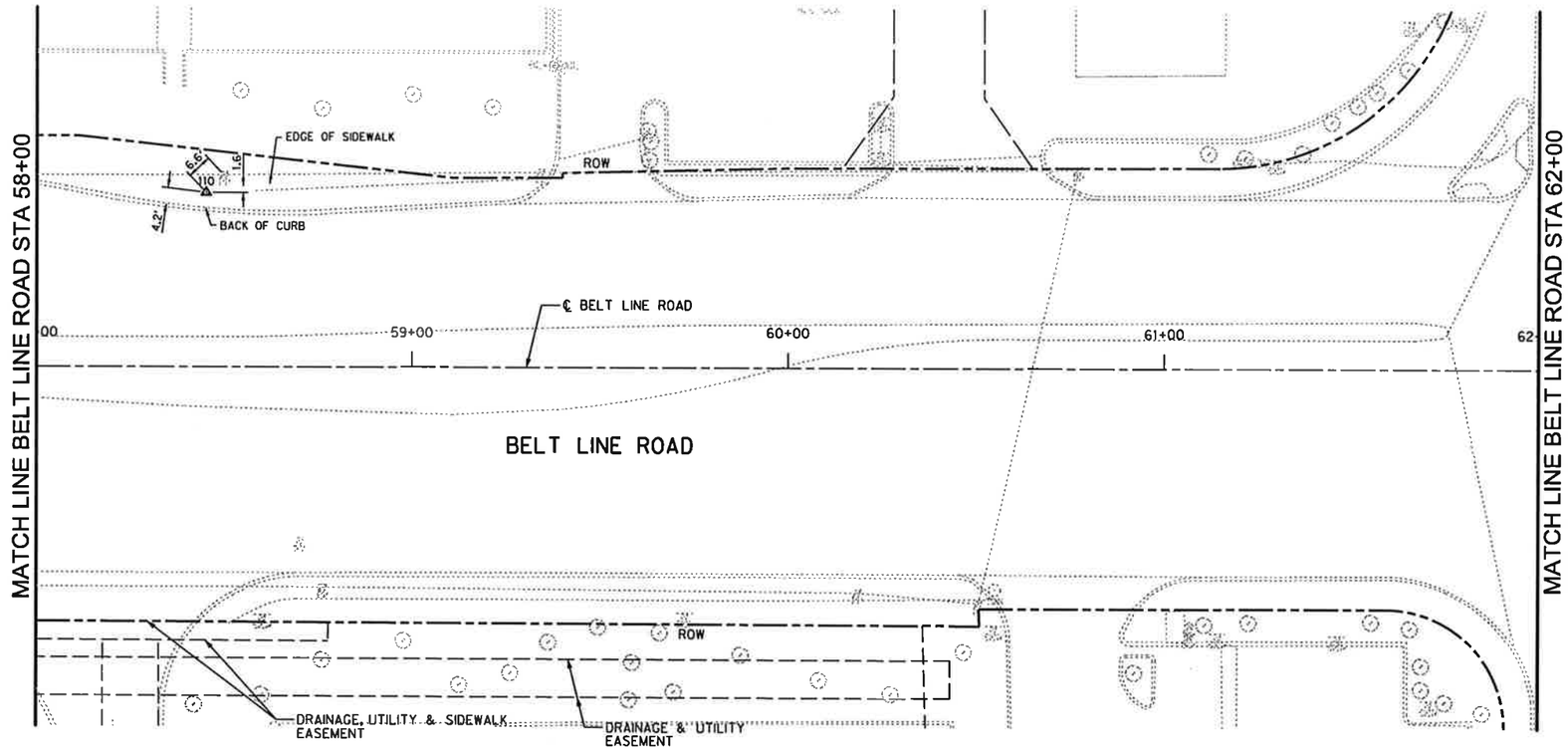

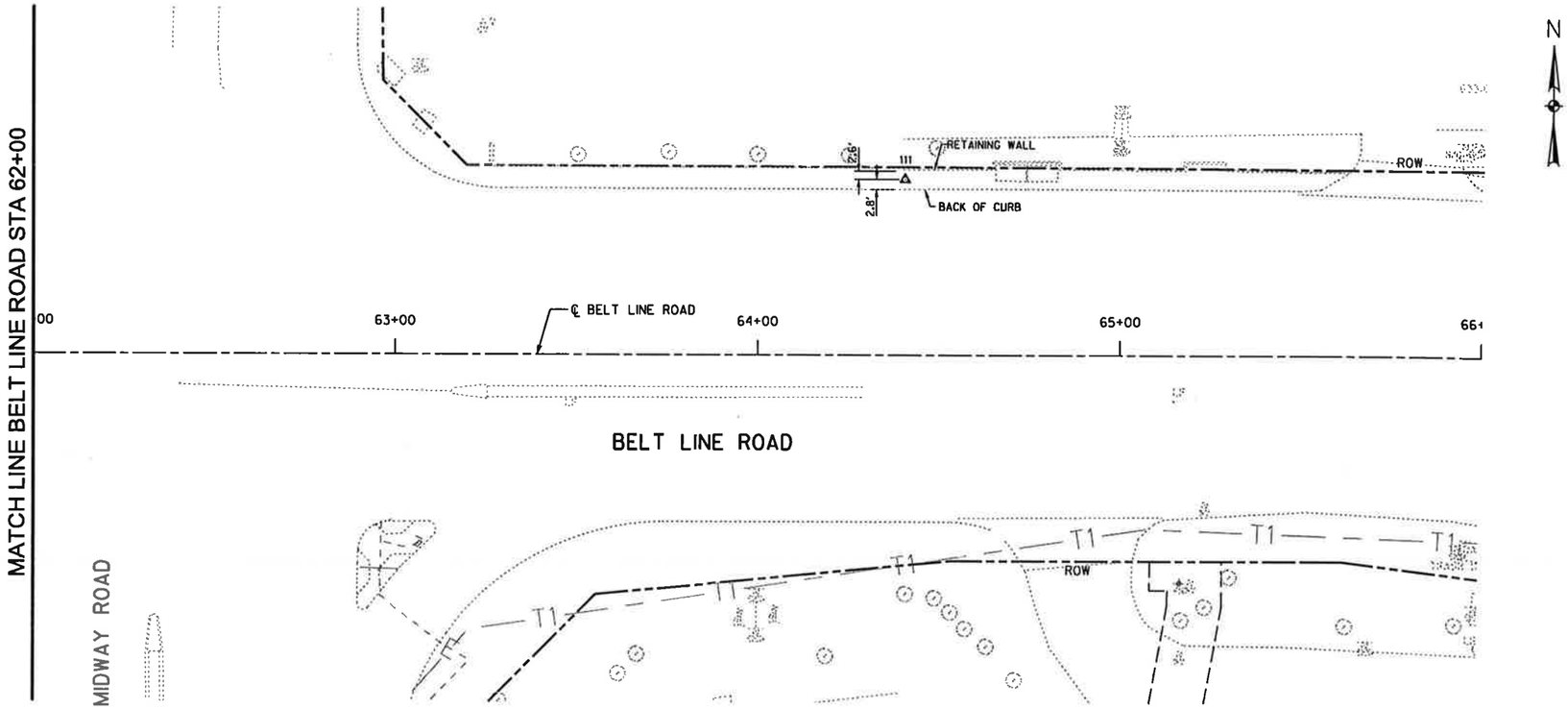

N

0 10 20 30 40 60
SCALE IN FEET

Point #	Northing	Easting	Elevation	Description
110	7,035,168.161	2,477,929.165	615.95	"X" cut on sidewalk in front of Johnny's Pizza House
111	7,035,171.789	2,478,524.619	631.42	"X" cut on sidewalk in front of 4275 Beltline (Genghis Grill) 25' +/- W of communication vault

LEGEND:

STMH	STORM SEWER MANHOLE
RCP	REINFORCED CONCRETE PIPE
COMM	COMMUNICATION VAULT
BOLL	TRAFFIC BOLLARD
TL	TRAFFIC SIGNAL LIGHT
PP	POWER POLE
TSB	TRAFFIC SIGNAL BOX
SSMH	SANITARY SEWER MANHOLE
SSCO	SANITARY SEWER CLEANOUT
ICV	IRRIGATION CONTROL VALVE
TMH	TELEPHONE MANHOLE
EM	ELECTRICAL METER
LP	LIGHT POLE
WM	WATER METER
WV	WATER VALVE
FH	FIRE HYDRANT
EB	ELECTRICAL BOX
TS	TRAFFIC SIGN
FOS	FIBER OPTIC SIGN
GL	GROUND LIGHT
—E—	OVERHEAD ELECTRICAL LINE

NOTES:
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STATE OF TEXAS REGISTERED JASON A. JERNIGAN 6023 PROFESSIONAL LAND SURVEYOR

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Jason A. Jernigan RPLS No. 6023 OCT. 25, 2013

TBPLS FIRM NO. 10029600

NO.	REVISION	BY	DATE

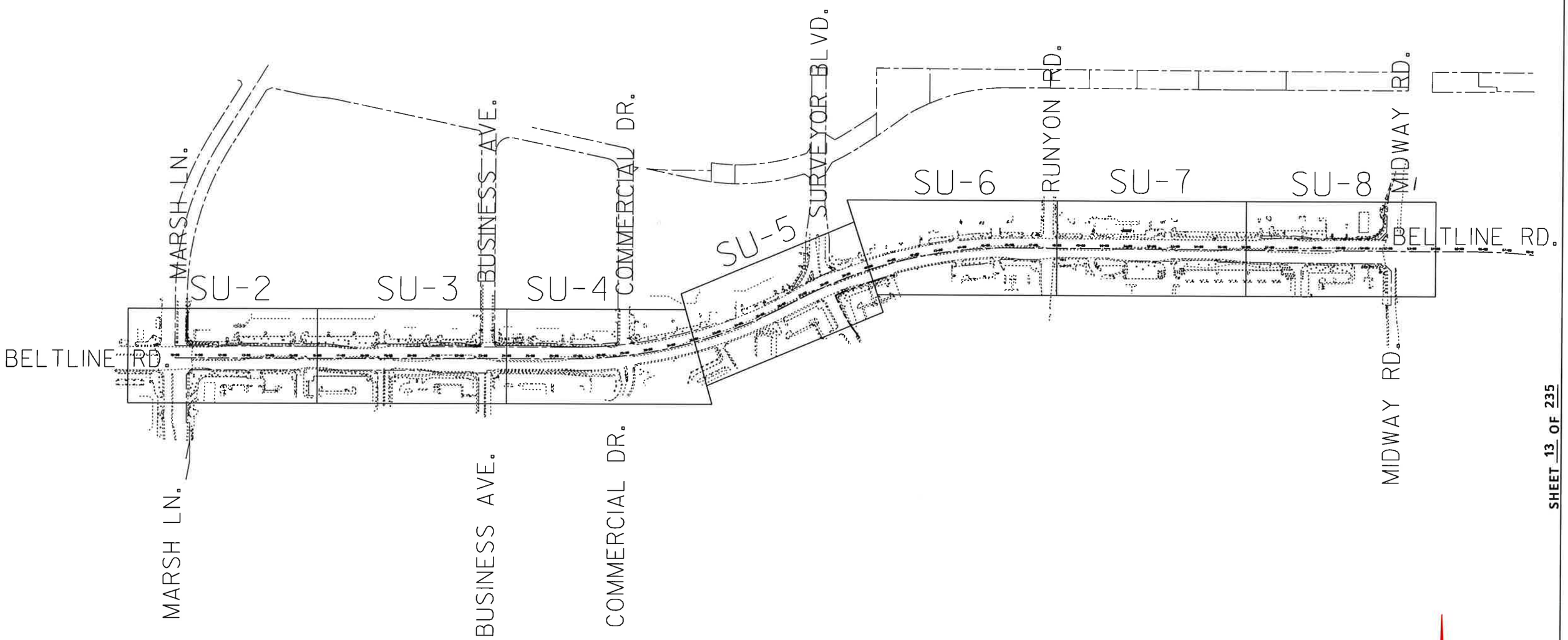
Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

SURVEY CONTROL
BELT LINE RD STA 58+00 TO STA 66+00

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 SURV 07	SC-7



LEGEND:

LEVEL "A"	LEVEL "B"	LEVEL "C" & "D"	
			TEST HOLE
			TELEPHONE LINE
			FIBER OPTIC LINE
			CABLE TELEVISION LINE
			WATER LINE
			WASTEWATER LINE
			STORM SEWER LINE
			GAS LINE
			ELECTRIC LINE
			OVERHEAD UTILITY LINE

TEL PED	TELEPHONE PEDESTAL	GTS	GAS TEST STATION
TEL MH	TELEPHONE MANHOLE	GMH	GAS MANHOLE
TEL HH	TELEPHONE HAND HOLE	PP	POWER POLE
TEL VLT	TELEPHONE VAULT	PP/R	POWER POLE W/RISER
FOC HH	FIBER OPTIC HAND HOLE	CWP	CROSSWALK POLE
FOC MH	FIBER OPTIC MANHOLE	EB	ELECTRIC BOX
FOC CAB	FIBER OPTIC CABINET	EJB	ELECTRIC JUNCTION BOX
FOC VLT	FIBER OPTIC VAULT	ELEC PED	ELECTRIC PEDESTAL
CATV PED	TELEVISION PEDESTAL	EM	ELECTRIC METER
CATV HH	CABLE TV HAND HOLE	LP	LIGHT POLE
FH	FIRE HYDRANT	TRANS	ELECTRIC TRANSFORMER
WV	WATER VALVE	TSP	TRAFFIC SIGNAL POLE
WM	WATER METER	TCB	TRAFFIC CONTROL BOX
WTR VLT	WATER VAULT		TRANSMISSION TOWER
WWMH	WASTEWATER MANHOLE		GUY WIRE
CO	WASTEWATER CLEAN OUT		UTILITY CONTINUATION
CI	CURB INLET		UTILITY END POINT
GI	GRATE INLET	ABN.	ABANDONED UTILITY
SDMH	STORM DRAIN MANHOLE	(QLB)	QUALITY LEVEL B
AI	AREA INLET	(QLC)	QUALITY LEVEL C
		(QLD)	QUALITY LEVEL D
GM	GAS METER	OH	OVERHEAD UTILITIES
GV	GAS VALVE	CP	CONTROL POINT

SURVEY CONTROL

C.P. No.	NORTHING	EASTING	ELEVATION	DESC.	SHT No.
104	7034577.23	2474968.20	580.37	FXTP	SU-4
105	7034681.96	2475444.15	587.02	FXTP	SU-5
106	7034881.56	2475902.12	594.70	FXTP	SU-5

OWNERSHIP LEGEND:	OWNER:	CONTACT:	PHONE:
TELEPHONE(T)	= AT&T	CHAD COOPER	972-234-7073
FIBER OPTIC CABLE(T1)	= AT&T	CHAD COOPER	972-234-7073
FIBER OPTIC CABLE(T2)	= FIBERLIGHT	MICHAEL BITSCHE	817-522-0453
CABLE TELEVISION(C)	= TIME WARNER CABLE	DAVID CHENEY	214-320-7406
WATER(W)	= TOWN OF ADDISON	LISA PYLES	972-450-2878
WASTEWATER(WW)	= TOWN OF ADDISON	LISA PYLES	972-450-2878
STORM SEWER(SS)	= TOWN OF ADDISON	LISA PYLES	972-450-2878
GAS(G)	= ATMOS ENERGY	BOBBY ROGERS	972-727-3905
ELECTRIC(E)	= ONCOR ELECTRIC DELIVERY (DISTRIBUTION)	LARRY BALDWIN	469-261-0649
ELECTRIC(E1)	= ONCOR ELECTRIC DELIVERY (TRANSMISSION)	BRYAN WILLIAMS	817-215-6285
ELECTRIC(E2)	= TOWN OF ADDISON	LISA PYLES	972-450-2878

FIELD WORK BEGAN ON JUNE 3, 2013 AND WAS COMPLETED JUNE 16, 2013. HALFF ASSOCIATES EXPRESSLY DISCLAIMS RESPONSIBILITY FOR NEW UTILITY INSTALLATIONS OR MODIFICATIONS OR ADJUSTMENTS TO EXISTING UTILITIES AFTER JUNE 16, 2013.

ALL UTILITY INFORMATION HEREON IS DEPICTED TO QUALITY LEVEL "B" UNLESS OTHERWISE NOTED.

SIZE INFORMATION SHOWN HEREON IS TAKEN FROM AVAILABLE UTILITY RECORDS:

LEVEL "B" INFORMATION OBTAINED THROUGH THE APPLICATION OF APPROPRIATE SURFACE GEOPHYSICAL METHODS TO DETERMINE THE EXISTENCE AND APPROXIMATE HORIZONTAL POSITION OF UTILITIES.

LEVEL "C" DEPICTED ACCORDING TO RECORD INFORMATION AND EXISTING ASSOCIATED UTILITY STRUCTURES. NO ELECTRONIC INFORMATION WAS OBTAINED

LEVEL "D" DEPICTED ACCORDING TO RECORD INFORMATION. NO ELECTRONIC INFORMATION WAS OBTAINED.

UNLESS NOTED OTHERWISE, UTILITY LINE LIMITS DEPICTED REPRESENT FIELD DESIGNATING LIMITS AND NOT END POINTS OF UTILITIES.

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WASTEWATER AND STORM SEWER FLOWLINE INFORMATION SHOWN HEREON ARE BASED ON FIELD MEASURED DEPTHS AND SHALL BE DEEMED APPROXIMATE.

TELEPHONE PAIR SIZES SHOWN HEREON ARE SHOWN FOR REFERENCE PURPOSES ONLY.

STATE OF TEXAS
RYAN D. LEWIS
95767
LICENSED
PROFESSIONAL ENGINEER

10/23/13

N

0 100 200 300 400

SCALE: 1"=400'

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

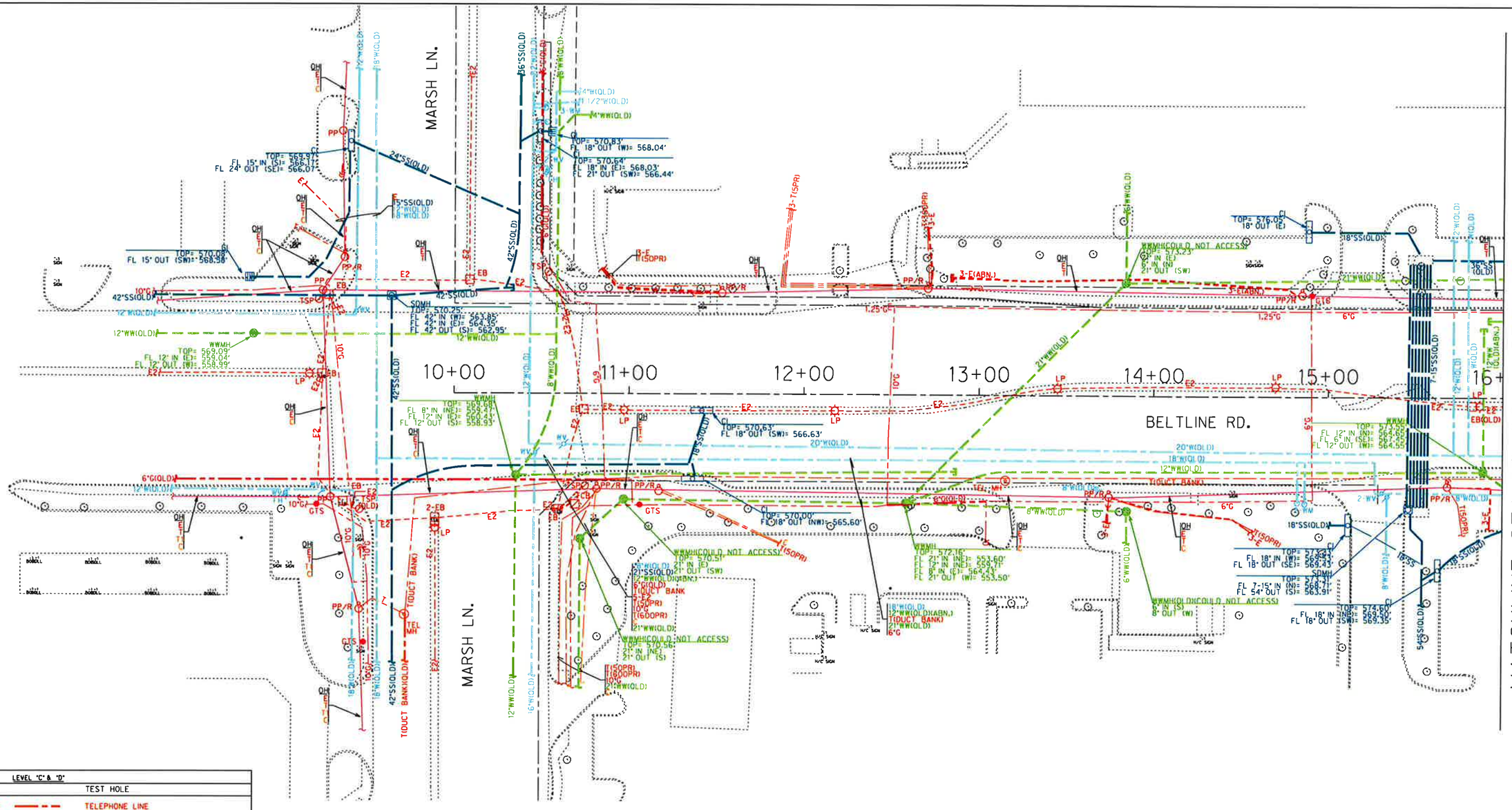
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD UNDERGROUND ELECTRICAL

SUBSURFACE UTILITY ENGINEERING

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCTOBER 2013	SH-MASTER-29350	SU-1



SHEET 14 OF 235

LEGEND:

LEVEL "A"	LEVEL "B"	LEVEL "C" & "D"	
			TEST HOLE
			TELEPHONE LINE
			FIBER OPTIC LINE
			CABLE TELEVISION LINE
			WATER LINE
			WASTEWATER LINE
			STORM SEWER LINE
			GAS LINE
			ELECTRIC LINE
			OVERHEAD UTILITY LINE

TEL PED	TELEPHONE PEDESTAL	GTS	GAS TEST STATION
TEL MH	TELEPHONE MANHOLE	GMH	GAS MANHOLE
TEL HH	TELEPHONE HAND HOLE	PP	POWER POLE
TEL VLT	TELEPHONE VAULT	PP/R	POWER POLE W/RISER
FOC HH	FIBER OPTIC HAND HOLE	CWP	CROSSWALK POLE
FOC MH	FIBER OPTIC MANHOLE	EB	ELECTRIC BOX
FOC CAB	FIBER OPTIC CABINET	EJB	ELECTRIC JUNCTION BOX
FOC VLT	FIBER OPTIC VAULT	ELEC PED	ELECTRIC PEDESTAL
CATV PED	TELEVISION PEDESTAL	EM	ELECTRIC METER
CATV HH	CABLE TV HAND HOLE	LP	LIGHT POLE
FH	FIRE HYDRANT	TRANS	ELECTRIC TRANSFORMER
WV	WATER VALVE	TSP	TRAFFIC SIGNAL POLE
WM	WATER METER	TCB	TRAFFIC CONTROL BOX
WTR VLT	WATER VAULT		TRANSMISSION TOWER
WWMH	WASTEWATER MANHOLE		GUY WIRE
CO	WASTEWATER CLEAN OUT		UTILITY CONTINUATION
CI	CURB INLET		UTILITY END POINT
GI	GRATE INLET	ABN.	ABANDONED UTILITY
SDMH	STORM DRAIN MANHOLE	(QLB)	QUALITY LEVEL B
AI	AREA INLET	(QLC)	QUALITY LEVEL C
		(QLD)	QUALITY LEVEL D
		OH	OVERHEAD UTILITIES
GM	GAS METER	CP	CONTROL POINT
GV	GAS VALVE		

OWNERSHIP LEGEND:	OWNER:	CONTACT:	PHONE:
TELEPHONE(T)	= AT&T	CHAD COOPER	972-234-7073
FIBER OPTIC CABLE(T1)	= AT&T	CHAD COOPER	972-234-7073
FIBER OPTIC CABLE(T2)	= FIBERLIGHT	MICHAEL BITSCHE	817-522-0453
CABLE TELEVISION(C)	= TIME WARNER CABLE	DAVID CHENEY	214-320-7406
WATER(W)	= TOWN OF ADDISON	LISA PYLES	972-450-2878
WASTEWATER(WW)	= TOWN OF ADDISON	LISA PYLES	972-450-2878
STORM SEWER(SS)	= TOWN OF ADDISON	LISA PYLES	972-450-2878
GAS(G)	= ATMOS ENERGY	BOBBY ROGERS	972-727-3905
ELECTRIC(E)	= ONCOR ELECTRIC DELIVERY (DISTRIBUTION)	LARRY BALDWIN	469-261-0649
ELECTRIC(E1)	= ONCOR ELECTRIC DELIVERY (TRANSMISSION)	BRYAN WILLIAMS	817-215-6285
ELECTRIC(E2)	= TOWN OF ADDISON	LISA PYLES	972-450-2878

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TELEPHONE PAIR SIZES SHOWN HEREON ARE SHOWN FOR REFERENCE PURPOSES ONLY.

STATE OF TEXAS
RYAN D. LEWIS
95767
LICENSED
PROFESSIONAL ENGINEER
10/23/13

0 15 30 45 60
SCALE: 1"=60'

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

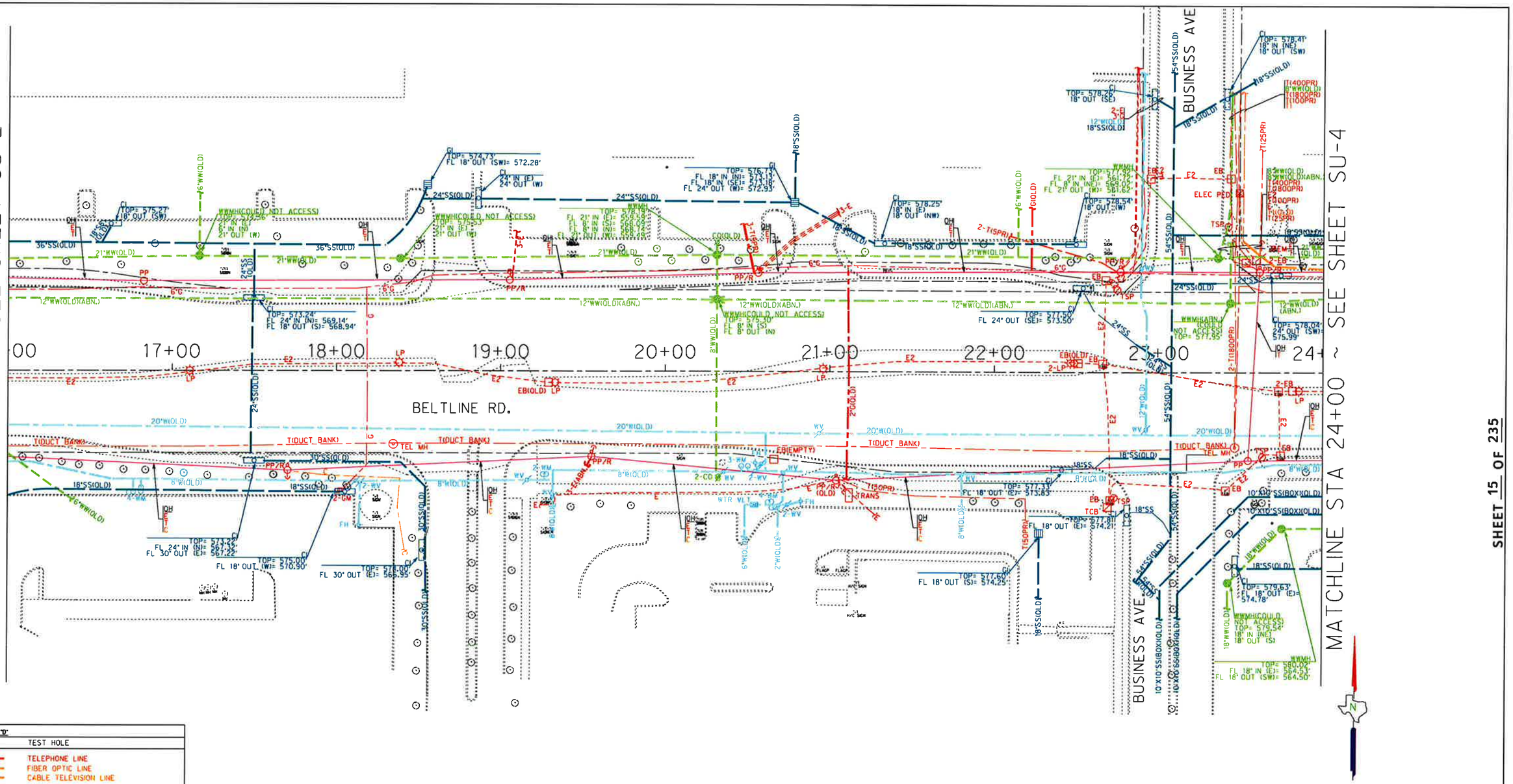
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

SUBSURFACE UTILITY ENGINEERING

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCTOBER 2013	SH-01-29350	SU-2



SHEET 15 OF 235

LEGEND:

LEVEL "A"	LEVEL "B"	LEVEL "C" & "D"	
			TEST HOLE
			TELEPHONE LINE
			FIBER OPTIC LINE
			CABLE TELEVISION LINE
			WATER LINE
			WASTEWATER LINE
			STORM SEWER LINE
			GAS LINE
			ELECTRIC LINE
			OVERHEAD UTILITY LINE
TEL PED			TELEPHONE PEDESTAL
TEL MH			TELEPHONE MANHOLE
TEL HH			TELEPHONE HAND HOLE
TEL VLT			TELEPHONE VAULT
FOC HH			FIBER OPTIC HAND HOLE
FOC MH			FIBER OPTIC MANHOLE
FOC CAB			FIBER OPTIC CABINET
FOC VLT			FIBER OPTIC VAULT
CATV PED			TELEVISION PEDESTAL
CATV HH			CABLE TV HAND HOLE
FH			FIRE HYDRANT
WV			WATER VALVE
WMO			WATER METER
WTR VLT			WATER VAULT
WWMH			WASTEWATER MANHOLE
CO			WASTEWATER CLEAN OUT
CI			CURB INLET
GI			GRATE INLET
SDMH			STORM DRAIN MANHOLE
AI			AREA INLET
GM			GAS METER
GV			GAS VALVE
GTS			GAS TEST STATION
GMH			GAS MANHOLE
PP			POWER POLE
PP/R			POWER POLE W/RISER
CWP			CROSSWALK POLE
EB			ELECTRIC BOX
EJB			ELECTRIC JUNCTION BOX
ELEC PED			ELECTRIC PEDESTAL
EM			ELECTRIC METER
LP			LIGHT POLE
TRANS			ELECTRIC TRANSFORMER
TSP			TRAFFIC SIGNAL POLE
TCB			TRAFFIC CONTROL BOX
			TRANSMISSION TOWER
			GUY WIRE
			UTILITY CONTINUATION
			UTILITY END POINT
		ABN.	ABANDONED UTILITY
		(QLB)	QUALITY LEVEL B
		(QLC)	QUALITY LEVEL C
		(QLD)	QUALITY LEVEL D
		OH	OVERHEAD UTILITIES
		CP	CONTROL POINT

OWNERSHIP LEGEND:	OWNER:	CONTACT:	PHONE:
TELEPHONE(T)	= AT&T	CHAD COOPER	972-234-7073
FIBER OPTIC CABLE(T1)	= AT&T	CHAD COOPER	972-234-7073
FIBER OPTIC CABLE(T2)	= FIBERLIGHT	MICHAEL BITSCHE	817-522-0453
CABLE TELEVISION(C)	= TIME WARNER CABLE	DAVID CHENEY	214-320-7406
WATER(W)	= TOWN OF ADDISON	LISA PYLES	972-450-2878
WASTEWATER(WW)	= TOWN OF ADDISON	LISA PYLES	972-450-2878
STORM SEWER(SS)	= TOWN OF ADDISON	LISA PYLES	972-450-2878
GAS(G)	= ATMOS ENERGY	BOBBY ROGERS	972-727-3905
ELECTRIC(E)	= ONCOR ELECTRIC DELIVERY (DISTRIBUTION)	LARRY BALDWIN	469-261-0649
ELECTRIC(E1)	= ONCOR ELECTRIC DELIVERY (TRANSMISSION)	BRYAN WILLIAMS	817-215-6285
ELECTRIC(E2)	= TOWN OF ADDISON	LISA PYLES	972-450-2878

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LEVEL "D" DEPICTED ACCORDING TO RECORD INFORMATION. NO ELECTRONIC INFORMATION WAS OBTAINED.

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TELEPHONE PAIR SIZES SHOWN HEREON ARE SHOWN FOR REFERENCE PURPOSES ONLY.

0 15 30 45 60

SCALE: 1"=60'

FIRM REGISTRATION NUMBER: 312

STATE OF TEXAS
RYAN D. LEWIS
95767
LICENSED
PROFESSIONAL ENGINEER

10/23/13

NO.	REVISION	BY	DATE

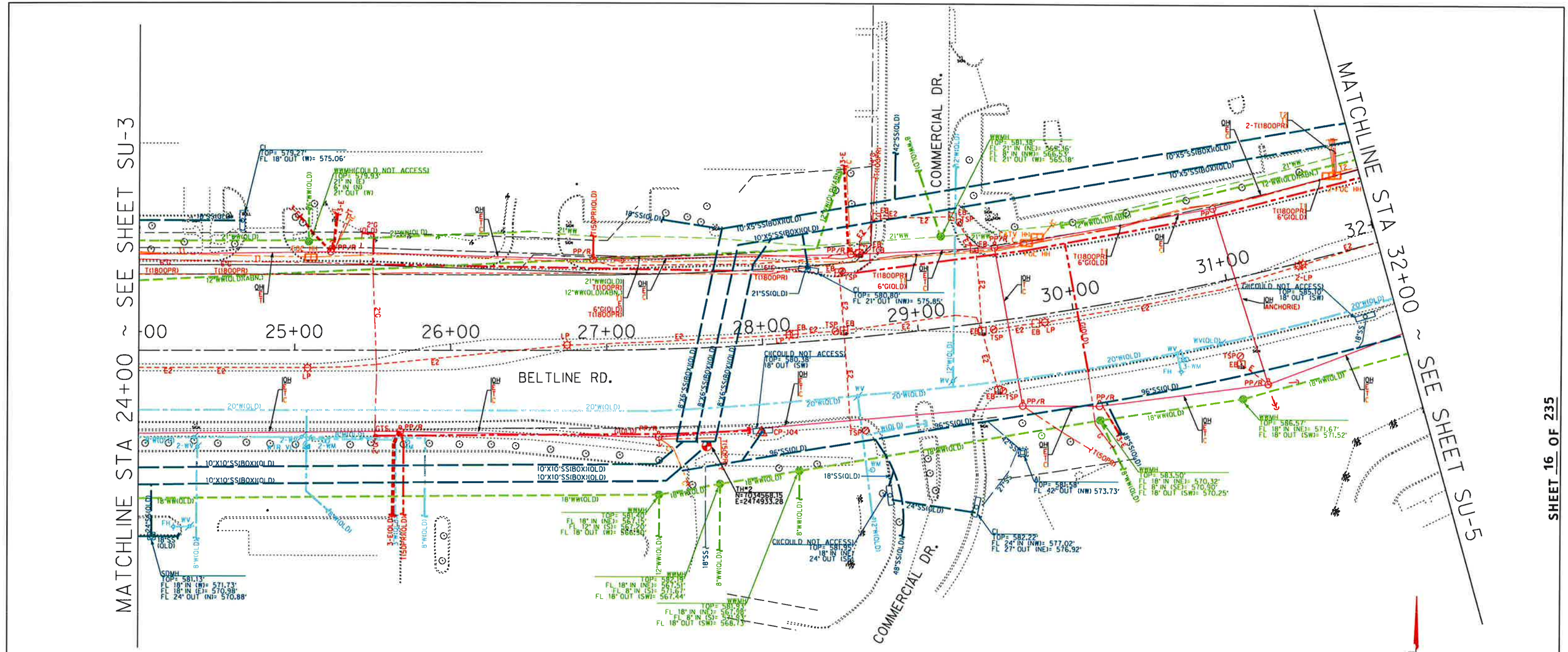
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

SUBSURFACE UTILITY ENGINEERING

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-8200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCTOBER 2013	SH-02-29350	SU-3



0 15 30 45 60
SCALE: 1"=60'

LEGEND:

LEVEL "A"	LEVEL "B"	LEVEL "C" & "D"	
●			TEST HOLE
	— - -	— - -	TELEPHONE LINE
	— - -	— - -	FIBER OPTIC LINE
	— - -	— - -	CABLE TELEVISION LINE
	— - -	— - -	WATER LINE
	— — —	— — —	WASTEWATER LINE
	— —	— —	STORM SEWER LINE
	— - -	— - -	GAS LINE
	- - - - -	- - - - -	ELECTRIC LINE
	——	——	OVERHEAD UTILITY LINE

Symbol	Description	Symbol	Description
TEL PED ☒	TELEPHONE PEDESTAL	GTS ●	GAS TEST STATION
TEL MH ◎	TELEPHONE MANHOLE	GMH ⊗	GAS MANHOLE
TEL HH ◫	TELEPHONE HAND HOLE	PP ○	POWER POLE
TEL VLT ■	TELEPHONE VAULT	PP/R ○	POWER POLE W/RISER
FOC HH ◫	FIBER OPTIC HAND HOLE	CWP ○	CROSSWALK POLE
FOC MH ⊖	FIBER OPTIC MANHOLE	EB ☐	ELECTRIC BOX
FOC CAB ☒	FIBER OPTIC CABINET	EJB ▭	ELECTRIC JUNCTION BOX
FOC VLT ■	FIBER OPTIC VAULT	ELEC PED ☒	ELECTRIC PEDESTAL
CATV PED ☒	TELEVISION PEDESTAL	EM ⊘	ELECTRIC METER
CATV HH ◫	CABLE TV HAND HOLE	LP ☼	LIGHT POLE
FH ⌖	FIRE HYDRANT	TRANS ▭	ELECTRIC TRANSFORMER
WV ⌀	WATER VALVE	TSP ⊘	TRAFFIC SIGNAL POLE
WM ○	WATER METER	TCB ⧄	TRAFFIC CONTROL BOX
WTR VLT ■	WATER VAULT	☒	TRANSMISSION TOWER
WWMH ●	WASTEWATER MANHOLE	←	GUY WIRE
CO ⌀	WASTEWATER CLEAN OUT	⊢	UTILITY CONTINUATION
CI ▭	CURB INLET	E	UTILITY END POINT
GI ▥	GRATE INLET	ABN.	ABANDONED UTILITY
SDMH ◙	STORM DRAIN MANHOLE	(QLB)	QUALITY LEVEL B
AI ▣	AREA INLET	(QLC)	QUALITY LEVEL C
		(QLD)	QUALITY LEVEL D
GM ☐	GAS METER	OH	OVERHEAD UTILITIES
GV ⌀	GAS VALVE	CP △	CONTROL POINT

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ELECTRIC(E)	= ONCOR ELECTRIC DELIVERY (DISTRIBUTION)	LARRY BALDWIN	469-261-0649
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STATE OF TEXAS
RYAN D. LEWIS
95767
LICENSED
PROFESSIONAL ENGINEER

10/23/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison!

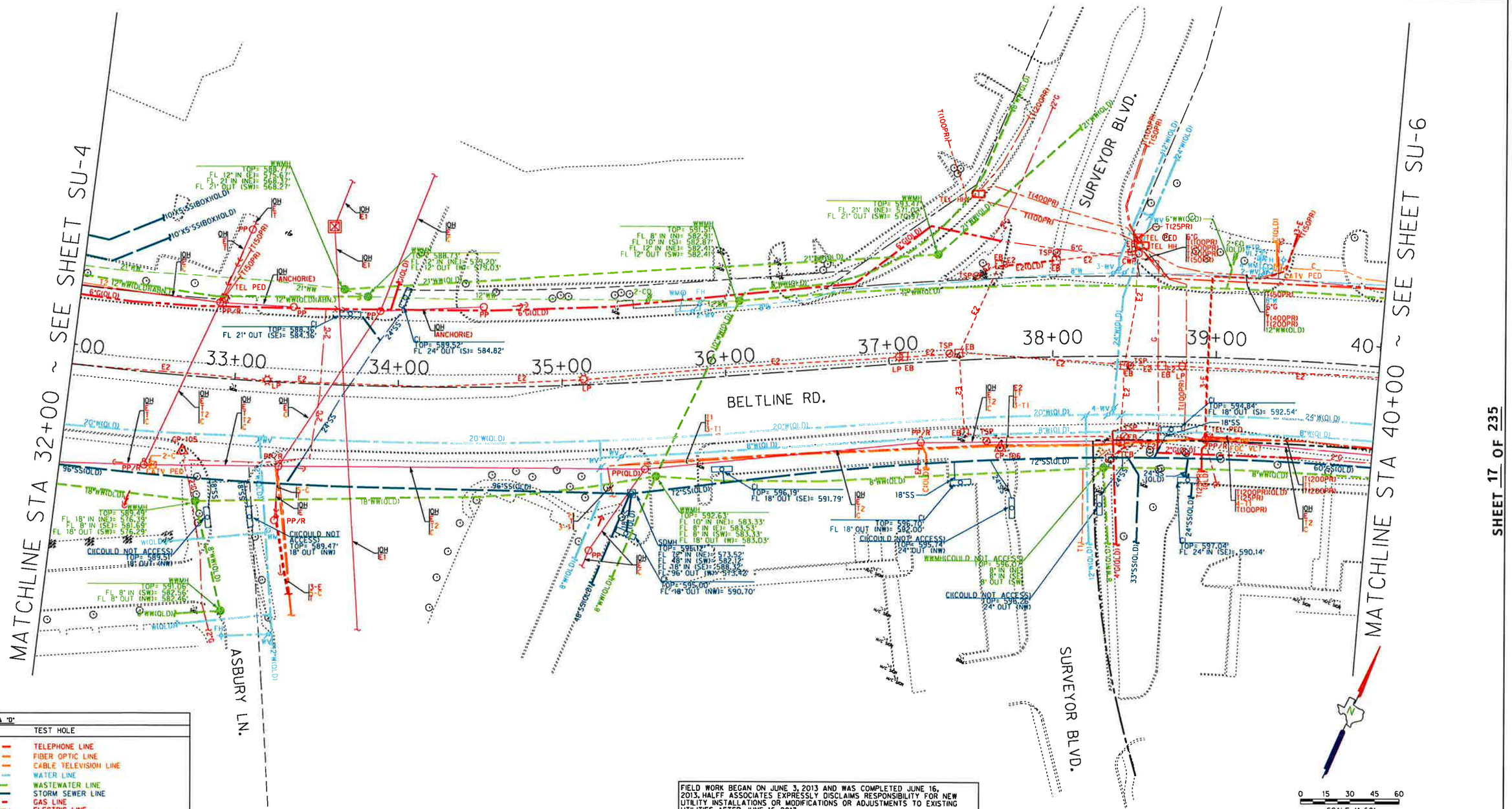
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

SUBSURFACE UTILITY ENGINEERING

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCTOBER 2013	SH-03-29350	SU-4



LEGEND:

LEVEL "A"	LEVEL "B"	LEVEL "C" & "D"	
			TEST HOLE
			TELEPHONE LINE
			FIBER OPTIC LINE
			CABLE TELEVISION LINE
			WATER LINE
			WASTEWATER LINE
			STORM SEWER LINE
			GAS LINE
			ELECTRIC LINE
			OVERHEAD UTILITY LINE

TEL PED	TELEPHONE PEDESTAL	GTS	GAS TEST STATION
TEL MH	TELEPHONE MANHOLE	GMH	GAS MANHOLE
TEL HH	TELEPHONE HAND HOLE	PP	POWER POLE
TEL VLT	TELEPHONE VAULT	PP/R	POWER POLE W/RISER
FOC HH	FIBER OPTIC HAND HOLE	CWP	CROSSWALK POLE
FOC MH	FIBER OPTIC MANHOLE	EB	ELECTRIC BOX
FOC CAB	FIBER OPTIC CABINET	EJB	ELECTRIC JUNCTION BOX
FOC VLT	FIBER OPTIC VAULT	ELEC PED	ELECTRIC PEDESTAL
CATV PED	TELEVISION PEDESTAL	EM	ELECTRIC METER
CATV HH	CABLE TV HAND HOLE	LP	LIGHT POLE
FH	FIRE HYDRANT	TRANS	ELECTRIC TRANSFORMER
WV	WATER VALVE	TSP	TRAFFIC SIGNAL POLE
WMO	WATER METER	TCB	TRAFFIC CONTROL BOX
WTR VLT	WATER VAULT		TRANSMISSION TOWER
WWMH	WASTEWATER MANHOLE		GUY WIRE
CO	WASTEWATER CLEAN OUT	T	UTILITY CONTINUATION
CI	CURB INLET	E	UTILITY END POINT
GI	GRATE INLET	ABN.	ABANDONED UTILITY
SDMH	STORM DRAIN MANHOLE	(QLB)	QUALITY LEVEL B
AI	AREA INLET	(QLC)	QUALITY LEVEL C
		(QLD)	QUALITY LEVEL D
		OH	OVERHEAD UTILITIES
GM	GAS METER	CP	CONTROL POINT
GV	GAS VALVE		

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WATER(W)	= TOWN OF ADDISON	LISA PYLES	972-450-2878
WASTEWATER(WW)	= TOWN OF ADDISON	LISA PYLES	972-450-2878
STORM SEWER(SS)	= TOWN OF ADDISON	LISA PYLES	972-450-2878
GAS(G)	= ATMOS ENERGY	BOBBY ROGERS	972-727-3905
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STATE OF TEXAS
RYAN D. LEWIS
95767
LICENSED
PROFESSIONAL ENGINEER

10/23/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

SUBSURFACE UTILITY ENGINEERING

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCTOBER 2013	SH-04-29350	SU-5

SHEET 17 OF 235

MATCHLINE STA 40+00 ~ SEE SHEET SU-5

MATCHLINE STA 48+00 ~ SEE SHEET SU-7

BELTLINE RD.

RUNYON RD.

RUNYON RD.

SHEET 18 OF 235

LEGEND:

LEVEL "A"	LEVEL "B"	LEVEL "C" & "D"	
			TEST HOLE
			TELEPHONE LINE
			FIBER OPTIC LINE
			CABLE TELEVISION LINE
			WATER LINE
			WASTEWATER LINE
			STORM SEWER LINE
			GAS LINE
			ELECTRIC LINE
			OVERHEAD UTILITY LINE

TEL PED	TELEPHONE PEDESTAL	GTS	GAS TEST STATION
TEL MH	TELEPHONE MANHOLE	GMH	GAS MANHOLE
TEL HH	TELEPHONE HAND HOLE	PP	POWER POLE
TEL VLT	TELEPHONE VAULT	PP/R	POWER POLE W/RISER
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CATV PED	TELEVISION PEDESTAL	EM	ELECTRIC METER
CATV HH	CABLE TV HAND HOLE	LP	LIGHT POLE
FH	FIRE HYDRANT	TRANS	ELECTRIC TRANSFORMER
WV	WATER VALVE	TSP	TRAFFIC SIGNAL POLE
WM	WATER METER	TCB	TRAFFIC CONTROL BOX
WTR VLT	WATER VAULT		TRANSMISSION TOWER
WWMH	WASTEWATER MANHOLE		GUY WIRE
CO	WASTEWATER CLEAN OUT		UTILITY CONTINUATION
CI	CURB INLET		UTILITY END POINT
GI	GRATE INLET	ABN.	ABANDONED UTILITY
SDMH	STORM DRAIN MANHOLE	(QLB)	QUALITY LEVEL B
AI	AREA INLET	(QLC)	QUALITY LEVEL C
		(QLD)	QUALITY LEVEL D
GM	GAS METER	OH	OVERHEAD UTILITIES
GV	GAS VALVE	CP	CONTROL POINT

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STATE OF TEXAS
RYAN D. LEWIS
95767
LICENSED
PROFESSIONAL ENGINEER

10/23/13

0 15 30 45 60
SCALE: 1"=60'

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

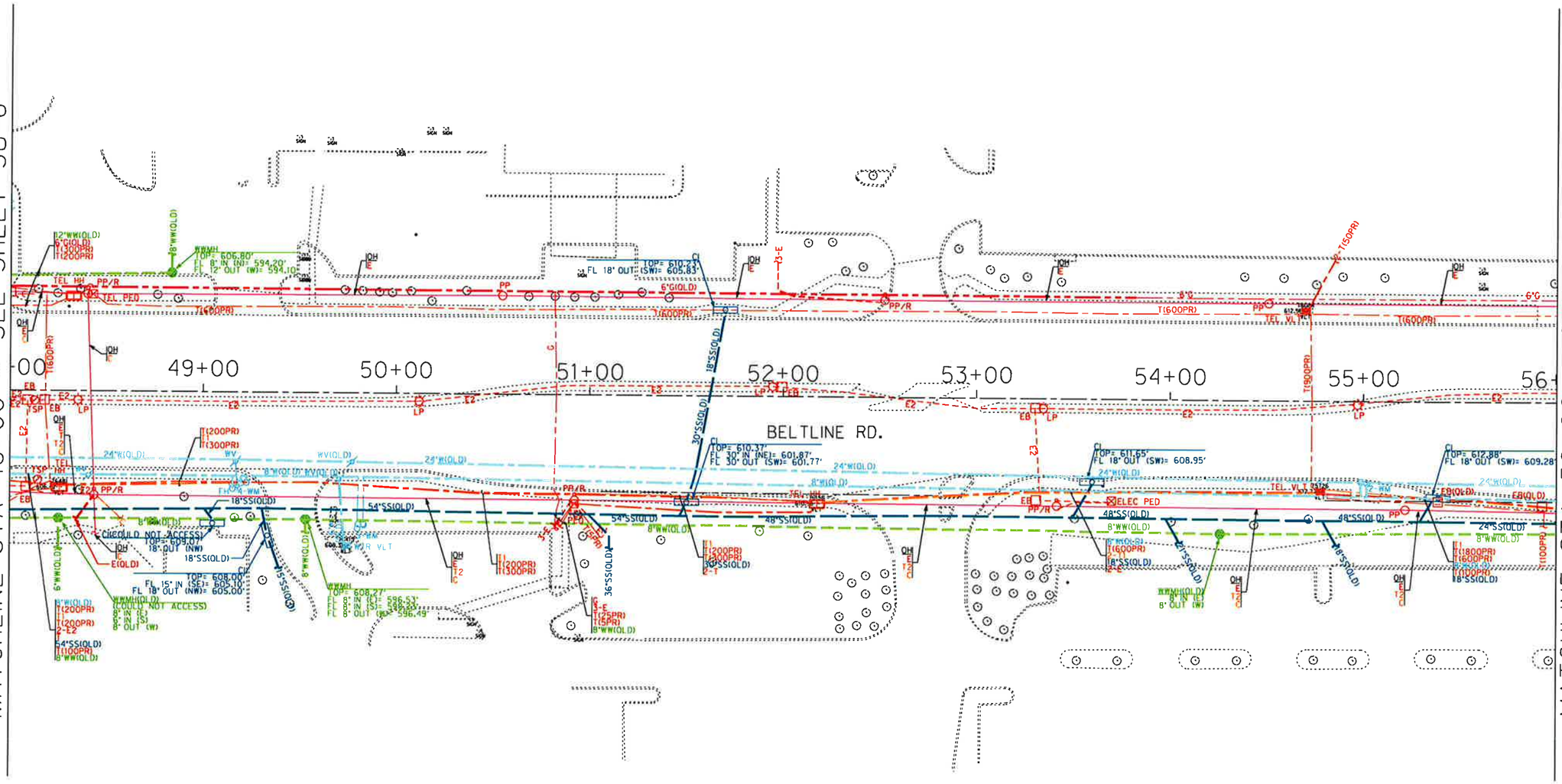
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

SUBSURFACE UTILITY ENGINEERING

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275 TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCTOBER 2013	SH-05-29350	SU-6



SHEET 19 OF 235

0 15 30 45 60
SCALE: 1"=60'

LEGEND:

LEVEL "A"	LEVEL "B"	LEVEL "C" & "D"	
			TEST HOLE
			TELEPHONE LINE
			FIBER OPTIC LINE
			CABLE TELEVISION LINE
			WATER LINE
			WASTEWATER LINE
			STORM SEWER LINE
			GAS LINE
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GM	GAS METER	(QLD)	QUALITY LEVEL D
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		CP	CONTROL POINT

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LEVEL "D" DEPICTED ACCORDING TO RECORD INFORMATION. NO ELECTRONIC INFORMATION WAS OBTAINED.

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UTILITY INFORMATION LABELED LEVEL "C" OR "D" IS DERIVED FROM FURNISHED RECORDS. SUCH INFORMATION MAY NOT BE ACCURATE OR RELIABLE. HALFF ASSOCIATES EXPRESSLY DISCLAIMS RESPONSIBILITY FOR THE ACCURACY OR RELIABILITY OF UTILITY INFORMATION DEPICTED ACCORDING TO RECORDS.

WASTEWATER AND STORM SEWER FLOWLINE INFORMATION SHOWN HEREON ARE BASED ON FIELD MEASURED DEPTHS AND SHALL BE DEEMED APPROXIMATE.

TELEPHONE PAIR SIZES SHOWN HEREON ARE SHOWN FOR REFERENCE PURPOSES ONLY.

STATE OF TEXAS
RYAN D. LEWIS
95767
LICENSED
PROFESSIONAL ENGINEER

10/23/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

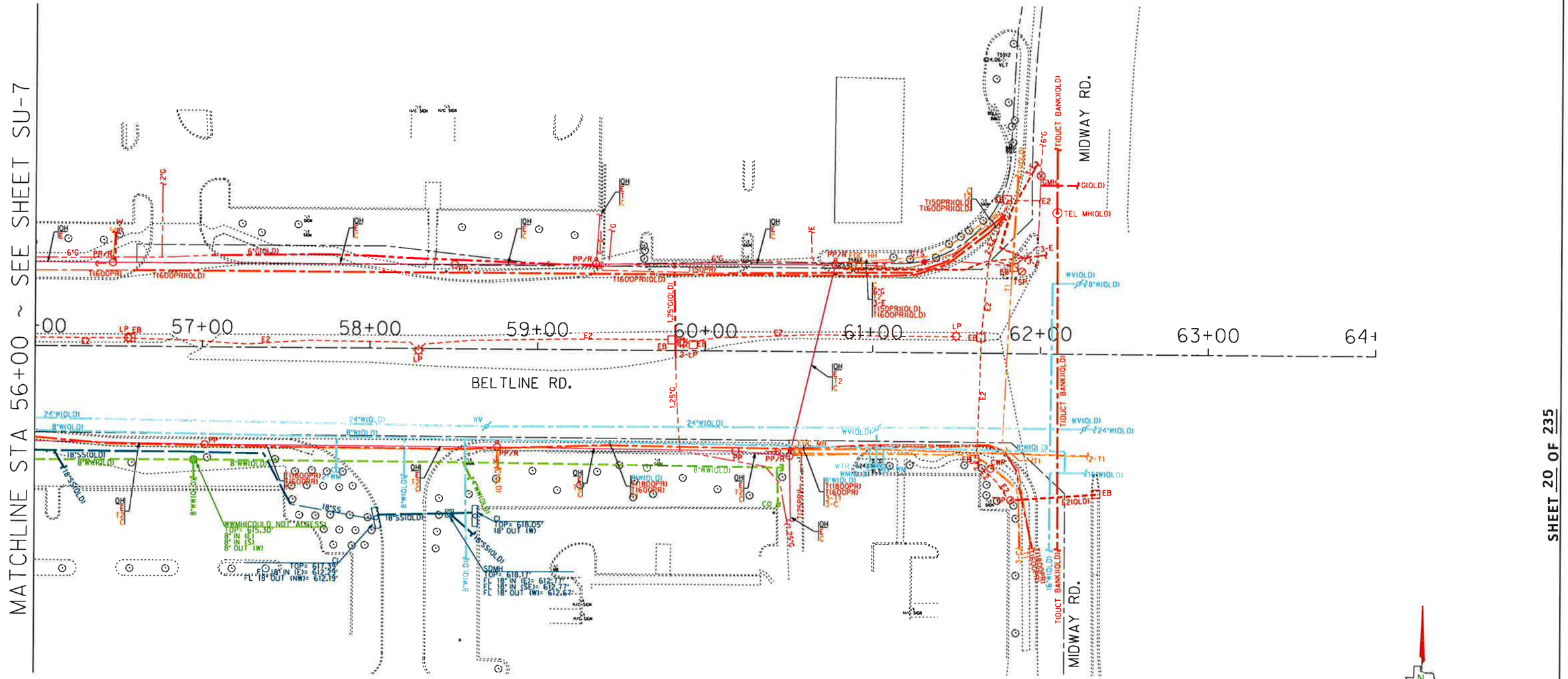
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

SUBSURFACE UTILITY ENGINEERING

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCTOBER 2013	SH-06-29350	SU-7



SCALE: 1"=60'

LEGEND:

LEVEL "A" LEVEL "B" LEVEL "C" & "D"

● TEST HOLE

Line	Description
— —	TELEPHONE LINE
— —	FIBER OPTIC LINE
— —	CABLE TELEVISION LINE
— —	WATER LINE
— —	WASTEWATER LINE
— —	STORM SEWER LINE
— —	GAS LINE
- - -	ELECTRIC LINE
——	OVERHEAD UTILITY LINE

Symbol	Description
TEL PED ☒	TELEPHONE PEDESTAL
TEL MH ⊙	TELEPHONE MANHOLE
TEL HH ◫	TELEPHONE HAND HOLE
TEL VLT ■	TELEPHONE VAULT
FOC HH ◫	FIBER OPTIC HAND HOLE
FOC MH ◎	FIBER OPTIC MANHOLE
FOC CAB ☒	FIBER OPTIC CABINET
FOC VLT ■	FIBER OPTIC VAULT
CATV PED ☒	TELEVISION PEDESTAL
CATV HH ◫	CABLE TV HAND HOLE
FH ✧	FIRE HYDRANT
WV ⌀	WATER VALVE
WM ○	WATER METER
WTR VLT ■	WATER VAULT
WWMH ●	WASTEWATER MANHOLE
CO ⌀	WASTEWATER CLEAN OUT
CI ▭	CURB INLET
GI ▥	GRATE INLET
SDMH ◙	STORM DRAIN MANHOLE
AI ⊠	AREA INLET
GM □	GAS METER
GV ⌀	GAS VALVE
GTS ●	GAS TEST STATION
GMH ⊗	GAS MANHOLE
PP ○	POWER POLE
PP/R ○	POWER POLE W/RISER
CWP ○	CROSSWALK POLE
EB □	ELECTRIC BOX
EJB ▭	ELECTRIC JUNCTION BOX
ELEC PED ☒	ELECTRIC PEDESTAL
EM ▪	ELECTRIC METER
LP ☼	LIGHT POLE
TRANS ▭	ELECTRIC TRANSFORMER
TSP ⊘	TRAFFIC SIGNAL POLE
TCB ◩	TRAFFIC CONTROL BOX
☒	TRANSMISSION TOWER
⟵	GUY WIRE
⊢	UTILITY CONTINUATION
⊏	UTILITY END POINT
ABN.	ABANDONED UTILITY
(QLB)	QUALITY LEVEL B
(QLC)	QUALITY LEVEL C
(QLD)	QUALITY LEVEL D
OH	OVERHEAD UTILITIES
CP △	CONTROL POINT

OWNERSHIP LEGEND:	OWNER:	CONTACT:	PHONE:
TELEPHONE(T)	= AT&T	CHAD COOPER	972-234-7073
FIBER OPTIC CABLE(T1)	= AT&T	CHAD COOPER	972-234-7073
FIBER OPTIC CABLE(T2)	= FIBERLIGHT	MICHAEL BITSCHE	817-522-0453
CABLE TELEVISION(C)	= TIME WARNER CABLE	DAVID CHENEY	214-320-7406
WATER(W)	= TOWN OF ADDISON	LISA PYLES	972-450-2878
WASTEWATER(WW)	= TOWN OF ADDISON	LISA PYLES	972-450-2878
STORM SEWER(SS)	= TOWN OF ADDISON	LISA PYLES	972-450-2878
GAS(G)	= ATMOS ENERGY	BOBBY ROGERS	972-727-3905
ELECTRIC(E)	= ONCOR ELECTRIC DELIVERY (DISTRIBUTION)	LARRY BALDWIN	469-261-0649
ELECTRIC(E1)	= ONCOR ELECTRIC DELIVERY (TRANSMISSION)	BRYAN WILLIAMS	817-215-6285
ELECTRIC(E2)	= TOWN OF ADDISON	LISA PYLES	972-450-2878

FIELD WORK BEGAN ON JUNE 3, 2013 AND WAS COMPLETED JUNE 16, 2013. HALFF ASSOCIATES EXPRESSLY DISCLAIMS RESPONSIBILITY FOR NEW UTILITY INSTALLATIONS OR MODIFICATIONS OR ADJUSTMENTS TO EXISTING UTILITIES AFTER JUNE 16, 2013.

ALL UTILITY INFORMATION HEREON IS DEPICTED TO QUALITY LEVEL "B" UNLESS OTHERWISE NOTED.

SIZE INFORMATION SHOWN HEREON IS TAKEN FROM AVAILABLE UTILITY RECORDS:

LEVEL "B"	INFORMATION OBTAINED THROUGH THE APPLICATION OF APPROPRIATE SURFACE GEOPHYSICAL METHODS TO DETERMINE THE EXISTENCE AND APPROXIMATE HORIZONTAL POSITION OF UTILITIES.
LEVEL "C"	DEPICTED ACCORDING TO RECORD INFORMATION AND EXISTING ASSOCIATED UTILITY STRUCTURES. NO ELECTRONIC INFORMATION WAS OBTAINED
LEVEL "D"	DEPICTED ACCORDING TO RECORD INFORMATION. NO ELECTRONIC INFORMATION WAS OBTAINED.

UNLESS OTHERWISE NOTED, UTILITY LINE LIMITS DEPICTED REPRESENT FIELD DESIGNATING LIMITS AND NOT END POINTS OF UTILITIES.

UTILITY INFORMATION LABELED LEVEL "C" OR "D" IS DERIVED FROM FURNISHED RECORDS. SUCH INFORMATION MAY NOT BE ACCURATE OR RELIABLE. HALFF ASSOCIATES EXPRESSLY DISCLAIMS RESPONSIBILITY FOR THE ACCURACY OR RELIABILITY OF UTILITY INFORMATION DEPICTED ACCORDING TO RECORDS.

WASTEWATER AND STORM SEWER FLOWLINE INFORMATION SHOWN HEREON ARE BASED ON FIELD MEASURED DEPTHS AND SHALL BE DEEMED APPROXIMATE.

TELEPHONE PAIR SIZES SHOWN HEREON ARE SHOWN FOR REFERENCE PURPOSES ONLY.

RYAN D. LEWIS
95767

10/23/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

SUBSURFACE UTILITY ENGINEERING

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCTOBER 2013	SH-07-29350	SU-8

TEST HOLE DATA SHEET

HALFF
TBPE #F-312

Halff Associates, Inc.
12225 Greenville Ave. Suite 200
Dallas, Texas 75243
Tel: 214.572.2272
Fax: 214.572.2273

Halff Project # 29350
Work Authorization # N/A
CSJ # N/A
City/ County Name: ADDISON/DALLAS
Highway # BELTLINE RD.
Highway Limits: MARSH LN. TO MIDWAY RD.

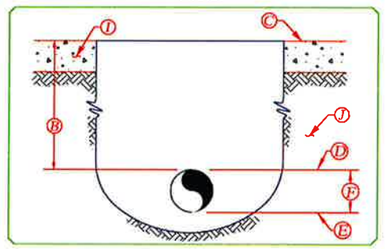
Test Hole # 1
Utility: GAS
Date: 9/16/13
Weather: CLOUDY

Test Hole Data

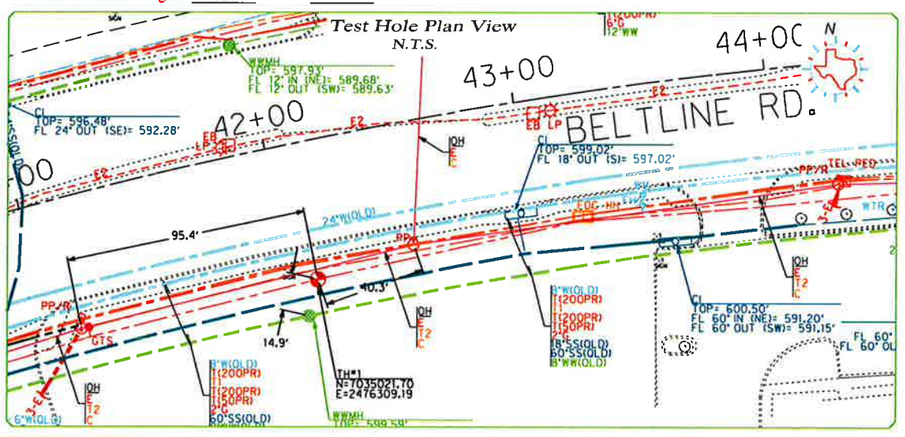
Ⓐ Approx. Sta. 42+10.2 Offset: 54.70'
Offset pulled from: BASELINE
Ⓑ Measured Depth of Hole: 1.90'
Ⓒ Surface Elevation: 599.11'
Ⓓ Elev. @ Top of Utility: 597.21'
Ⓔ Elev. @ Bottom of Utility: 597.04' (CALC.)
Ⓕ Size of Utility: 2"
Ⓖ Utility Material: POLYETHYLENE
Ⓗ Utility Condition: GOOD
Ⓘ Thickness of Pvmt.: N/A
Type of Pvmt., Base, etc: N/A
Ⓙ Description of soil: CLAY

Unit of Measure: English X Metric

Test Hole Profile
N.T.S.



Test Hole Plan View
N.T.S.



Field Notes or Comments:

MEASUREMENTS TAKEN FROM:
1) T.H. TO POWER POLE W/ RISER (95.4')
2) T.H. TO WASTEWATER MANHOLE (14.9')
3) T.H. TO POWER POLE (40.3')

OWNER: ATMOS ENERGY

Legend:

TH	TEST HOLE
WWMH	WASTEWATER MANHOLE
PP	POWER POLE
PP/R	POWER POLE W/ RISER

Certification:

I hereby certify that the information shown hereon is correct to the best of my knowledge and belief.

TEST HOLE DATA SHEET

HALFF
TBPE #F-312

Halff Associates, Inc.
12225 Greenville Ave. Suite 200
Dallas, Texas 75243
Tel: 214.572.2272
Fax: 214.572.2273

Halff Project # 29350
Work Authorization # N/A
CSJ # N/A
City/ County Name: ADDISON/DALLAS
Highway # BELTLINE RD.
Highway Limits: MARSH LN. TO MIDWAY RD.

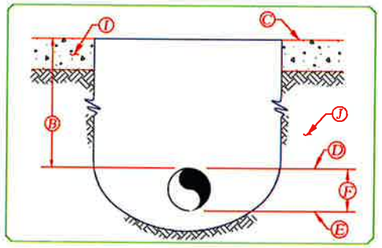
Test Hole # 2
Utility: STORM SEWER
Date: 9/9/13
Weather: SUNNY

Test Hole Data

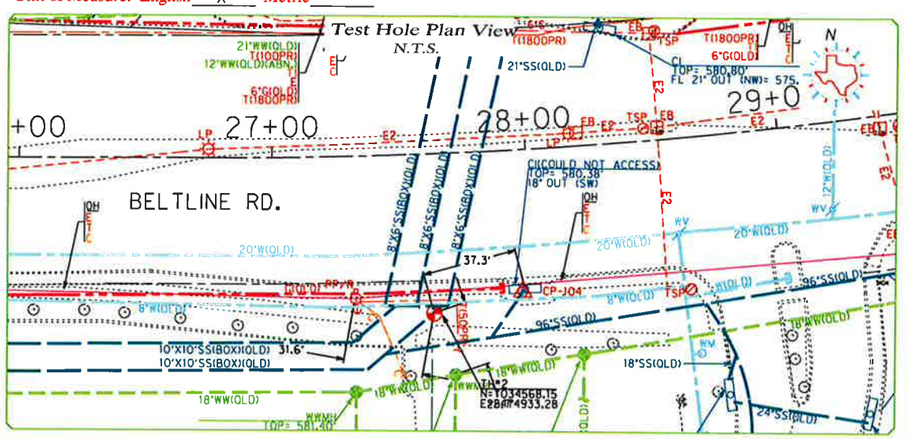
Ⓐ Approx. Sta. 27+61.7 Offset: 63.04' RT
Offset pulled from: BASELINE
Ⓑ Measured Depth of Hole: 3.72'
Ⓒ Surface Elevation: 581.28'
Ⓓ Elev. @ Top of Utility: 577.56'
Ⓔ Elev. @ Bottom of Utility: 567.56' (CALC.)
Ⓕ Size of Utility: 10'X10'
Ⓖ Utility Material: RCB
Ⓗ Utility Condition: GOOD
Ⓘ Thickness of Pvmt.: N/A
Type of Pvmt., Base, etc: N/A
Ⓙ Description of soil: ROCK

Unit of Measure: English X Metric

Test Hole Profile
N.T.S.



Test Hole Plan View
N.T.S.



Field Notes or Comments:

MEASUREMENTS TAKEN FROM:
1) T.H. TO POWER POLE W/ RISER (31.6')
2) T.H. TO CURB INLET (37.3')
3) T.H. TO WASTEWATER MANHOLE (25.7')

OWNER: CITY OF ADDISON

Legend:

TH	TEST HOLE
WWMH	WASTEWATER MANHOLE
	CURB INLET
PP/R	POWER POLE W/ RISER

Certification:

I hereby certify that the information shown hereon is correct to the best of my knowledge and belief.

SHEET 21 OF 235

STATE OF TEXAS
RYAN D. LEWIS
95767
LICENSED
PROFESSIONAL ENGINEER
10/23/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

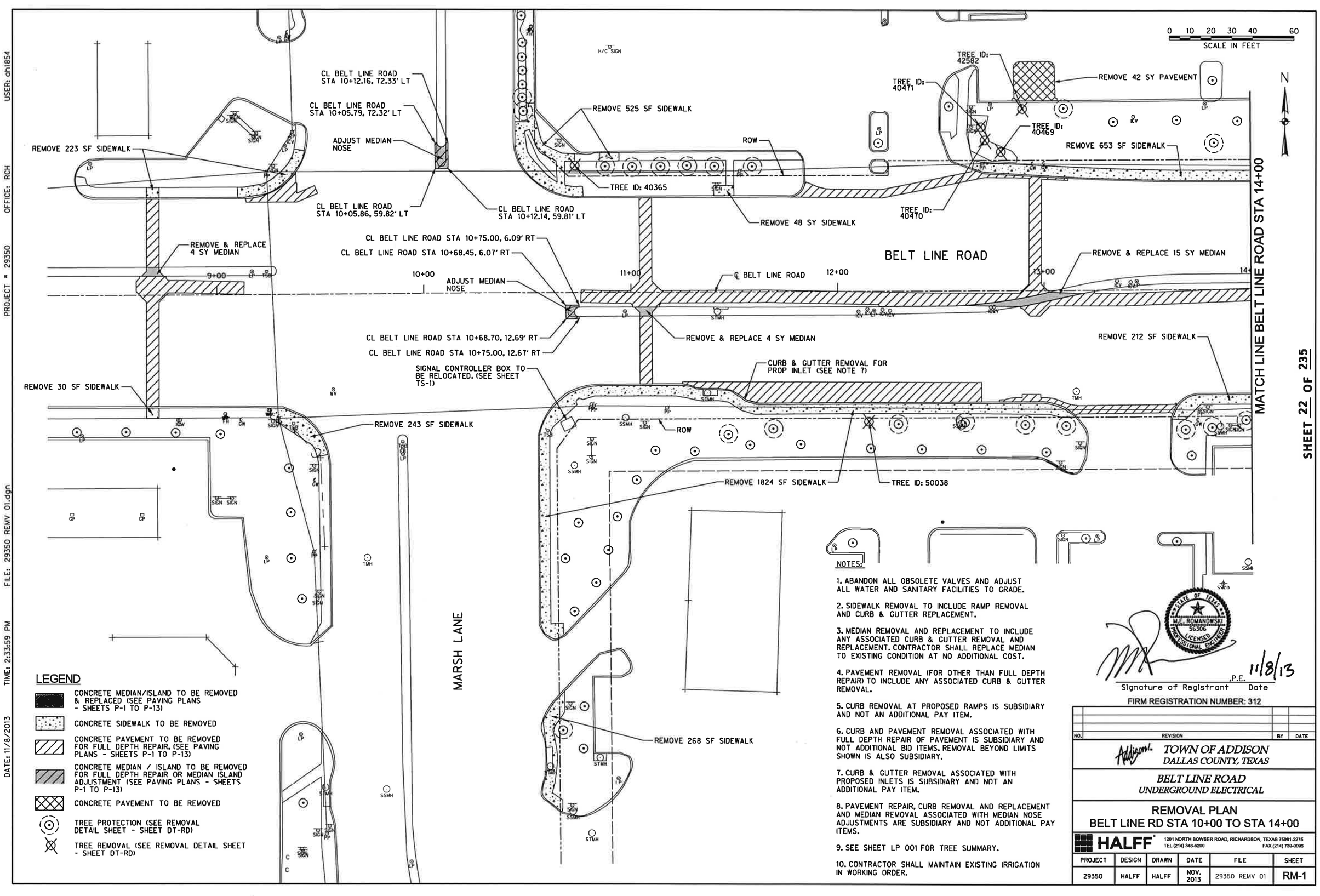
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

SUBSURFACE UTILITY ENGINEERING

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCTOBER 2013	SH-08-29350	SU-9



LEGEND

- CONCRETE MEDIAN/ISLAND TO BE REMOVED & REPLACED (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE SIDEWALK TO BE REMOVED
- CONCRETE PAVEMENT TO BE REMOVED FOR FULL DEPTH REPAIR. (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE MEDIAN / ISLAND TO BE REMOVED FOR FULL DEPTH REPAIR OR MEDIAN ISLAND ADJUSTMENT (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE PAVEMENT TO BE REMOVED
- TREE PROTECTION (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)
- TREE REMOVAL (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)

NOTES:

1. ABANDON ALL OBSOLETE VALVES AND ADJUST ALL WATER AND SANITARY FACILITIES TO GRADE.
2. SIDEWALK REMOVAL TO INCLUDE RAMP REMOVAL AND CURB & GUTTER REPLACEMENT.
3. MEDIAN REMOVAL AND REPLACEMENT TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL AND REPLACEMENT. CONTRACTOR SHALL REPLACE MEDIAN TO EXISTING CONDITION AT NO ADDITIONAL COST.
4. PAVEMENT REMOVAL (FOR OTHER THAN FULL DEPTH REPAIR) TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL.
5. CURB REMOVAL AT PROPOSED RAMPS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.
6. CURB AND PAVEMENT REMOVAL ASSOCIATED WITH FULL DEPTH REPAIR OF PAVEMENT IS SUBSIDIARY AND NOT ADDITIONAL BID ITEMS. REMOVAL BEYOND LIMITS SHOWN IS ALSO SUBSIDIARY.
7. CURB & GUTTER REMOVAL ASSOCIATED WITH PROPOSED INLETS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.
8. PAVEMENT REPAIR, CURB REMOVAL AND REPLACEMENT AND MEDIAN REMOVAL ASSOCIATED WITH MEDIAN NOSE ADJUSTMENTS ARE SUBSIDIARY AND NOT ADDITIONAL PAY ITEMS.
9. SEE SHEET LP 001 FOR TREE SUMMARY.
10. CONTRACTOR SHALL MAINTAIN EXISTING IRRIGATION IN WORKING ORDER.

STATE OF TEXAS
M.E. ROMANOWSKI
56306
LICENSED
PROFESSIONAL ENGINEER

11/8/13
Signature of Registrant, P.E. Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

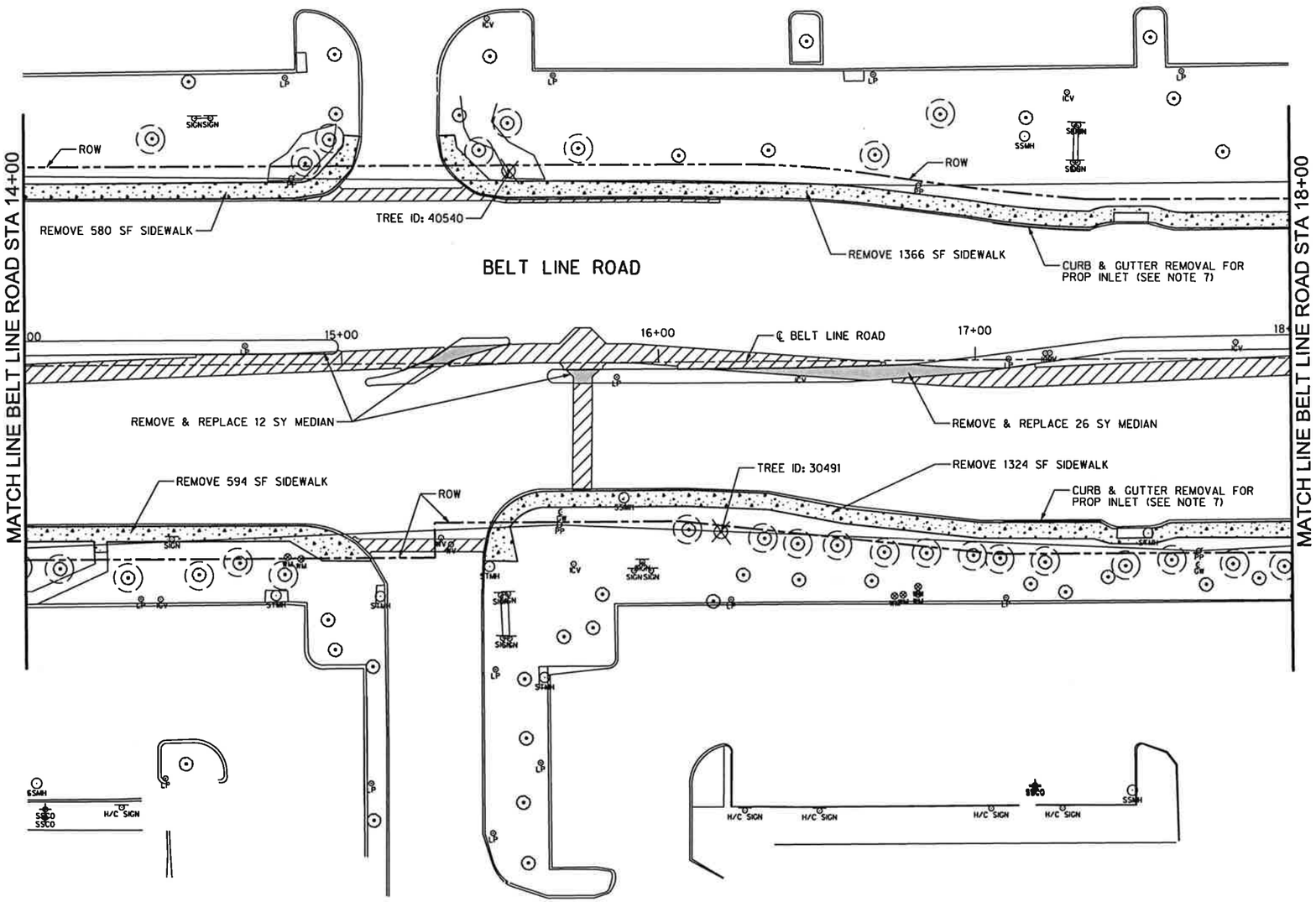
REMOVAL PLAN
BELT LINE RD STA 10+00 TO STA 14+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 REMV 01	RM-1

SHEET 22 OF 235

USER: ah1854
OFFICE: RCH
PROJECT # 29350
FILE: 29350 REMV 01.dgn
TIME: 2:33:59 PM
DATE: 11/8/2013



0 10 20 30 40 60
SCALE IN FEET

N

LEGEND

- CONCRETE MEDIAN/ISLAND TO BE REMOVED & REPLACED (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE SIDEWALK TO BE REMOVED
- CONCRETE PAVEMENT TO BE REMOVED FOR FULL DEPTH REPAIR. (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE MEDIAN / ISLAND TO BE REMOVED FOR FULL DEPTH REPAIR OR MEDIAN ISLAND ADJUSTMENT (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE PAVEMENT TO BE REMOVED
- TREE PROTECTION (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)
- TREE REMOVAL (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)

NOTES:

1. ABANDON ALL OBSOLETE VALVES AND ADJUST ALL WATER AND SANITARY FACILITIES TO GRADE.

2. SIDEWALK REMOVAL TO INCLUDE RAMP REMOVAL AND CURB & GUTTER REPLACEMENT.

3. MEDIAN REMOVAL AND REPLACEMENT TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL AND REPLACEMENT. CONTRACTOR SHALL REPLACE MEDIAN TO EXISTING CONDITION AT NO ADDITIONAL COST.

4. PAVEMENT REMOVAL (FOR OTHER THAN FULL DEPTH REPAIR) TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL.

5. CURB REMOVAL AT PROPOSED RAMPS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

6. CURB AND PAVEMENT REMOVAL ASSOCIATED WITH FULL DEPTH REPAIR OF PAVEMENT IS SUBSIDIARY AND NOT ADDITIONAL BID ITEMS. REMOVAL BEYOND LIMITS SHOWN IS ALSO SUBSIDIARY.

7. CURB & GUTTER REMOVAL ASSOCIATED WITH PROPOSED INLETS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

8. PAVEMENT REPAIR, CURB REMOVAL AND REPLACEMENT AND MEDIAN REMOVAL ASSOCIATED WITH MEDIAN NOSE ADJUSTMENTS ARE SUBSIDIARY AND NOT ADDITIONAL PAY ITEMS.

9. SEE SHEET LP 001 FOR TREE SUMMARY.

10. CONTRACTOR SHALL MAINTAIN EXISTING IRRIGATION IN WORKING ORDER.

STATE OF TEXAS
M.E. ROMANOWSKI
96308
LICENSED
PROFESSIONAL ENGINEER

P.E. 10/23/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison

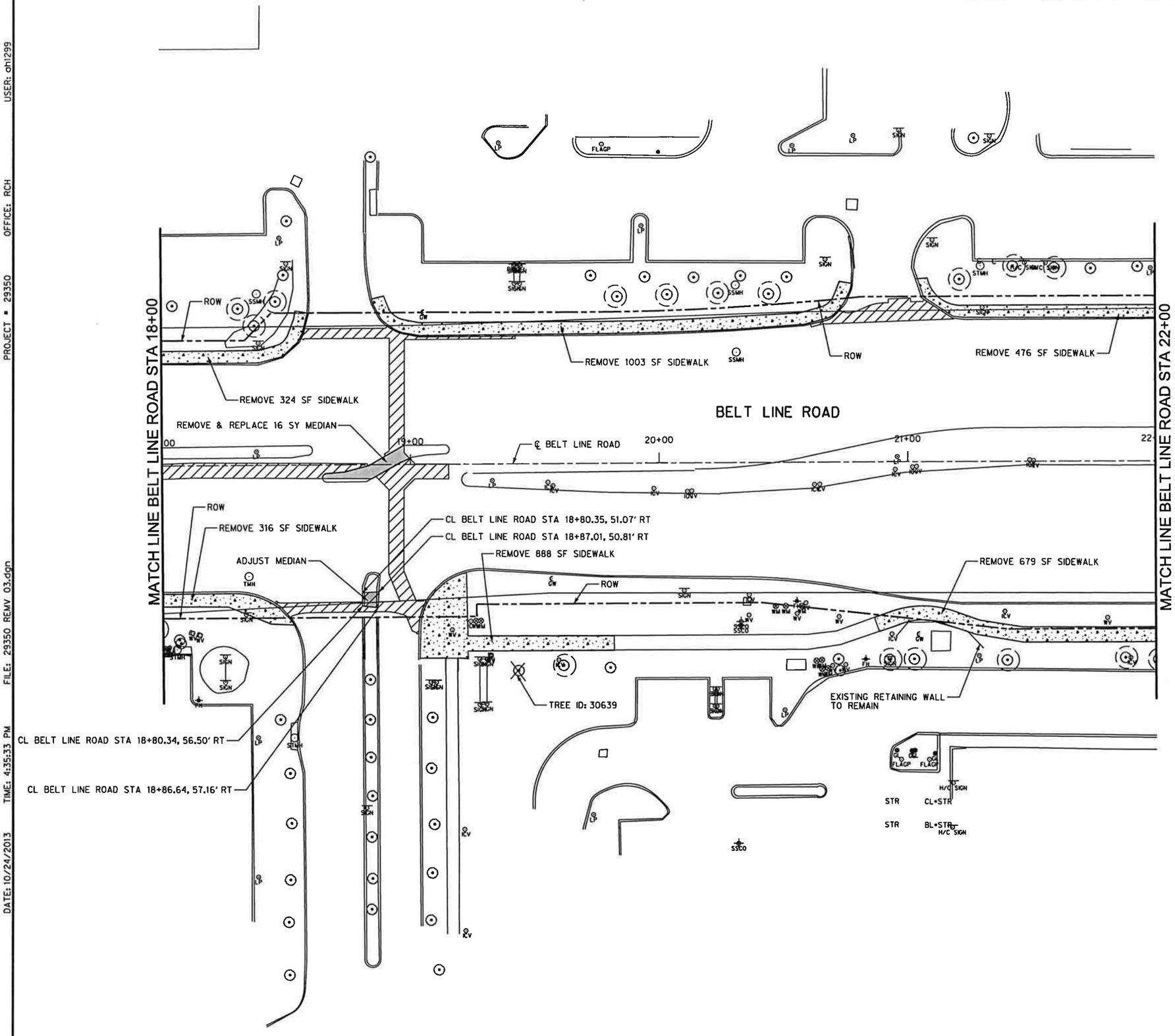
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

REMOVAL PLAN
BELT LINE RD STA 14+00 TO STA 18+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 REMV 02	RM-2



0 10 20 30 40 60
SCALE IN FEET

N

LEGEND

- CONCRETE MEDIAN/ISLAND TO BE REMOVED & REPLACED (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE SIDEWALK TO BE REMOVED
- CONCRETE PAVEMENT TO BE REMOVED FOR FULL DEPTH REPAIR. (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE MEDIAN / ISLAND TO BE REMOVED FOR FULL DEPTH REPAIR OR MEDIAN ISLAND ADJUSTMENT (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE PAVEMENT TO BE REMOVED
- TREE PROTECTION (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)
- TREE REMOVAL (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)

NOTES:

1. ABANDON ALL OBSOLETE VALVES AND ADJUST ALL WATER AND SANITARY FACILITIES TO GRADE.

2. SIDEWALK REMOVAL TO INCLUDE RAMP REMOVAL AND CURB & GUTTER REPLACEMENT.

3. MEDIAN REMOVAL AND REPLACEMENT TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL AND REPLACEMENT. CONTRACTOR SHALL REPLACE MEDIAN TO EXISTING CONDITION AT NO ADDITIONAL COST.

4. PAVEMENT REMOVAL (FOR OTHER THAN FULL DEPTH REPAIR) TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL.

5. CURB REMOVAL AT PROPOSED RAMPS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

6. CURB AND PAVEMENT REMOVAL ASSOCIATED WITH FULL DEPTH REPAIR OF PAVEMENT IS SUBSIDIARY AND NOT ADDITIONAL BID ITEMS. REMOVAL BEYOND LIMITS SHOWN IS ALSO SUBSIDIARY.

7. CURB & GUTTER REMOVAL ASSOCIATED WITH PROPOSED INLETS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

8. PAVEMENT REPAIR, CURB REMOVAL AND REPLACEMENT AND MEDIAN REMOVAL ASSOCIATED WITH MEDIAN NOSE ADJUSTMENTS ARE SUBSIDIARY AND NOT ADDITIONAL PAY ITEMS.

9. SEE SHEET LP 001 FOR TREE SUMMARY.

10. CONTRACTOR SHALL MAINTAIN EXISTING IRRIGATION IN WORKING ORDER.

SHEET 24 OF 235

STATE OF TEXAS
M.E. ROMANOWSKI
56308
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant ,P.E. 12/23/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

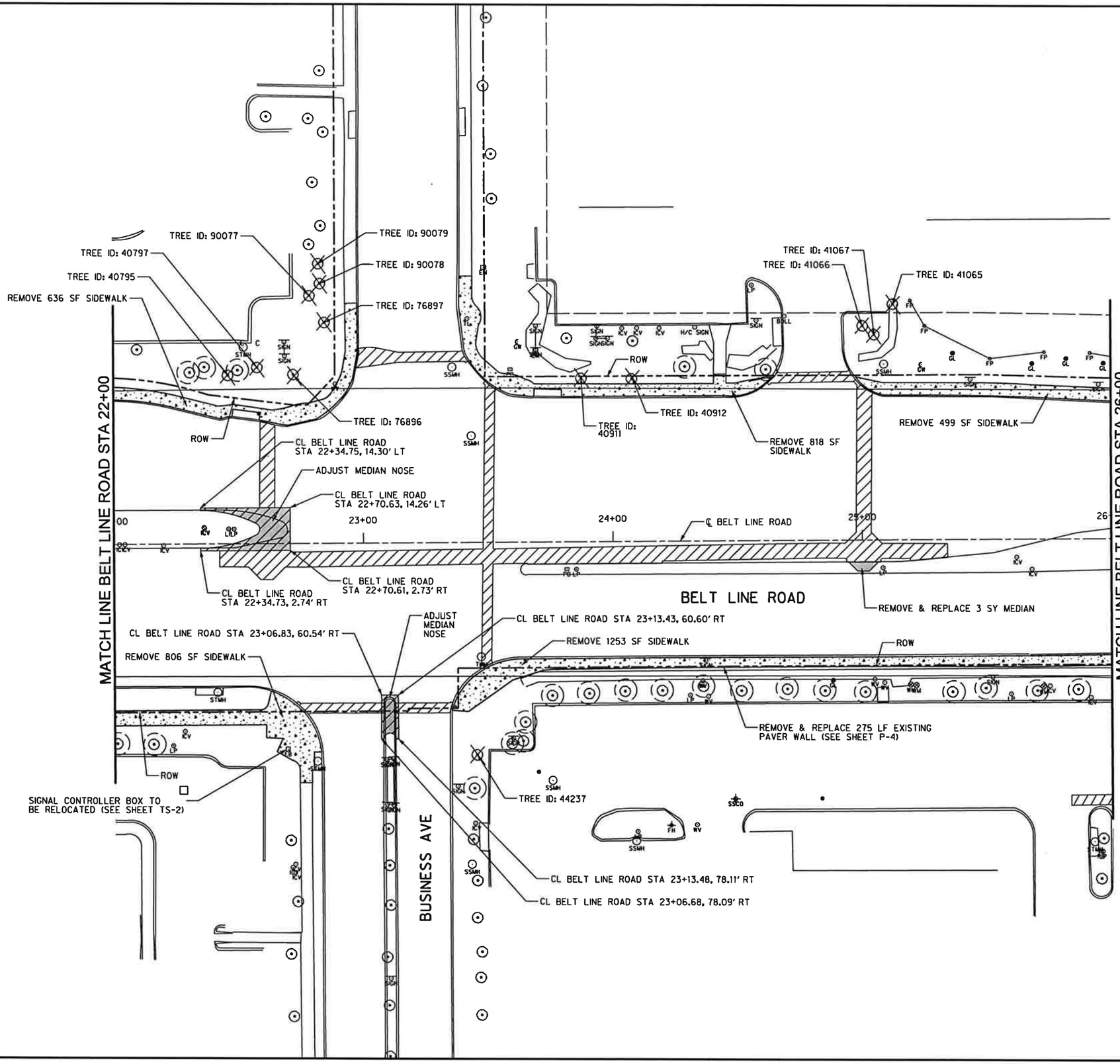
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

REMOVAL PLAN
BELT LINE RD STA 18+00 TO STA 22+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 REMV 02	RM-3



0 10 20 30 40 60
SCALE IN FEET

N

LEGEND

- CONCRETE MEDIAN/ISLAND TO BE REMOVED & REPLACED (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE SIDEWALK TO BE REMOVED
- CONCRETE PAVEMENT TO BE REMOVED FOR FULL DEPTH REPAIR. (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE MEDIAN / ISLAND TO BE REMOVED FOR FULL DEPTH REPAIR OR MEDIAN ISLAND ADJUSTMENT (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE PAVEMENT TO BE REMOVED
- TREE PROTECTION (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)
- TREE REMOVAL (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)

NOTES:

1. ABANDON ALL OBSOLETE VALVES AND ADJUST ALL WATER AND SANITARY FACILITIES TO GRADE.

2. SIDEWALK REMOVAL TO INCLUDE RAMP REMOVAL AND CURB & GUTTER REPLACEMENT.

3. MEDIAN REMOVAL AND REPLACEMENT TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL AND REPLACEMENT. CONTRACTOR SHALL REPLACE MEDIAN TO EXISTING CONDITION AT NO ADDITIONAL COST.

4. PAVEMENT REMOVAL (FOR OTHER THAN FULL DEPTH REPAIR) TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL.

5. CURB REMOVAL AT PROPOSED RAMPS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

6. CURB AND PAVEMENT REMOVAL ASSOCIATED WITH FULL DEPTH REPAIR OF PAVEMENT IS SUBSIDIARY AND NOT ADDITIONAL BID ITEMS. REMOVAL BEYOND LIMITS SHOWN IS ALSO SUBSIDIARY.

7. CURB & GUTTER REMOVAL ASSOCIATED WITH PROPOSED INLETS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

8. PAVEMENT REPAIR, CURB REMOVAL AND REPLACEMENT AND MEDIAN REMOVAL ASSOCIATED WITH MEDIAN NOSE ADJUSTMENTS ARE SUBSIDIARY AND NOT ADDITIONAL PAY ITEMS.

9. SEE SHEET LP 001 FOR TREE SUMMARY.

10. CONTRACTOR SHALL MAINTAIN EXISTING IRRIGATION IN WORKING ORDER.

STATE OF TEXAS
M.E. ROMANOWSKI
86508
LICENSED PROFESSIONAL ENGINEER

P.E. 10/23/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

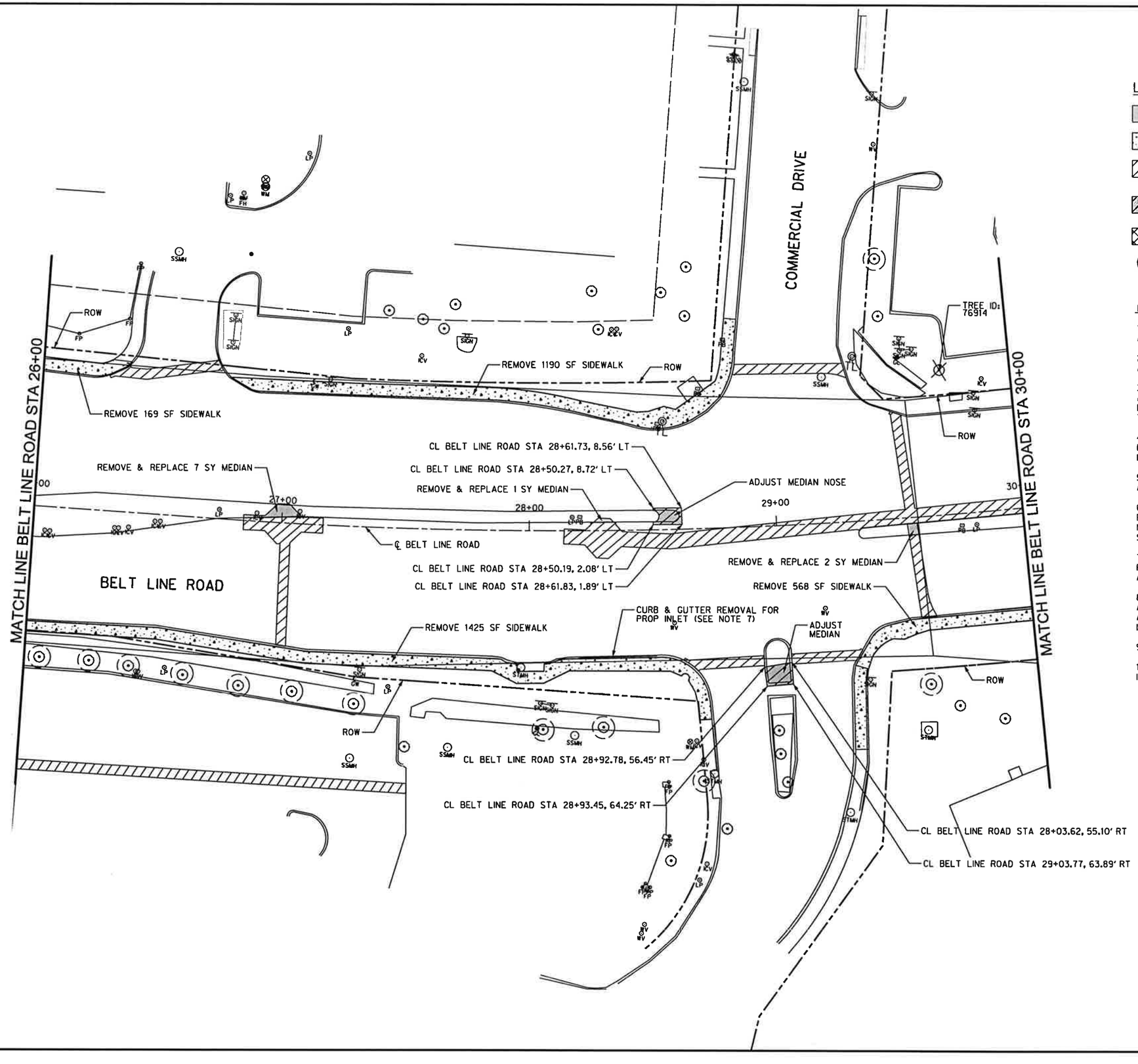
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

REMOVAL PLAN
BELT LINE RD STA 22+00 TO STA 26+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 REMV 04	RM-4



0 10 20 30 40 60
SCALE IN FEET

N

LEGEND

- CONCRETE MEDIAN/ISLAND TO BE REMOVED & REPLACED (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE SIDEWALK TO BE REMOVED
- CONCRETE PAVEMENT TO BE REMOVED FOR FULL DEPTH REPAIR. (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE MEDIAN / ISLAND TO BE REMOVED FOR FULL DEPTH REPAIR OR MEDIAN ISLAND ADJUSTMENT (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE PAVEMENT TO BE REMOVED
- TREE PROTECTION (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)
- TREE REMOVAL (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)

NOTES:

1. ABANDON ALL OBSOLETE VALVES AND ADJUST ALL WATER AND SANITARY FACILITIES TO GRADE.

2. SIDEWALK REMOVAL TO INCLUDE RAMP REMOVAL AND CURB & GUTTER REPLACEMENT.

3. MEDIAN REMOVAL AND REPLACEMENT TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL AND REPLACEMENT. CONTRACTOR SHALL REPLACE MEDIAN TO EXISTING CONDITION AT NO ADDITIONAL COST.

4. PAVEMENT REMOVAL (FOR OTHER THAN FULL DEPTH REPAIR) TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL.

5. CURB REMOVAL AT PROPOSED RAMPS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

6. CURB AND PAVEMENT REMOVAL ASSOCIATED WITH FULL DEPTH REPAIR OF PAVEMENT IS SUBSIDIARY AND NOT ADDITIONAL BID ITEMS. REMOVAL BEYOND LIMITS SHOWN IS ALSO SUBSIDIARY.

7. CURB & GUTTER REMOVAL ASSOCIATED WITH PROPOSED INLETS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

8. PAVEMENT REPAIR, CURB REMOVAL AND REPLACEMENT AND MEDIAN REMOVAL ASSOCIATED WITH MEDIAN NOSE ADJUSTMENTS ARE SUBSIDIARY AND NOT ADDITIONAL PAY ITEMS.

9. SEE SHEET LP 001 FOR TREE SUMMARY.

10. CONTRACTOR SHALL MAINTAIN EXISTING IRRIGATION IN WORKING ORDER.

STATE OF TEXAS
M.E. ROMANOWSKI
56306
REGISTERED
PROFESSIONAL ENGINEER

P.E. 10/23/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

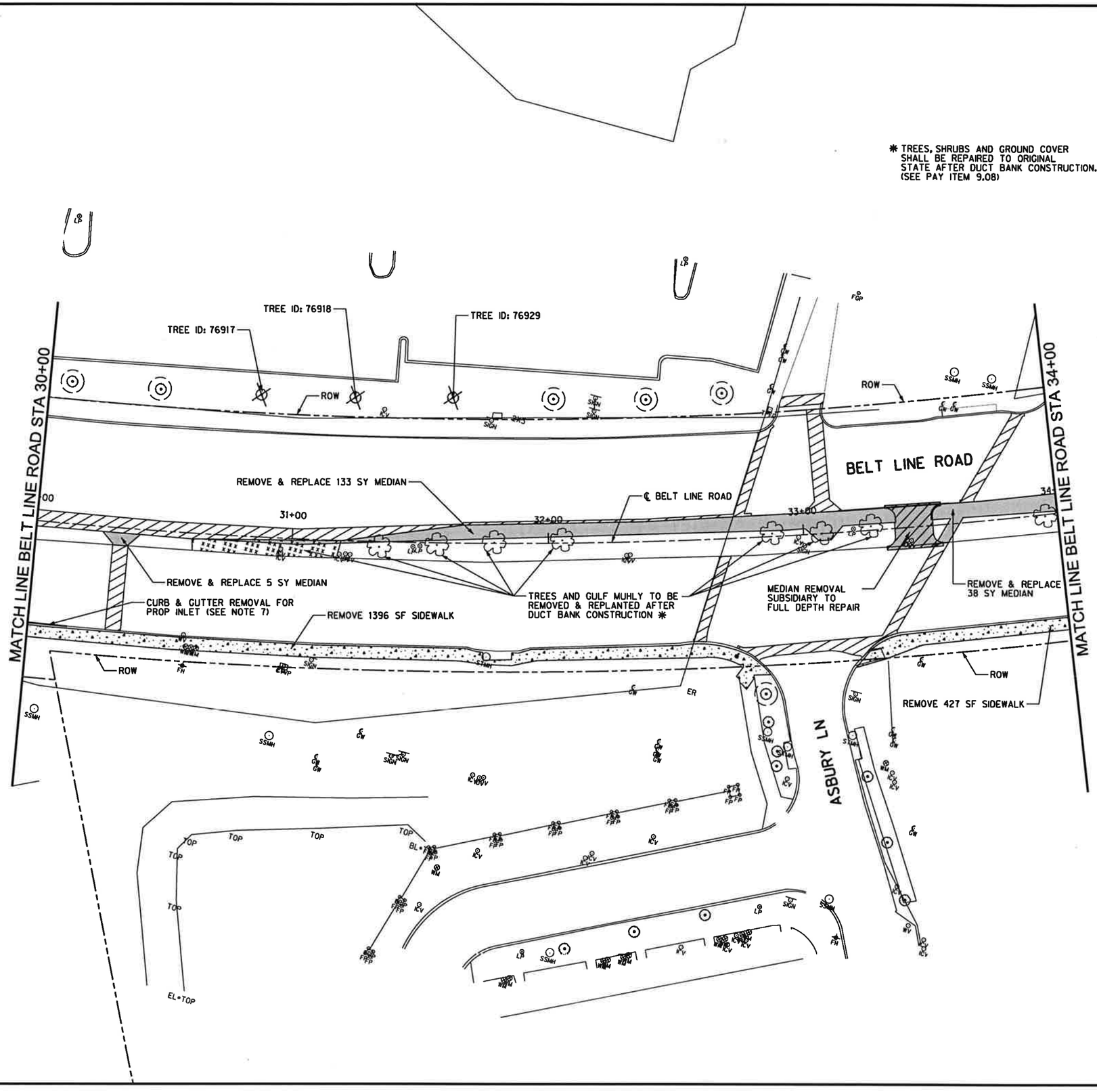
BELT LINE ROAD
UNDERGROUND ELECTRICAL

REMOVAL PLAN
BELT LINE RD STA 26+00 TO STA 30+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 348-6200 FAX (214) 738-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 REMV 05	RM-5

SHEET 26 OF 235



0 10 20 30 40 60
SCALE IN FEET

N

LEGEND

- CONCRETE MEDIAN/ISLAND TO BE REMOVED & REPLACED (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE SIDEWALK TO BE REMOVED
- CONCRETE PAVEMENT TO BE REMOVED FOR FULL DEPTH REPAIR. (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE MEDIAN / ISLAND TO BE REMOVED FOR FULL DEPTH REPAIR OR MEDIAN ISLAND ADJUSTMENT (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE PAVEMENT TO BE REMOVED
- TREE PROTECTION (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)
- TREE REMOVAL (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)

NOTES:

1. ABANDON ALL OBSOLETE VALVES AND ADJUST ALL WATER AND SANITARY FACILITIES TO GRADE.
2. SIDEWALK REMOVAL TO INCLUDE RAMP REMOVAL AND CURB & GUTTER REPLACEMENT.
3. MEDIAN REMOVAL AND REPLACEMENT TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL AND REPLACEMENT. CONTRACTOR SHALL REPLACE MEDIAN TO EXISTING CONDITION AT NO ADDITIONAL COST.
4. PAVEMENT REMOVAL (FOR OTHER THAN FULL DEPTH REPAIR) TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL.
5. CURB REMOVAL AT PROPOSED RAMPS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.
6. CURB AND PAVEMENT REMOVAL ASSOCIATED WITH FULL DEPTH REPAIR OF PAVEMENT IS SUBSIDIARY AND NOT ADDITIONAL BID ITEMS. REMOVAL BEYOND LIMITS SHOWN IS ALSO SUBSIDIARY.
7. CURB & GUTTER REMOVAL ASSOCIATED WITH PROPOSED INLETS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.
8. PAVEMENT REPAIR, CURB REMOVAL AND REPLACEMENT AND MEDIAN REMOVAL ASSOCIATED WITH MEDIAN NOSE ADJUSTMENTS ARE SUBSIDIARY AND NOT ADDITIONAL PAY ITEMS.
9. SEE SHEET LP 001 FOR TREE SUMMARY.
10. CONTRACTOR SHALL MAINTAIN EXISTING IRRIGATION IN WORKING ORDER.

STATE OF TEXAS
M.E. ROMANOWSKI
56306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 11/8/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

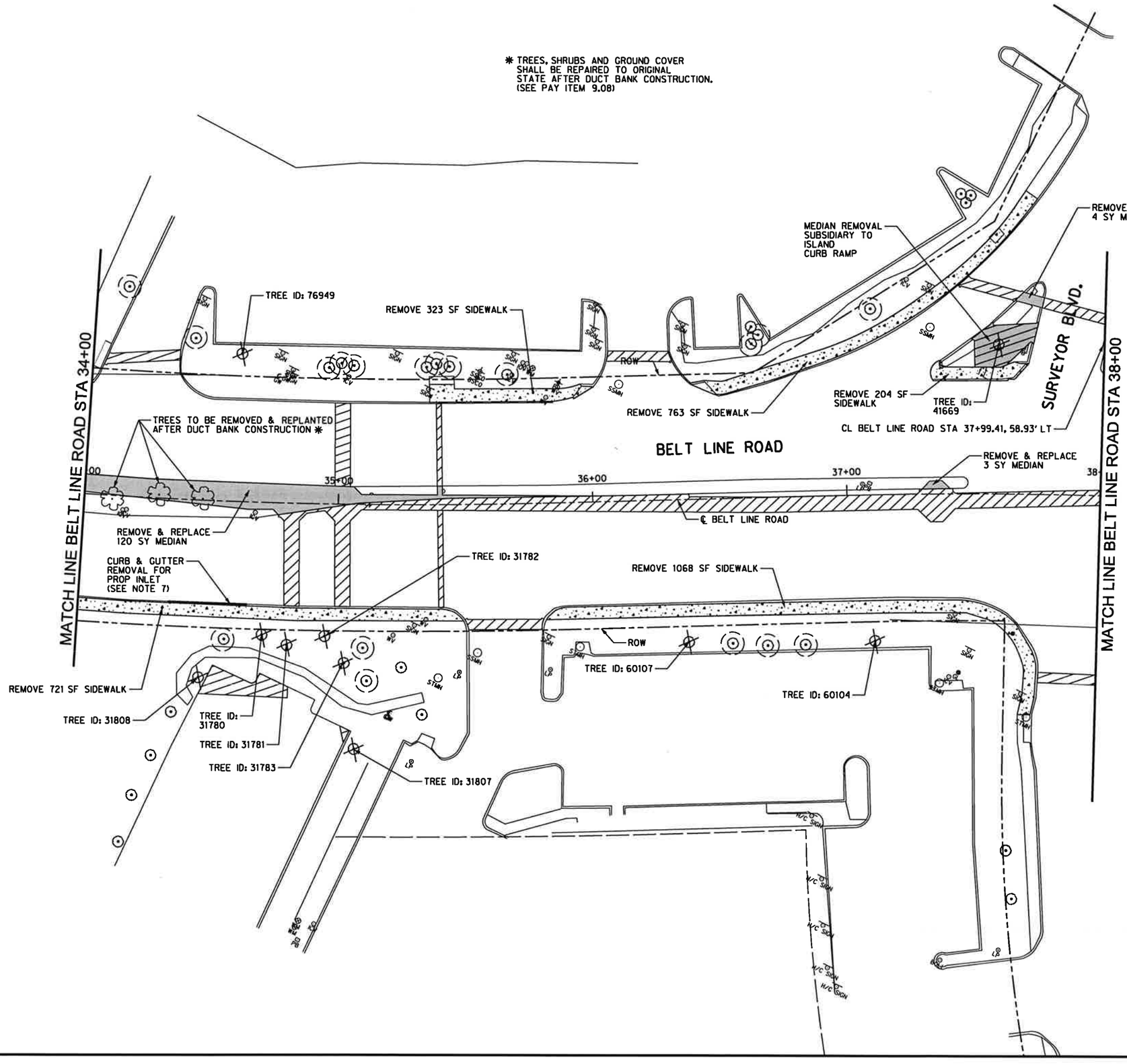
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

REMOVAL PLAN
BELT LINE RD STA 30+00 TO STA 34+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2276
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 REMV 06	RM-6



0 10 20 30 40 60
SCALE IN FEET

N

LEGEND

- CONCRETE MEDIAN/ISLAND TO BE REMOVED & REPLACED (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE SIDEWALK TO BE REMOVED
- CONCRETE PAVEMENT TO BE REMOVED FOR FULL DEPTH REPAIR. (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE MEDIAN / ISLAND TO BE REMOVED FOR FULL DEPTH REPAIR OR MEDIAN ISLAND ADJUSTMENT (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE PAVEMENT TO BE REMOVED
- TREE PROTECTION (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)
- TREE REMOVAL (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)

NOTES:

1. ABANDON ALL OBSOLETE VALVES AND ADJUST ALL WATER AND SANITARY FACILITIES TO GRADE.

2. SIDEWALK REMOVAL TO INCLUDE RAMP REMOVAL AND CURB & GUTTER REPLACEMENT.

3. MEDIAN REMOVAL AND REPLACEMENT TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL AND REPLACEMENT. CONTRACTOR SHALL REPLACE MEDIAN TO EXISTING CONDITION AT NO ADDITIONAL COST.

4. PAVEMENT REMOVAL (FOR OTHER THAN FULL DEPTH REPAIR) TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL.

5. CURB REMOVAL AT PROPOSED RAMPS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

6. CURB AND PAVEMENT REMOVAL ASSOCIATED WITH FULL DEPTH REPAIR OF PAVEMENT IS SUBSIDIARY AND NOT ADDITIONAL BID ITEMS. REMOVAL BEYOND LIMITS SHOWN IS ALSO SUBSIDIARY.

7. CURB & GUTTER REMOVAL ASSOCIATED WITH PROPOSED INLETS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

8. PAVEMENT REPAIR, CURB REMOVAL AND REPLACEMENT AND MEDIAN REMOVAL ASSOCIATED WITH MEDIAN NOSE ADJUSTMENTS ARE SUBSIDIARY AND NOT ADDITIONAL PAY ITEMS.

9. SEE SHEET LP 001 FOR TREE SUMMARY.

10. CONTRACTOR SHALL MAINTAIN EXISTING IRRIGATION IN WORKING ORDER.

STATE OF TEXAS
W.E. ROMANOWSKI
56306
LICENSED
PROFESSIONAL ENGINEER

11/6/13
Signature of Registrant, P.E. Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

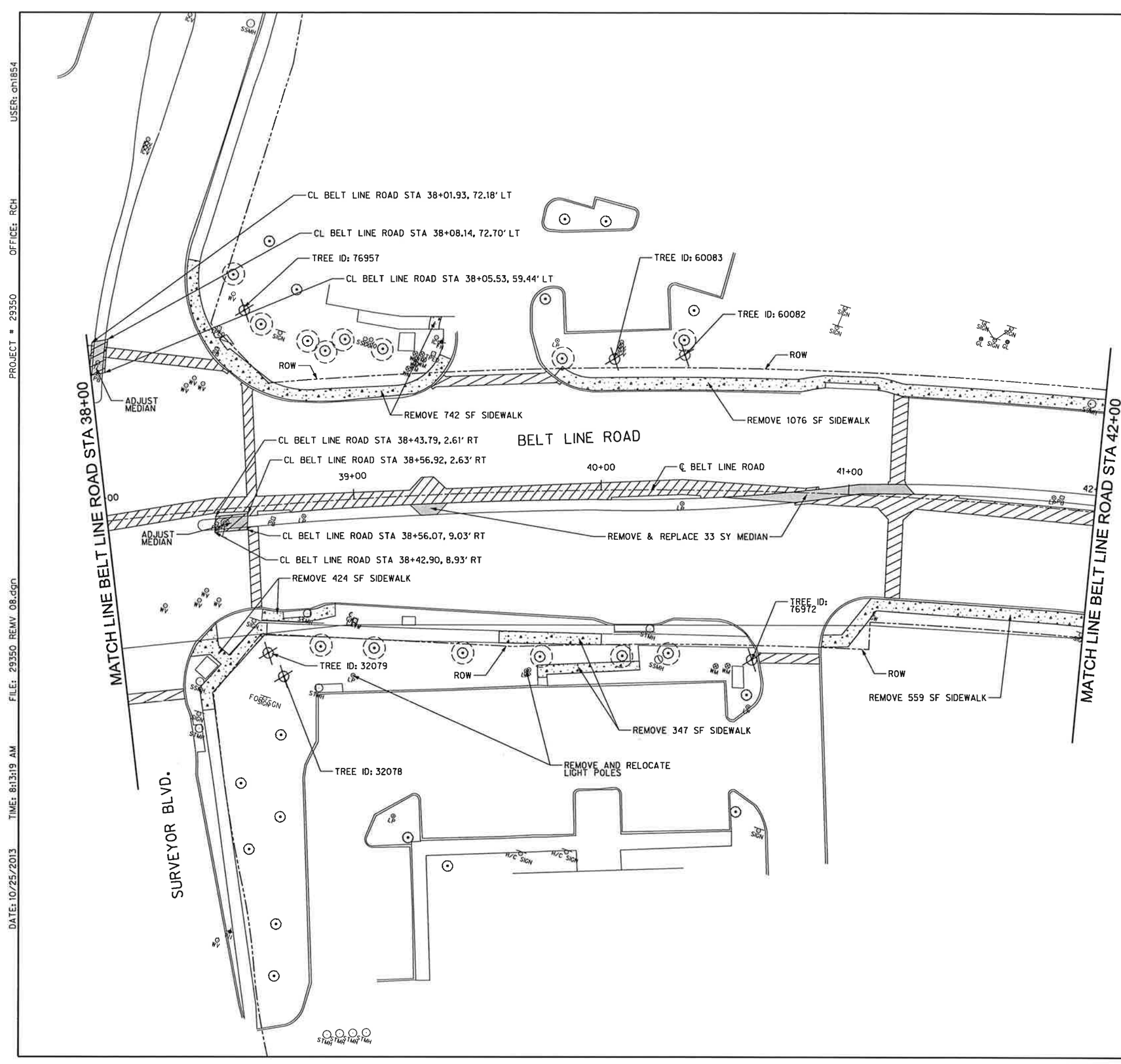
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

REMOVAL PLAN
BELT LINE RD STA 34+00 TO STA 38+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 REMV 07	RM-7



0 10 20 30 40 60
SCALE IN FEET

N

LEGEND

- CONCRETE MEDIAN/ISLAND TO BE REMOVED & REPLACED (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE SIDEWALK TO BE REMOVED
- CONCRETE PAVEMENT TO BE REMOVED FOR FULL DEPTH REPAIR. (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE MEDIAN / ISLAND TO BE REMOVED FOR FULL DEPTH REPAIR OR MEDIAN ISLAND ADJUSTMENT (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE PAVEMENT TO BE REMOVED
- TREE PROTECTION (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)
- TREE REMOVAL (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)

NOTES:

1. ABANDON ALL OBSOLETE VALVES AND ADJUST ALL WATER AND SANITARY FACILITIES TO GRADE.

2. SIDEWALK REMOVAL TO INCLUDE RAMP REMOVAL AND CURB & GUTTER REPLACEMENT.

3. MEDIAN REMOVAL AND REPLACEMENT TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL AND REPLACEMENT. CONTRACTOR SHALL REPLACE MEDIAN TO EXISTING CONDITION AT NO ADDITIONAL COST.

4. PAVEMENT REMOVAL (FOR OTHER THAN FULL DEPTH REPAIR) TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL.

5. CURB REMOVAL AT PROPOSED RAMPS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

6. CURB AND PAVEMENT REMOVAL ASSOCIATED WITH FULL DEPTH REPAIR OF PAVEMENT IS SUBSIDIARY AND NOT ADDITIONAL BID ITEMS. REMOVAL BEYOND LIMITS SHOWN IS ALSO SUBSIDIARY.

7. CURB & GUTTER REMOVAL ASSOCIATED WITH PROPOSED INLETS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

8. PAVEMENT REPAIR, CURB REMOVAL AND REPLACEMENT AND MEDIAN REMOVAL ASSOCIATED WITH MEDIAN NOSE ADJUSTMENTS ARE SUBSIDIARY AND NOT ADDITIONAL PAY ITEMS.

9. SEE SHEET LP 001 FOR TREE SUMMARY.

10. CONTRACTOR SHALL MAINTAIN EXISTING IRRIGATION IN WORKING ORDER.

STATE OF TEXAS
M.E. ROMANOWSKI
56306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant ,P.E. Date 10/23/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

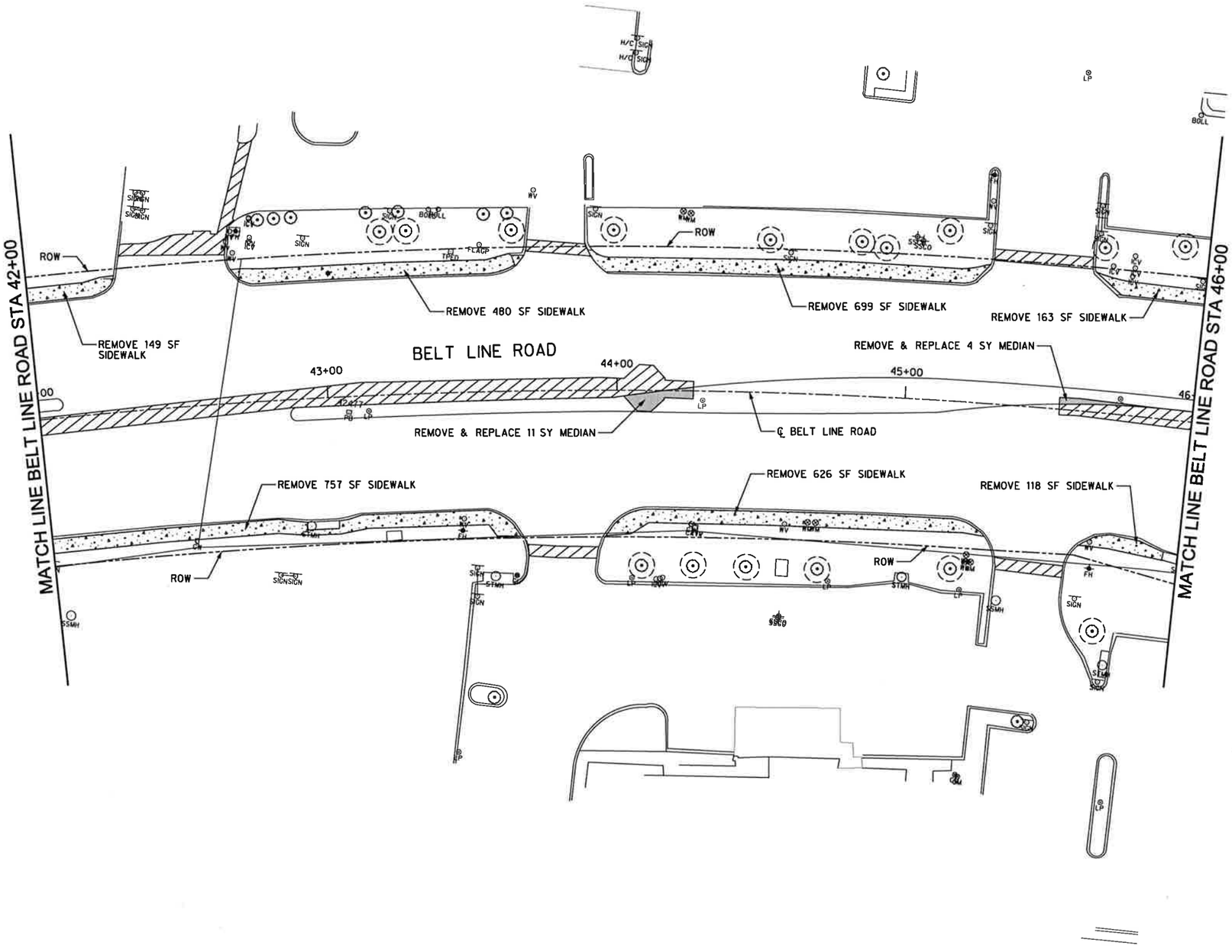
REMOVAL PLAN
BELT LINE RD STA 38+00 TO STA 42+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 REMV 08	RM-8

SHEET 29 OF 235

DATE: 10/25/2013 TIME: 8:13:19 AM FILE: 29350 REMV 08.dgn PROJECT # 29350 OFFICE: RCH USER: dn1854



0 10 20 30 40 60
SCALE IN FEET

N

LEGEND

- CONCRETE MEDIAN/ISLAND TO BE REMOVED & REPLACED (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE SIDEWALK TO BE REMOVED
- CONCRETE PAVEMENT TO BE REMOVED FOR FULL DEPTH REPAIR. (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE MEDIAN / ISLAND TO BE REMOVED FOR FULL DEPTH REPAIR OR MEDIAN ISLAND ADJUSTMENT (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE PAVEMENT TO BE REMOVED
- TREE PROTECTION (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)
- TREE REMOVAL (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)

NOTES:

1. ABANDON ALL OBSOLETE VALVES AND ADJUST ALL WATER AND SANITARY FACILITIES TO GRADE.

2. SIDEWALK REMOVAL TO INCLUDE RAMP REMOVAL AND CURB & GUTTER REPLACEMENT.

3. MEDIAN REMOVAL AND REPLACEMENT TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL AND REPLACEMENT. CONTRACTOR SHALL REPLACE MEDIAN TO EXISTING CONDITION AT NO ADDITIONAL COST.

4. PAVEMENT REMOVAL (FOR OTHER THAN FULL DEPTH REPAIR) TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL.

5. CURB REMOVAL AT PROPOSED RAMPS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

6. CURB AND PAVEMENT REMOVAL ASSOCIATED WITH FULL DEPTH REPAIR OF PAVEMENT IS SUBSIDIARY AND NOT ADDITIONAL BID ITEMS. REMOVAL BEYOND LIMITS SHOWN IS ALSO SUBSIDIARY.

7. CURB & GUTTER REMOVAL ASSOCIATED WITH PROPOSED INLETS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

8. PAVEMENT REPAIR, CURB REMOVAL AND REPLACEMENT AND MEDIAN REMOVAL ASSOCIATED WITH MEDIAN NOSE ADJUSTMENTS ARE SUBSIDIARY AND NOT ADDITIONAL PAY ITEMS.

9. SEE SHEET LP 001 FOR TREE SUMMARY.

10. CONTRACTOR SHALL MAINTAIN EXISTING IRRIGATION IN WORKING ORDER.

STATE OF TEXAS
M.S. ROMANOWSKI
56306
LICENSED
PROFESSIONAL ENGINEER

, P.E. 11/8/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

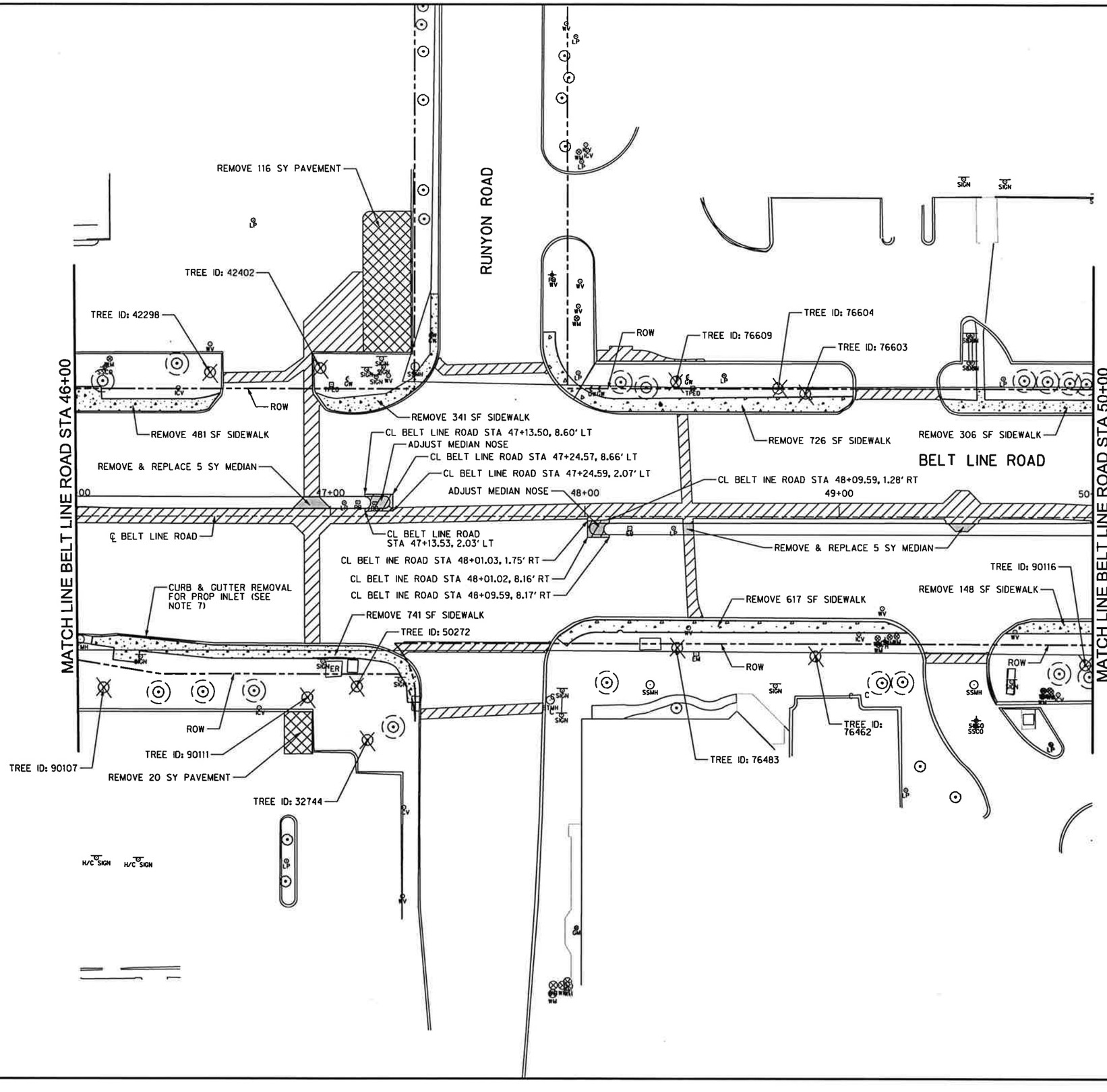
BELT LINE ROAD
UNDERGROUND ELECTRICAL

REMOVAL PLAN
BELT LINE RD STA 42+00 TO STA 46+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 REMV 09	RM-9

SHEET 30 OF 235



0 10 20 30 40 60
SCALE IN FEET

N

LEGEND

- CONCRETE MEDIAN/ISLAND TO BE REMOVED & REPLACED (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE SIDEWALK TO BE REMOVED
- CONCRETE PAVEMENT TO BE REMOVED FOR FULL DEPTH REPAIR. (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE MEDIAN / ISLAND TO BE REMOVED FOR FULL DEPTH REPAIR OR MEDIAN ISLAND ADJUSTMENT (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE PAVEMENT TO BE REMOVED
- TREE PROTECTION (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)
- TREE REMOVAL (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)

NOTES:

1. ABANDON ALL OBSOLETE VALVES AND ADJUST ALL WATER AND SANITARY FACILITIES TO GRADE.

2. SIDEWALK REMOVAL TO INCLUDE RAMP REMOVAL AND CURB & GUTTER REPLACEMENT.

3. MEDIAN REMOVAL AND REPLACEMENT TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL AND REPLACEMENT. CONTRACTOR SHALL REPLACE MEDIAN TO EXISTING CONDITION AT NO ADDITIONAL COST.

4. PAVEMENT REMOVAL (FOR OTHER THAN FULL DEPTH REPAIR) TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL.

5. CURB REMOVAL AT PROPOSED RAMPS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

6. CURB AND PAVEMENT REMOVAL ASSOCIATED WITH FULL DEPTH REPAIR OF PAVEMENT IS SUBSIDIARY AND NOT ADDITIONAL BID ITEMS. REMOVAL BEYOND LIMITS SHOWN IS ALSO SUBSIDIARY.

7. CURB & GUTTER REMOVAL ASSOCIATED WITH PROPOSED INLETS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

8. PAVEMENT REPAIR, CURB REMOVAL AND REPLACEMENT AND MEDIAN REMOVAL ASSOCIATED WITH MEDIAN NOSE ADJUSTMENTS ARE SUBSIDIARY AND NOT ADDITIONAL PAY ITEMS.

9. SEE SHEET LP 001 FOR TREE SUMMARY.

10. CONTRACTOR SHALL MAINTAIN EXISTING IRRIGATION IN WORKING ORDER.

STATE OF TEXAS
M.E. ROMANOWSKI
94308
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant , P.E. 10/23/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

REMOVAL PLAN
BELT LINE RD STA 46+00 TO STA 50+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 738-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 REMV 10	RM-10

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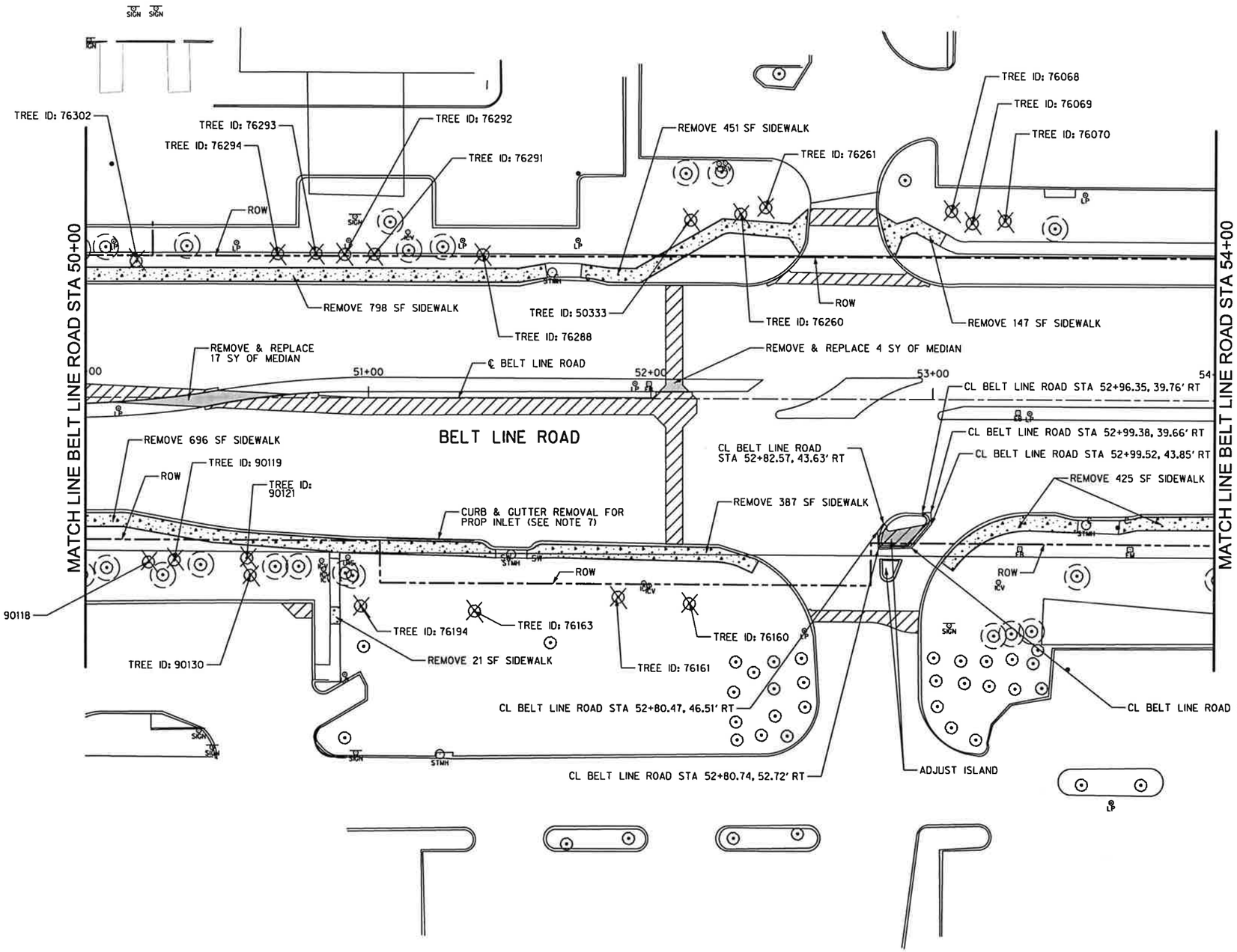
OFFICE: RCH
PROJECT # 29350
FILE: 29350 REMV 10.dgn
TIME: 4:35:44 PM
DATE: 10/24/2013



0 10 20 30 40 60
SCALE IN FEET

N

LEGEND

- CONCRETE MEDIAN/ISLAND TO BE REMOVED & REPLACED (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE SIDEWALK TO BE REMOVED
- CONCRETE PAVEMENT TO BE REMOVED FOR FULL DEPTH REPAIR. (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE MEDIAN / ISLAND TO BE REMOVED FOR FULL DEPTH REPAIR OR MEDIAN ISLAND ADJUSTMENT (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE PAVEMENT TO BE REMOVED
- TREE PROTECTION (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)
- TREE REMOVAL (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)

NOTES:

1. ABANDON ALL OBSOLETE VALVES AND ADJUST ALL WATER AND SANITARY FACILITIES TO GRADE.

2. SIDEWALK REMOVAL TO INCLUDE RAMP REMOVAL AND CURB & GUTTER REPLACEMENT.

3. MEDIAN REMOVAL AND REPLACEMENT TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL AND REPLACEMENT. CONTRACTOR SHALL REPLACE MEDIAN TO EXISTING CONDITION AT NO ADDITIONAL COST.

4. PAVEMENT REMOVAL (FOR OTHER THAN FULL DEPTH REPAIR) TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL.

5. CURB REMOVAL AT PROPOSED RAMPS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

6. CURB AND PAVEMENT REMOVAL ASSOCIATED WITH FULL DEPTH REPAIR OF PAVEMENT IS SUBSIDIARY AND NOT ADDITIONAL BID ITEMS. REMOVAL BEYOND LIMITS SHOWN IS ALSO SUBSIDIARY.

7. CURB & GUTTER REMOVAL ASSOCIATED WITH PROPOSED INLETS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

8. PAVEMENT REPAIR, CURB REMOVAL AND REPLACEMENT AND MEDIAN REMOVAL ASSOCIATED WITH MEDIAN NOSE ADJUSTMENTS ARE SUBSIDIARY AND NOT ADDITIONAL PAY ITEMS.

9. SEE SHEET LP 001 FOR TREE SUMMARY.

10. CONTRACTOR SHALL MAINTAIN EXISTING IRRIGATION IN WORKING ORDER.

SHEET 32 OF 235

STATE OF TEXAS
M.E. ROMANOWSKI
56306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10/23/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

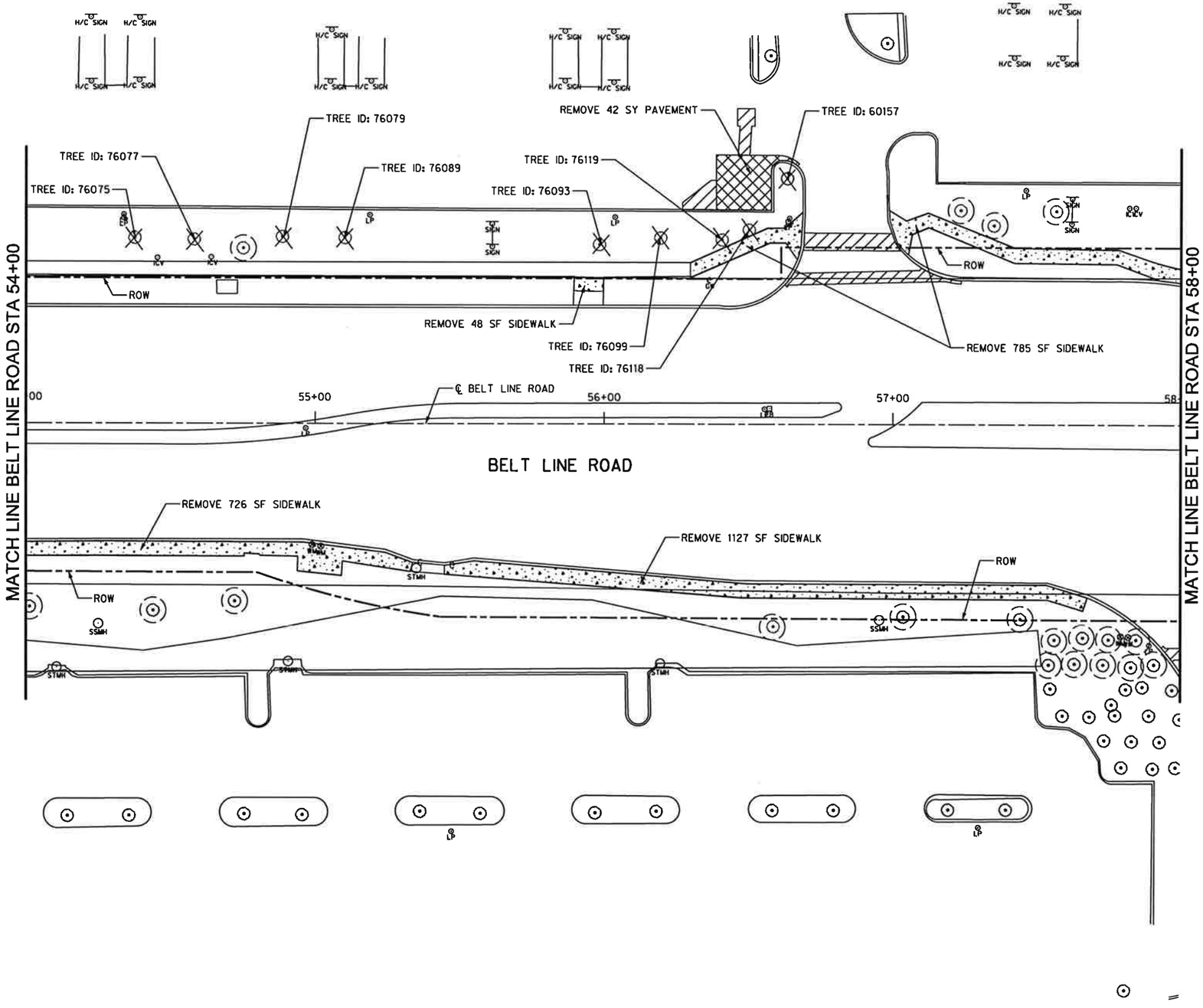
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

REMOVAL PLAN
BELT LINE RD STA 50+00 TO STA 54+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 REMV 11	RM-11



0 10 20 30 40 60
SCALE IN FEET

N

LEGEND

- CONCRETE MEDIAN/ISLAND TO BE REMOVED & REPLACED (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE SIDEWALK TO BE REMOVED
- CONCRETE PAVEMENT TO BE REMOVED FOR FULL DEPTH REPAIR. (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE MEDIAN / ISLAND TO BE REMOVED FOR FULL DEPTH REPAIR OR MEDIAN ISLAND ADJUSTMENT (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE PAVEMENT TO BE REMOVED
- TREE PROTECTION (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)
- TREE REMOVAL (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)

NOTES:

1. ABANDON ALL OBSOLETE VALVES AND ADJUST ALL WATER AND SANITARY FACILITIES TO GRADE.

2. SIDEWALK REMOVAL TO INCLUDE RAMP REMOVAL AND CURB & GUTTER REPLACEMENT.

3. MEDIAN REMOVAL AND REPLACEMENT TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL AND REPLACEMENT. CONTRACTOR SHALL REPLACE MEDIAN TO EXISTING CONDITION AT NO ADDITIONAL COST.

4. PAVEMENT REMOVAL (FOR OTHER THAN FULL DEPTH REPAIR) TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL.

5. CURB REMOVAL AT PROPOSED RAMPS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

6. CURB AND PAVEMENT REMOVAL ASSOCIATED WITH FULL DEPTH REPAIR OF PAVEMENT IS SUBSIDIARY AND NOT ADDITIONAL BID ITEMS. REMOVAL BEYOND LIMITS SHOWN IS ALSO SUBSIDIARY.

7. CURB & GUTTER REMOVAL ASSOCIATED WITH PROPOSED INLETS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

8. PAVEMENT REPAIR, CURB REMOVAL AND REPLACEMENT AND MEDIAN REMOVAL ASSOCIATED WITH MEDIAN NOSE ADJUSTMENTS ARE SUBSIDIARY AND NOT ADDITIONAL PAY ITEMS.

9. SEE SHEET LP 001 FOR TREE SUMMARY.

10. CONTRACTOR SHALL MAINTAIN EXISTING IRRIGATION IN WORKING ORDER.

STATE OF TEXAS M.E. ROMANOWSKI 56306 LICENSED PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10/23/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

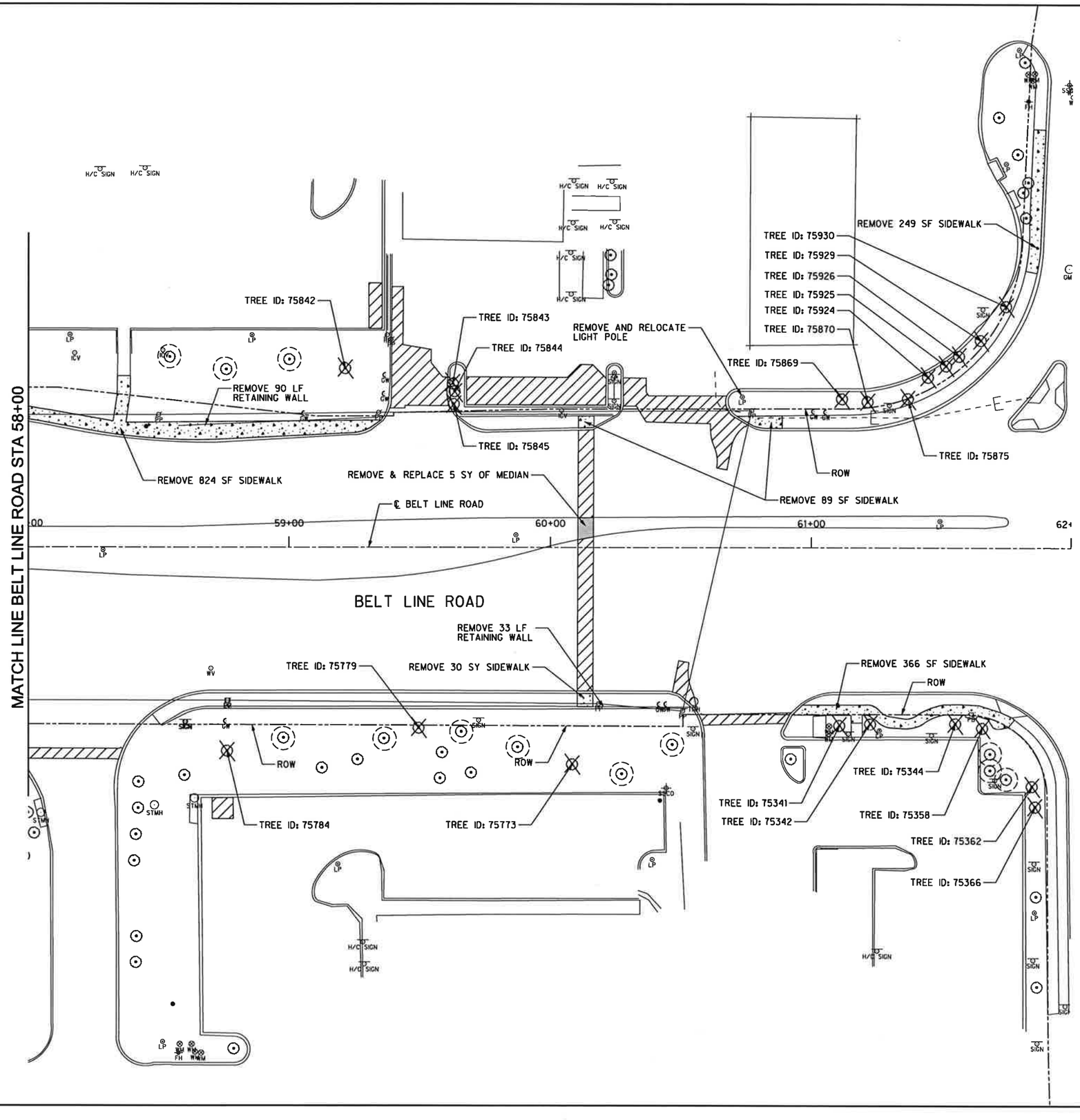
Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

REMOVAL PLAN
BELT LINE RD STA 54+00 TO STA 58+00

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 REMV 12	RM-12



0 10 20 30 40 60
SCALE IN FEET

N

LEGEND

- CONCRETE MEDIAN/ISLAND TO BE REMOVED & REPLACED (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE SIDEWALK TO BE REMOVED
- CONCRETE PAVEMENT TO BE REMOVED FOR FULL DEPTH REPAIR. (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE MEDIAN / ISLAND TO BE REMOVED FOR FULL DEPTH REPAIR OR MEDIAN ISLAND ADJUSTMENT (SEE PAVING PLANS - SHEETS P-1 TO P-13)
- CONCRETE PAVEMENT TO BE REMOVED
- TREE PROTECTION (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)
- TREE REMOVAL (SEE REMOVAL DETAIL SHEET - SHEET DT-RD)

NOTES:

1. ABANDON ALL OBSOLETE VALVES AND ADJUST ALL WATER AND SANITARY FACILITIES TO GRADE.

2. SIDEWALK REMOVAL TO INCLUDE RAMP REMOVAL AND CURB & GUTTER REPLACEMENT.

3. MEDIAN REMOVAL AND REPLACEMENT TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL AND REPLACEMENT. CONTRACTOR SHALL REPLACE MEDIAN TO EXISTING CONDITION AT NO ADDITIONAL COST.

4. PAVEMENT REMOVAL (FOR OTHER THAN FULL DEPTH REPAIR) TO INCLUDE ANY ASSOCIATED CURB & GUTTER REMOVAL.

5. CURB REMOVAL AT PROPOSED RAMPS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

6. CURB AND PAVEMENT REMOVAL ASSOCIATED WITH FULL DEPTH REPAIR OF PAVEMENT IS SUBSIDIARY AND NOT ADDITIONAL BID ITEMS. REMOVAL BEYOND LIMITS SHOWN IS ALSO SUBSIDIARY.

7. CURB & GUTTER REMOVAL ASSOCIATED WITH PROPOSED INLETS IS SUBSIDIARY AND NOT AN ADDITIONAL PAY ITEM.

8. PAVEMENT REPAIR, CURB REMOVAL AND REPLACEMENT AND MEDIAN REMOVAL ASSOCIATED WITH MEDIAN NOSE ADJUSTMENTS ARE SUBSIDIARY AND NOT ADDITIONAL PAY ITEMS.

9. SEE SHEET LP 001 FOR TREE SUMMARY.

10. CONTRACTOR SHALL MAINTAIN EXISTING IRRIGATION IN WORKING ORDER.

STATE OF TEXAS
M.E. ROMANOWSKI
56306
LICENSED
PROFESSIONAL ENGINEER

M.E. Romanowski, P.E. 11/8/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

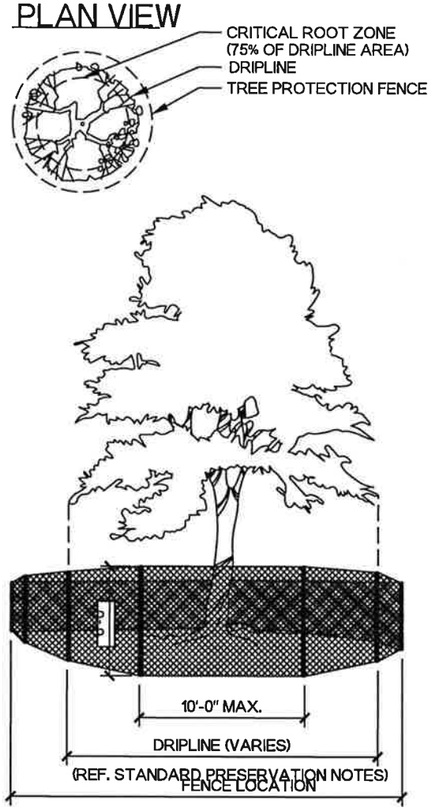
BELT LINE ROAD
UNDERGROUND ELECTRICAL

REMOVAL PLAN
BELT LINE RD STA 58+00 TO STA 62+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 REMV 13	RM-13

PLAN VIEW



01 TREE PROTECTION DETAIL
SCALE: N.T.S.

STANDARD PRESERVATION NOTES FOR
TREE AND NATURAL AREA PROTECTION

1. All trees and natural areas shown on plan to be preserved shall be protected during construction with temporary fencing and other measures as needed which may include retaining walls, pruning of limbs, roots, etc.
2. Protective fences shall be erected according to City Standards for Tree Protection.
3. Protective fences shall be installed prior to the start of any site preparation work (clearing, grubbing or grading), and shall be maintained throughout all phases of the construction project.
4. Erosion and sedimentation control barriers shall be installed or maintained in a manner which does not result in soil build-up within tree drip lines.
5. Protective fences shall surround the trees or group of trees, and will be located no closer than the outermost limit of branches (drip line) plus an additional 2'-0" away from the limits of dripline. For natural areas, protective fences shall follow the Limit of Construction line, in order to prevent the following:
   A. Soil compaction in the root zone area resulting from vehicular traffic or storage of equipment or materials;
   B. Root zone disturbances due to grade changes (greater than 6 inches cut or fill), or trenching not reviewed and authorized by the City Parks Department;
   C. Wounds to exposed roots, trunk or limbs by mechanical equipment;
   D. Other activities detrimental to trees such as chemical storage, cement truck cleaning, and fires.
6. Exceptions to installing fences at tree drip lines may be permitted in the following cases:
   A. Where there is to be an approved grade change, impermeable paving surface, tree well, or other such site development, erect the fence approximately 2 to 4 feet beyond the area disturbed;
   B. Where permeable paving is to be installed within a tree's drip line, erect the fence at the outer limits of the permeable paving area (prior to site grading so that this area is graded separately by hand prior to paving installation to minimized root damage);
   C. Where trees are close to proposed buildings, erect the fence to allow root pruning in the work space between the fence and the building, prior to disturbance. The fence can be erected at the point of root pruning;
   D. Where there are severe space constraints due to tract size, or other special requirements, contact an Arborist to discuss alternatives.

   Special Note: Exceptions are permitted for areas outside the critical root zone. No disturbances are permitted within the critical root zone (75% of the dripline area). For the protection of natural areas, no exceptions to installing fences at the Limit of Construction line will be permitted, and no silting of stock piling of material or dirt is allowed around trees.
7. Where any of the above exceptions result in a fence being closer than 4 feet to a tree trunk, protect the trunk with strapped-on planking to a height of 8 ft. in addition to the reduced fencing provided.
8. Trees approved for removal shall be removed in a manner which does not impact trees to be preserved.
9. Any roots exposed by construction activity shall be pruned flush with the soil. Backfill root areas with good quality top soil as soon as possible. If exposed root areas are not backfilled within 2 days, cover them with organic material in a manner which reduces soil temperature and minimizes water loss due to evaporation.
10. Trenching required for the installation of irrigation shall be placed as far from existing tree trunks as possible.
11. No landscape topsoil dressing greater than 2 inches shall be permitted within the drip line of trees. No soil or mulch is permitted on the root flare of any tree.
12. Limbing & pruning to provide clearance for structures, traffic and equipment shall take place before damage occurs.
13. All finished pruning shall be done according to recognized, approved standards of the industry (Reference the National Arborist Association Pruning Standards for Shade Trees).

STATE OF TEXAS
M.E. ROMANOWSKI
84306
LICENSED
PROFESSIONAL ENGINEER

P.E. 10/23/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

REMOVAL DETAILS

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 DTLS 01	DT-RD

<* 1 DESCRIBE CHAIN BASELINE (℄ BELT LINE ROAD)

Chain BASELINE contains:
18000 18001 CUR C18003-18005 CUR C18007-18009 CUR C18013-18016 CUR C18017-1801-
9 18020 18021 18025 18026 18027 18028

Beginning chain BASELINE description
==========

Point 18000 N 7,034,611.8415 E 2,472,668.3766 Sta 5+00.00

Course from 18000 to 18001 N 89° 37' 21.0000" E Dist 1,077.5000

Point 18001 N 7,034,618.9407 E 2,473,745.8532 Sta 15+77.50

Course from 18001 to PC C18003-18005 N 89° 30' 09.0000" E Dist 1,099.3200

Curve Data

Curve C18003-18005
P.I. Station 31+37.21 N 7,034,632.4836 E 2,475,305.5065
Delta = 27° 06' 16.0000" (LT)
Degree = 2° 59' 59.2045"
Tangent = 460.3920
Length = 903.5480
Radius = 1,910.0000
External = 54.7038
Long Chord = 895.1465
Mid. Ord. = 53.1806
P.C. Station 26+76.82 N 7,034,628.4860 E 2,474,845.1318
P.T. Station 35+80.37 N 7,034,845.7952 E 2,475,713.5003
C.C. N 7,036,538.4140 E 2,474,828.5475
Back = N 89° 30' 09.0000" E
Ahead = N 62° 23' 53.0000" E
Chord Bear = N 75° 57' 01.0000" E

Course from PT C18003-18005 to PC C18007-18009 N 62° 23' 53.0000" E Dist 121.1100

Curve Data

Curve C18007-18009
P.I. Station 41+68.26 N 7,035,118.1801 E 2,476,234.4815
Delta = 27° 27' 55.0000" (RT)
Degree = 2° 59' 58.7522"
Tangent = 466.7802
Length = 915.6150
Radius = 1,910.0800
External = 56.2082
Long Chord = 906.8737
Mid. Ord. = 54.6015
P.C. Station 37+01.48 N 7,034,901.9086 E 2,475,820.8265
P.T. Station 46+17.09 N 7,035,119.2935 E 2,476,701.2604
C.C. N 7,033,209.2189 E 2,476,705.8165
Back = N 62° 23' 53.0000" E
Ahead = N 89° 51' 48.0000" E
Chord Bear = N 76° 07' 50.5000" E

Course from PT C18007-18009 to PC C18013-18016 N 89° 51' 48.0000" E Dist 1,935.3400

Curve Data

Curve C18013-18016
P.I. Station 66+73.44 N 7,035,124.1985 E 2,478,757.6040
Delta = 4° 50' 15.0000" (RT)
Degree = 1° 59' 59.9974"
Tangent = 121.0094
Length = 241.8751
Radius = 2,864.7900
External = 2.5546
Long Chord = 241.8033
Mid. Ord. = 2.5523
P.C. Station 65+52.43 N 7,035,123.9098 E 2,478,636.5949
P.T. Station 67+94.31 N 7,035,114.2814 E 2,478,878.2064
C.C. N 7,032,259.1280 E 2,478,643.4282
Back = N 89° 51' 48.0000" E
Ahead = S 85° 17' 57.0000" E
Chord Bear = S 87° 43' 04.5000" E

==========

Ending chain BASELINE description

STATE OF TEXAS
M.E. ROMANOWSKI
96306
LICENSED
PROFESSIONAL ENGINEER

M. E. Romanowski, P.E. 10/23/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

HORIZONTAL DATA

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 738-0095

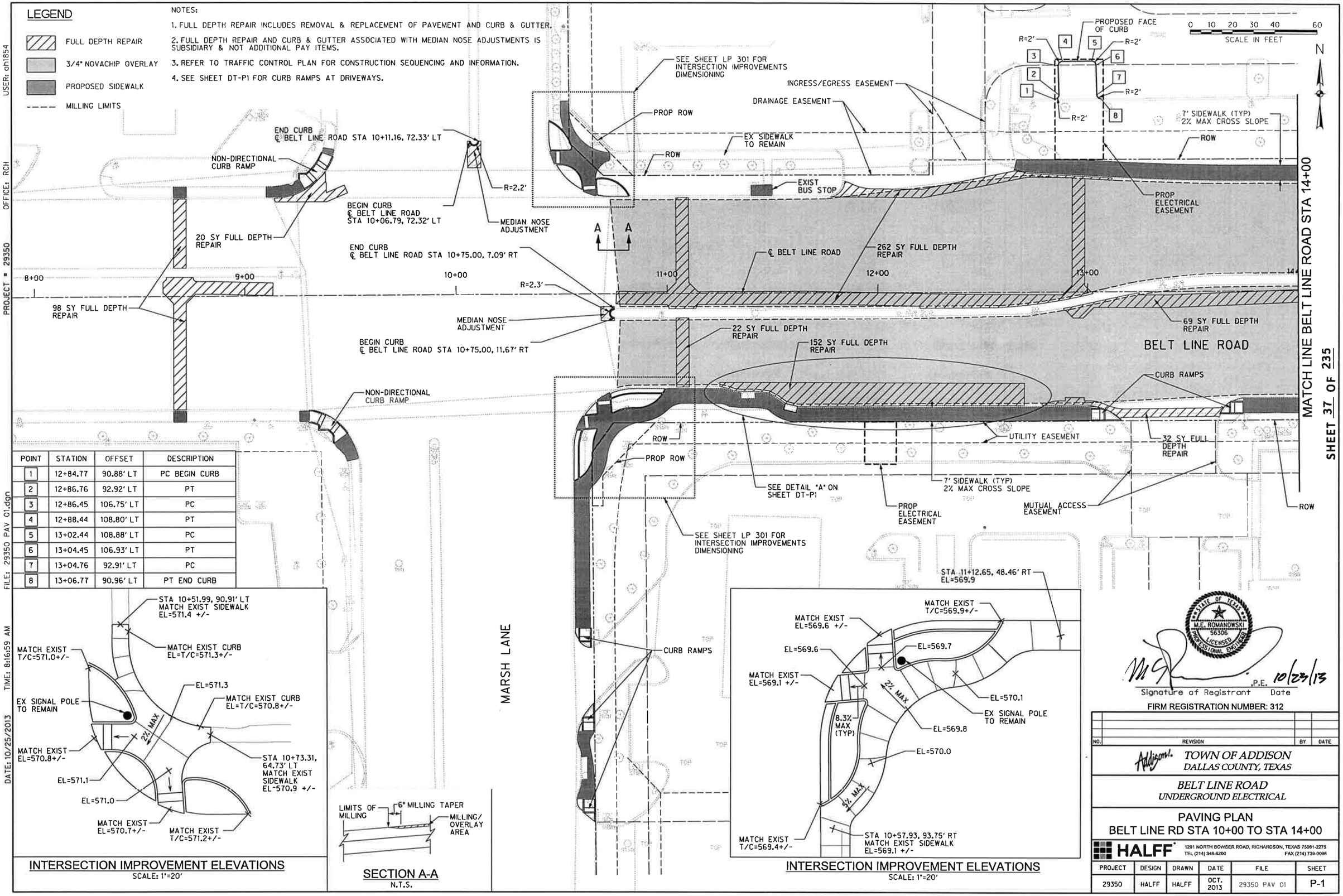
PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 ALGN 01	HD-1

LEGEND

- FULL DEPTH REPAIR
- 3/4" NOVACHIP OVERLAY
- PROPOSED SIDEWALK
- MILLING LIMITS

NOTES:

1. FULL DEPTH REPAIR INCLUDES REMOVAL & REPLACEMENT OF PAVEMENT AND CURB & GUTTER.
2. FULL DEPTH REPAIR AND CURB & GUTTER ASSOCIATED WITH MEDIAN NOSE ADJUSTMENTS IS SUBSIDIARY & NOT ADDITIONAL PAY ITEMS.
3. REFER TO TRAFFIC CONTROL PLAN FOR CONSTRUCTION SEQUENCING AND INFORMATION.
4. SEE SHEET DT-P1 FOR CURB RAMPS AT DRIVEWAYS.



POINT	STATION	OFFSET	DESCRIPTION
1	12+84.77	90.88' LT	PC BEGIN CURB
2	12+86.76	92.92' LT	PT
3	12+86.45	106.75' LT	PC
4	12+88.44	108.80' LT	PT
5	13+02.44	108.88' LT	PC
6	13+04.45	106.93' LT	PT
7	13+04.76	92.91' LT	PC
8	13+06.77	90.96' LT	PT END CURB

INTERSECTION IMPROVEMENT ELEVATIONS
SCALE: 1"=20'

SECTION A-A
N.T.S.

INTERSECTION IMPROVEMENT ELEVATIONS
SCALE: 1"=20'

STATE OF TEXAS
M.E. ROMANOWSKI
56306
LICENSED PROFESSIONAL ENGINEER

Signature of Registrant P.E. Date 10/23/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

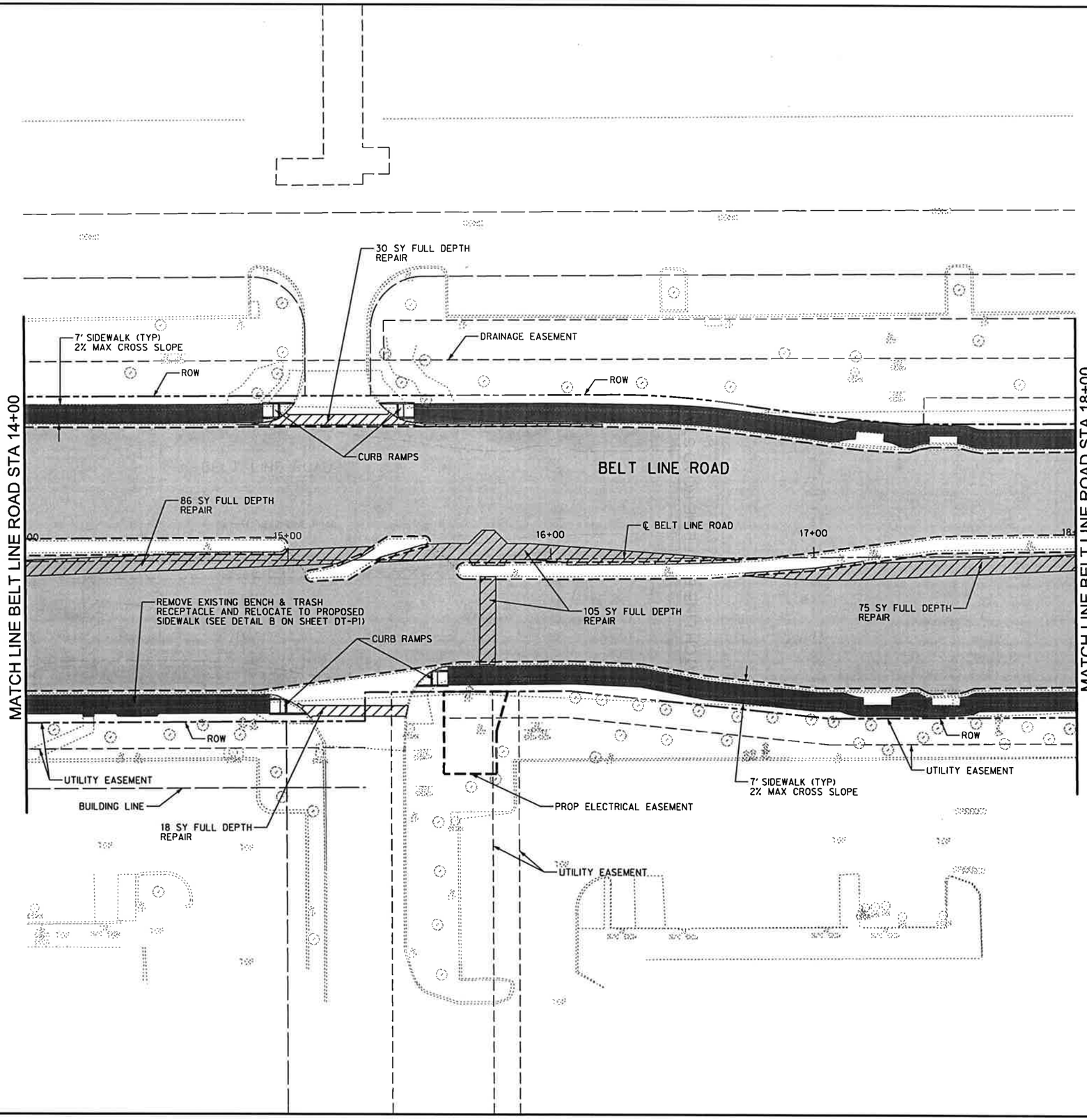
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

PAVING PLAN
BELT LINE RD STA 10+00 TO STA 14+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 PAV 01	P-1



0 10 20 30 40 60
SCALE IN FEET

N

LEGEND

- FULL DEPTH REPAIR
- 3/4" NOVACHIP OVERLAY
- PROPOSED SIDEWALK
- MILLING LIMITS

SHEET 38 OF 235

M.E. ROMANOWSKI 94306 LICENSED PROFESSIONAL ENGINEER

Signature of Registrant P.E. Date 10/23/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

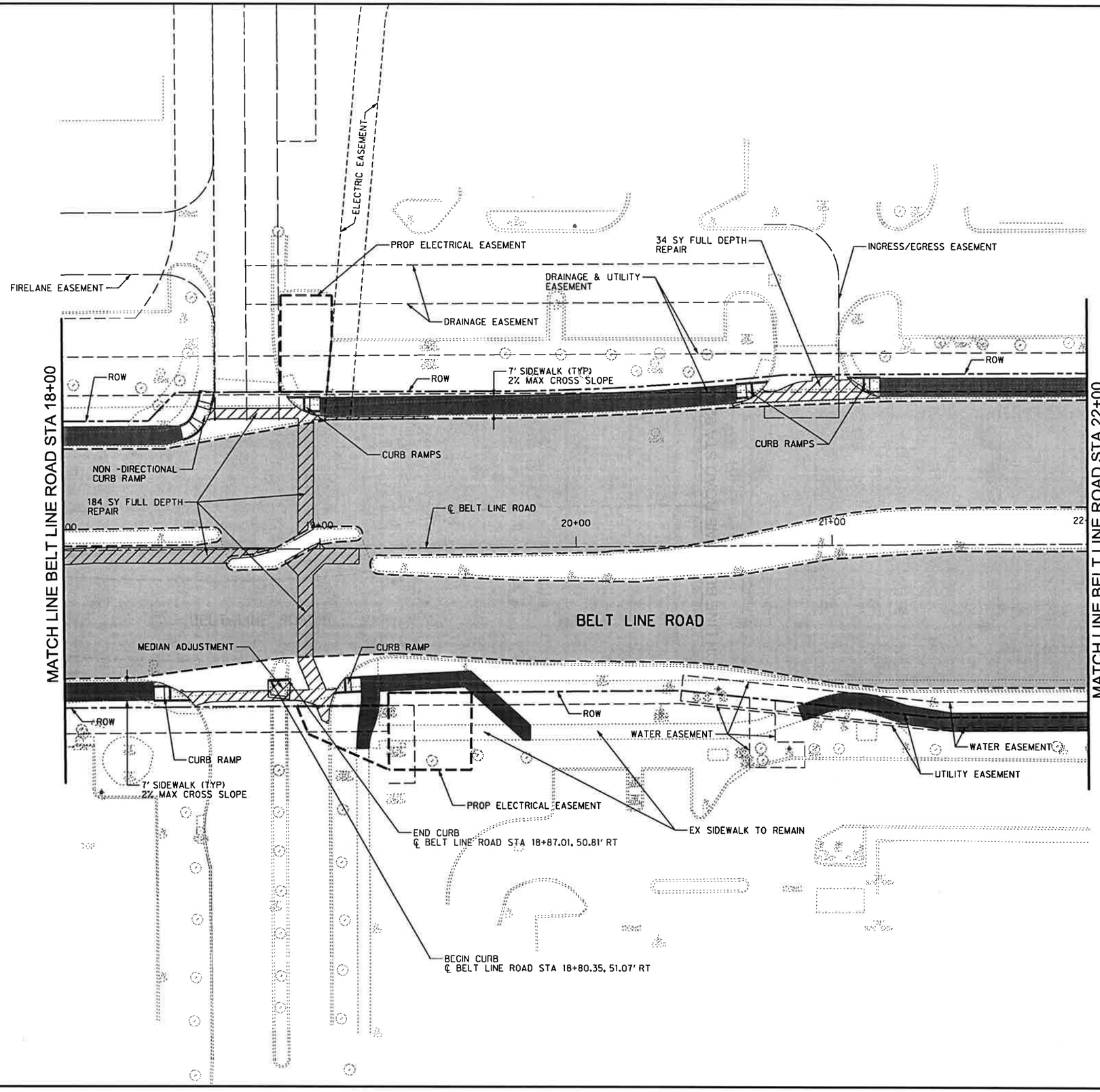
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

PAVING PLAN
BELT LINE RD STA 14+00 TO STA 18+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 PAV 02	P-2



0 10 20 30 40 60
SCALE IN FEET

N

LEGEND

- FULL DEPTH REPAIR
- 3/4" NOVACHIP OVERLAY
- PROPOSED SIDEWALK
- MILLING LIMITS

SHEET 39 OF 235

M.E. ROMANOWSKI 56306 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Signature of Registrant P.E. Date 10/23/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

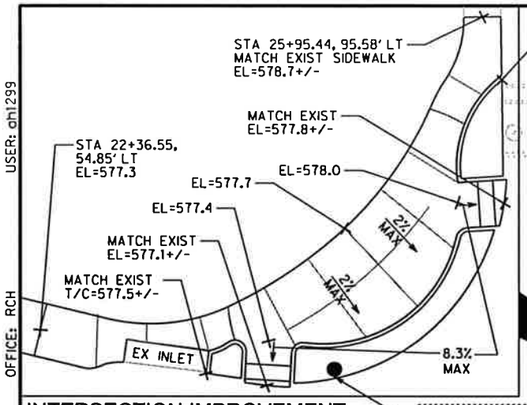
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

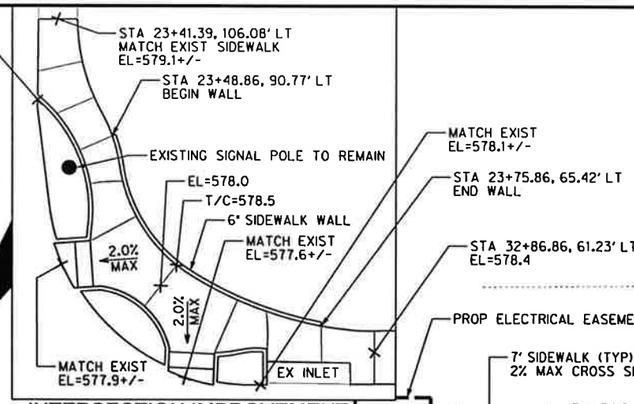
PAVING PLAN
BELT LINE RD STA 18+00 TO STA 22+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

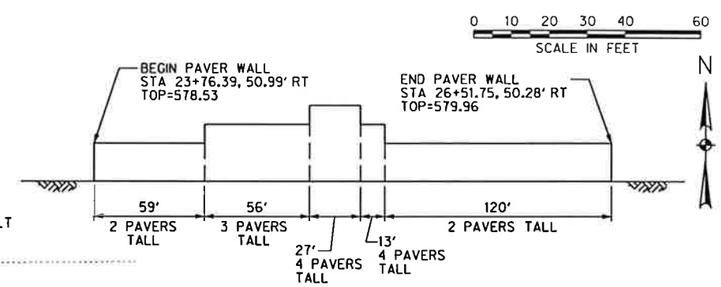
PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 PAV 03	P-3



INTERSECTION IMPROVEMENT ELEVATIONS
SCALE: 1"=20'



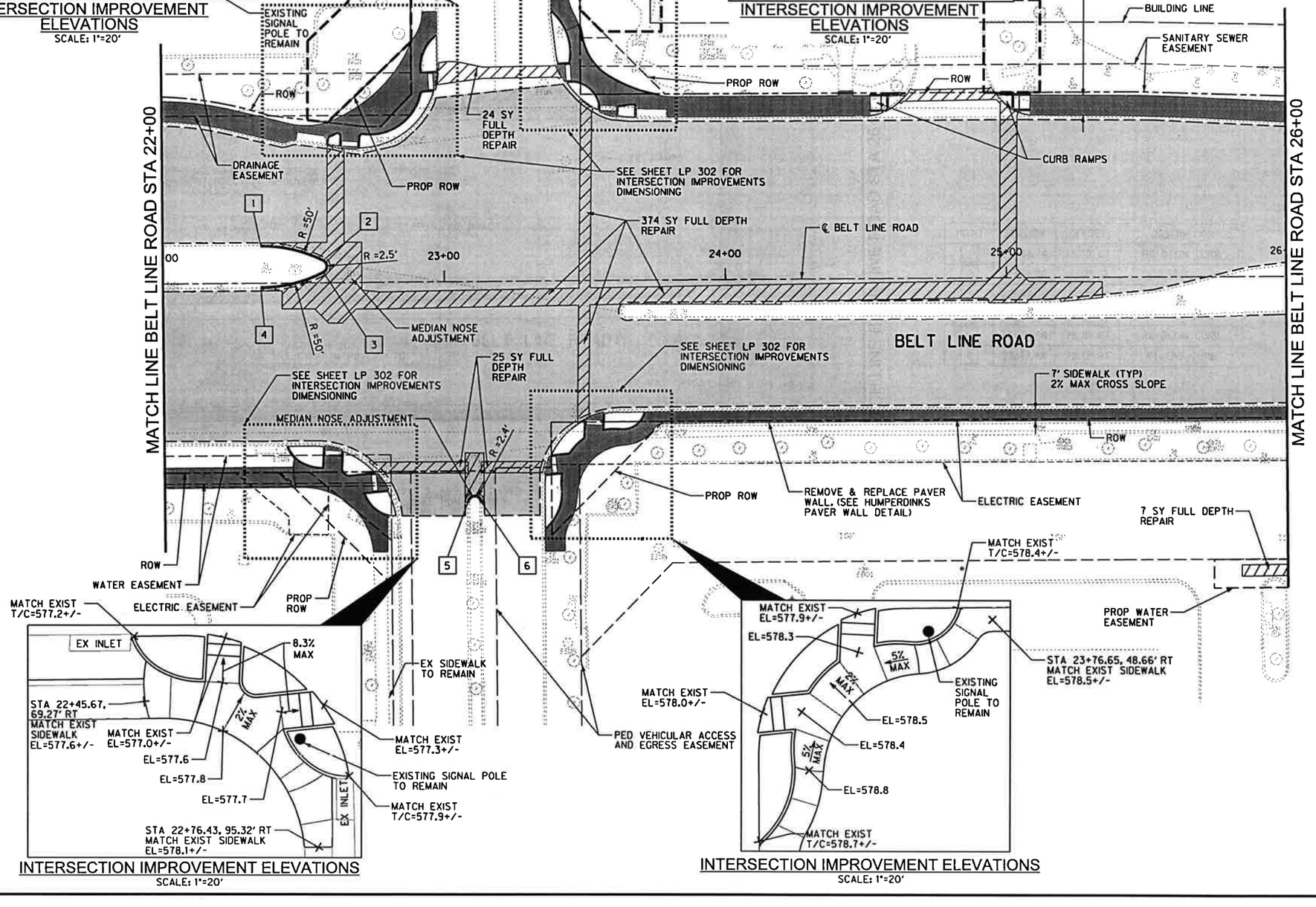
INTERSECTION IMPROVEMENT ELEVATIONS
SCALE: 1"=20'



HUMPERDINKS PAVER WALL
N.T.S.

LEGEND

- FULL DEPTH REPAIR
- 3/4" NOVACHIP OVERLAY
- PROPOSED SIDEWALK
- MILLING LIMITS



INTERSECTION IMPROVEMENT ELEVATIONS
SCALE: 1"=20'

INTERSECTION IMPROVEMENT ELEVATIONS
SCALE: 1"=20'

POINT	STATION	OFFSET	DESCRIPTION
1	22+34.74	13.30' LT	PC BEGIN CURB
2	22+57.06	8.02' LT	PCC
3	22+57.05	3.54' LT	PCC
4	22+34.72	1.73' RT	PT END CURB
5	23+07.68	78.10' RT	PC BEGIN CURB
6	23+12.48	78.12' RT	PT END CURB

STATE OF TEXAS
M.E. ROMANOWSKI
56306
LICENSED PROFESSIONAL ENGINEER

Signature of Registrant P.E. Date 10/23/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

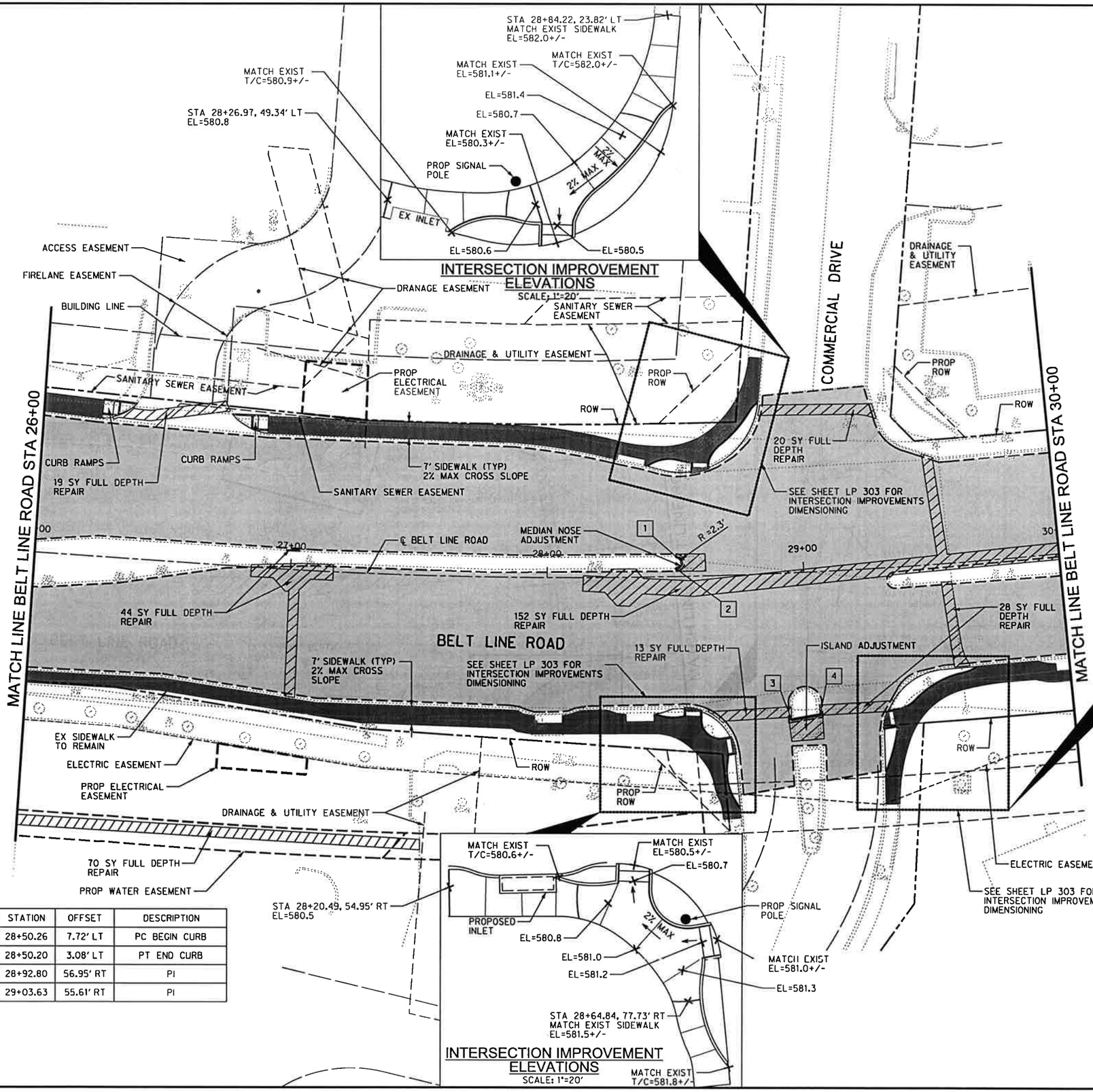
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

PAVING PLAN
BELT LINE RD STA 18+00 TO STA 26+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 PAV 04	P-4



POINT	STATION	OFFSET	DESCRIPTION
1	28+50.26	7.72' LT	PC BEGIN CURB
2	28+50.20	3.08' LT	PT END CURB
3	28+92.80	56.95' RT	PI
4	29+03.63	55.61' RT	PI

M.E. ROMANOWSKI 54306 LAKEWOOD PROFESSIONAL ENGINEER STATE OF TEXAS

Signature of Registrant P.E. 10/23/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

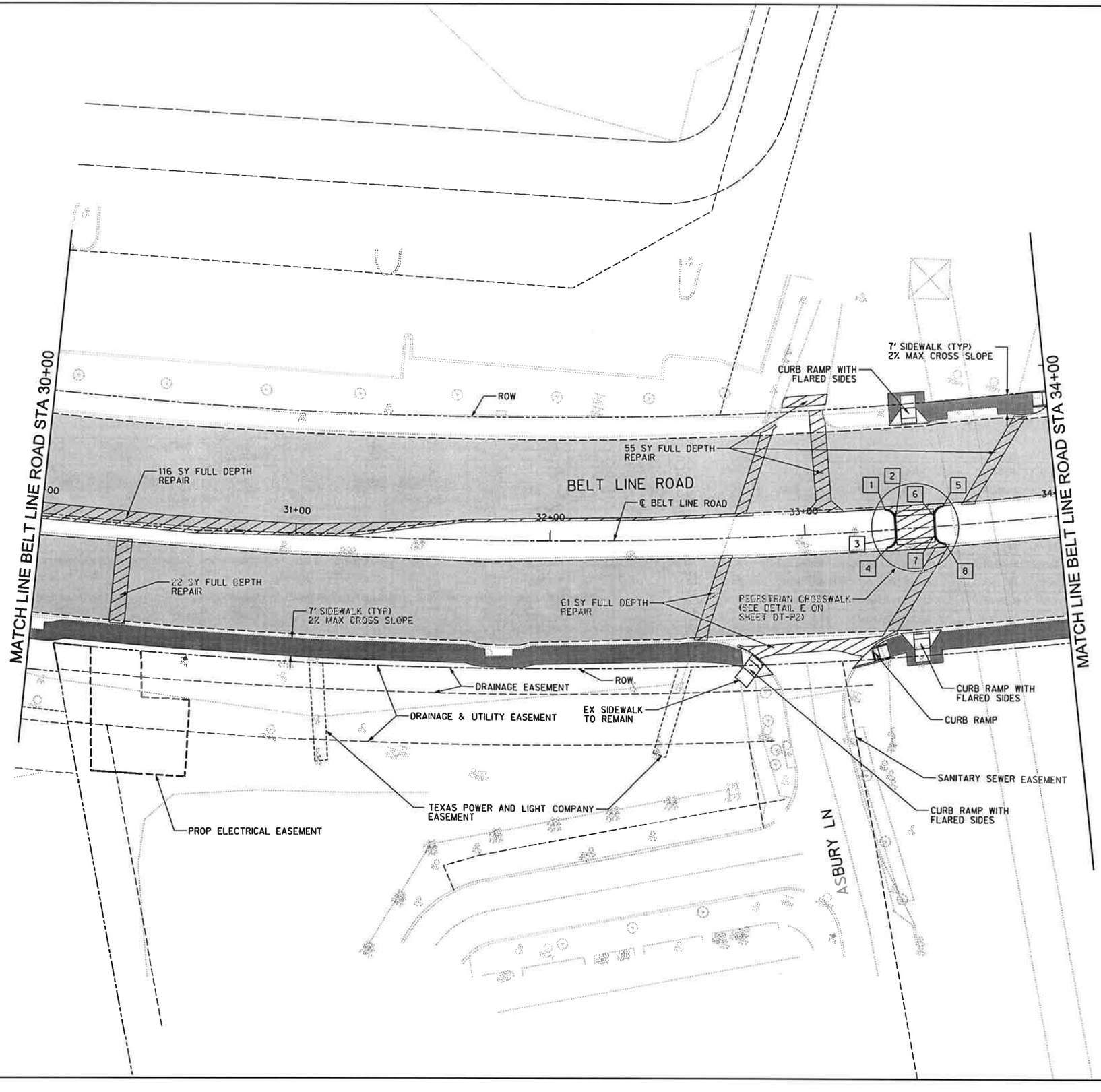
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

PAVING PLAN
BELT LINE RD STA 26+00 TO STA 30+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 PAV 05	P-5



0 10 20 30 40 60
SCALE IN FEET

N

LEGEND

- FULL DEPTH REPAIR
- 3/4" NOVACHIP OVERLAY
- PROPOSED SIDEWALK
- MILLING LIMITS

POINT	STATION	OFFSET	DESCRIPTION
1	33+31.99	8.25' LT	PC BEGIN CURB, R=4'
2	33+35.99	4.22' LT	PT
3	33+53.93	3.07' RT	PC, R=4'
4	33+31.88	7.03' RT	PT END CURB
5	33+55.09	8.02' LT	PC BEGIN CURB, R=4'
6	33+51.02	4.09' LT	PT
7	33+50.90	3.01' RT	PC, R=4'
8	33+54.92	7.08' RT	PT END CURB

SHEET 42 OF 235

M.E. ROMANOWSKI 56306 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Signature of Registrant P.E. Date 10/25/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

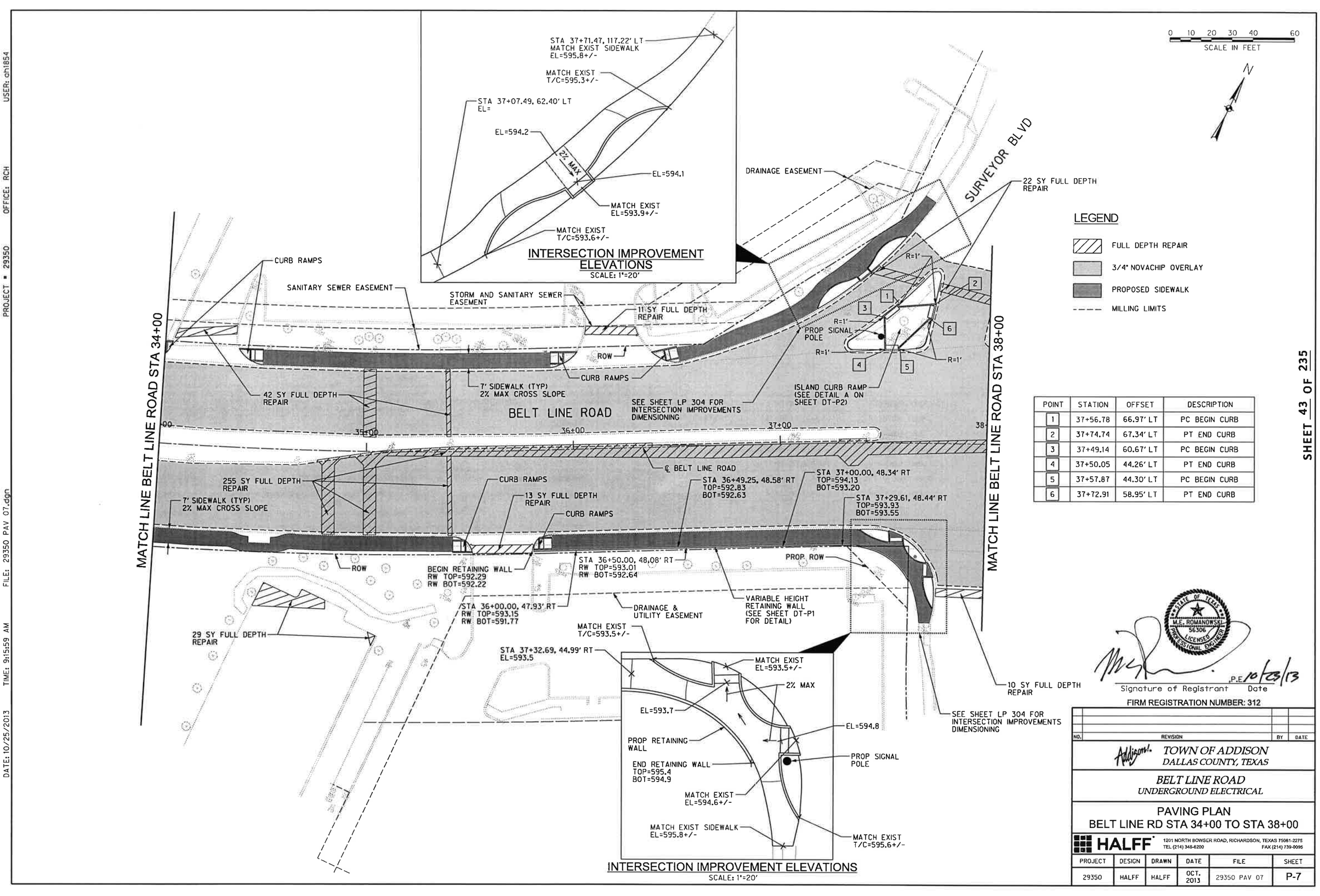
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

PAVING PLAN
BELT LINE RD STA 30+00 TO STA 34+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2278
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 PAV 06	P-6



POINT	STATION	OFFSET	DESCRIPTION
1	37+56.78	66.97' LT	PC BEGIN CURB
2	37+74.74	67.34' LT	PT END CURB
3	37+49.14	60.67' LT	PC BEGIN CURB
4	37+50.05	44.26' LT	PT END CURB
5	37+57.87	44.30' LT	PC BEGIN CURB
6	37+72.91	58.95' LT	PT END CURB

M.E. ROMANOWSKI 56306 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

Signature of Registrant P.E. 10/23/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

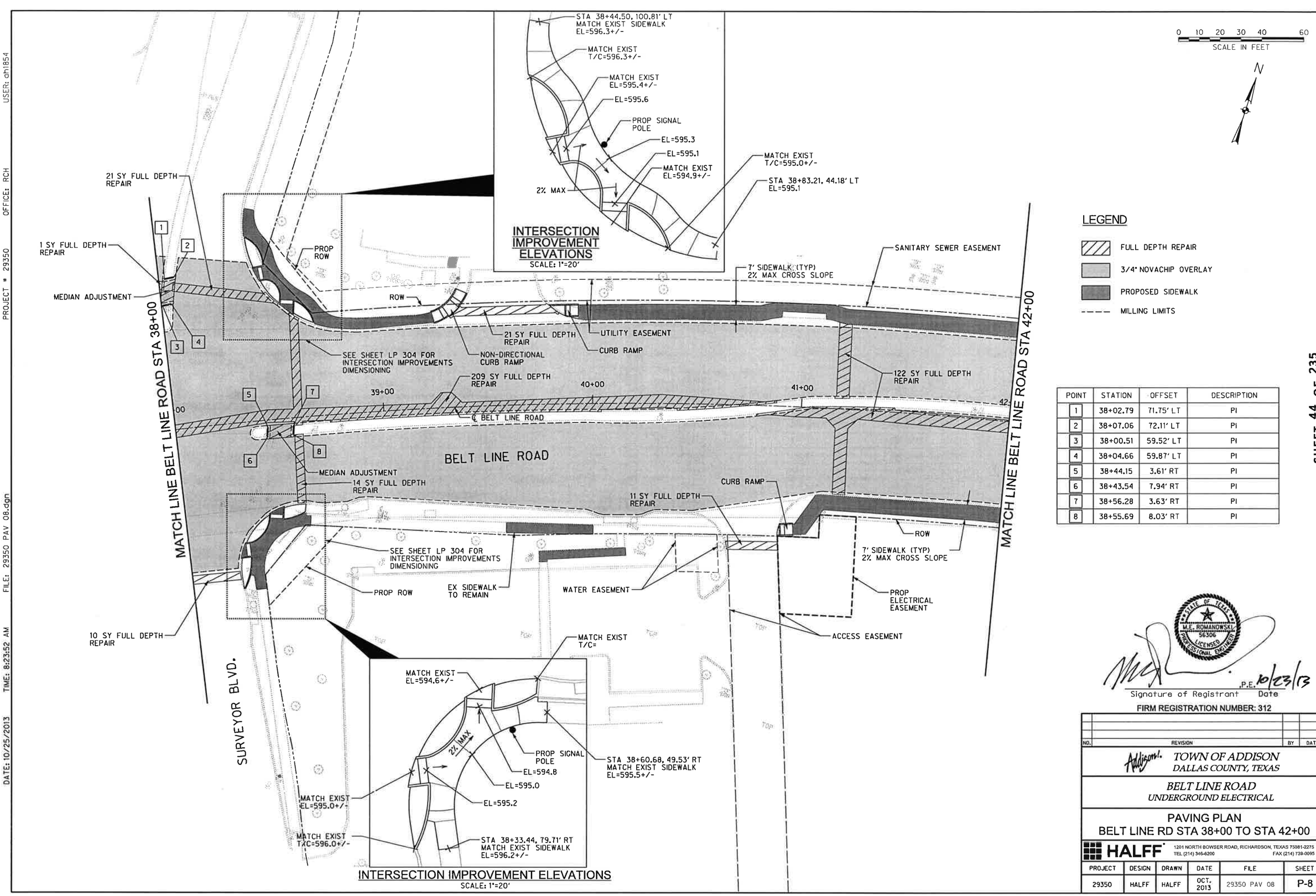
PAVING PLAN
BELT LINE RD STA 34+00 TO STA 38+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 PAV 07	P-7

SHEET 43 OF 235

DATE: 10/25/2013 TIME: 9:15:59 AM PROJECT # 29350 OFFICE: RCH USER: dh1854 FILE: 29350 PAV 07.dgn



POINT	STATION	OFFSET	DESCRIPTION
1	38+02.79	71.75' LT	PI
2	38+07.06	72.11' LT	PI
3	38+00.51	59.52' LT	PI
4	38+04.66	59.87' LT	PI
5	38+44.15	3.61' RT	PI
6	38+43.54	7.94' RT	PI
7	38+56.28	3.63' RT	PI
8	38+55.69	8.03' RT	PI

Signature of Registrant ,P.E. 10/23/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison. TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

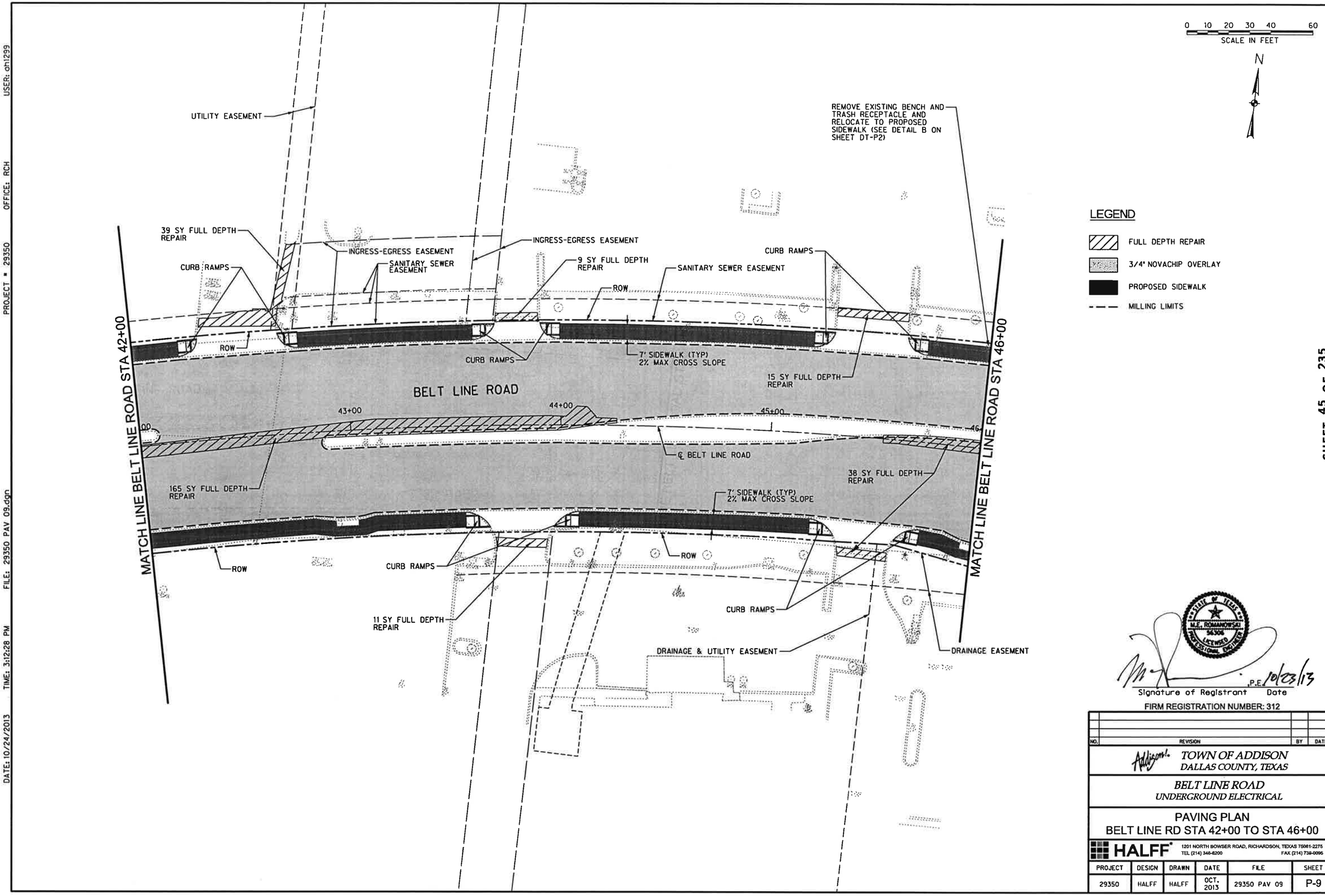
PAVING PLAN
BELT LINE RD STA 38+00 TO STA 42+00

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 PAV 08	P-8

SHEET 44 OF 235

USER: gh1854
OFFICE: RCH
PROJECT # 29350
FILE: 29350 PAV 08.dgn
TIME: 8:23:52 AM
DATE: 10/25/2013



SHEET 45 OF 235

M.E. ROMANOWSKI 84306 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Signature of Registrant P.E. Date 10/23/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

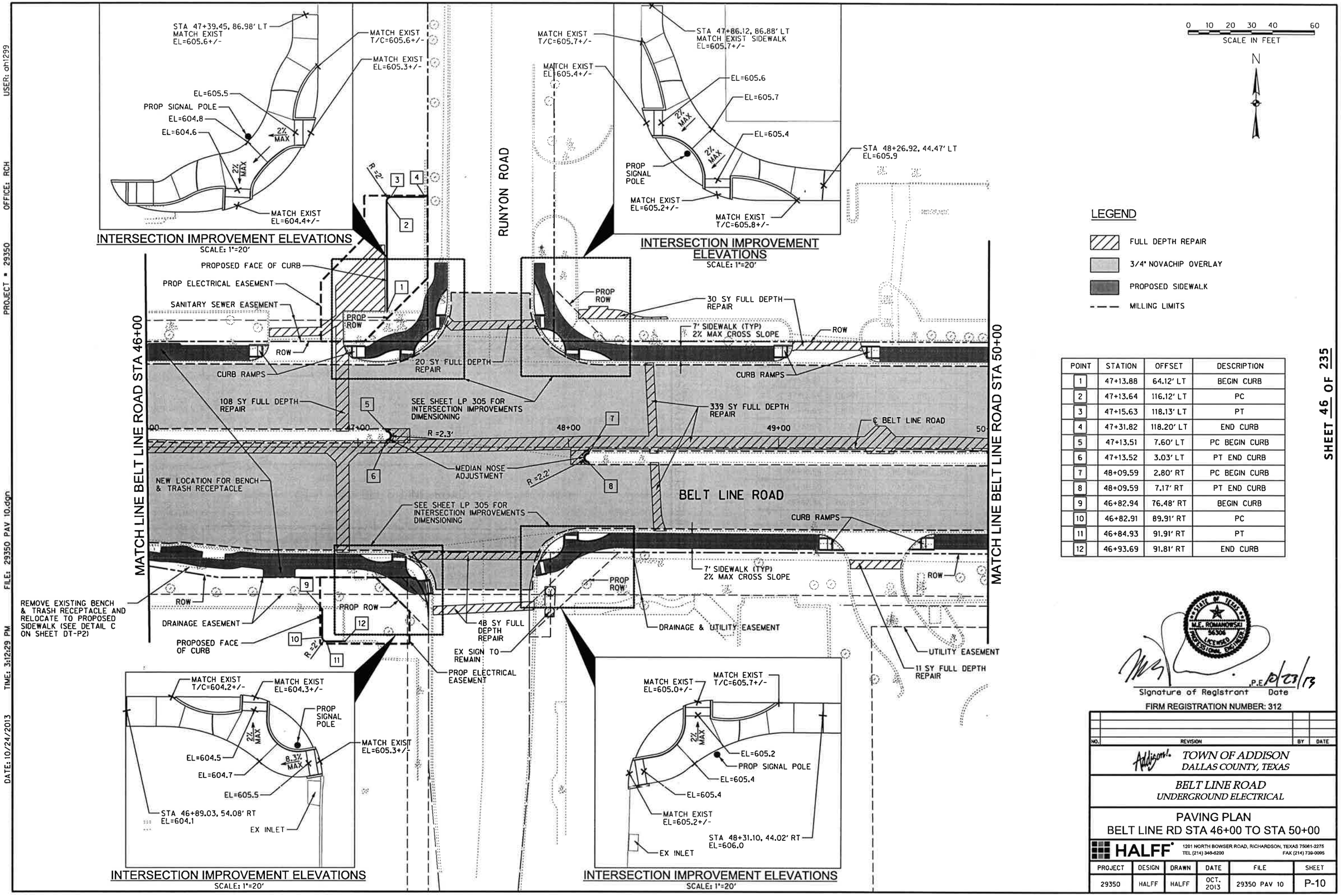
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

PAVING PLAN
BELT LINE RD STA 42+00 TO STA 46+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-8200 FAX (214) 738-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 PAV 09	P-9



0 10 20 30 40 60
SCALE IN FEET

N

LEGEND

- FULL DEPTH REPAIR
- 3/4" NOVACHIP OVERLAY
- PROPOSED SIDEWALK
- MILLING LIMITS

POINT	STATION	OFFSET	DESCRIPTION
1	47+13.88	64.12' LT	BEGIN CURB
2	47+13.64	116.12' LT	PC
3	47+15.63	118.13' LT	PT
4	47+31.82	118.20' LT	END CURB
5	47+13.51	7.60' LT	PC BEGIN CURB
6	47+13.52	3.03' LT	PT END CURB
7	48+09.59	2.80' RT	PC BEGIN CURB
8	48+09.59	7.17' RT	PT END CURB
9	46+82.94	76.48' RT	BEGIN CURB
10	46+82.91	89.91' RT	PC
11	46+84.93	91.91' RT	PT
12	46+93.69	91.81' RT	END CURB

SHEET 46 OF 235

STATE OF TEXAS
M.E. ROMANOWSKI
94304
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. Date 10/23/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

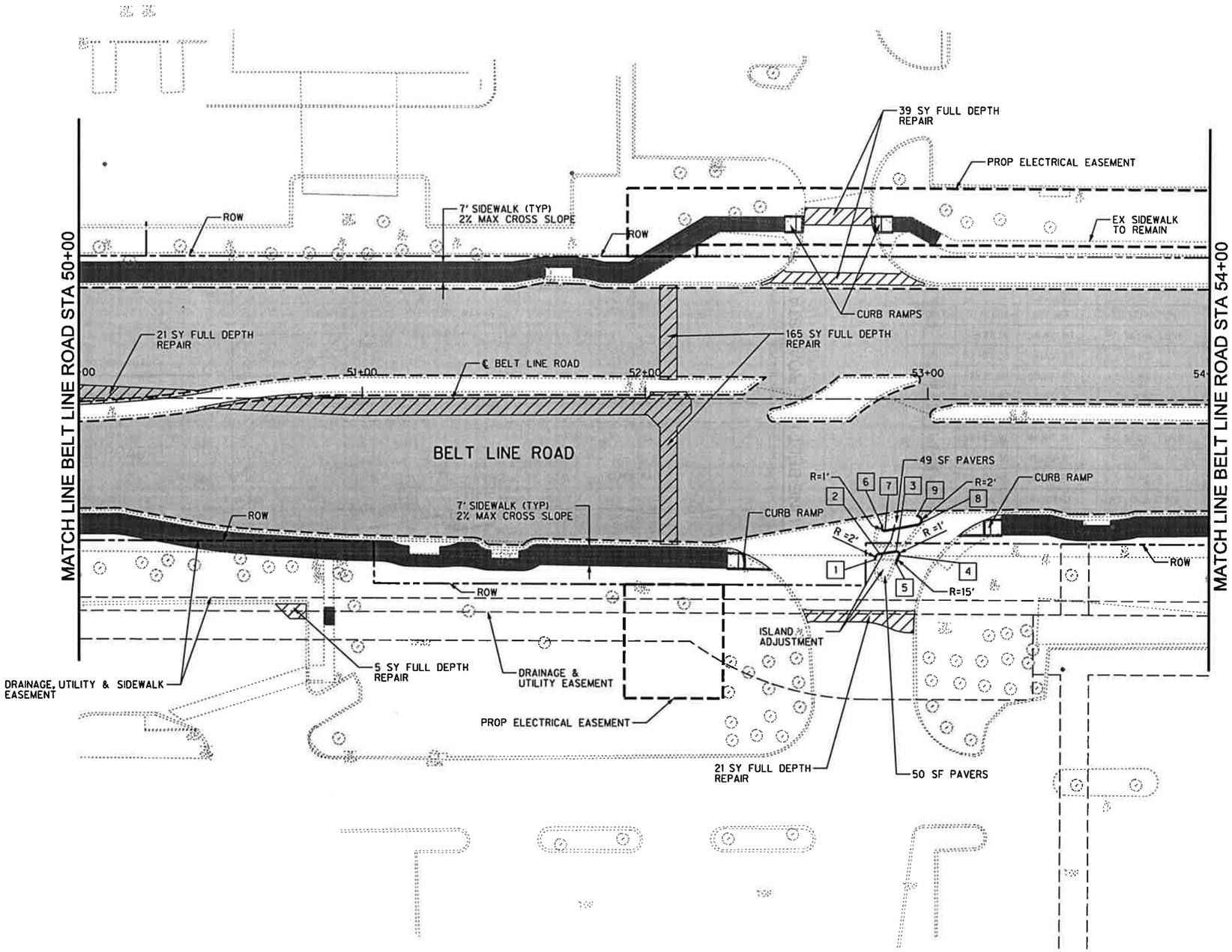
Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

PAVING PLAN
BELT LINE RD STA 46+00 TO STA 50+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 PAV 10	P-10



0 10 20 30 40 60
SCALE IN FEET

N

LEGEND

- FULL DEPTH REPAIR
- 3/4" NOVACHIP OVERLAY
- PROPOSED SIDEWALK
- MILLING LIMITS

POINT	STATION	OFFSET	DESCRIPTION
1	52+81.36	56.42' RT	PC BEGIN CURB
2	52+83.08	54.39' RT	PT
3	52+88.84	53.57' RT	PC
4	52+89.86	55.03' RT	PRC
5	52+88.76	57.74' RT	PT END CURB
6	52+83.92	44.67' RT	PC BEGIN CURB
7	52+84.90	46.26' RT	PT
8	52+96.55	44.11' RT	PC
9	52+96.31	41.01' RT	PT END CURB

SHEET 47 OF 235

STATE OF TEXAS
M.E. ROMANOWSKI
94306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. Date 10/28/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

PAVING PLAN
BELT LINE RD STA 50+00 TO STA 54+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 PAV 11	P-11

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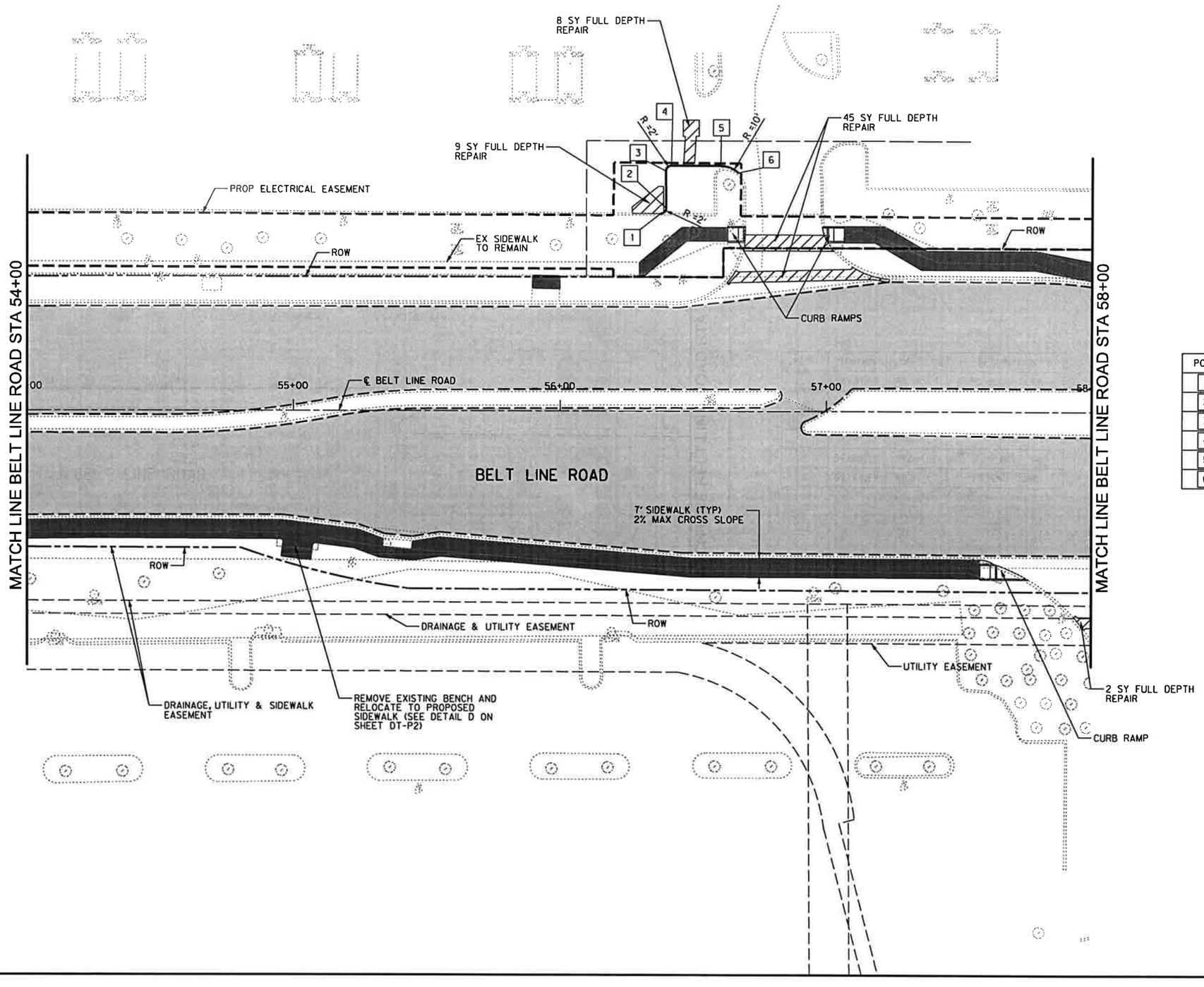
OFFICE: RCH
PROJECT # 29350
FILE: 29350 PAV 12.dgn
TIME: 3:12:31 PM
DATE: 10/24/2013



0 10 20 30 40 60
SCALE IN FEET

N

LEGEND

- FULL DEPTH REPAIR
- 3/4" NOVACHIP OVERLAY
- PROPOSED SIDEWALK
- MILLING LIMITS

POINT	STATION	OFFSET	DESCRIPTION
1	56+37.68	73.68' LT	PC BEGIN CURB
2	56+39.69	75.69' LT	PT
3	56+39.62	89.65' LT	PC
4	56+41.63	91.66' LT	PT
5	56+60.00	91.58' LT	PC
6	56+66.69	89.97' LT	PT END CURB

SHEET 48 OF 235

STATE OF TEXAS
M.E. ROMANOWSKI
56308
LICENSED
PROFESSIONAL ENGINEER

P.E 10/23/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

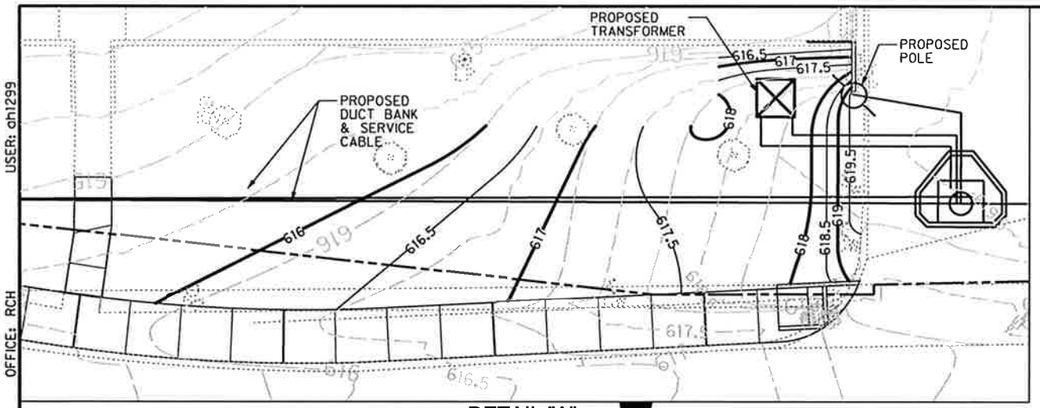
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

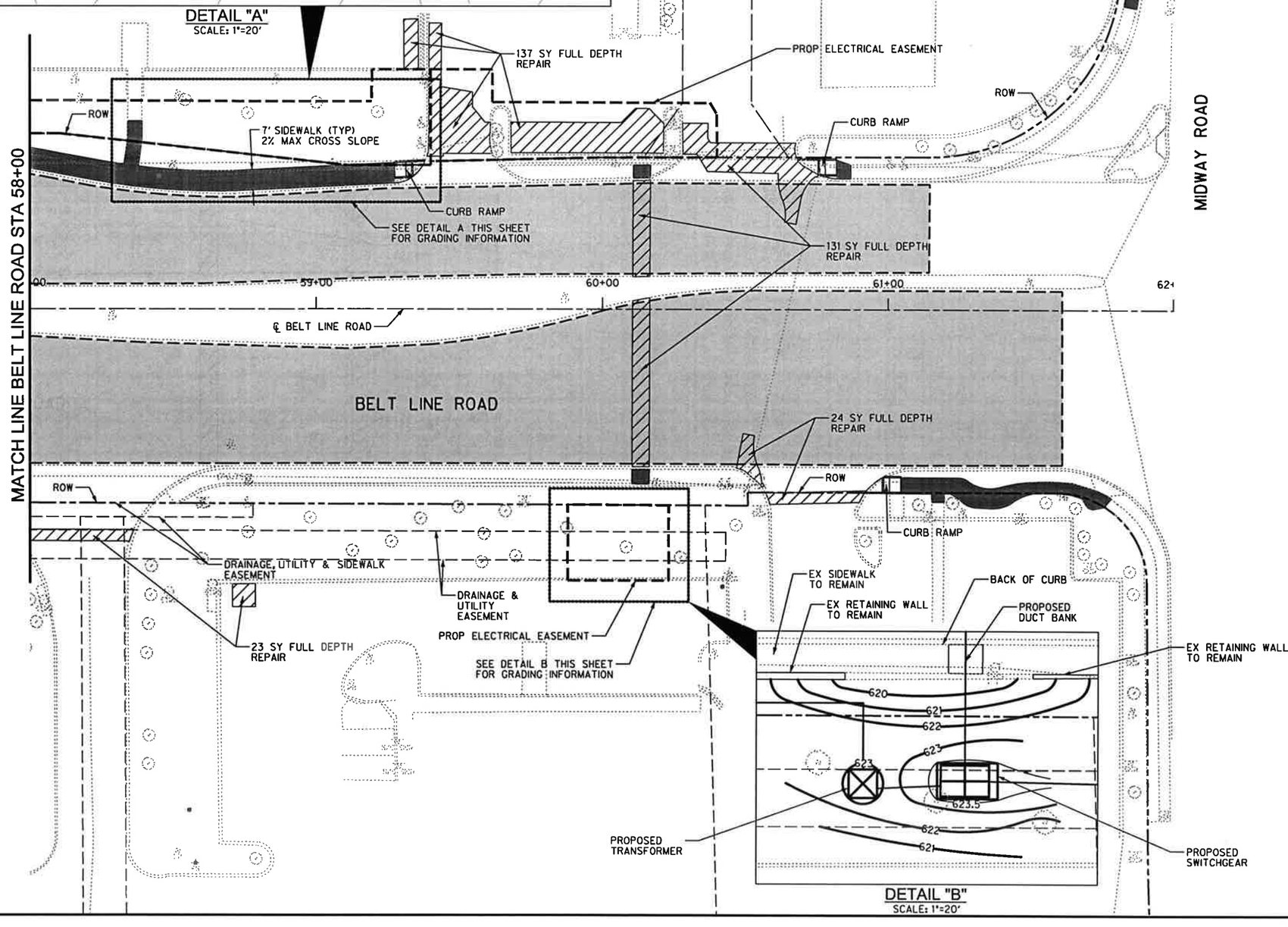
PAVING PLAN
BELT LINE RD STA 54+00 TO STA 58+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 738-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 PAV 12	P-12



DETAIL "A"
SCALE: 1"=20'



DETAIL "B"
SCALE: 1"=20'

0 10 20 30 40 60
SCALE IN FEET

N

LEGEND

- FULL DEPTH REPAIR
- 3/4" NOVACHIP OVERLAY
- PROPOSED SIDEWALK
- MILLING LIMITS

STATE OF TEXAS
M.E. ROMANOWSKI
94306
LICENSED
PROFESSIONAL ENGINEER

P.E. 10/23/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

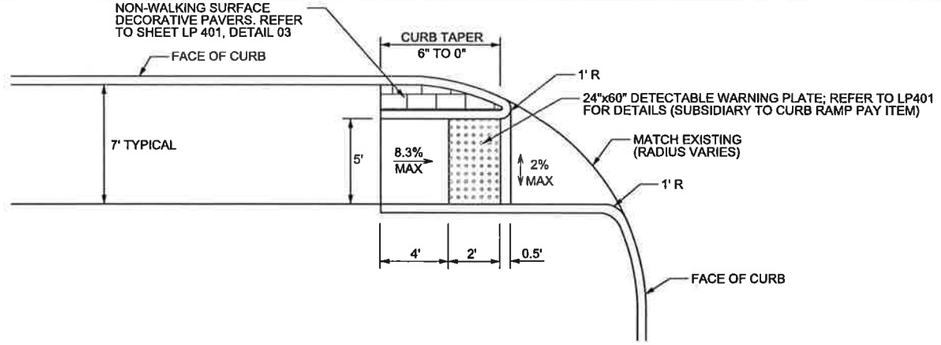
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

PAVING PLAN
BELT LINE RD STA 58+00 TO STA 62+00

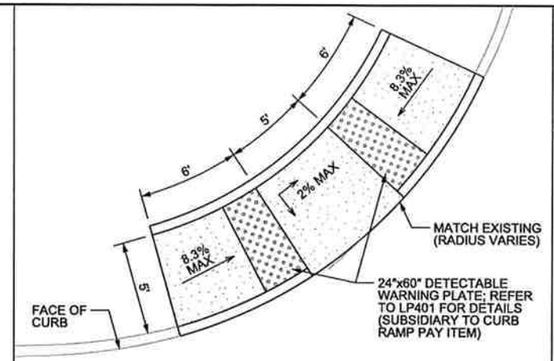
HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 PAV 13	P-13



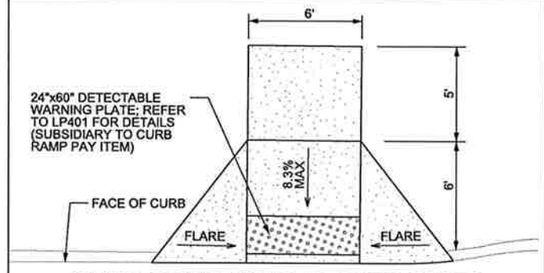
TYPICAL CURB RAMP AT DRIVEWAYS

N.T.S.



NON-DIRECTIONAL CURB RAMPS

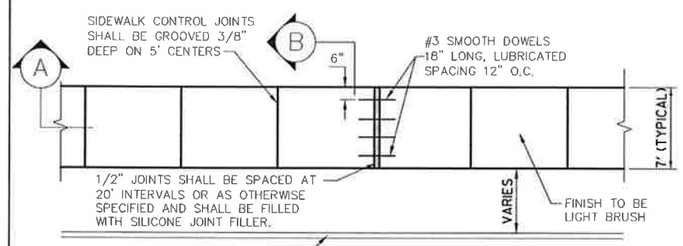
N.T.S.



CURB RAMP WITH FLARED SIDES

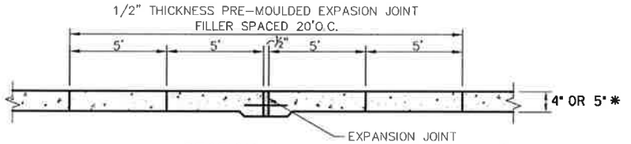
N.T.S.

* 5' OR LESS WIDE SIDEWALKS ARE 4" THICK. SIDEWALKS GREATER THAN 5' WIDE SIDEWALKS ARE 5" THICK.



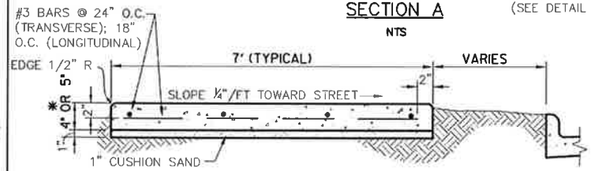
PLAN

NTS



SECTION A

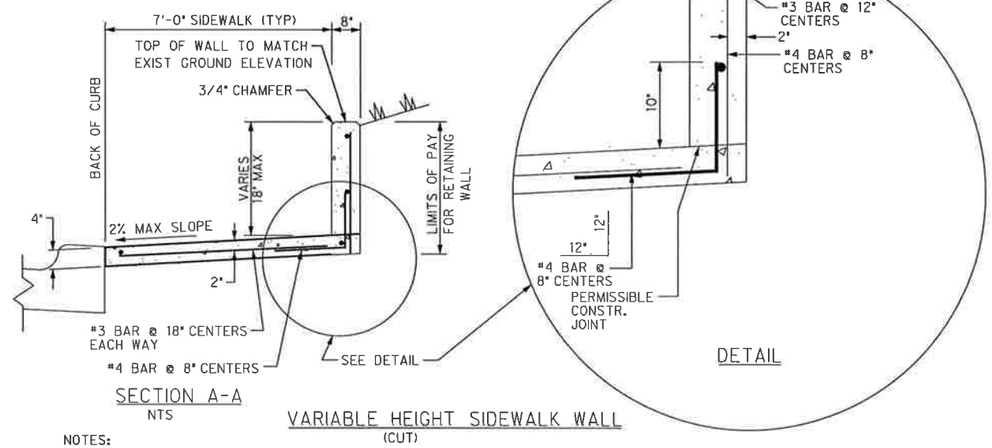
NTS



SECTION B

NTS

NOTE:
WHEN CONCRETE WALK IS ADJACENT TO CURB, DEPTH OF EXPANSION JOINT MATERIAL SHALL BE SUFFICIENT TO PREVENT CONCRETE TO CONCRETE CONTACT BETWEEN WALK AND CURB.



SECTION A-A

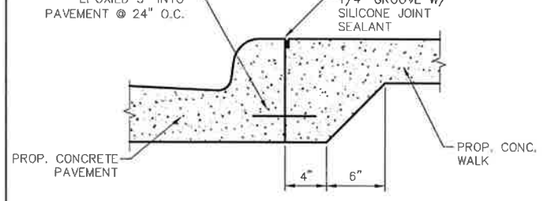
NTS

VARIABLE HEIGHT SIDEWALK WALL

(CUT)

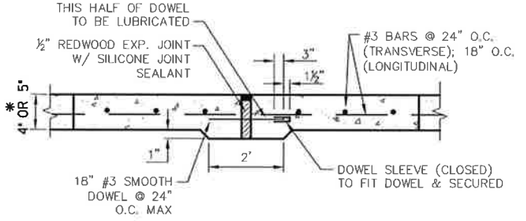
NOTES:

1. STEEL REINFORCING IN WALL SHALL BE #3 BARS @ 12" CENTERS HORIZONTALLY AND #4 BARS @ 8" CENTERS VERTICALLY.
2. EXPANSION JOINTS IN WALL SHALL MATCH EXPANSION JOINTS IN THE SIDEWALK.
3. ENDS OF WALL SHALL ALSO BE CHAMFERED.
4. CONCRETE TO HAVE COMPRESSIVE STRENGTH OF 3000 psi at 28 DAYS.
5. UNIT PAVER WALL MAY BE SUBSTITUTED AT TOWN OF ADDISON'S REQUEST.



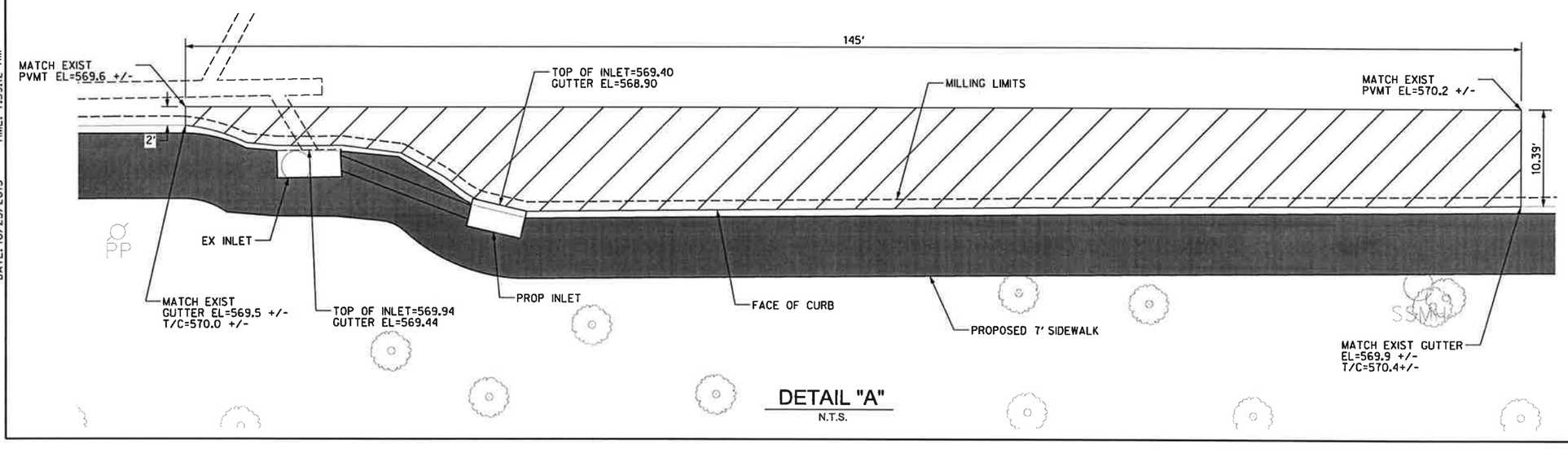
JOINT DETAIL FOR SIDEWALKS ADJACENT TO CURB

NTS



EXPANSION JOINT DETAIL

NTS



DETAIL "A"

N.T.S.

STATE OF TEXAS
M.E. ROMANOWSKI
56306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. Date 10/03/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

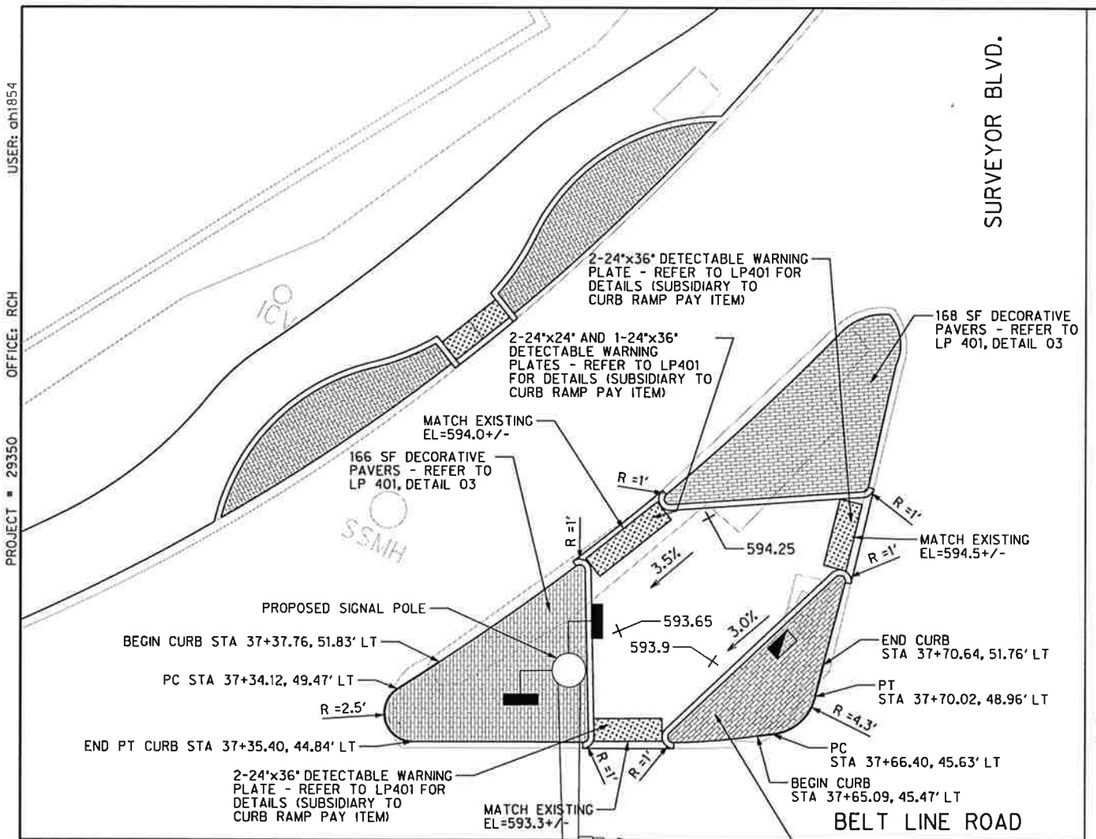
BELT LINE ROAD
UNDERGROUND ELECTRICAL

PAVEMENT DETAILS

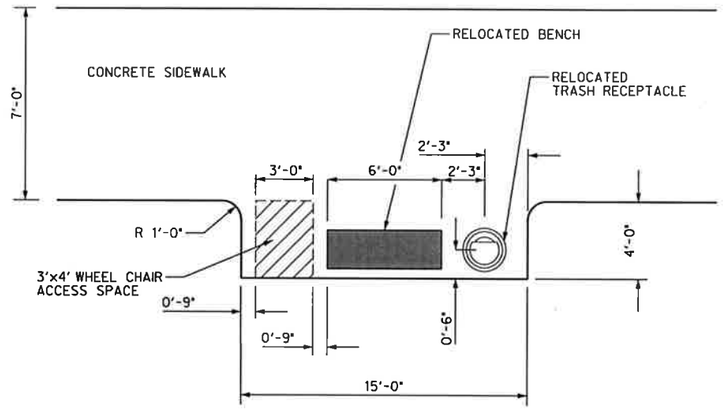
HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 738-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 DTPV 01	DT-P1

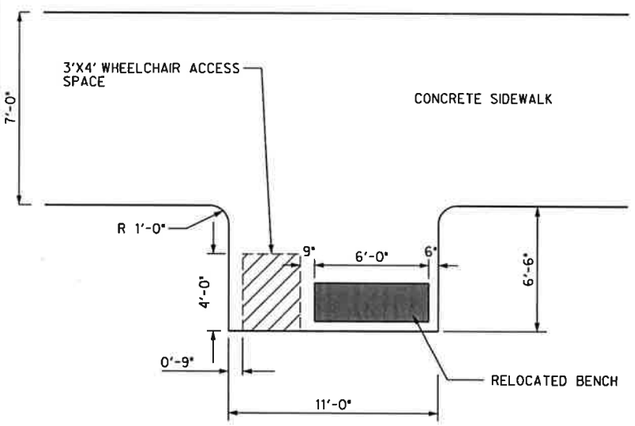
USER: ah1854
OFFICE: RCH
PROJECT # 29350
FILE: 29350 DTPV 01.dgn
TIME: 7:59:12 AM
DATE: 10/25/2013



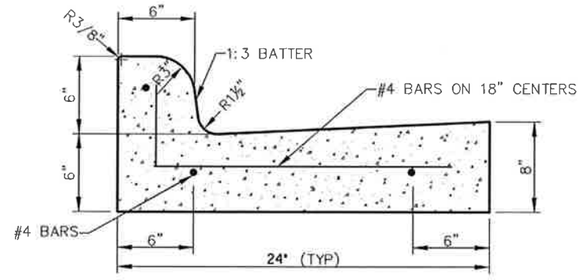
DETAIL A - ISLAND CURB RAMP
N.T.S.



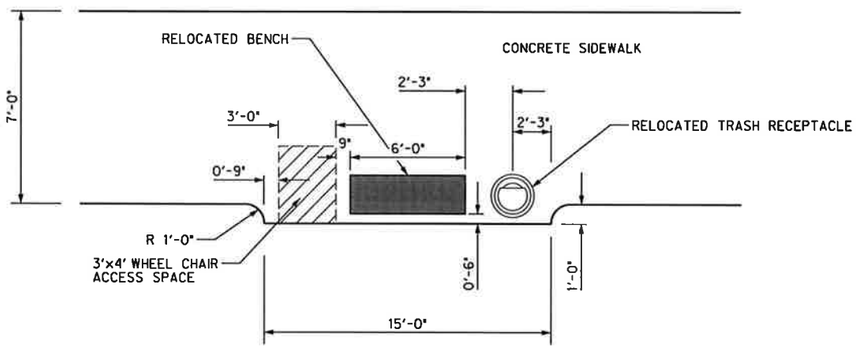
DETAIL C - BUS STOP
N.T.S.



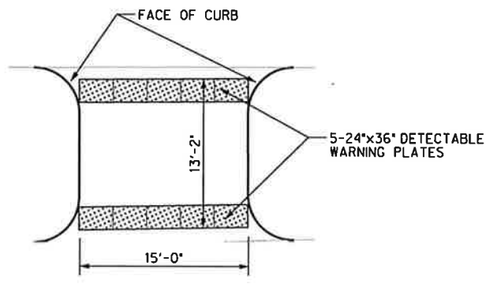
DETAIL D - BUS STOP
N.T.S.



CURB AND GUTTER
N.T.S.



DETAIL B - BUS STOP
N.T.S.



DETAIL E - PEDESTRIAN MEDIAN CROSSING
N.T.S.

STATE OF TEXAS
M.E. ROMANOWSKI
56306
LICENSED PROFESSIONAL ENGINEER

P.E. 10/25/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

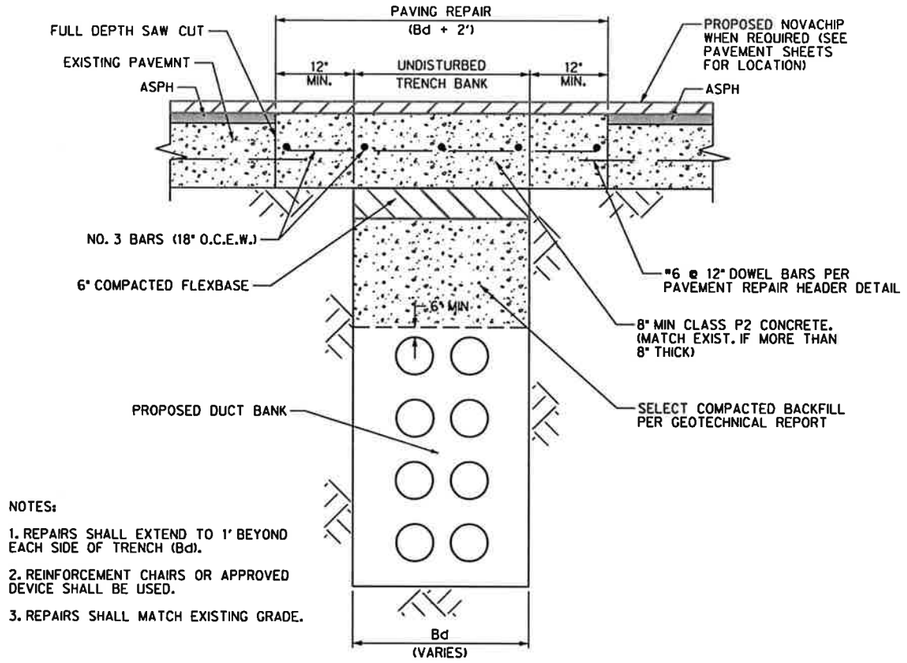
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

PAVEMENT DETAILS

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29530 DTPV 02	DT-P2

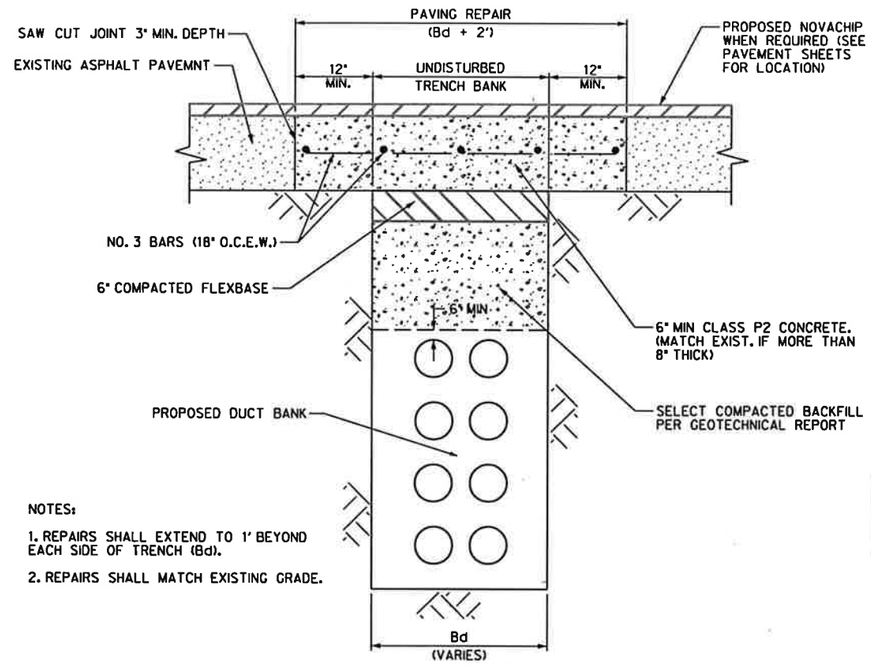


NOTES:

1. REPAIRS SHALL EXTEND TO 1' BEYOND EACH SIDE OF TRENCH (Bd).
2. REINFORCEMENT CHAIRS OR APPROVED DEVICE SHALL BE USED.
3. REPAIRS SHALL MATCH EXISTING GRADE.

UTILITY INSTALLATION BENEATH CONCRETE ROAD SURFACE

N.T.S.



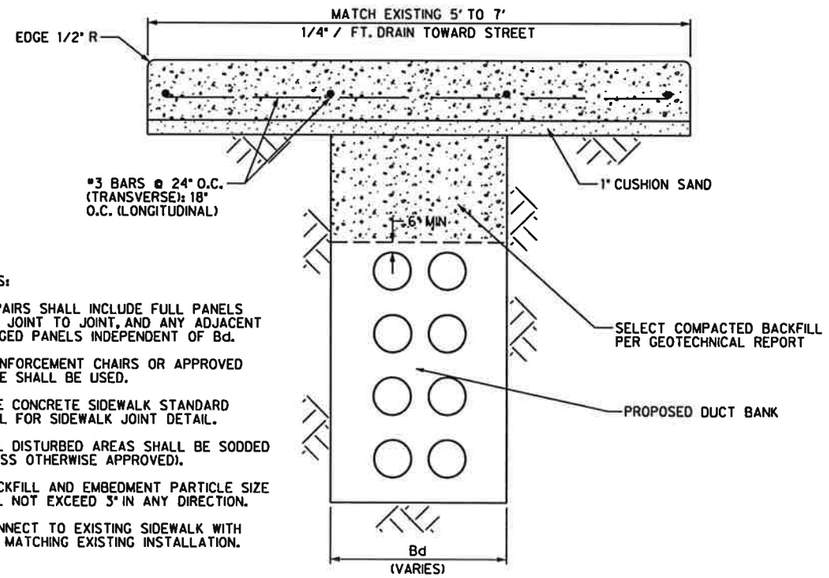
NOTES:

1. REPAIRS SHALL EXTEND TO 1' BEYOND EACH SIDE OF TRENCH (Bd).
2. REPAIRS SHALL MATCH EXISTING GRADE.

UTILITY INSTALLATION BENEATH ASPHALT ROAD SURFACE

N.T.S.

REFER TO SHEET ELE-0 AND TEL-0 FOR FURTHER INFORMATION ON DUCT BANKS

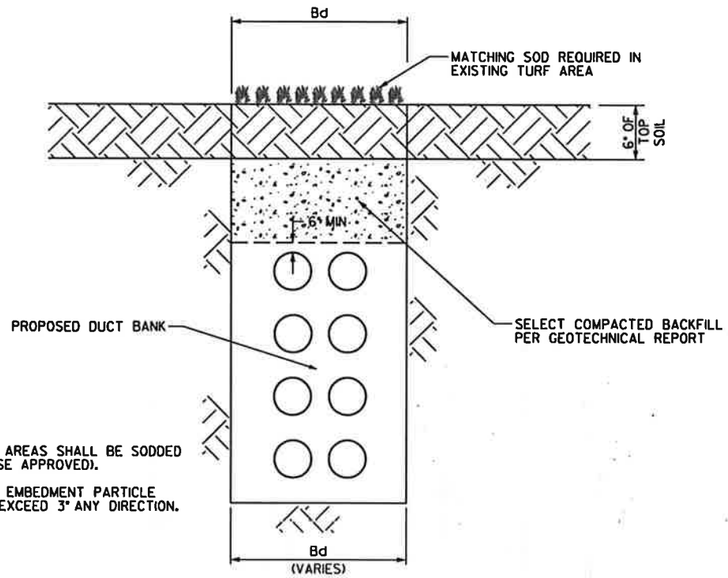


NOTES:

1. REPAIRS SHALL INCLUDE FULL PANELS FROM JOINT TO JOINT, AND ANY ADJACENT DAMAGED PANELS INDEPENDENT OF Bd.
2. REINFORCEMENT CHAIRS OR APPROVED DEVICE SHALL BE USED.
3. SEE CONCRETE SIDEWALK STANDARD DETAIL FOR SIDEWALK JOINT DETAIL.
4. ALL DISTURBED AREAS SHALL BE SODDED (UNLESS OTHERWISE APPROVED).
5. BACKFILL AND EMBEDMENT PARTICLE SIZE SHALL NOT EXCEED 3" IN ANY DIRECTION.
6. CONNECT TO EXISTING SIDEWALK WITH BARS MATCHING EXISTING INSTALLATION.

UTILITY INSTALLATION BENEATH SIDEWALK

N.T.S.



NOTES:

1. ALL DISTURBED AREAS SHALL BE SODDED (UNLESS OTHERWISE APPROVED).
2. BACKFILLL AND EMBEDMENT PARTICLE SIZE SHALL NOT EXCEED 3" ANY DIRECTION.

UTILITY INSTALLATION WITHIN TURF AREAS

N.T.S.

P.E. 10/23/13

Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

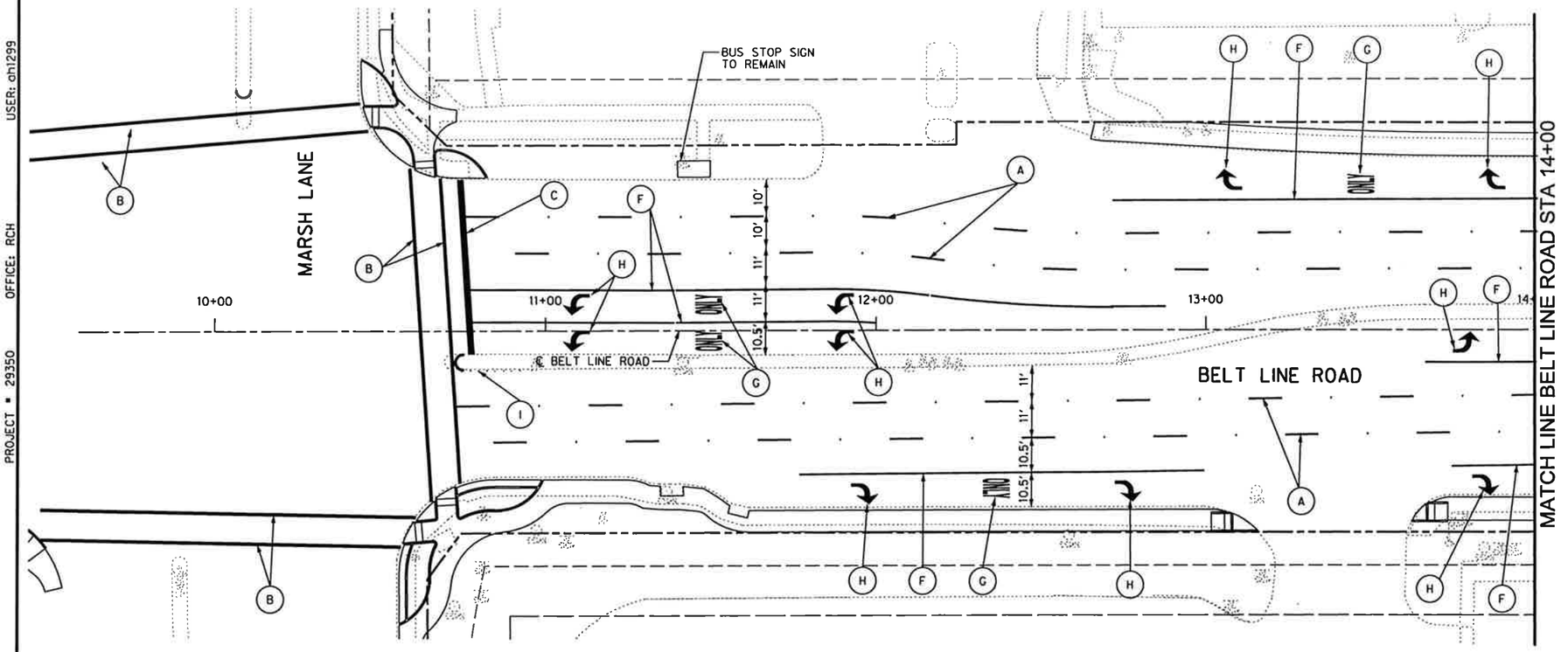
PAVEMENT DETAILS

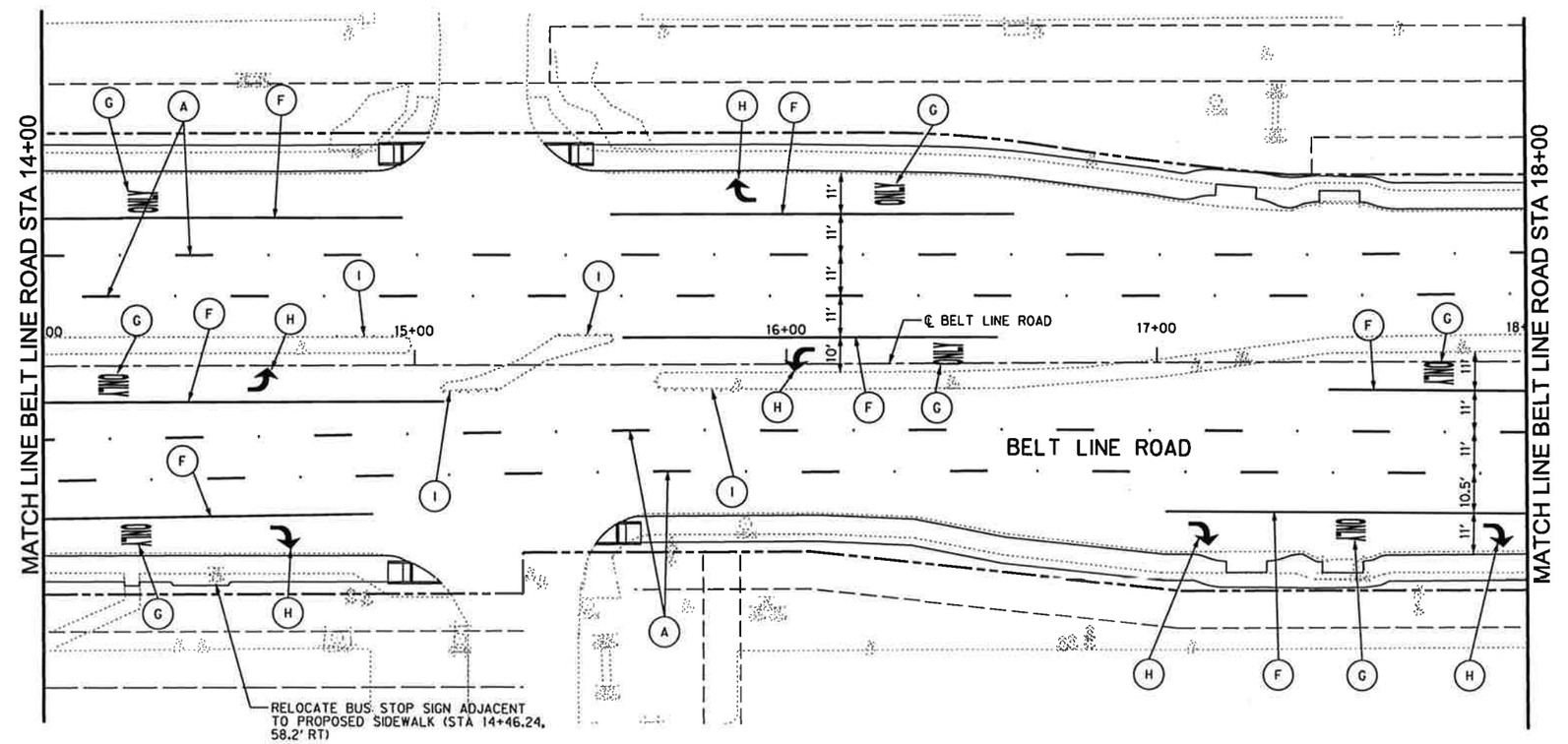
HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 738-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29530 DTPV 03	DT-P3

SHEET 52 OF 235

USER: ah1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 DTPV 03.dgn
TIME: 3:22:42 PM
DATE: 10/24/2013





N

0 10 20 30 40 60
SCALE IN FEET

LEGEND

- (A) 4" WHITE BROKEN STRIPE 10' IN LENGTH WITH 30' GAPS SUPPLEMENTED BY TY-II-CR BUTTONS CENTERED ON GAP. CLEAR SIDE OF BUTTON SHALL FACE TRAFFIC FLOW. (SEE DETAIL 'A' ON SHEET DT-PM)
- (B) 12" WHITE SOLID REFLECTORIZED PAVEMENT MARKING
- (C) 24" WHITE SOLID REFLECTORIZED PAVEMENT MARKING
- (D) 4" WHITE DOT REFLECTORIZED PAVEMENT MARKING ("PUPPY TRACKS") (SEE DETAIL "F" ON SHEET DT-PM)
- (E) DOUBLE 4" YELLOW SOLID REFLECTORIZED PAVEMENT MARKING SUPPLEMENTED, BY TY-II-A-A BUTTONS. (SEE DETAIL 'B' ON SHEET DT-PM)
- (F) 8" WHITE SOLID REFLECTORIZED PAVEMENT MARKING SUPPLEMENTED BY TY I-C BUTTONS (SEE DETAIL "C" ON SHEET DT-PM)
- (G) WHITE REFLECTORIZED PAVEMENT MARKING WORD
- (H) WHITE REFLECTORIZED PAVEMENT MARKING ARROW
- (I) 4" ROUND NON-REFLECTIVE YELLOW MARKER AND YELLOW R.P.M. TYPE II-A-A (SEE DETAIL 'C' ON SHEET DT-PM)
- (J) WHITE REFLECTORIZED YIELD LINE (SEE DETAIL 'D' ON SHEET DT-PM)

NOTES:
ALL SIGNING AND STRIPING SHALL COMPLY WITH THE LATEST VERSION OF TMUTCD.

EXISTING SIGNAGE SHALL BE REUSED AND MOUNTED IN SAME LOCATION AFTER SIDEWALK DEMO AND RECONSTRUCTION. REFER TO BC(5)-07 OPTION 3 FOR SIGN MOUNT.

SHEET 53 OF 235

STATE OF TEXAS
M.E. ROMANOWSKI
94306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. Date 10/25/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

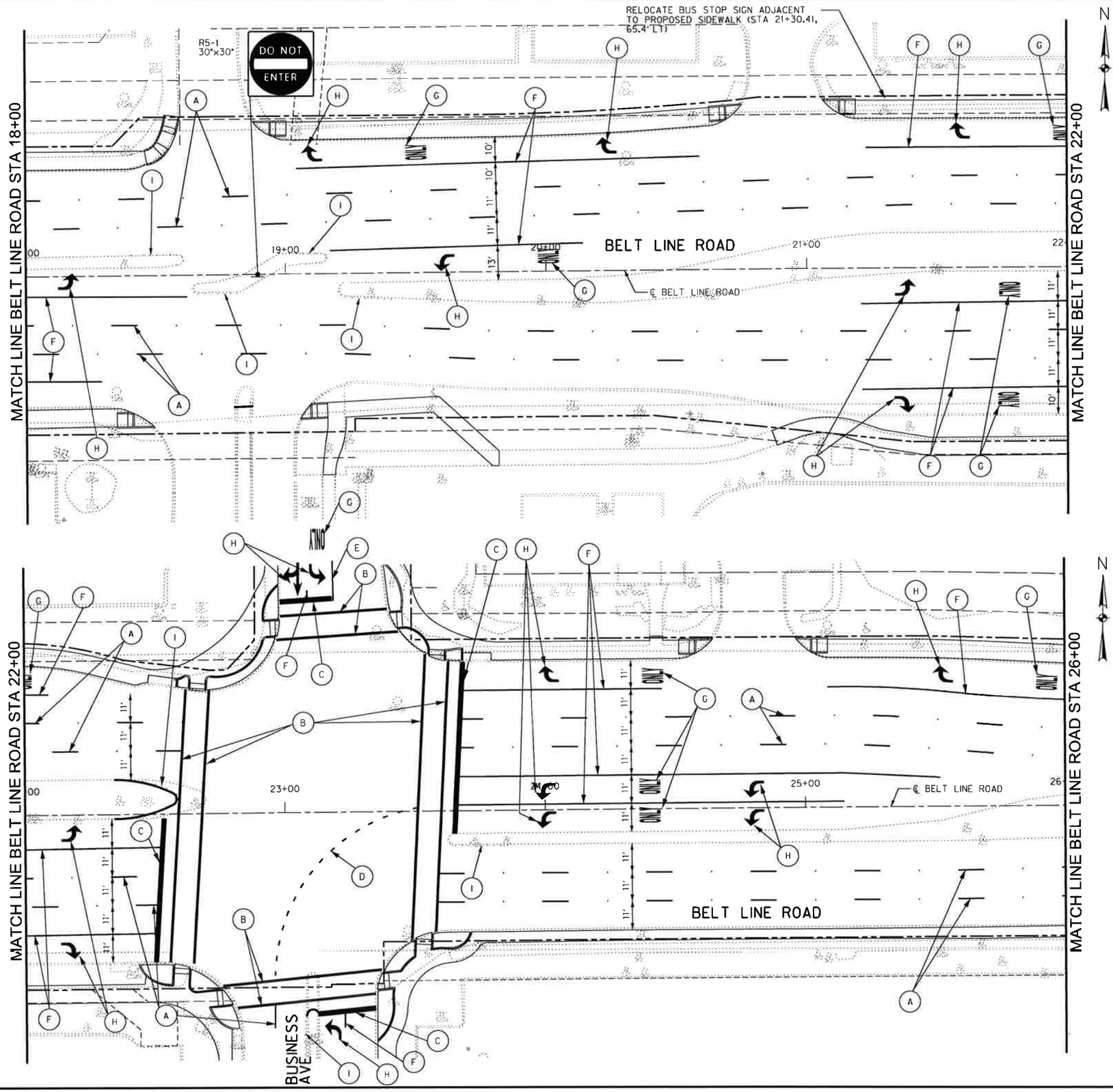
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

STRIPING & SIGNAGE LAYOUT
BELT LINE RD STA 10+00 TO STA 18+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 SNPM 01	PM-1



LEGEND

- (A) 4" WHITE BROKEN STRIPE 10' IN LENGTH WITH 30' GAPS SUPPLEMENTED BY TY-II-CR BUTTONS CENTERED ON GAP. CLEAR SIDE OF BUTTON SHALL FACE TRAFFIC FLOW. (SEE DETAIL 'A' ON SHEET DT-PM)
- (B) 12" WHITE SOLID REFLECTORIZED PAVEMENT MARKING
- (C) 24" WHITE SOLID REFLECTORIZED PAVEMENT MARKING
- (D) 4" WHITE DOT REFLECTORIZED PAVEMENT MARKING ("PUPPY TRACKS") (SEE DETAIL "F" ON SHEET DT-PM)
- (E) DOUBLE 4" YELLOW SOLID REFLECTORIZED PAVEMENT MARKING SUPPLEMENTED BY TY-II-A-A BUTTONS. (SEE DETAIL 'B' ON SHEET DT-PM)
- (F) 8" WHITE SOLID REFLECTORIZED PAVEMENT MARKING SUPPLEMENTED BY TY I-C BUTTONS (SEE DETAIL "G" ON SHEET DT-PM)
- (G) WHITE REFLECTORIZED PAVEMENT MARKING WORD
- (H) WHITE REFLECTORIZED PAVEMENT MARKING ARROW
- (I) 4" ROUND NON-REFLECTIVE YELLOW MARKER AND YELLOW R.P.M. TYPE II-A-A (SEE DETAIL 'C' ON SHEET DT-PM)
- (J) WHITE REFLECTORIZED YIELD LINE (SEE DETAIL 'D' ON SHEET DT-PM)

NOTES:
ALL SIGNING AND STRIPING SHALL COMPLY WITH THE LATEST VERSION OF TMUTCD.

EXISTING SIGNAGE SHALL BE REUSED AND MOUNTED IN SAME LOCATION AFTER SIDEWALK DEMO AND RECONSTRUCTION. REFER TO BC(5)-07 OPTION 3 FOR SIGN MOUNT.

STATE OF TEXAS
M.E. ROMANOWSKI
56308
LICENSED PROFESSIONAL ENGINEER

P.E. 1/20/14
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

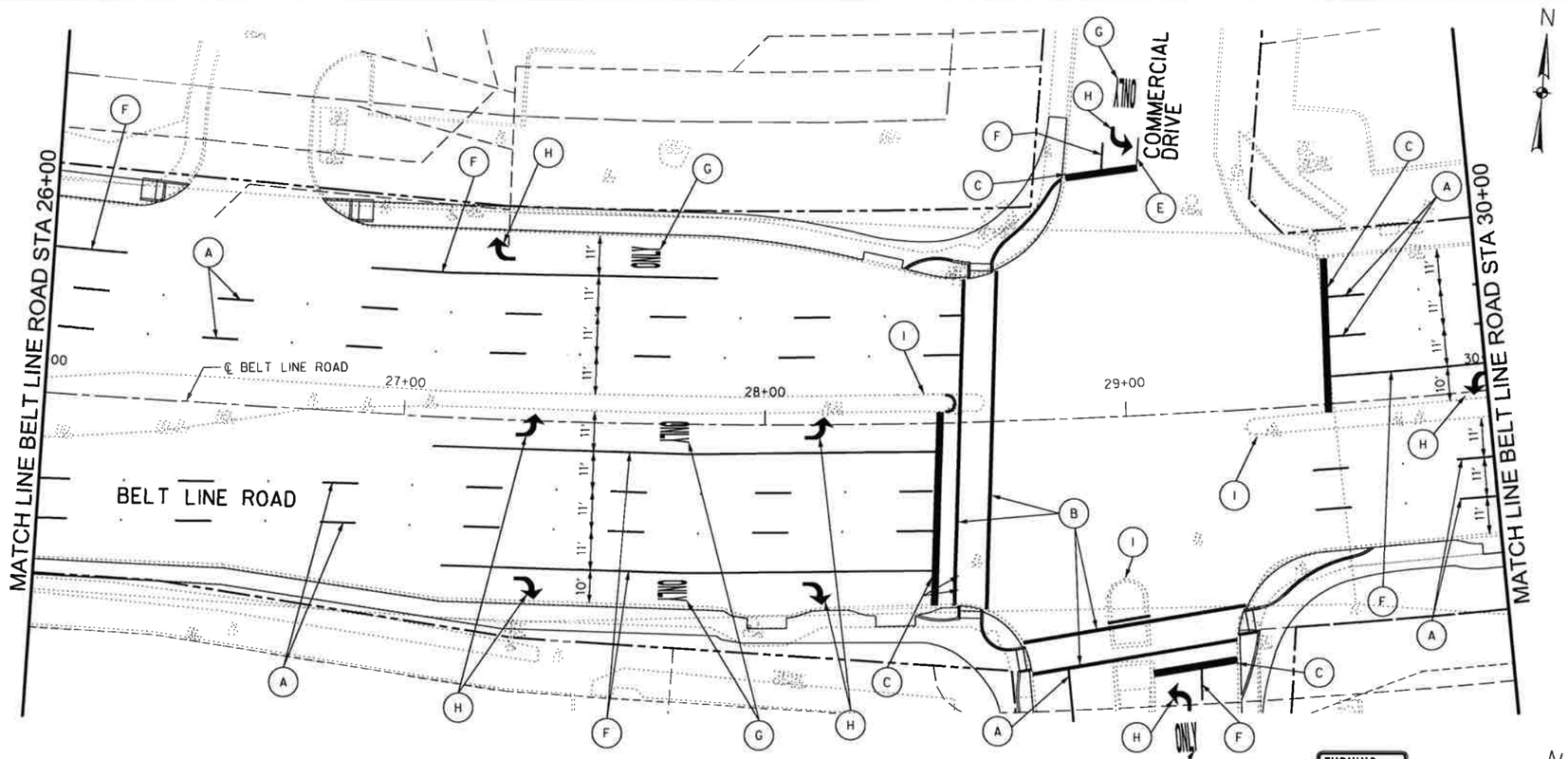
BELT LINE ROAD
UNDERGROUND ELECTRICAL

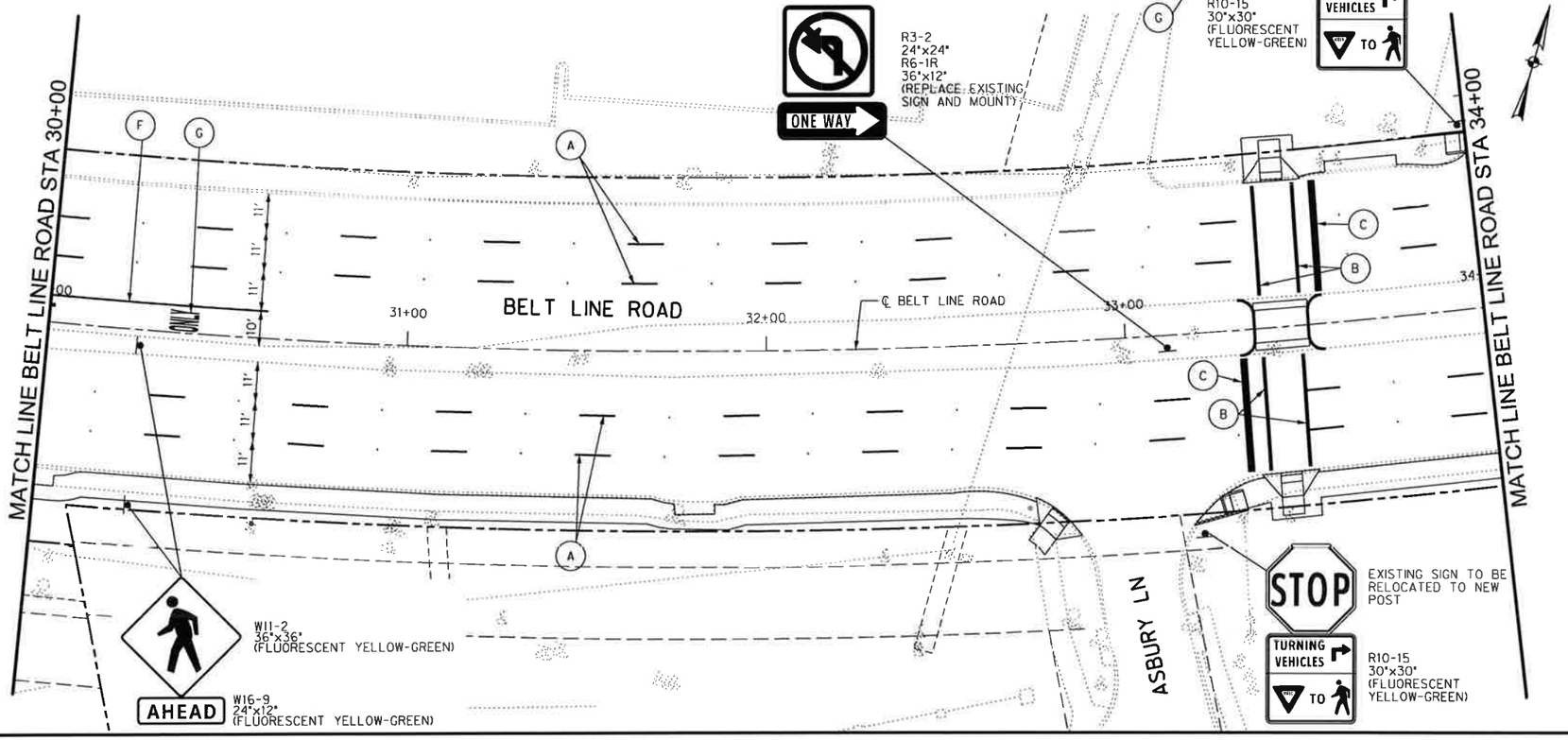
STRIPING & SIGNAGE LAYOUT
BELT LINE RD STA 18+00 TO STA 26+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2276
TEL (214) 346-6200 FAX (214) 739-0055

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 SNPM 02	PM-2

PROJECT # 29350 OFFICE: RCH USER: dh1854
DATE: 1/20/2014 TIME: 11:09:01 AM FILE: 29350 SNPM 03.dgn





0 10 20 30 40 60
SCALE IN FEET

LEGEND

- (A) 4" WHITE BROKEN STRIPE 10' IN LENGTH WITH 30' GAPS SUPPLEMENTED BY TY-II-CR BUTTONS CENTERED ON GAP. CLEAR SIDE OF BUTTON SHALL FACE TRAFFIC FLOW. (SEE DETAIL 'A' ON SHEET DT-PM)
- (B) 12" WHITE SOLID REFLECTORIZED PAVEMENT MARKING
- (C) 24" WHITE SOLID REFLECTORIZED PAVEMENT MARKING
- (D) 4" WHITE DOT REFLECTORIZED PAVEMENT MARKING ("PUPPY TRACKS") (SEE DETAIL "F" ON SHEET DT-PM)
- (E) DOUBLE 4" YELLOW SOLID REFLECTORIZED PAVEMENT MARKING SUPPLEMENTED, BY TY-II-A-A BUTTONS. (SEE DETAIL 'B' ON SHEET DT-PM)
- (F) 8" WHITE SOLID REFLECTORIZED PAVEMENT MARKING SUPPLEMENTED BY TY I-C BUTTONS (SEE DETAIL "C" ON SHEET DT-PM)
- (G) WHITE REFLECTORIZED PAVEMENT MARKING WORD
- (H) WHITE REFLECTORIZED PAVEMENT MARKING ARROW
- (I) 4" ROUND NON-REFLECTIVE YELLOW MARKER AND YELLOW R.P.M. TYPE II-A-A (SEE DETAIL 'C' ON SHEET DT-PM)
- (J) WHITE REFLECTORIZED YIELD LINE (SEE DETAIL 'D' ON SHEET DT-PM)

NOTES:
ALL SIGNING AND STRIPING SHALL COMPLY WITH THE LATEST VERSION OF TMUTCD.

EXISTING SIGNAGE SHALL BE REUSED AND MOUNTED IN SAME LOCATION AFTER SIDEWALK DEMO AND RECONSTRUCTION. REFER TO BC(5)-07 OPTION 3 FOR SIGN MOUNT.

SHEET 55 OF 235

STATE OF TEXAS
M.E. ROMANOWSKI
94306
LICENSED PROFESSIONAL ENGINEER

1/20/14
P.E.
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

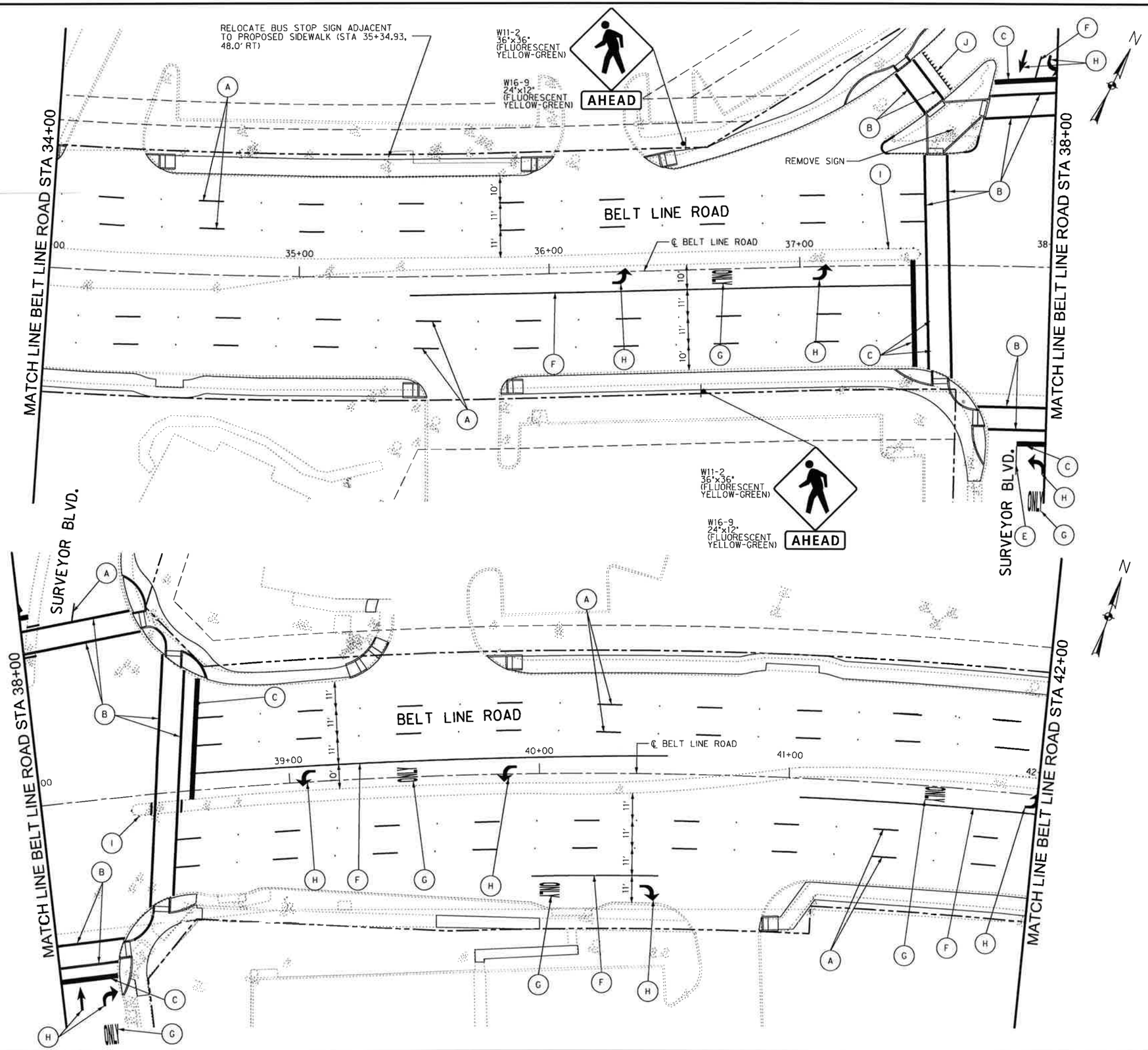
Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

STRIPING & SIGNAGE LAYOUT
BELT LINE RD STA 26+00 TO STA 34+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 SNPM 03	PM-3



0 10 20 30 40 60
SCALE IN FEET

LEGEND

- (A) 4" WHITE BROKEN STRIPE 10' IN LENGTH WITH 30' GAPS SUPPLEMENTED BY TY-II-CR BUTTONS CENTERED ON GAP. CLEAR SIDE OF BUTTON SHALL FACE TRAFFIC FLOW. (SEE DETAIL 'A' ON SHEET DT-PM)
- (B) 12" WHITE SOLID REFLECTORIZED PAVEMENT MARKING
- (C) 24" WHITE SOLID REFLECTORIZED PAVEMENT MARKING
- (D) 4" WHITE DOT REFLECTORIZED PAVEMENT MARKING ("PUPPY TRACKS") (SEE DETAIL "F" ON SHEET DT-PM)
- (E) DOUBLE 4" YELLOW SOLID REFLECTORIZED PAVEMENT MARKING SUPPLEMENTED, BY TY-II-A-A BUTTONS. (SEE DETAIL 'B' ON SHEET DT-PM)
- (F) 8" WHITE SOLID REFLECTORIZED PAVEMENT MARKING SUPPLEMENTED BY TY I-C BUTTONS (SEE DETAIL "G" ON SHEET DT-PM)
- (G) WHITE REFLECTORIZED PAVEMENT MARKING WORD
- (H) WHITE REFLECTORIZED PAVEMENT MARKING ARROW
- (I) 4" ROUND NON-REFLECTIVE YELLOW MARKER AND YELLOW R.P.M. TYPE II-A-A (SEE DETAIL 'C' ON SHEET DT-PM)
- (J) WHITE REFLECTORIZED YIELD LINE (SEE DETAIL 'D' ON SHEET DT-PM)

NOTES:
ALL SIGNING AND STRIPING SHALL COMPLY WITH THE LATEST VERSION OF TMUTCD.

EXISTING SIGNAGE SHALL BE REUSED AND MOUNTED IN SAME LOCATION AFTER SIDEWALK DEMO AND RECONSTRUCTION. REFER TO BC(5)-07 OPTION 3 FOR SIGN MOUNT.

M.E. ROMANOWSKI 56506 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

1/20/14
P.E. Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

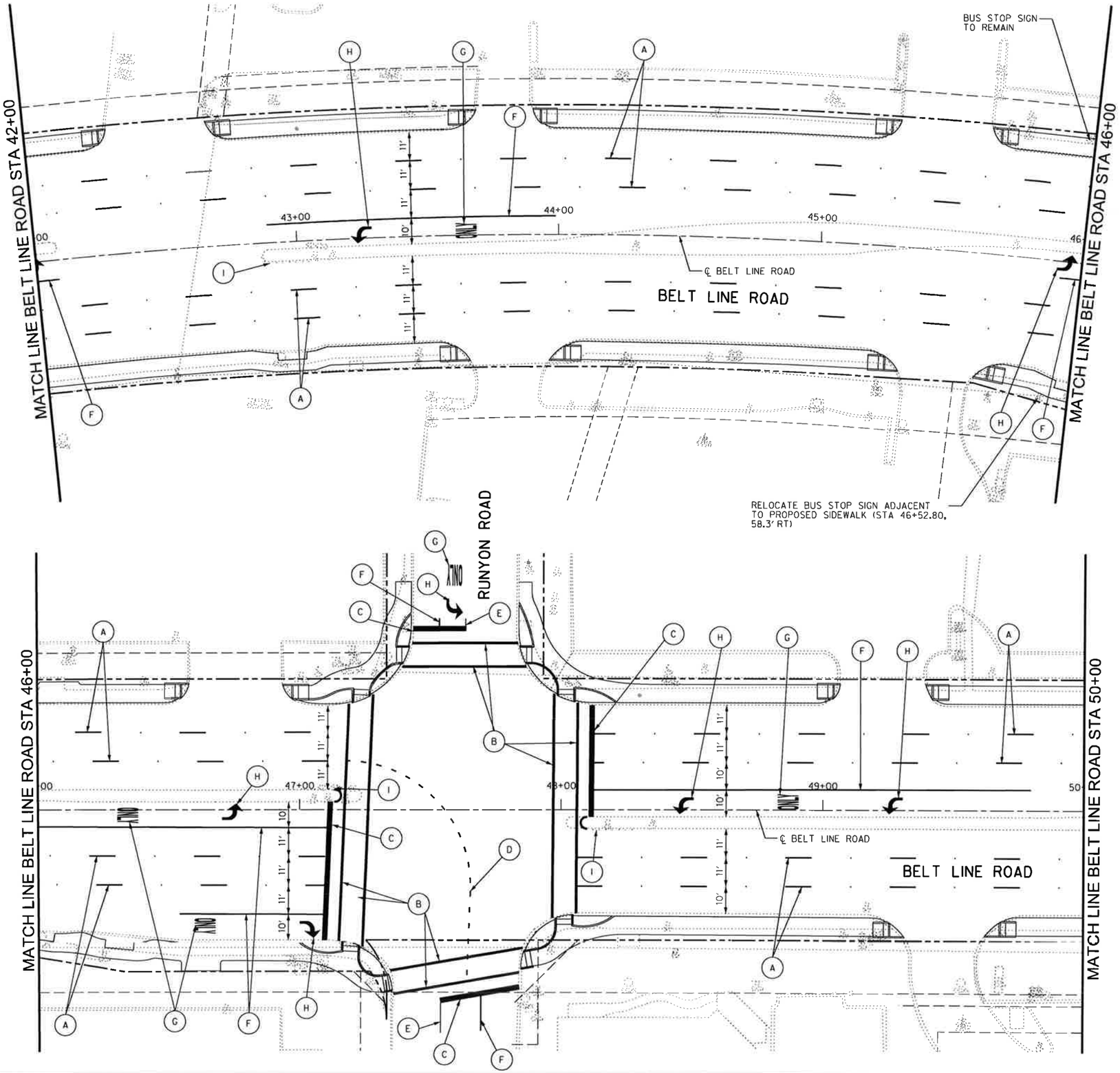
BELT LINE ROAD
UNDERGROUND ELECTRICAL

STRIPING & SIGNAGE LAYOUT BELT LINE RD STA 34+00 TO STA 42+00

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275 TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 SNPM 04	PM-4

SHEET 56 OF 235



LEGEND

- (A) 4" WHITE BROKEN STRIPE 10' IN LENGTH WITH 30' GAPS SUPPLEMENTED BY TY-II-CR BUTTONS CENTERED ON GAP. CLEAR SIDE OF BUTTON SHALL FACE TRAFFIC FLOW. (SEE DETAIL 'A' ON SHEET DT-PM)
- (B) 12" WHITE SOLID REFLECTORIZED PAVEMENT MARKING
- (C) 24" WHITE SOLID REFLECTORIZED PAVEMENT MARKING
- (D) 4" WHITE DOT REFLECTORIZED PAVEMENT MARKING ('PUPPY TRACKS') (SEE DETAIL 'F' ON SHEET DT-PM)
- (E) DOUBLE 4" YELLOW SOLID REFLECTORIZED PAVEMENT MARKING SUPPLEMENTED, BY TY-II-A-A BUTTONS. (SEE DETAIL 'B' ON SHEET DT-PM)
- (F) 8" WHITE SOLID REFLECTORIZED PAVEMENT MARKING SUPPLEMENTED BY TY I-C BUTTONS (SEE DETAIL 'C' ON SHEET DT-PM)
- (G) WHITE REFLECTORIZED PAVEMENT MARKING WORD
- (H) WHITE REFLECTORIZED PAVEMENT MARKING ARROW
- (I) 4" ROUND NON-REFLECTIVE YELLOW MARKER AND YELLOW R.P.M. TYPE II-A-A (SEE DETAIL 'C' ON SHEET DT-PM)
- (J) WHITE REFLECTORIZED YIELD LINE (SEE DETAIL 'D' ON SHEET DT-PM)

NOTES:
ALL SIGNING AND STRIPING SHALL COMPLY WITH THE LATEST VERSION OF TMUTCD.

EXISTING SIGNAGE SHALL BE REUSED AND MOUNTED IN SAME LOCATION AFTER SIDEWALK DEMO AND RECONSTRUCTION. REFER TO BC(5)-07 OPTION 3 FOR SIGN MOUNT.

SHEET 57 OF 235

M.E. ROMANOWSKI 56306 LICENSED PROFESSIONAL ENGINEER

1/20/14

Signature of Registrant, P.E. Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

STRIPING & SIGNAGE LAYOUT
BELT LINE RD STA 42+00 TO STA 50+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 SNPM 05	PM-5

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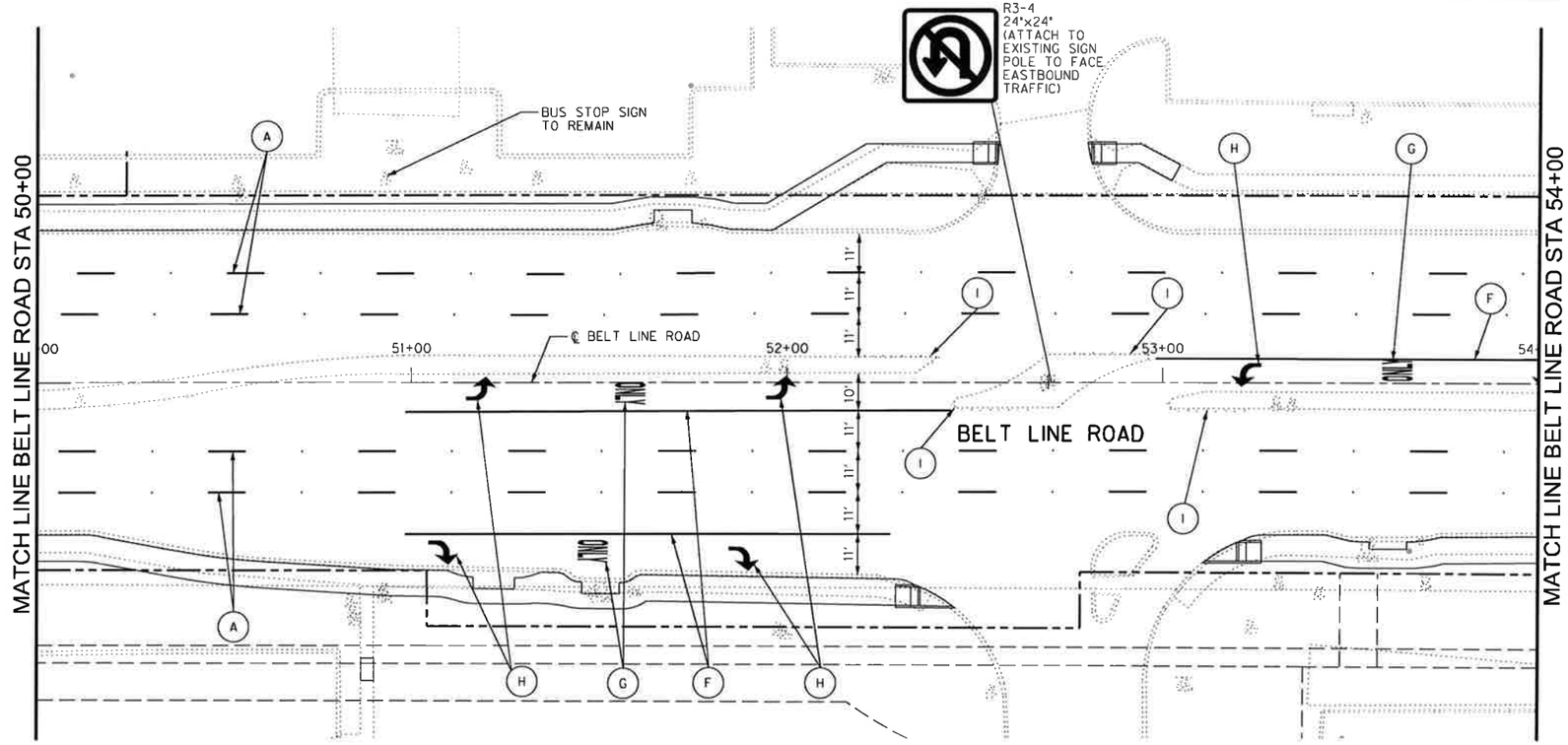
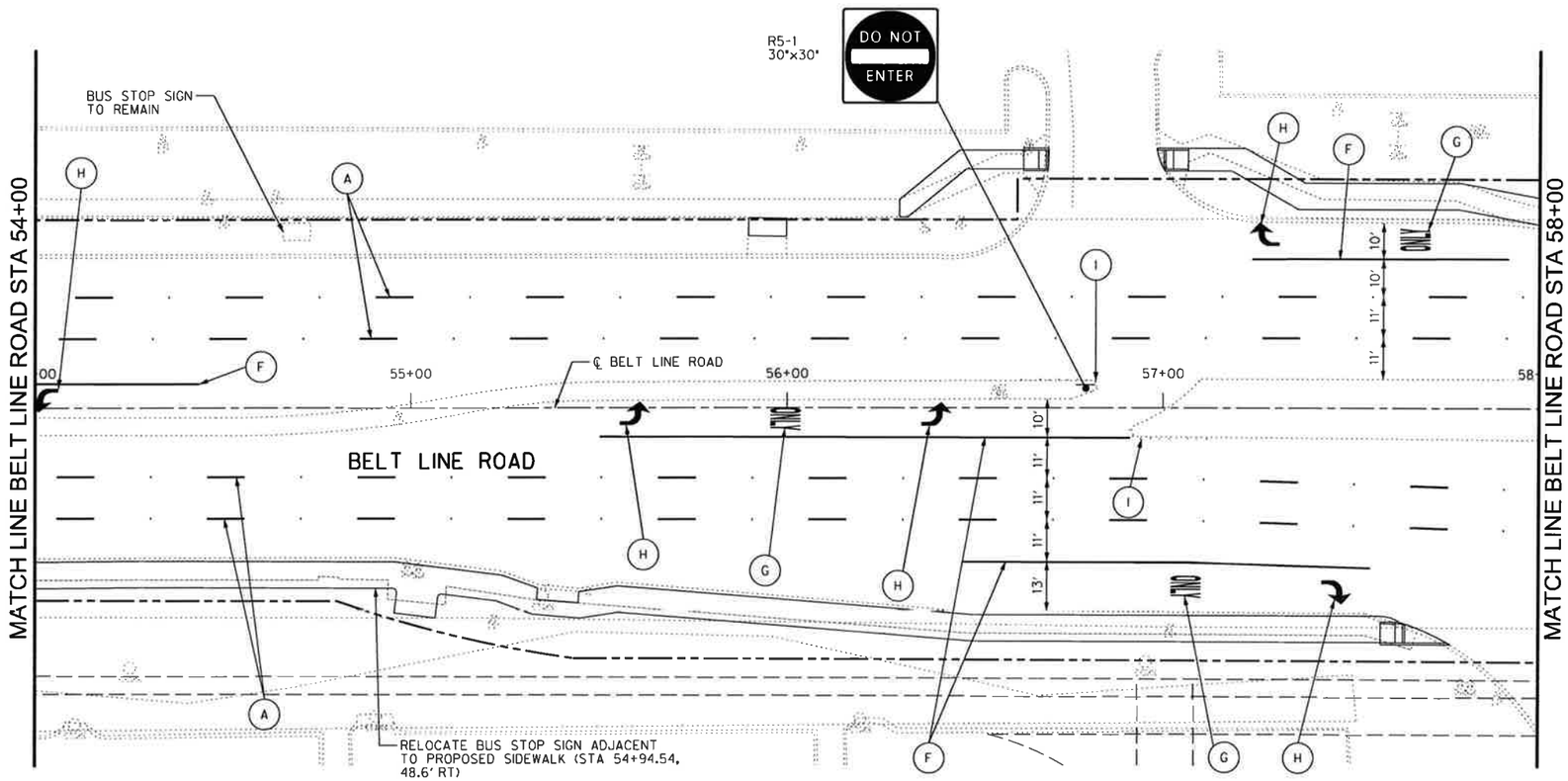
OFFICE: RCH
PROJECT # 29350
FILE: 29350 SNPM 06.dgn
TIME: 11:44:27 AM
DATE: 1/20/2014





N

0 10 20 30 40 60
SCALE IN FEET

LEGEND

- (A) 4" WHITE BROKEN STRIPE 10' IN LENGTH WITH 30' GAPS SUPPLEMENTED BY TY-II-CR BUTTONS CENTERED ON GAP. CLEAR SIDE OF BUTTON SHALL FACE TRAFFIC FLOW. (SEE DETAIL 'A' ON SHEET DT-PM)
- (B) 12" WHITE SOLID REFLECTORIZED PAVEMENT MARKING
- (C) 24" WHITE SOLID REFLECTORIZED PAVEMENT MARKING
- (D) 4" WHITE DOT REFLECTORIZED PAVEMENT MARKING ("PUPPY TRACKS") (SEE DETAIL "F" ON SHEET DT-PM)
- (E) DOUBLE 4" YELLOW SOLID REFLECTORIZED PAVEMENT MARKING SUPPLEMENTED BY TY-II-A-A BUTTONS. (SEE DETAIL 'B' ON SHEET DT-PM)
- (F) 8" WHITE SOLID REFLECTORIZED PAVEMENT MARKING SUPPLEMENTED BY TY I-C BUTTONS (SEE DETAIL "G" ON SHEET DT-PM)
- (G) WHITE REFLECTORIZED PAVEMENT MARKING WORD
- (H) WHITE REFLECTORIZED PAVEMENT MARKING ARROW
- (I) 4" ROUND NON-REFLECTIVE YELLOW MARKER AND YELLOW R.P.M. TYPE II-A-A (SEE DETAIL 'C' ON SHEET DT-PM)
- (J) WHITE REFLECTORIZED YIELD LINE (SEE DETAIL 'D' ON SHEET DT-PM)

NOTES:
ALL SIGNING AND STRIPING SHALL COMPLY WITH THE LATEST VERSION OF TMUTCD.

EXISTING SIGNAGE SHALL BE REUSED AND MOUNTED IN SAME LOCATION AFTER SIDEWALK DEMO AND RECONSTRUCTION. REFER TO BC(5)-07 OPTION 3 FOR SIGN MOUNT.

SHEET 58 OF 235

STATE OF TEXAS
M.E. ROMANOWSKI
56306
LICENSED
PROFESSIONAL ENGINEER

1/20/14
P.E. Date
Signature of Registrant

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

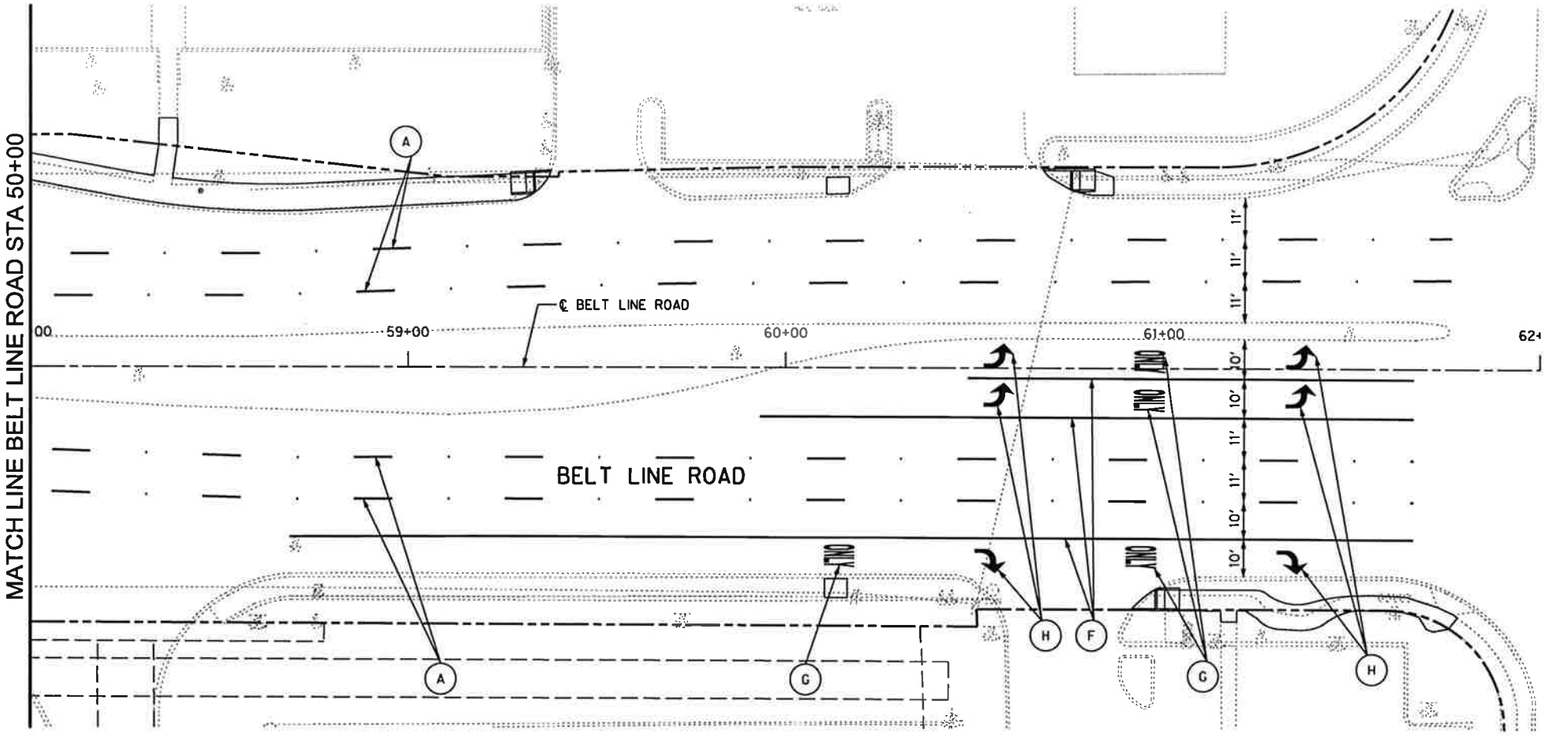
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

STRIPING & SIGNAGE LAYOUT
BELT LINE RD STA 50+00 TO STA 58+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 SNPM 06	PM-6



N

0 10 20 30 40 60
SCALE IN FEET

LEGEND

- (A) 4" WHITE BROKEN STRIPE 10' IN LENGTH WITH 30' GAPS SUPPLEMENTED BY TY-II-CR BUTTONS CENTERED ON GAP. CLEAR SIDE OF BUTTON SHALL FACE TRAFFIC FLOW. (SEE DETAIL 'A' ON SHEET DT-PM)
- (B) 12" WHITE SOLID REFLECTORIZED PAVEMENT MARKING
- (C) 24" WHITE SOLID REFLECTORIZED PAVEMENT MARKING
- (D) 4" WHITE DOT REFLECTORIZED PAVEMENT MARKING ("PUPPY TRACKS") (SEE DETAIL "F" ON SHEET DT-PM)
- (E) DOUBLE 4" YELLOW SOLID REFLECTORIZED PAVEMENT MARKING SUPPLEMENTED, BY TY-II-A-A BUTTONS. (SEE DETAIL 'B' ON SHEET DT-PM)
- (F) 8" WHITE SOLID REFLECTORIZED PAVEMENT MARKING SUPPLEMENTED BY TY I-C BUTTONS (SEE DETAIL "C" ON SHEET DT-PM)
- (G) WHITE REFLECTORIZED PAVEMENT MARKING WORD
- (H) WHITE REFLECTORIZED PAVEMENT MARKING ARROW
- (I) 4" ROUND NON-REFLECTIVE YELLOW MARKER AND YELLOW R.P.M. TYPE II-A-A (SEE DETAIL 'C' ON SHEET DT-PM)
- (J) WHITE REFLECTORIZED YIELD LINE (SEE DETAIL 'D' ON SHEET DT-PM)

NOTES:
ALL SIGNING AND STRIPING SHALL COMPLY WITH THE LATEST VERSION OF TMUTCD.

EXISTING SIGNAGE SHALL BE REUSED AND MOUNTED IN SAME LOCATION AFTER SIDEWALK DEMO AND RECONSTRUCTION. REFER TO BC(5)-07 OPTION 3 FOR SIGN MOUNT.

SHEET 59 OF 235

STATE OF TEXAS
M.E. ROMANOWSKI
96306
LICENSED
PROFESSIONAL ENGINEER

P.E. 10/25/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

STRIPING & SIGNAGE LAYOUT
BELT LINE RD STA 58+00 TO STA 62+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
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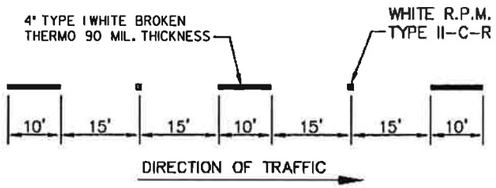
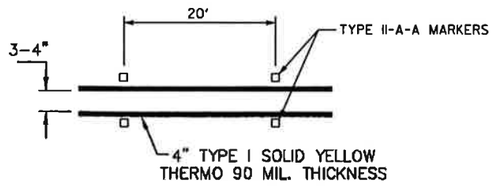


DETAIL "A"
N.T.S.



DETAIL "B"
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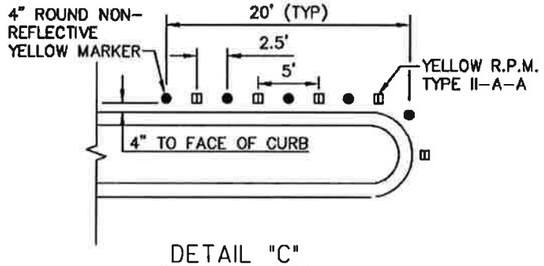
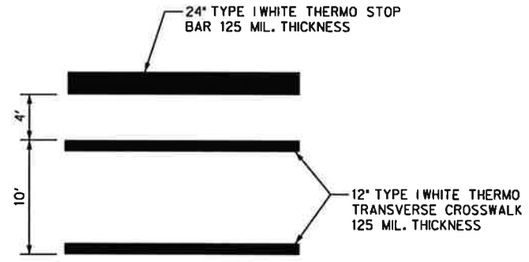


DETAIL "C"
N.T.S.

FOR POSTED SPEED ON ROAD BEING MARKED EQUAL TO OR LESS THAN 40 MPH

YIELD LINES

DETAIL "D"
N.T.S.



DETAIL "E"
CROSSWALK STRIPING LAYOUT
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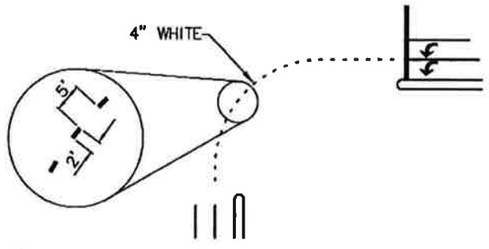

"PUPPY TRACK" MARKING LAYOUT

DETAIL "F"
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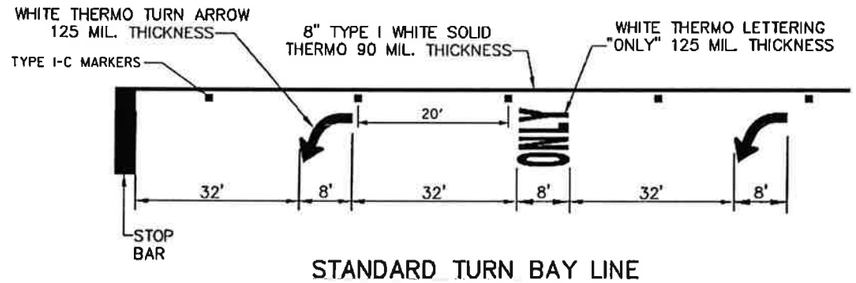

STANDARD TURN BAY LINE

DETAIL "G"
N.T.S.

P.E. 10/25/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

PAVEMENT MARKING DETAILS

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29530 DTSN 01	DT-PM

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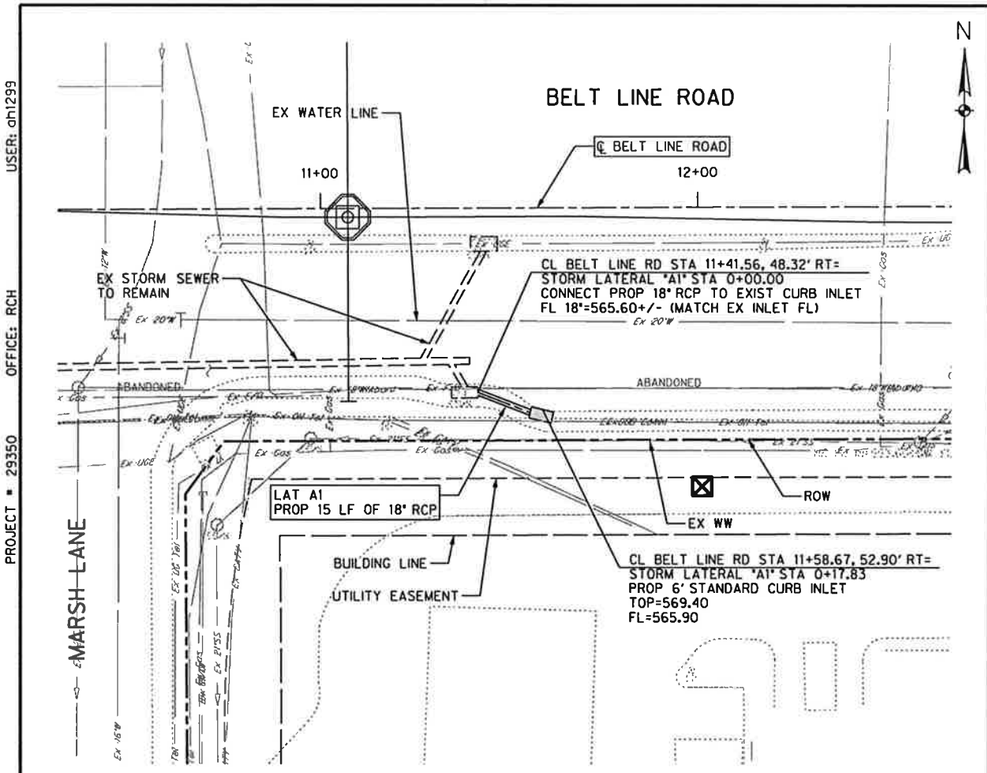
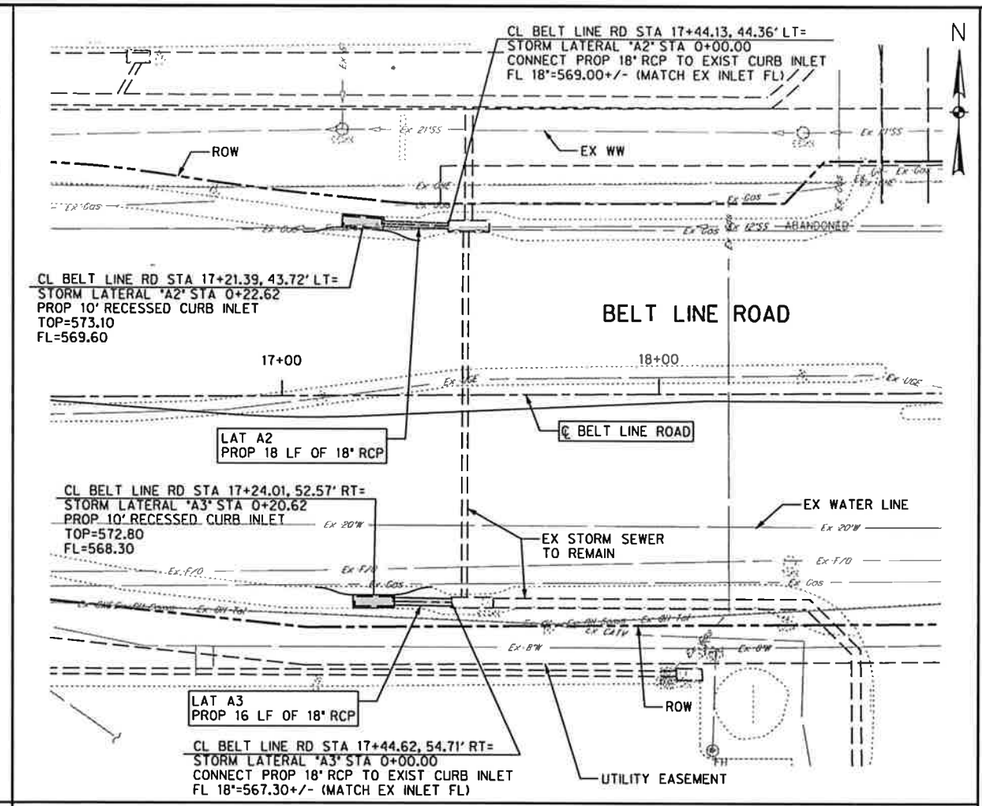
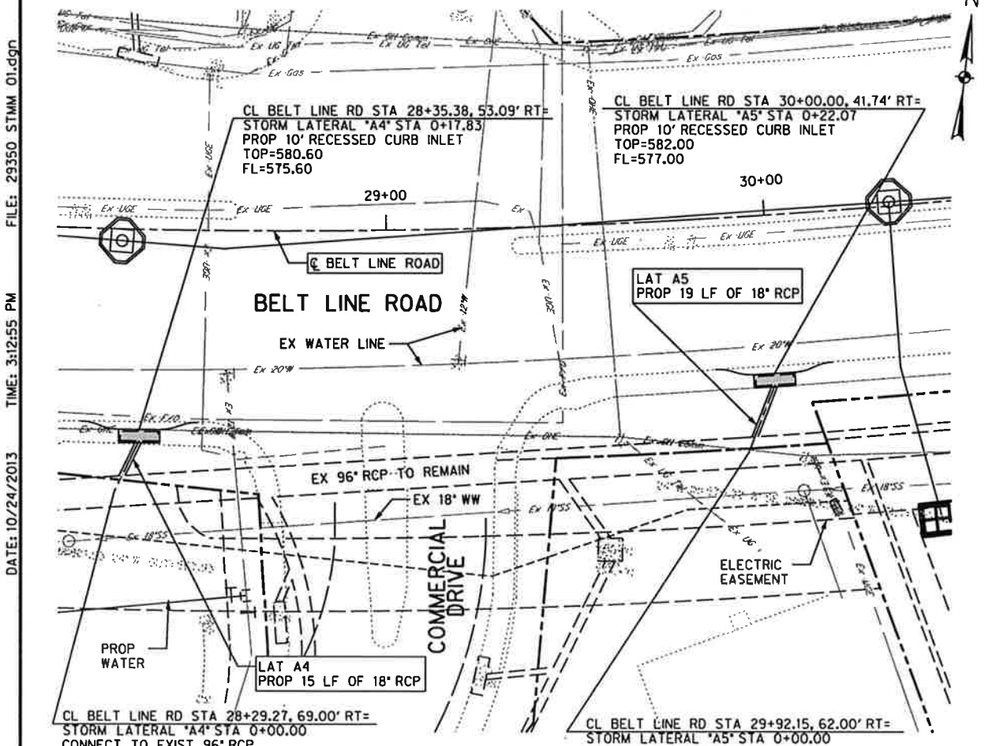
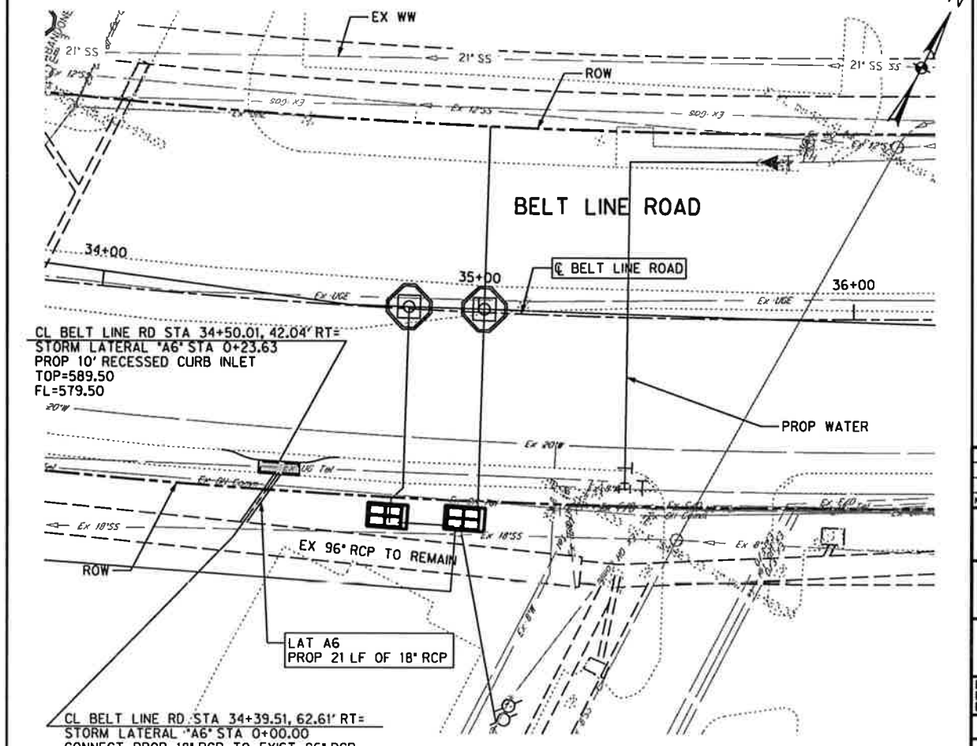
OFFICE: RCH
PROJECT # 29350
FILE: 29350 DTSN 01.dgn
TIME: 3:12:51 PM
DATE: 10/24/2013









0 10 20 30 40 60
SCALE IN FEET

SHEET 61 OF 235

STATE OF TEXAS
MANUS CHAIPRASERT
94638
LICENSED
PROFESSIONAL ENGINEER

Manu Chaiprasert, P.E. 10/25/2013
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

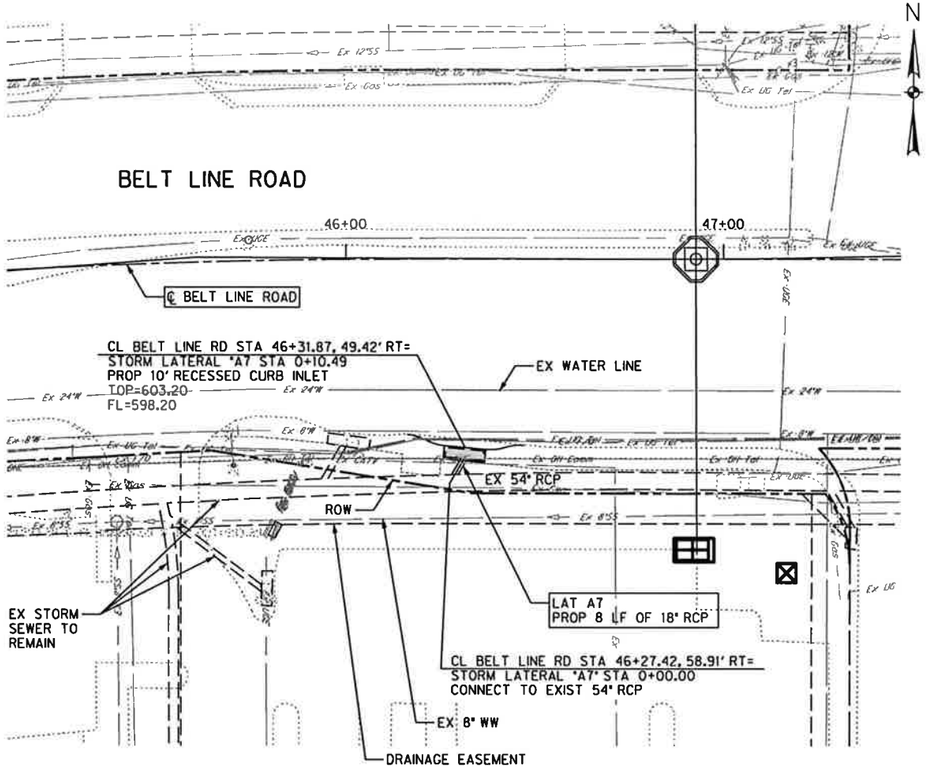
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

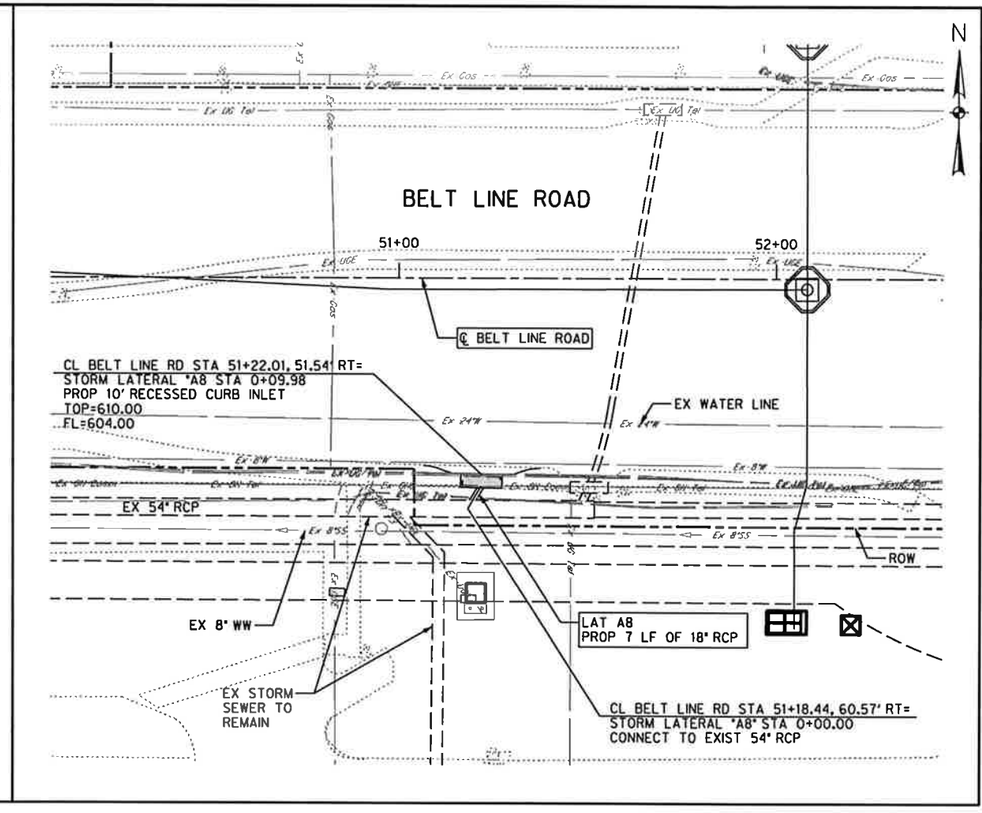
BELT LINE ROAD
UNDERGROUND ELECTRICAL

STORM DRAIN PLAN

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 STMM 01	STM-1





0 10 20 30 40 60
SCALE IN FEET

SHEET 62 OF 235

USER: dh1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 STMM 02.dgn
TIME: 3:12:56 PM
DATE: 10/24/2013

MANUS CHAPRASERT
94638
LICENSED
PROFESSIONAL ENGINEER

Manus Chaprasert P.E. 10/25/2013
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

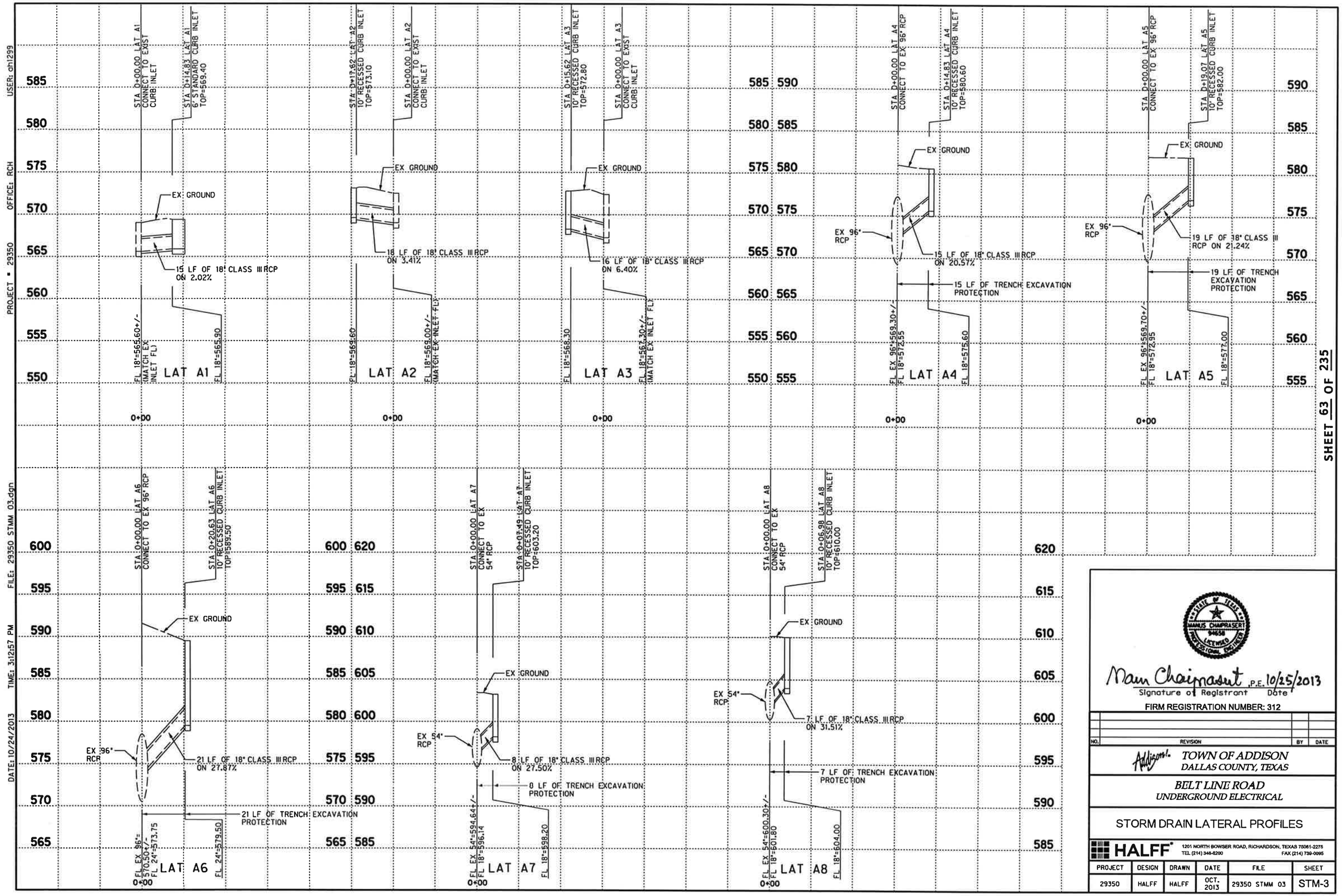
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

STORM DRAIN PLAN

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 STMM 02	STM-2



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OFFICE: RCH
PROJECT # 29350
FILE: 29350 STMM 03.dgn
TIME: 3:12:57 PM
DATE: 10/24/2013

SHEET 63 OF 235

Nam Chaipraserd, P.E. 10/25/2013
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

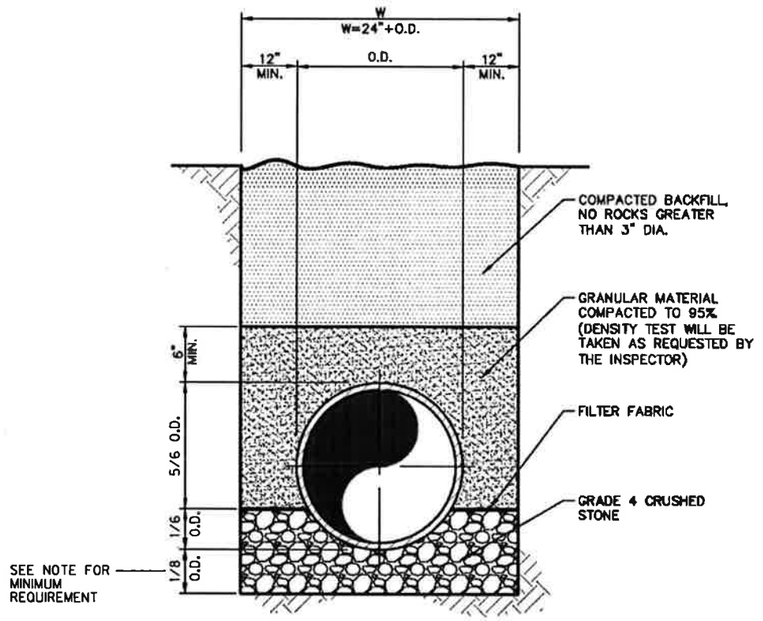
STORM DRAIN LATERAL PROFILES

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 STMM 03	STM-3

STORM SEWER - GENERAL NOTES:

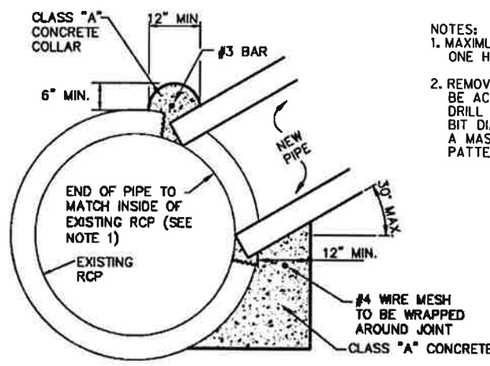
1. ALL CONCRETE DRAINAGE STRUCTURES SHALL BE CLASS C CONCRETE MINIMUM.
2. ALL CRUSHED STONE SHALL BE 3/4", PASSING #4 SIEVE (GRADE 4)
3. ALL FIELD JOINTS WILL BE APPROVED BY THE TOWN ENGINEER. FIELD JOINTS SHALL BE WIPED ON THE INSIDE AND OUTSIDE TO PROVIDE FOR SMOOTH FLOW OF WATER.
4. RAMNECK COMPOUND OR APPROVED EQUAL SHALL BE USED FOR JOINT SEALS.
5. PROPOSED STORM SEWER PIPE SHALL BE CAMERA INSPECTED AFTER THE INSTALLATION OF ALL PAVING AND UTILITIES AND PRIOR TO FINAL ACCEPTANCE OF THE PROJECT.



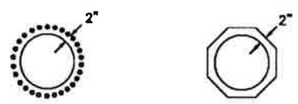
RCP STORM SEWER PIPE BEDDING
NTS

NOTE:
1. THE DEPTH OF TRENCH BELOW THE PROPOSED CONDUIT SHALL BE AS FOLLOWS:
   - 3" MIN. FOR 27" PIPE & SMALLER.
   - 4" MIN. FOR 30" TO 60" PIPE.
   - 6" MIN. FOR 66" PIPE OR LARGER.

RCP STORM SEWER PIPE BEDDING
N.T.S.



NOTES:
1. MAXIMUM DIAMETER OF NEW PIPE EQUALS ONE HALF OF EXISTING PIPE'S DIAMETER.
2. REMOVAL OF PLUG FROM EXISTING RCP TO BE ACCOMPLISHED BY USING A MASONRY DRILL AT A SPACING EQUAL TO THE DRILL BIT DIAMETER IN A CIRCULAR PATTERN OR A MASONRY SAW IN AN OCTAGONAL PATTERN PER DETAIL.



CONNECTION TO EXISTING RCP STORM DRAIN
NTS

STATE OF TEXAS — MANUS CHAMPAGNE — 94858 — LICENSED — PROFESSIONAL ENGINEER

Manus Champagne P.E. 10/25/2013
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

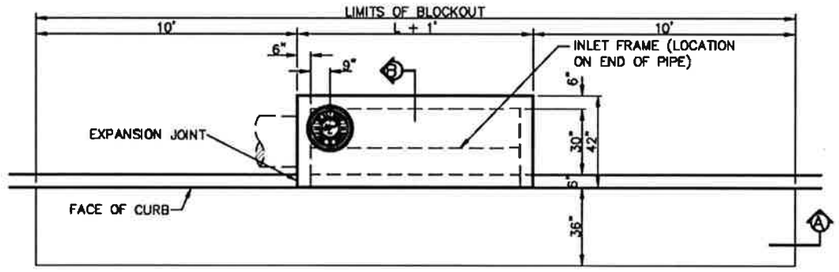
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

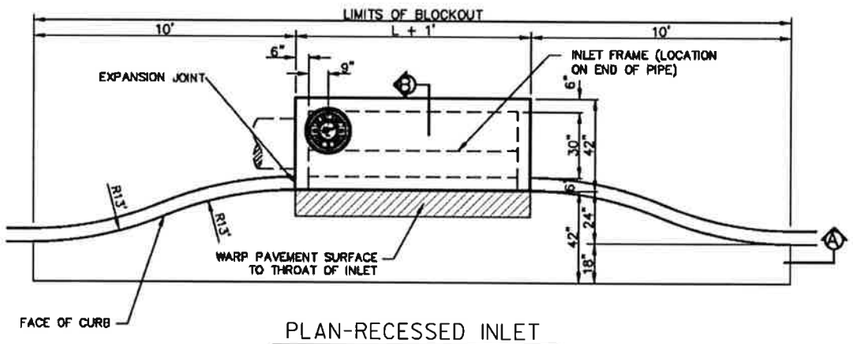
STORM DRAIN DETAILS

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

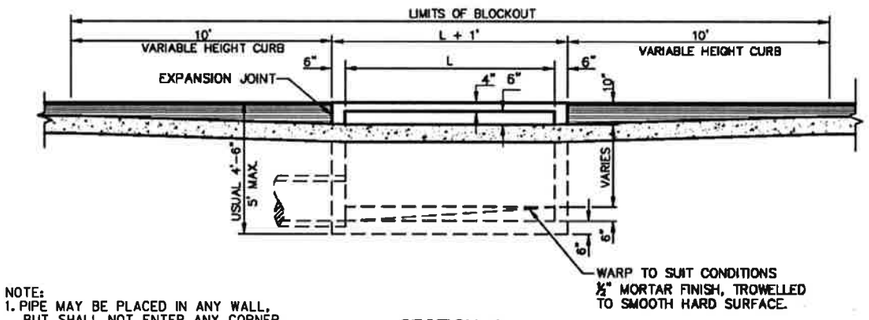
PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29530 STMD 03	DT-SD1



PLAN-STANDARD INLET
NTS



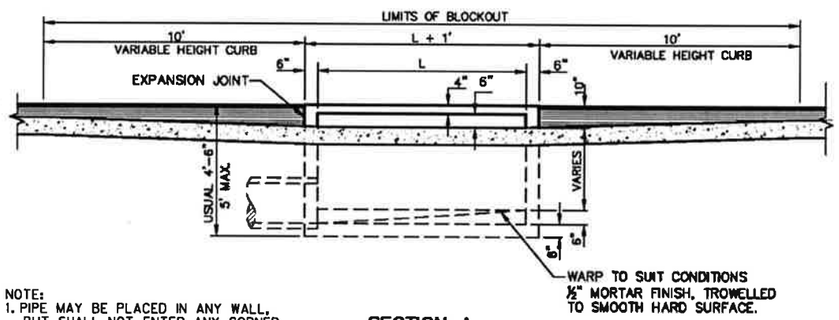
PLAN-RECESSED INLET
N.T.S.



NOTE:
1. PIPE MAY BE PLACED IN ANY WALL, BUT SHALL NOT ENTER ANY CORNER OR BOTTOM.
2. #3 BAR 18" O.C.E.W. IN BLOCK OUT DRILLED INTO EXISTING CONCRETE.
3. BACKFILL AROUND INLET SHALL BE FLOWABLE BACKFILL PER NCTCOG 504.2.3.4.

SECTION A
NTS

STANDARD CURB INLET
N.T.S.



NOTE:
1. PIPE MAY BE PLACED IN ANY WALL, BUT SHALL NOT ENTER ANY CORNER OR BOTTOM.
2. #3 BAR 18" O.C.E.W. IN BLOCK OUT DRILLED INTO EXISTING CONCRETE.
3. BACKFILL AROUND INLET SHALL BE FLOWABLE BACKFILL PER NCTCOG 504.2.3.4.

SECTION A
NTS

RECESSED CURB INLET
N.T.S.

STATE OF TEXAS
MANUS CHAPRASERT
94658
LICENSED
PROFESSIONAL ENGINEER

Manu Chaprasert P.E. 10/25/2013
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

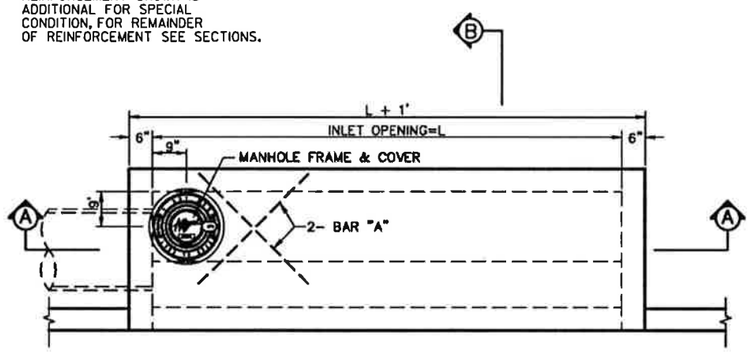
BELT LINE ROAD
UNDERGROUND ELECTRICAL

STORM DRAIN DETAILS

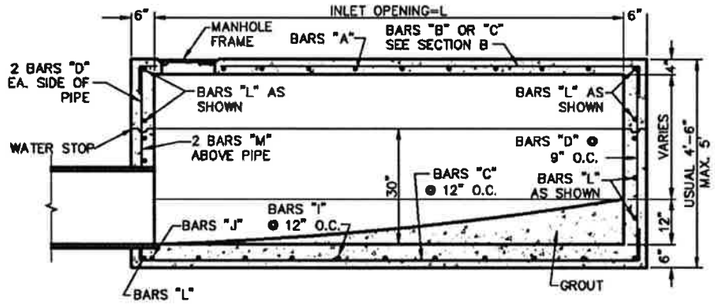
HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29530 STMD 04	DT-SD2

NOTE:
REINFORCEMENT SHOWN IS ADDITIONAL FOR SPECIAL CONDITION, FOR REMAINDER OF REINFORCEMENT SEE SECTIONS.

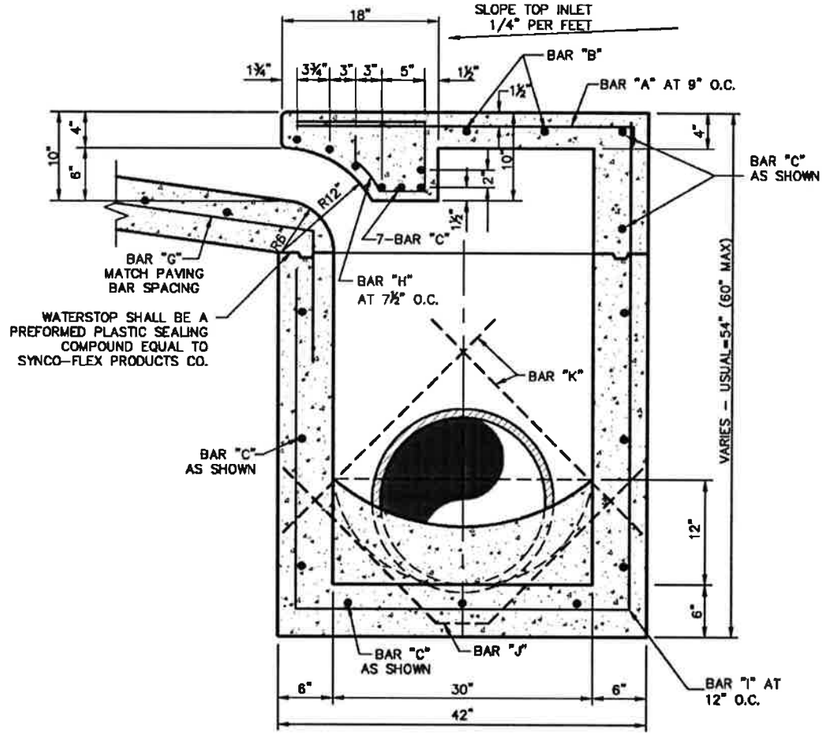


PLAN–STANDARD INLET
NTS



SECTION A
NTS

STANDARD & RECESSED CURB INLET 4, 6, 8 & 10 FOOT INLETS
N.T.S.



SECTION "B"
NTS

TYPICAL SECTION "B"
STANDARD & RECESSED CURB INLETS
(4, 6, 8 & 10 FOOT INLETS)
N.T.S.

REINFORCING STEEL SCHEDULE
DIMENSIONS SHOWN ARE FOR MAXIMUM SIZE INLET

INLET LENGTH	BAR TYPE	BAR DIA. (1/8")	NO REQ'D	BAR DIMENSIONS A	B	C
4'	A	3	6	3'–2"	0'–3"	–
	B	3	2	2'–10"	–	–
	C	4	18	4'–8"	0'–6"	–
	D	4	9	4'–8"	–	–
	G	3	4	2'–0"	1'–3"	–
	H	3	7	•	•	•
	I	4	3	3'–2"	3'–2"	4'–8"
	J	5	1	•	•	•
	K	5	2	3'–2"	0'–6"	–
	L	4	11	3'–2"	0'–6"	–
	M	4	2	3'–0"**	–	–
6'	A	3	9	3'–2"	0'–3"	–
	B	3	2	4'–10"	–	–
	C	4	18	6'–8"	0'–6"	–
	D	4	9	4'–8"	–	–
	G	3	6	2'–0"	1'–3"	–
	H	3	11	•	•	•
	I	4	5	3'–2"	3'–2"	4'–8"
	J	5	1	•	•	•
	K	5	2	3'–2"	0'–6"	–
	L	4	11	3'–2"	0'–6"	–
	M	4	2	3'–0"**	–	–
8'	A	3	12	3'–2"	0'–3"	–
	B	3	2	6'–10"	–	–
	C	4	18	8'–8"	0'–6"	–
	D	4	9	4'–8"	–	–
	G	3	7	2'–0"	1'–3"	–
	H	3	14	•	•	•
	I	4	7	3'–2"	3'–2"	4'–8"
	J	5	1	•	•	•
	K	5	2	3'–2"	0'–6"	–
	L	4	11	3'–2"	0'–6"	–
	M	4	2	3'–0"**	–	–
10'	A	3	15	3'–2"	0'–3"	–
	B	3	2	6'–10"	–	–
	C	4	18	10'–8"	0'–6"	–
	D	4	9	4'–8"	–	–
	G	3	9	2'–0"	1'–3"	–
	H	3	17	•	•	•
	I	4	9	3'–2"	3'–2"	4'–8"
	J	5	1	•	•	•
	K	5	2	3'–2"	0'–6"	–
	L	4	11	3'–2"	0'–6"	–
	M	4	2	3'–0"**	–	–

* SEE DIAGRAM FOR DIMENSIONS
** FIELD CUT AS REQUIRED TO ACCOMMODATE DRAIN PIPE

REINFORCING STEEL SCHEDULE
4, 6, 8 & 10 FOOT INLETS
N.T.S.

STATE OF TEXAS
MANUS CHAIPRASERT
94638
LICENSED
PROFESSIONAL ENGINEER

Manus Chaiprasert ,P.E. 10/25/2013
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

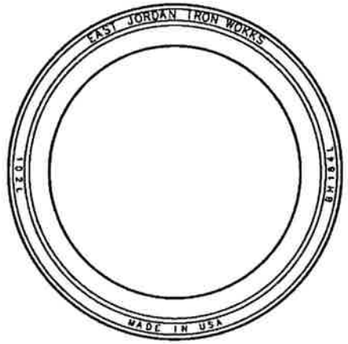
BELT LINE ROAD
UNDERGROUND ELECTRICAL

STORM DRAIN DETAILS

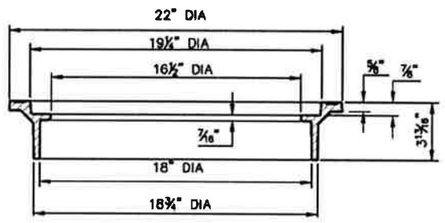
HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29530 STMD 05	DT-SD3

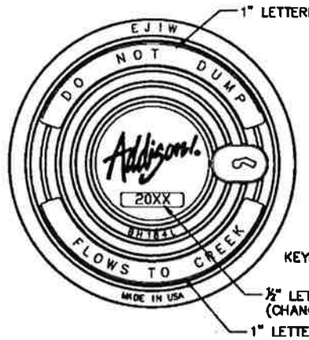
SHEET 66 OF 235



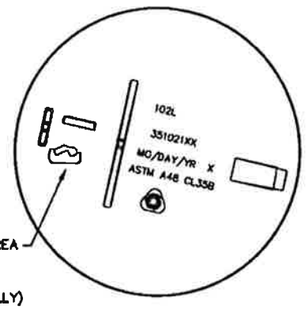
RING



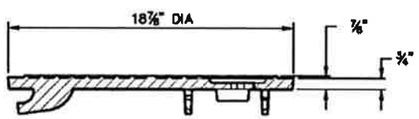
RING SECTION



COVER



COVER BOTTOM VIEW



COVER SECTION

NOTE:
FRAME AND COVER SHALL BE EAST JORDAN IRON WORKS FRAME PRODUCT #35202000 AND COVER PRODUCT #NCR08-0060B OR APPROVED EQUAL AND SHALL BE GRAY CAST IRON CONFORMING TO ASTM A48-CL35B.

INLET FRAME & COVER
N.T.S.

MANUS CHAMPRASERT 94658 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

Manus Champrasert, P.E. 10/25/2013
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

STORM DRAIN DETAILS

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29530 STMD 04	DT-SD4

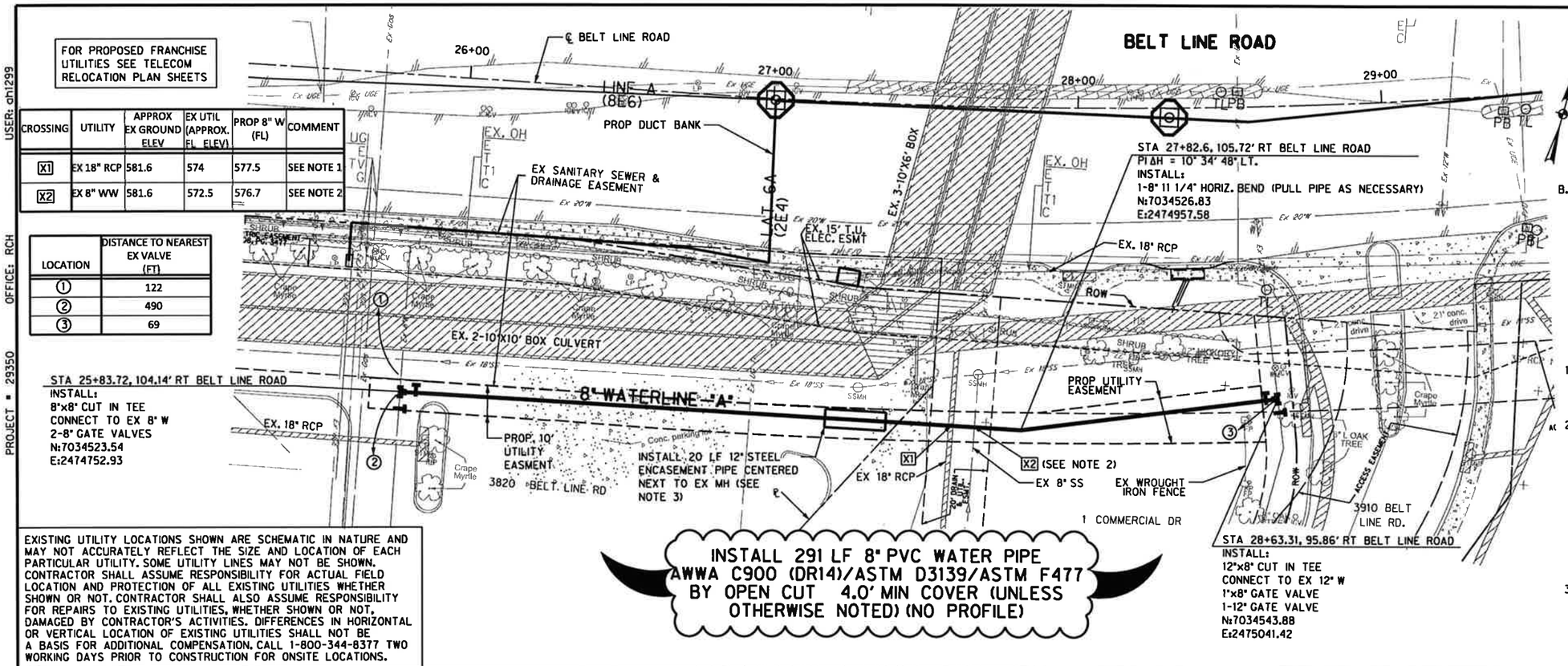
PROJECT # 29350 OFFICE: RCH USER: ah1299
FILE: 29350 STMD 04.dgn
TIME: 3:13:05 PM
DATE: 10/24/2013

FOR PROPOSED FRANCHISE UTILITIES SEE TELECOM RELOCATION PLAN SHEETS

CROSSING	UTILITY	APPROX EX GROUND ELEV	EX UTIL (APPROX. FL ELEV)	PROP 8" W (FL)	COMMENT
X1	EX 18" RCP	581.6	574	577.5	SEE NOTE 1
X2	EX 8" WW	581.6	572.5	576.7	SEE NOTE 2

LOCATION	DISTANCE TO NEAREST EX VALVE (FT)
①	122
②	490
③	69

EXISTING UTILITY LOCATIONS SHOWN ARE SCHEMATIC IN NATURE AND MAY NOT ACCURATELY REFLECT THE SIZE AND LOCATION OF EACH PARTICULAR UTILITY. SOME UTILITY LINES MAY NOT BE SHOWN. CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ACTUAL FIELD LOCATION AND PROTECTION OF ALL EXISTING UTILITIES WHETHER SHOWN OR NOT. CONTRACTOR SHALL ALSO ASSUME RESPONSIBILITY FOR REPAIRS TO EXISTING UTILITIES, WHETHER SHOWN OR NOT, DAMAGED BY CONTRACTOR'S ACTIVITIES. DIFFERENCES IN HORIZONTAL OR VERTICAL LOCATION OF EXISTING UTILITIES SHALL NOT BE A BASIS FOR ADDITIONAL COMPENSATION. CALL 1-800-344-8377 TWO WORKING DAYS PRIOR TO CONSTRUCTION FOR ONSITE LOCATIONS.

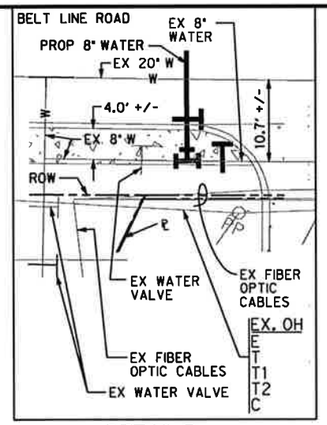


NOTES:

1) 3.0' MIN. COVER AT EX. STORM SEWER CROSSING. MINIMUM OF 1.0' OF CLEARANCE BETWEEN PROPOSED WATER AND EXISTING STORM.

2) CROSSING TO MEET TCEQ STANDARDS FOR CROSSING EXISTING NON PRESSURE RATED WASTEWATER MAIN. CENTER ONE SEGMENT OF PIPE OVER WASTEWATER MAIN SO THAT THE JOINTS OF THE WATERLINE PIPE ARE EQUIDISTANT AND AT LEAST NINE FEET HORIZONTALLY FROM CENTERLINE OF WASTEWATER MAIN. MINIMUM 2.0' OF CLEARANCE BETWEEN PROPOSED WATER AND EXISTING WASTEWATER MAIN. IF THE EXIST. WASTEWATER MAIN OR LATERAL IS DISTURBED OR SHOWS SIGNS OF LEAKING IT SHALL BE REAPLACED FOR AT LEAST NINE FT (18' TOTAL) IN BOTH DIRECTION WITH AT LEAST 150 PSI PRESSURE RATED PIPE.

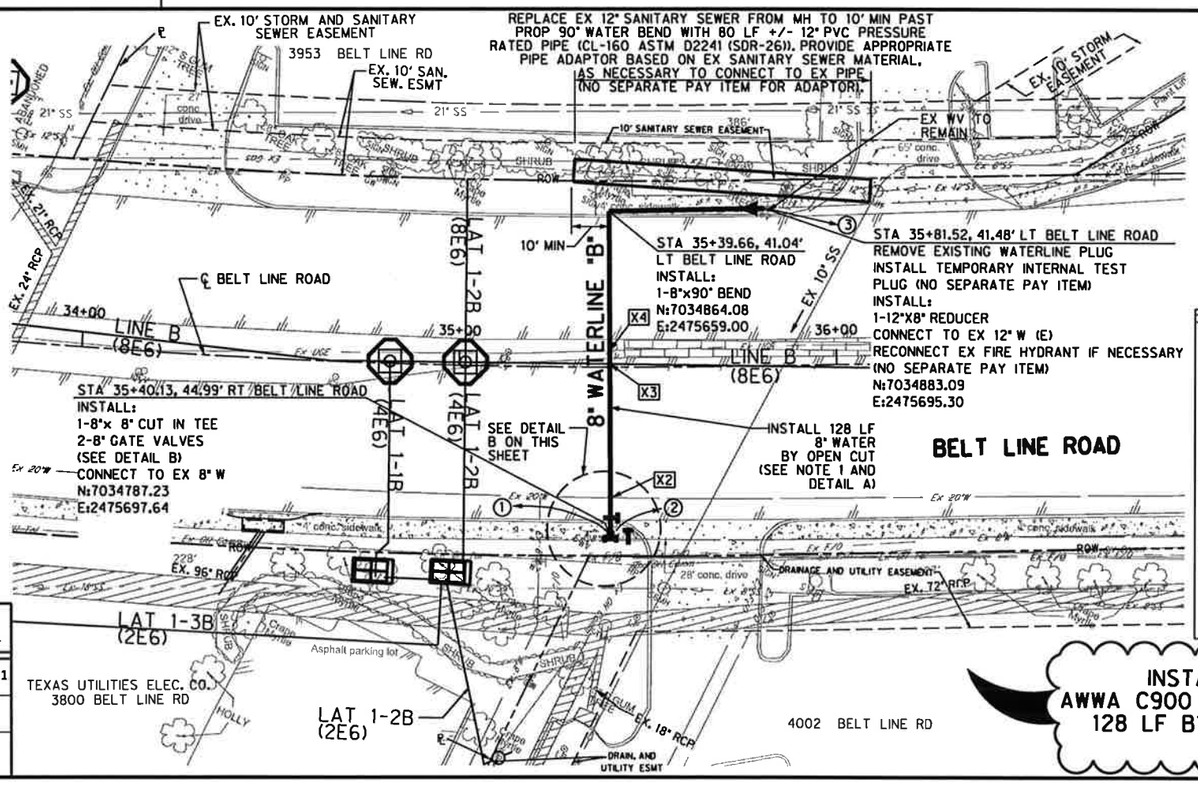
3) CARRIER PIPE TO BE SUPPORTED AT FIVE FOOT INTERNALS WITH SPACERS OR FILLED TO THE SPRING LINE WITH WASHED SAND OR GROUT. ENDS TO BE SEALED WITH CEMENT GROUT OR MANUFACTURED SEALERS PER TCEQ REQUIREMENTS.



DETAIL B
N.T.S.

LOCATION	DISTANCE TO NEAREST EX VALVE (FT)
①	6
②	1300
③	260

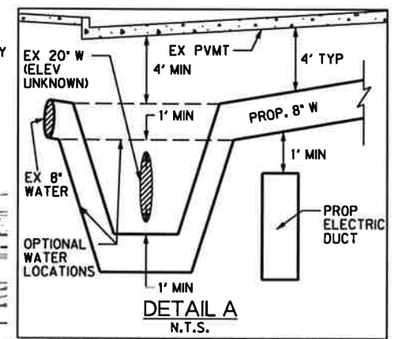
CROSSING	UTILITY	APPROX EX GROUND ELEV	UTIL ELEV	8" W PROP. FL
X2	EX 20"W	590.6	UNKNOWN	SEE NOTE 1
X3	PROP 8E6 DUCT	591.5	580.5 (TOP)	4' MIN. COVER
X4	EX UGE	592	UNKNOWN	4' MIN. COVER



NOTES:

1) CONTRACTOR TO DETERMINE HORIZONTAL AND VERTICAL ELEVATION OF EX 20" W PRIOR TO CONSTRUCTION. INSTALL 8" WATER WITH MIN 1' OF VERTICAL CLEARANCE WITH EX 20" WATER. UTILIZE 4-8"x45° VERTICAL BENDS IF NECESSARY TO LOWER WATER UNDER 20" W. (SEE DETAIL A)

2) CONTRACTOR TO INSTALL TEMPORARY INTERNAL TEST PLUGS AS NECESSARY TO MEET TESTING REQUIREMENTS (NO SEPARATE PAY ITEM).



DETAIL A
N.T.S.

INSTALL 8" PVC WATER PIPE AWWA C900 (DR14)/ASTM D3139/ASTM F477 128 LF BY OPEN CUT (4.0' MIN COVER) (NO PROFILE)

STATE OF TEXAS — K. T. KUNZ — 58430 — LICENSED PROFESSIONAL ENGINEER

K. T. Kunz, P.E. 11/7/2013
Signature of Registrant — Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

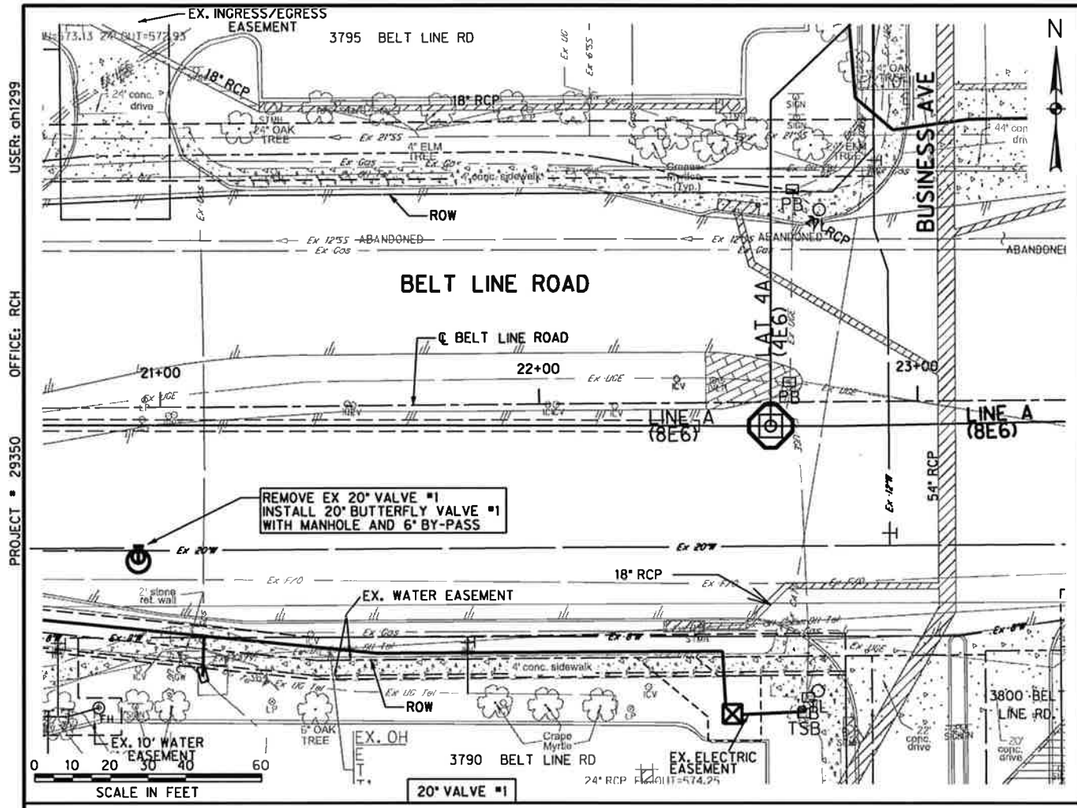
WATER LINE "A" & "B" PLAN

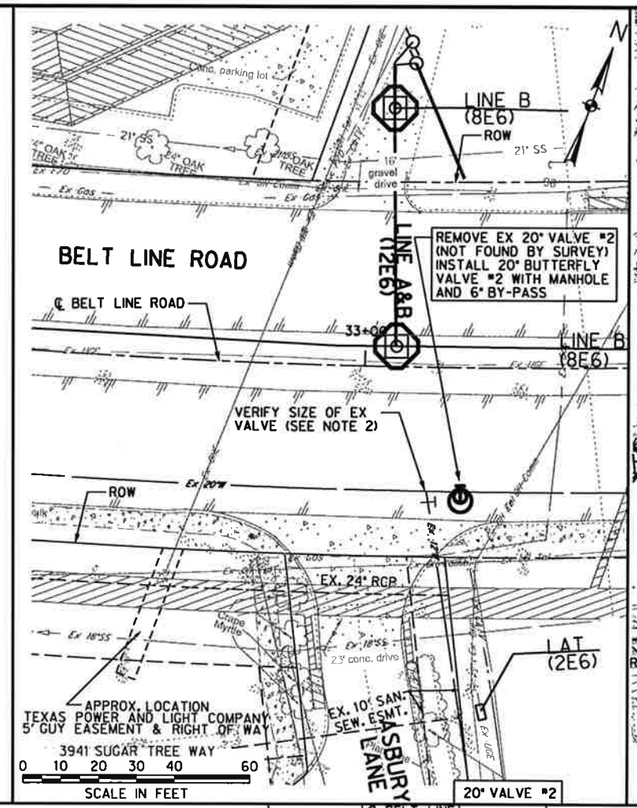
HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

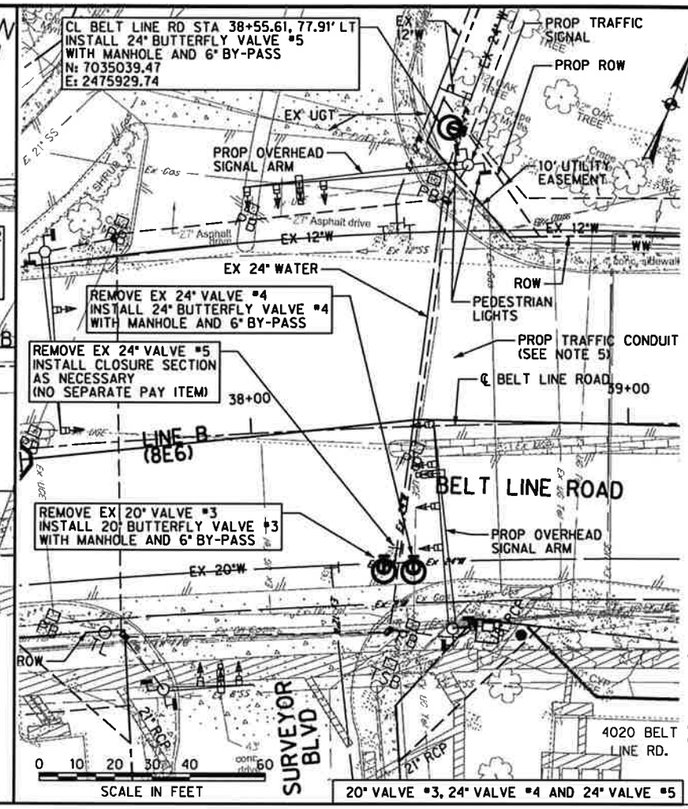
PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 WTR 01	WTR-1

SHEET 68 OF 235

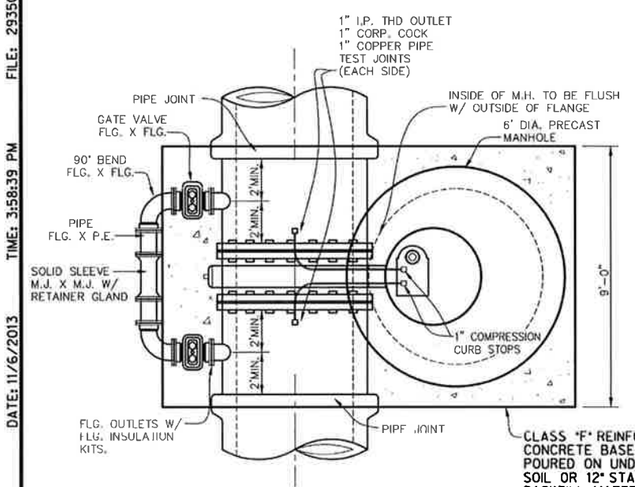
USER: dh1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 WTR 01.dgn
TIME: 4:19:47 PM
DATE: 11/6/2013



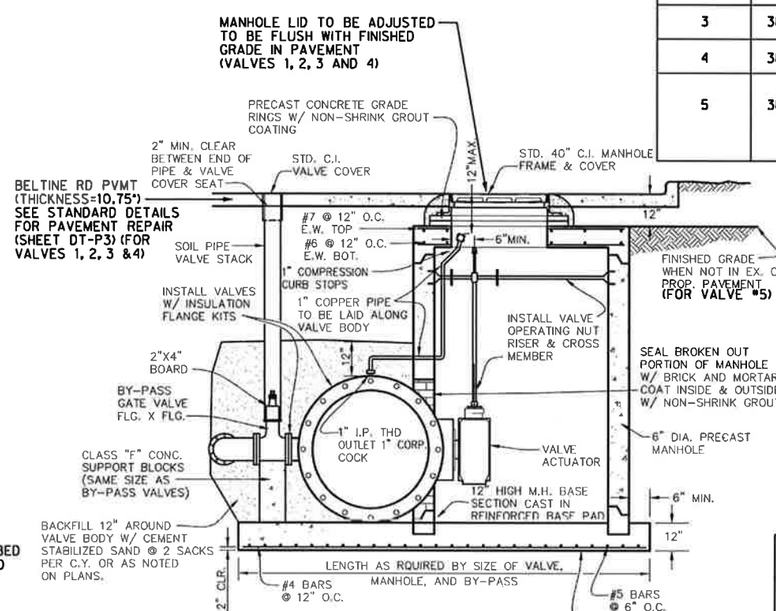




EX VALVE #	℄ BELT LINE STATION	OFFSET	NOTE
1	20+93.60	39.25' RT	REMOVE EX VALVE AND REPLACE WITH BUTTERFLY VALVE WITH MANHOLE AND BY-PASS PER DETAIL THIS SHEET. INSTALL FLANGED END SPOOL PIECE, FLANGED CLOSURE SECTION AND FLANGED ISOLATION KITS @ ALL FLANGED CONNECTIONS, AS NECESSARY TO RECONNECT TO EX WATER MAIN.
2	33+16.72	32.63' RT	
3	38+34.08	36.70' RT	REMOVE EX VALVE AND REPLACE WITH BUTTERFLY VALVE WITH MANHOLE AND BY-PASS PER DETAIL THIS SHEET. INSTALL FLANGED END SPOOL PIECE, FLANGED CLOSURE SECTION AND FLANGED ISOLATION KITS @ ALL FLANGED CONNECTIONS, AS NECESSARY TO RECONNECT TO EX WATER MAIN AND CLEAR EX TEE AND OTHER PROPOSED VALVES AND MANHOLES.
4	38+42.02	37.11' RT	
5	38+26.59	31.85' RT	REMOVE EX VALVE AND REPLACE WITH CLOSURE SECTION AS NECESSARY. INSTALL BUTTERFLY VALVE WITH MANHOLE AND BY-PASS AT LOCATION SPECIFIED PER DETAIL THIS SHEET. INSTALL FLANGED END SPOOL PIECE, FLANGED CLOSURE SECTION AND FLANGED ISOLATION KITS @ ALL FLANGED CONNECTIONS, AS NECESSARY TO RECONNECT TO EX WATER MAIN. VERIFY ADEQUATE CLEARANCE DISTANCE BETWEEN EX 12" W AND EX 24" W PRIOR TO CONSTRUCTION. MOVE EX. UNDERGROUND TELEPHONE LINES AS NECESSARY FOR CONSTRUCTION.



PLAN
NTS



SECTION
NTS

BUTTERFLY VALVE WITH MANHOLE INSTALLATION

N.T.S.

NOTES:

1. EX WATERLINE SIZES PER RECORD DRAWINGS. DOES NOT MATCH TOWN OF ADDISON GIS IN ALL PLACES.
2. CONTRACTOR TO VERIFY TYPE, SIZE, VERTICAL AND HORIZONTAL LOCATION, AND OPERATING CONDITION OF EXIST. VALVE AND TYPE OF PIPE MATERIAL. PROVIDE INFORMATION TO TOWN OF ADDISON REPRESENTATIVE PRIOR TO REMOVAL AND REPLACEMENT OF EXISTING VALVE. PROP VALVE LOCATION WILL BE DETERMINED AFTER SIZE OF EX VALVE IS VERIFIED.
3. ALL ITEMS NECESSARY TO REMOVE EXISTING VALVE, CONSTRUCT BUTTERFLY VALVE WITH BY-PASS AND MANHOLE AS SHOWN ON DETAIL THIS SHEET, AND RECONNECT TO EXISTING WATER MAIN SHALL BE CONSIDERED INCIDENTAL TO THE BID ITEM FOR BUTTERFLY VALVE WITH MANHOLE.
4. SEE WATER NOTES ON GENERAL NOTE SHEET.
5. CONTRACTOR TO COORDINATE CONSTRUCTION OF TRAFFIC CONDUIT AND BUTTERFLY VALVES.

EXISTING UTILITY LOCATIONS SHOWN ARE SCHEMATIC IN NATURE AND MAY NOT ACCURATELY REFLECT THE SIZE AND LOCATION OF EACH PARTICULAR UTILITY. SOME UTILITY LINES MAY NOT BE SHOWN. CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ACTUAL FIELD LOCATION AND PROTECTION OF ALL EXISTING UTILITIES WHETHER SHOWN OR NOT. CONTRACTOR SHALL ALSO ASSUME RESPONSIBILITY FOR REPAIRS TO EXISTING UTILITIES, WHETHER SHOWN OR NOT, DAMAGED BY CONTRACTOR'S ACTIVITIES. DIFFERENCES IN HORIZONTAL OR VERTICAL LOCATION OF EXISTING UTILITIES SHALL NOT BE A BASIS FOR ADDITIONAL COMPENSATION. CALL 1-800-344-8377 TWO WORKING DAYS PRIOR TO CONSTRUCTION FOR ONSITE LOCATIONS.

STATE OF TEXAS
K.T. KUNZ
58430
LICENSED
PROFESSIONAL ENGINEER

K. T. Kunz, P.E. 11/7/2013
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison. TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

VALVE-MANHOLE DETAIL

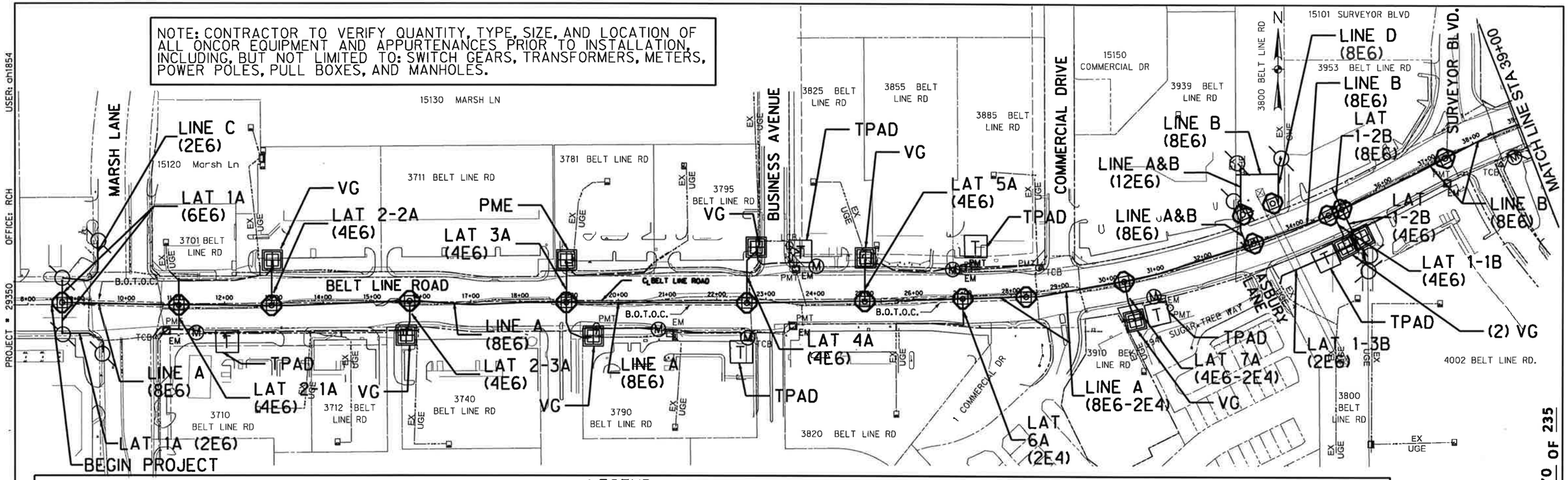
HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 WTR 02	WTR-2

SHEET 69 OF 235

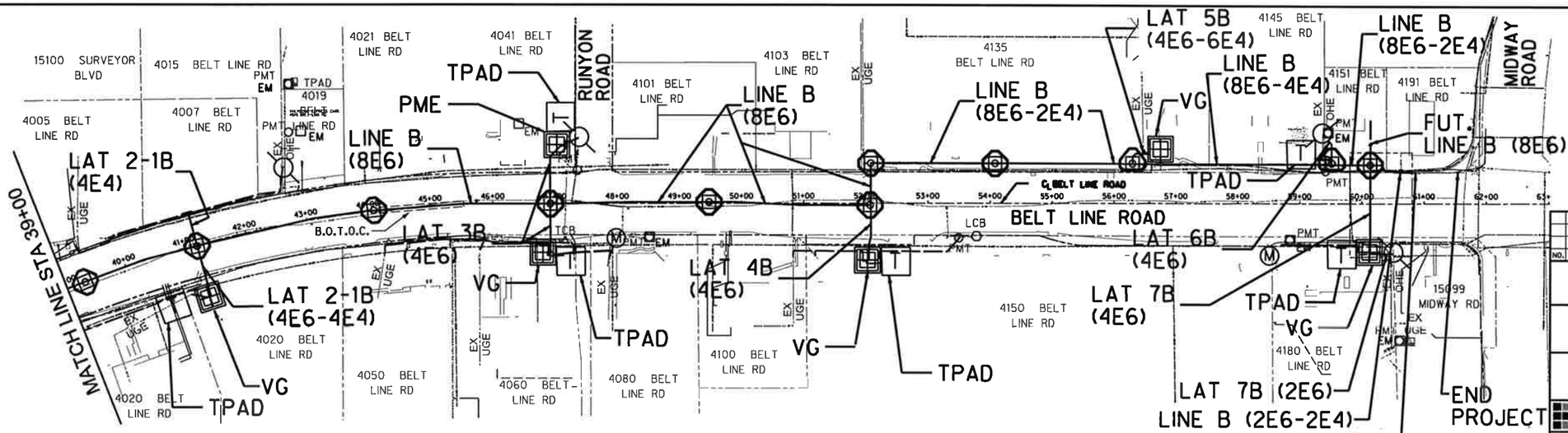
USER: ah1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 WTR 02.dgn
TIME: 3:58:39 PM
DATE: 11/6/2013

NOTE: CONTRACTOR TO VERIFY QUANTITY, TYPE, SIZE, AND LOCATION OF ALL ONCOR EQUIPMENT AND APPURTENANCES PRIOR TO INSTALLATION, INCLUDING, BUT NOT LIMITED TO: SWITCH GEARS, TRANSFORMERS, METERS, POWER POLES, PULL BOXES, AND MANHOLES.



LEGEND

- PROPOSED VISTA GEAR (VG) OR PME SWITCHGEAR AND PAD (SWITCHGEAR TO BE INSTALLED BY OTHERS)
- T / TPAD — PROPOSED TRANSFORMER AND PAD (TRANSFORMER TO BE INSTALLED BY OTHERS)
- PROPOSED ELECTRICAL DUCT BANK MANHOLE (3-WAY, 4-WAY)
- PROPOSED RISER AND POWERPOLE (ONCOR TO INSTALL POWERPOLE)
- (M) PROPOSED CABINET FOR ONCOR PROVIDED METER
- B.O.T.O.C. — PROPOSED ELECTRIC DUCT BANK BY OTHER THAN OPEN CUT
- LINE REFERENCE (SIZE) — PROPOSED ELECTRICAL SOURCE DUCT BANK BY OPEN CUT
- PROPOSED ELECTRICAL LOAD CABLE DUCT BANK
- PMT EXISTING POLE MOUNTED TRANSFORMER
- EM EXISTING ELECTRIC METER
- TCB EXISTING TRAFFIC SIGNAL CONTROL BOX
- LCB EXISTING LIGHTING CONTROL BOX
- TPAD EXISTING TRANSFORMER (PAD MOUNTED)
- EX UGE EXISTING UNDERGROUND ELECTRIC SERVICE



N

0 50 100 150 200 300
SCALE IN FEET

CHARLIE BARTHELL MORAN III 101189 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Signature of Registrant — P.E. 11-8-2013 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

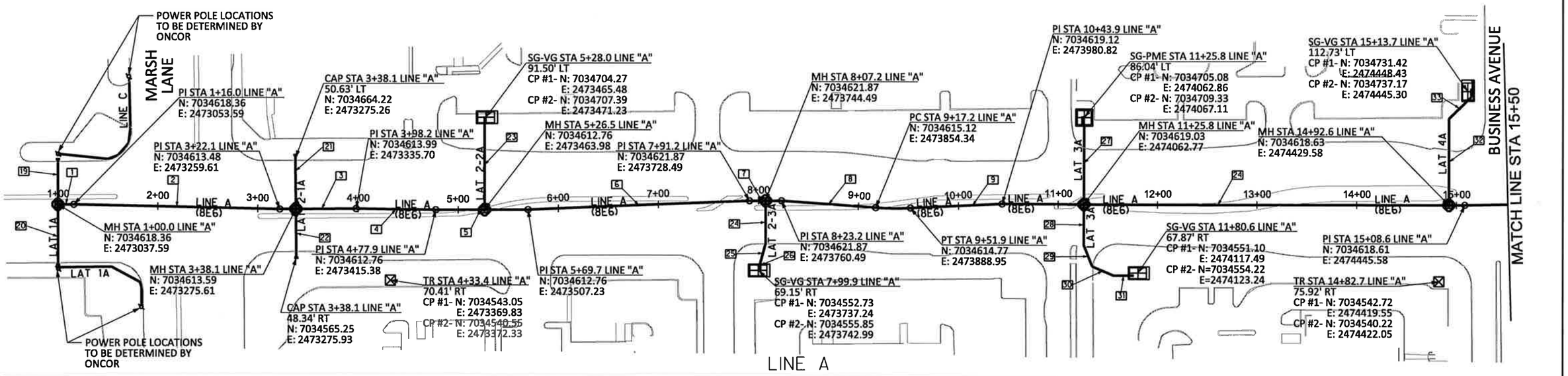
ONCOR DUCT BANK KEYMAP

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 DCTB 01	DCB-1

SHEET 70 OF 235

USER: dh1854
OFFICE: RCH
PROJECT # 29350
FILE: 29350 DCTB 01.dgn
TIME: 2:37:53 PM
DATE: 11/8/2013



LINE A

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
BEARING	N 90°00'00"E	S 88°38'33"E	N 89°36'44"E	S 89°06'49"E	N 90°00'00"E	N 87°38'30"E	N 90°00'00"E	S 85°53'10"E	N 87°17'08"E	S 89°56'14"E	N 88°51'59"E	S 89°56'14"E	N 88°01'40"E	N 79°33'35"E	N 77°29'55"E	N 72°34'01"E	N 22°38'12"W	N 00°08'12"W
DISTANCE	16.00'	206.07'	76.09'	79.69'	48.60'	221.45'	32.00'	94.09'	91.97'	464.75'	207.30'	48.98'	323.79'	192.59'	53.05'	190.94'	34.10'	112.20'

LATERALS

	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
BEARING	S 0°00'06"E	S 0°00'06"E	S 0°23'16"E	S 0°23'16"E	S 0°00'12"E	S 0°00'12"E	S 15°34'44"W	S 0°34'44"W	S 0°03'46"W	S 0°03'46"W	N 22°20'50"W	S 67°09'30"W	S 89°39'38"E	S 0°03'44"W	N 46°04'20"E	S 0°03'46"W	S 1°58'20"E	N 10°26'25"W
DISTANCE	50.46'	63.90'	50.63'	48.34'	88.80'	42.68'	19.49'	5.11'	81.80'	40.36'	22.87'	22.87'	20.72'	85.67'	29.52'	84.59'	56.76'	43.57'

SHEET 71 OF 235

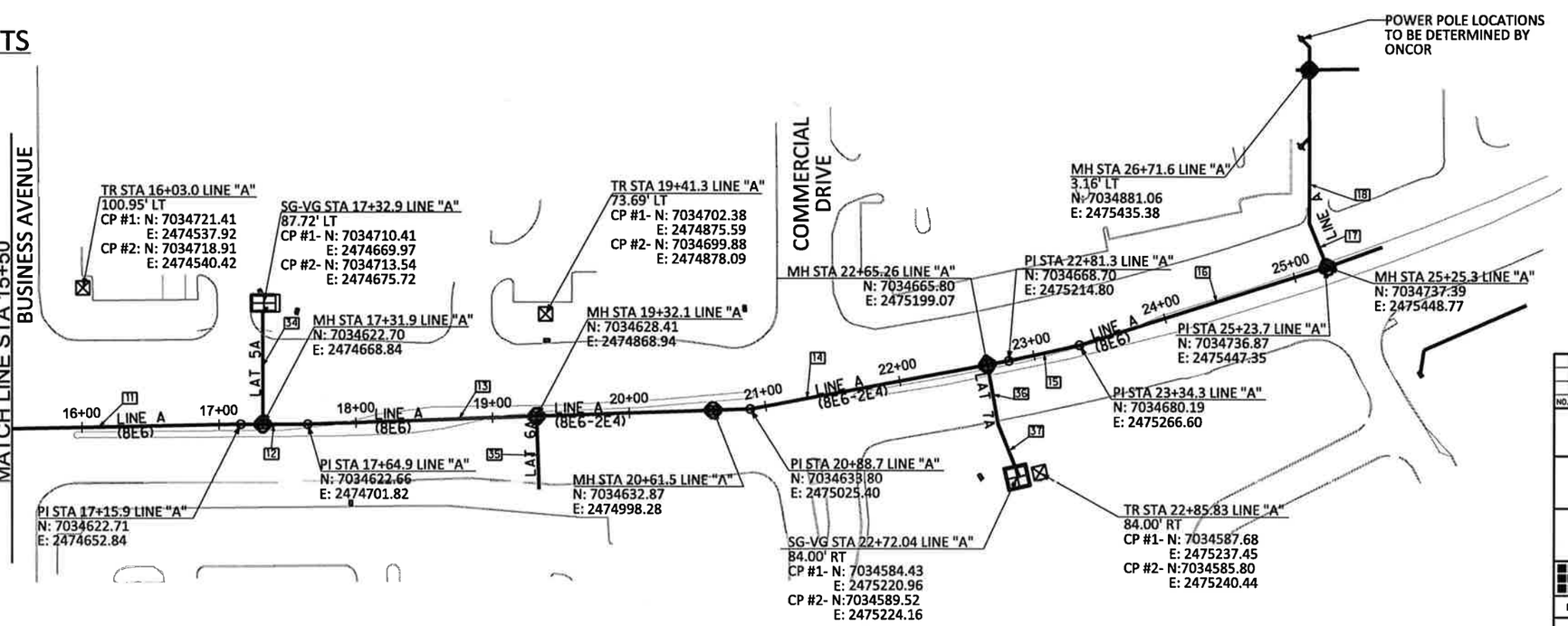
CONTROL POINTS

CP #1
PAD
CP #2
TR
TRANSFORMER

4.25'
4.04'
CP #2
CP #1
SG-PME
PME SWITCHGEAR

4.875'
5.75'
3.125'
CP #2
PAD
SG CABINET
CP #1
SG-VG
VISTA GEAR SWITCHGEAR

CONTROL POINT
MH
MANHOLE



	37
BEARING	S 252°4'11"E
DISTANCE	42.00'

CHARLIE BARTHELL MORAN III
101189
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

Signature of Registrant ,P.E. 11-8-2013
Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

HORIZONTAL CONTROL SHEET
LINE A & LATERALS

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 DCTB 02	DCB-2

CONTROL POINTS

CP #1 — PAD — CP #2
TR
TRANSFORMER

4.875' 5.75' 3.125' CP #2 — PAD — SG CABINET — CP #1
SG-VG
VISTA GEAR SWITCHGEAR

PP
RISER POLE

4.25' 4.04' CP #2 — CP #1
SG-PME
PME SWITCHGEAR

CONTROL POINT
MH
MANHOLE

SURVEYOR BL VD

RUNYON ROAD

MATCH LINE STA 22+00

MATCH LINE STA 22+00

PP STA 5+65.7 LINE "B"
6.3' RT
*VERIFY EXACT LOCATION WITH ONCOR

PP STA 3+99.0 LINE "B"
*VERIFY EXACT LOCATION WITH ONCOR

MH STA 5+09.9 LINE "B"
N: 7034881.06
E: 2475435.38

PI STA 4+16.6 LINE "B"
N: 7034898.72
E: 2475512.41

MH STA 4+32.8 LINE "B"
N: 7034882.48
E: 2475512.44

CAP STA 8+63.8 LINE "B"
48.22' LT
N: 7034854.96
E: 2475621.66

MH STA 8+63.8 LINE "B"
N: 7034811.53
E: 2475642.61

MH STA 12+92.4 LINE "B"
N: 7034994.76
E: 2476029.56

PI STA 12+06.6 LINE "B"
N: 7034964.98
E: 2475949.12

MH STA 10+97.4 LINE "B"
N: 7034914.74
E: 2475852.14

PI STA 10+30.1 LINE "B"
N: 7034883.77
E: 2475792.37

MH STA 8+43.8 LINE "B"
N: 7034802.84
E: 2475624.60

PI STA 6+86.8 LINE "B"
N: 7034768.86
E: 2475435.65

SG-VG STA 8+64.3 LINE "B"
58.02' RT
CP #1: N: 7034759.48
E: 2475668.23
CP #2: N: 7034769.78
E: 2475676.30

POWER POLE LOCATIONS TO BE DETERMINED BY ONCOR

PI STA 6+86.8 LINE "B"
N: 7034747.82
E: 2475477.42

MH STA 6+56.2 LINE "B"
N: 7034737.77
E: 7034737.39

PI STA 8+57.4 LINE "B"
N: 7034741.72
E: 2475669.14

PI STA 8+27.8 LINE "B"
N: 7034795.89
E: 2475610.19

SG-VG STA 8+43.8 LINE "B"
57.48' RT
CP #1- N: 7034751.07
E: 2475649.57
CP #2- N: 7034761.38
E: 2475657.64

PI STA 7+02.6 LINE "B"
N: 7034677.42
E: 2475519.87

PI STA 13+95.3 LINE "B"
N: 7035030.47
E: 2476126.01

PI STA 14+65.9 LINE "B"
N: 7035047.79
E: 2476194.49

MH STA 14+81.9 LINE "B"
N: 7035052.07
E: 2476209.90

PI STA 16+73.9 LINE "B"
N: 7035095.80
E: 2476396.82

MH STA 17+72.2 LINE "B"
N: 7035108.34
E: 2476494.28

PI STA 14+97.9 LINE "B"
N: 7035056.35
E: 2476225.32

TR STA 14+65.2 LINE "B"
81.74' RT
CP #1- N: 7034968.38
E: 2476213.86
CP #2- N: 7034966.63
E: 2476216.93

SG-VG STA 14+80.8 LINE "B"
82.17' RT
CP #1- N: 7034972.59
E: 2476230.77
CP #2- N: 7034977.12
E: 2476235.50

PI STA 19+22.8 LINE "B"
N: 7035119.61
E: 2476644.45

PI STA 17+56.2 LINE "B"
N: 7035107.15
E: 2476478.32

TR STA 20+85.3 LINE "B"
111.0' LT
CP #1- N: 7035230.93
E: 2476804.52
CP #2- N: 7035228.43
E: 2476807.02

SG-PME STA 20+81.3 LINE "B"
93.66' LT
CP #1- N: 7035213.51
E: 2476800.92
CP #2- N: 7035217.76
E: 2476805.17

PI STA 21+73.5 LINE "B"
N: 7035121.96
E: 2476895.20

PI STA 20+39.2 LINE "B"
N: 7035119.46
E: 2476760.87

PI STA 20+71.2 LINE "B"
N: 7035119.64
E: 2476792.87

SG-VG STA 20+55.4 LINE "B"
76.56' RT
CP #1- N: 7035043.00
E: 2476777.53
CP #2- N: 7035046.13
E: 2476783.27

TR STA 20+77.7 LINE "B"
79.58' RT
CP #1- N: 7035040.23
E: 2476801.17
CP #2- N: 7035037.73
E: 2476803.67

LINE B

REFERENCE	1	2	3	4	5	7	8	9	10	11
BEARING	S 22°21'48"W	S 0°8'12"E	S 88°56'30"W	S 0°8'12"E	S 22°38'12"E	N 69°59'35"E	N 70°05'52"E	N 64°14'48"E	N 62°36'52"E	N 69°41'04"E
DISTANCE	17.58'	16.24'	77.08'	112.20'	34.10'	30.49'	141.20'	202.97'	176.54'	188.63'
REFERENCE	12	13	14	15	16	17	18	19	20	21
BEARING	N 75°48'01"E	N 74°29'37"E	N 77°02'42"E	N 82°04'23"E	N 85°42'36"E	N 89°55'27"E	N 89°39'55"E	N 88°42'08"E	N 89°47'46"E	S 87°25'25"E
DISTANCE	70.63'	32.00'	175.98'	82.29'	166.60'	116.41'	32.00'	102.36'	173.73'	112.81'
REFERENCE	22	23	24	25	26					
BEARING	N 89°42'46"E	N 89°42'11"E	N 89°57'12"E	S 31°06'39"E	N 88°34'01"E					
DISTANCE	110.82'	32.00'	770.42'	12.65'	48.36'					

LATERALS

REFERENCE	27	28	29	30	31	32	33	34	35	36
BEARING	S 9°03'22"W	S 66°41'48"W	S 25°45'12"E	S 25°45'12"E	S 25°45'12"E	S 38°08'02"E	S 15°30'26"E	N 44°39'55"E	S 0°20'05"E	S 0°20'05"E
DISTANCE	17.32'	166.93'	57.48'	48.22'	55.07'	48.23'	79.48'	24.89'	74.78'	73.85'
REFERENCE	37	38	39	40	41	42	43	44	45	46	47
BEARING	S 0°17'14"E	N 14°42'46"E	S 0°17'14"E	N 0°17'14"W	S 0°11'36"W	S 52°03'55"W	S 90°00'00"W	S 0°02'48"W	S 88°55'40"E	N 15°30'23"W	N 23°18'12"W
DISTANCE	51.06'	13.04'	26.46'	66.65'	11.84'	6.33'	13.71'	141.01'	37.81'	55.41'	17.12'

MH STA 23+10.9 LINE "B"
N: 7035122.45
E: 2477032.60

MH STA 26+37.5 LINE "B"
N: 7035184.71
E: 2477292.11

PI STA 23+47.3 LINE "B"
N: 7035122.58
E: 2477068.93

PI STA 24+60.1 LINE "B"
N: 7035117.51
E: 2477181.63

PI STA 26+88.8 LINE "B"
N: 7035184.98
E: 2477343.37

MH STA 28+37.5 LINE "B"
N: 7035184.86
E: 2477492.11

MH STA 25+70.9 LINE "B"
N: 7035118.06
E: 2477292.45

MH STA 30+59.4 LINE "B"
N: 7035184.68
E: 2477713.99

TR STA 25+70.9 LINE "B"
89.21' RT
CP #1- N: 7035029.68
E: 2477304.59
CP #2- N: 7035027.18
E: 2477307.09

SG-VG STA 25+65.1 LINE "B"
87.63' RT
CP #1- N: 7035030.41
E: 2477287.07
CP # 2- N: 7035033.53
E: 2477292.82

SG-VG STA 30+83.0 LINE "B"
12.58' LT
CP #1- N: 7035197.24
E: 2477737.58
CP #2- N: 7035200.32
E: 2477743.36

MH STA 33+80.8 LINE "B"
N: 7035184.42
E: 2478035.38

PI STA 34+61.2 LINE "B"
N: 7035184.35
E: 2478115.82

POWER POLE LOCATION TO BE DETERMINED BY ONCOR

TR STA 33+56.3 LINE "B"
13.80' LT
CP #1- N: 7035198.24
E: 2478010.86
CP #2- N: 7035195.74
E: 2478013.36

MH STA 34+43.2 LINE "B"
N: 7035184.36
E: 2478097.79

PI STA 34+73.9 LINE "B"
N: 7035173.52
E: 2478122.35

TR STA 34+73.9 LINE "B"
137.47' RT
CP #1- N: 7035042.82
E: 2478079.77
CP #2- N: 7035040.32
E: 2478082.27

SG-VG STA 34+73.9 LINE "B"
132.49' RT
CP #1- N: 7035043.35
E: 2478097.67
CP #2- N: 7035046.48
E: 2478103.42

POWER POLE LOCATIONS TO BE DETERMINED BY ONCOR

LAT 1-1B
LAT 1-2B
LAT 1-3B
LAT 2-1B
LAT 3B
LAT 4B
LAT 5B
LAT 6B
LAT 7B

FUTURE LINE B (8E6)

STATE OF TEXAS
CHARLIE BARTHELL MORAN, JR.
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 11-8-2013 Date
FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

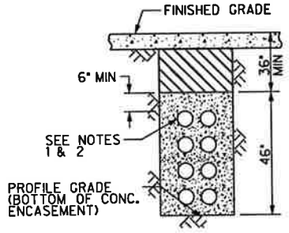
HORIZONTAL CONTROL SHEET
LINE B & LATERALS

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 348-6200 FAX (214) 739-0095

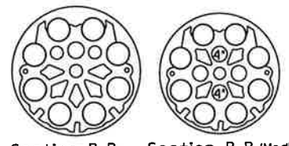
PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 DCTB 03	DCB-3

LEGEND

2Wx*H	2-6" SPACERS WIDE BY * OF 6" SPACERS HIGH FOR TRENCH SECTIONS
*E6	NUMBER OF 6" ELECTRICAL CONDUITS
*E4	NUMBER OF 4" ELECTRICAL CONDUITS
*E2	NUMBER OF 2" ELECTRICAL CONDUITS



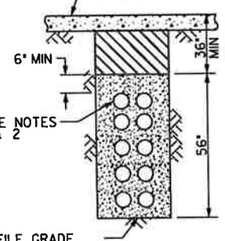
Section A-A
Trench Embedment Detail (2Wx4H)
(Refer to Oncor Details and Specs)
N.T.S.
4E6-2E4-2E2
8E6



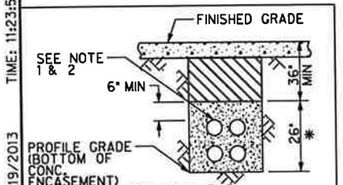
Section B-B (8E6)

Section B-B (Modified) (8E6-2E4)

Encasement Pipe Detail
(See Note 3)
N.T.S.

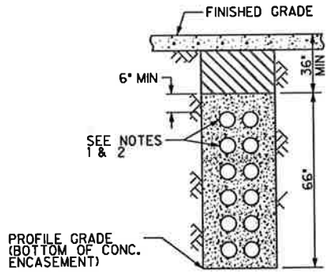


Section C-C
Trench Embedment Detail (2Wx5H spacer)
(Refer to Oncor Details and Specs)
N.T.S.
8E6-2E4
4E6-6E4



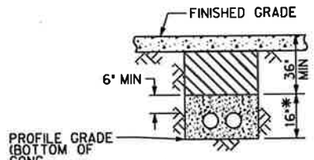
Section D-D
Trench Embedment Detail (2Wx2H spacer)
(Refer to Oncor Details and Specs)
N.I.S.
*4E6
*2E4-2E2
*2E6-2E4
4E4

Section D-D (Alternative)
Encasement Pipe Detail (4E6)
(See Note 3)
N.T.S.

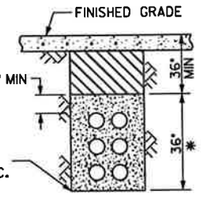


Section F-F
Trench Embedment Detail (2Wx6H spacer)
(Refer to Oncor Details and Specs)

12E6
8E6-4E4

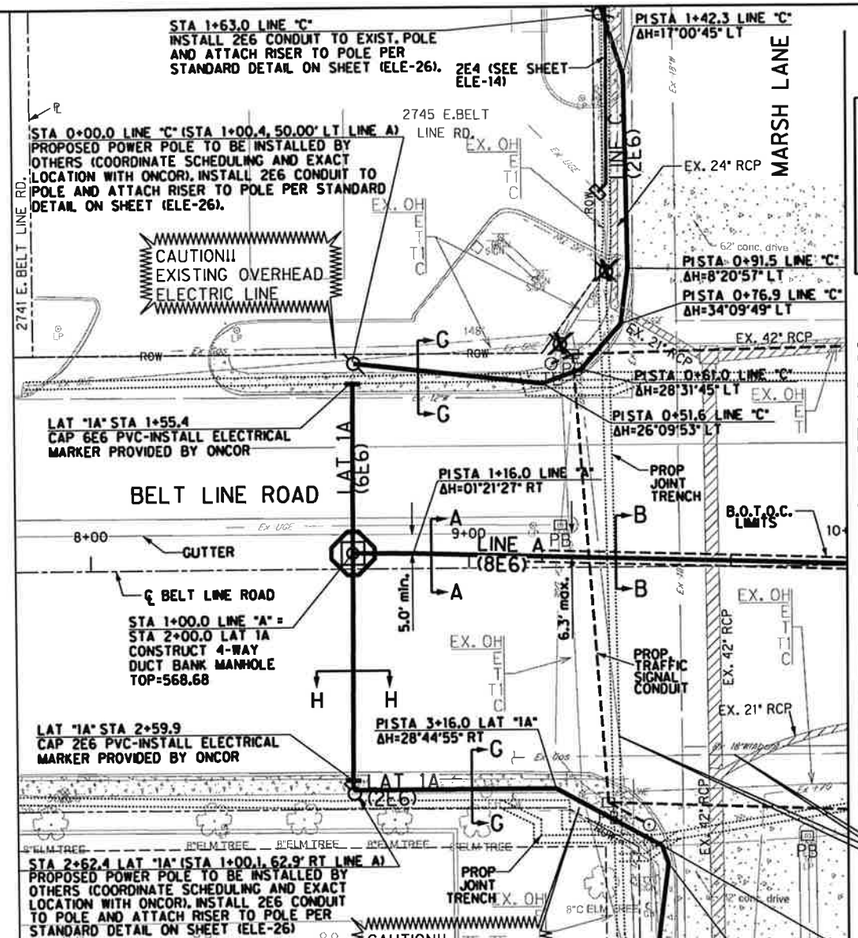


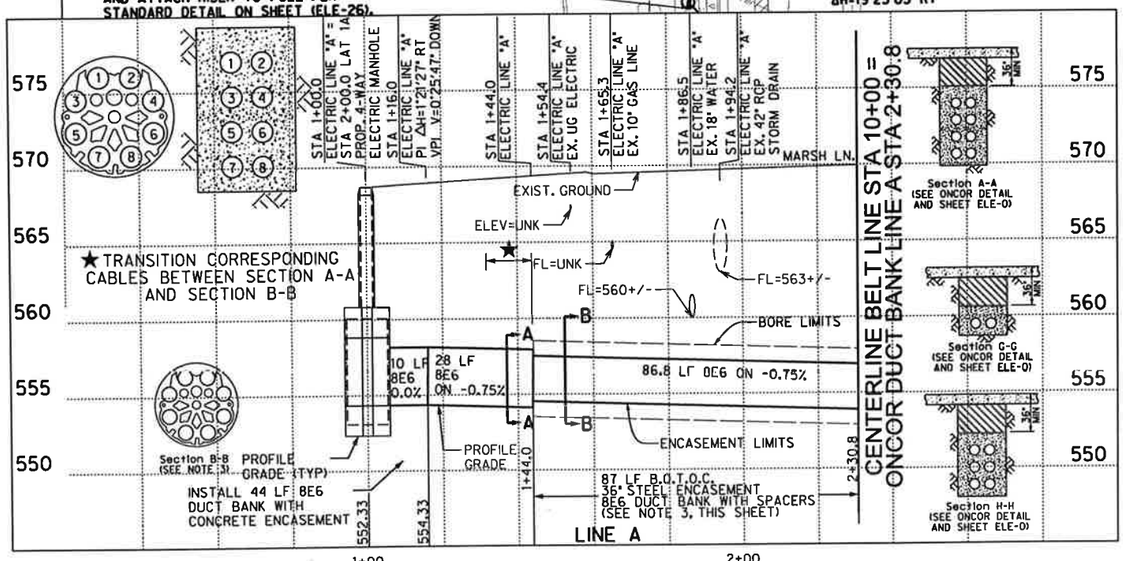
Section G-G
Trench Embedment Detail (2E6)
(Refer to Oncor Details and Specs)
N.T.S.
2E2
2E4
2E6 *



Section H-H
Trench Embedment Detail (2Wx3H spacer)
(Refer to Oncor Details and Specs)
N.T.S.
6E4
6E6 *
4E6-2E4 *

1. USE REDUCER TO INSTALL 4" PVC CONDUIT INSIDE 6" SPACER - WHERE E4 IS SPECIFIED FOR DUCT. QUANTITY AS SPECIFIED ON PLANS.
2. USE REDUCER TO INSTALL 2" PVC CONDUIT INSIDE 6" SPACER - WHERE E2 IS SPECIFIED FOR DUCT. QUANTITY AS SPECIFIED ON PLANS.
3. STEEL ENCASEMENT PIPE SIZES SHOWN ARE APPROXIMATE AND SHALL BE AS REQUIRED FOR CONSTRUCTION AND RECOMMENDED BY PIPE SPACER MANUFACTURER. PIPE SPACERS SHALL BE DESIGNED AND SUPPLIED BY UNDERGROUND DEVICES, INC. OR APPROVED EQUAL.
4. SEE SHEET DT-P3 FOR PAVEMENT REPAIR AND TRENCH BACKFILL REQUIREMENTS.
5. MINIMUM DEPTH TO TOP OF CONCRETE ENCASED DUCT BANK OR STEEL ENCASED PIPE SHALL BE 36" FOR THIS PROJECT. THIS REQUIREMENT SHALL SUPERSEDE THIS 30" MIN. DIMENSION NOTED ON DCS-5 SHEET 11 OF 19.
6. SPACERS SHALL PROVIDE 3" MINIMUM OF VERTICAL AND HORIZONTAL SEPARATION BETWEEN CONDUITS. ONCOR TO APPROVE ALL ELECTRICAL SPACERS PRIOR TO INSTALLATION.





0 10 20 30 40 60
HORIZONTAL SCALE: 1"=40'
0 5 10 15
VERTICAL SCALE: 1"=10'

EXISTING UTILITY LOCATIONS SHOWN ARE SCHEMATIC IN NATURE AND MAY NOT ACCURATELY REFLECT THE SIZE AND LOCATION OF EACH PARTICULAR UTILITY. SOME UTILITY LINES MAY NOT BE SHOWN. CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ACTUAL FIELD LOCATION AND PROTECTION OF ALL EXISTING UTILITIES WHETHER SHOWN OR NOT. CONTRACTOR SHALL ALSO ASSUME RESPONSIBILITY FOR REPAIRS TO EXISTING UTILITIES, WHETHER SHOWN OR NOT, DAMAGED BY CONTRACTOR'S ACTIVITIES. DIFFERENCES IN HORIZONTAL OR VERTICAL LOCATION OF EXISTING UTILITIES SHALL NOT BE A BASIS FOR ADDITIONAL COMPENSATION. CALL 1-800-344-8377 TWO WORKING DAYS PRIOR TO CONSTRUCTION FOR ONSITE LOCATIONS.

N

LEGEND

- EXISTING POWER POLES TO BE REMOVED BY OTHERS (COORDINATE SCHEDULING AND EXACT LOCATION WITH ONCOR)
- PROPOSED PULL OR SERVICE BOX (AS NOTED)
- PROPOSED POWER POLE WITH RISER (POWER POLE BY OTHERS)
- PROPOSED TRANSFORMER PAD
- PROPOSED VISTA GEAR PAD
- PROPOSED PME PAD
- PROPOSED ELECTRICAL DUCT BANK MANHOLE
- PROPOSED ELECTRIC DUCT BANK BY OTHER THAN OPEN CUT (B.O.T.O.C.)
- PROPOSED ELECTRICAL DUCT BANK BY OPEN CUT (SIZE)
- PROP JOINT TRENCH (FRANCHISE & ONCOR) (SEE NOTE 4)
- (M) PROPOSED CABINET FOR ONCOR PROVIDED METER

NOTE:
1. ALL PROFILE ELEVATIONS FOR ELECTRICAL DUCT BANK ARE FOR OUTSIDE BOTTOM OF DUCT BANK UNLESS OTHERWISE SPECIFIED.

2. ALL PROFILE ELEVATIONS FOR ELECTRICAL MANHOLES ARE FOR OUTSIDE BOTTOM OF MANHOLE FLOOR UNLESS OTHERWISE SPECIFIED.

3. STEEL ENCASEMENT PIPE SIZES SHOWN ARE APPROXIMATE AND SHALL BE AS REQUIRED FOR CONSTRUCTION AND RECOMMENDED BY PIPE SPACER MANUFACTURER. PIPE SPACERS SHALL BE DESIGNED AND SUPPLIED BY UNDERGROUND DEVICES, INC. OR APPROVED EQUAL.

4. ALL ELECTRIC LOAD CABLES TO BE INSTALLED IN JOINT TRENCH WITH RELOCATED FRANCHISE UTILITIES, EXCEPT AS NECESSARY TO CONNECT TO ELECTRICAL EQUIPMENT OR AS NOTED ON THE PLANS. FOR JOINT TRENCH SEE TELECOM RELOCATION PLAN SHEETS.

STATE OF TEXAS
CHARLIE BARTHELL MORAN
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 12-19-2013 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

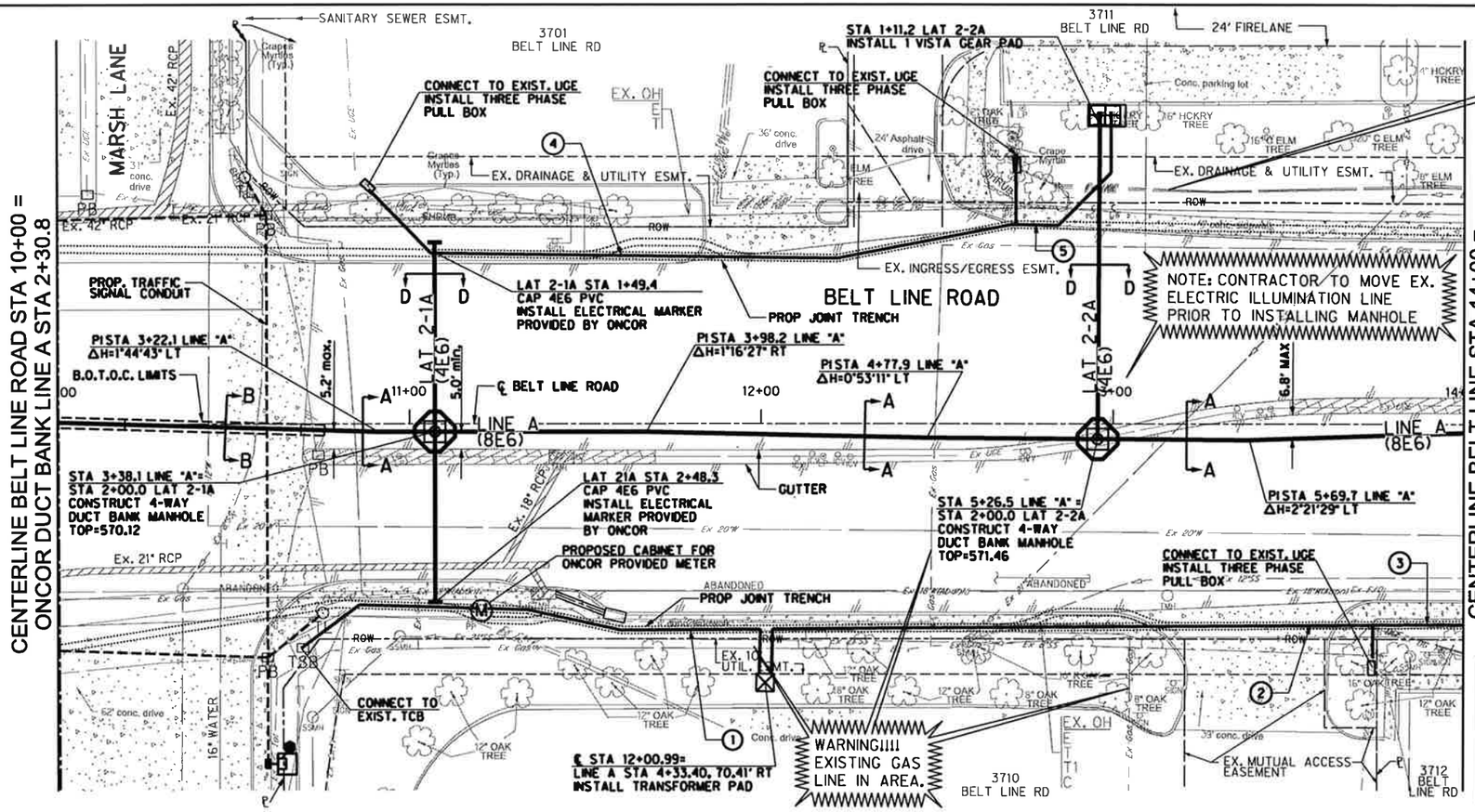
BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK PLAN AND PROFILE
BELT LINE RD BEGIN TO STA 10+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 ELEC 00	ELE-0

SHEET 73 OF 235



0 10 20 30 40 60
HORIZONTAL SCALE: 1"=40'
0 5 10 15
VERTICAL SCALE: 1"=10'

N

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LEGEND

- PROPOSED PULL OR SERVICE BOX (AS NOTED)
- PROPOSED POWER POLE WITH RISER (POWER POLE BY OTHERS)
- PROPOSED TRANSFORMER PAD
- PROPOSED VISTA GEAR PAD
- PROPOSED PME PAD
- PROPOSED ELECTRICAL DUCT BANK MANHOLE
- PROPOSED ELECTRIC DUCT BANK BY OTHER THAN OPEN CUT (B.O.T.O.C.)
- PROPOSED ELECTRICAL DUCT BANK BY OPEN CUT (SIZE)
- PROP JOINT TRENCH (FRANCHISE & ONCOR) (SEE NOTE 4)
- (M) PROPOSED CABINET FOR ONCOR PROVIDED METER

LOAD CABLES
(SEE NOTE 4)

	L	TYPE
1	133'	2E2
2	173'	2E4
3	26'	4E4
4	190'	2E4
5	50'	4E4

NOTE:
1. ALL PROFILE ELEVATIONS FOR ELECTRICAL DUCT BANK ARE FOR OUTSIDE BOTTOM OF DUCT BANK UNLESS OTHERWISE SPECIFIED.

2. ALL PROFILE ELEVATIONS FOR ELECTRICAL MANHOLES ARE FOR OUTSIDE BOTTOM OF MANHOLE FLOOR UNLESS OTHERWISE SPECIFIED.

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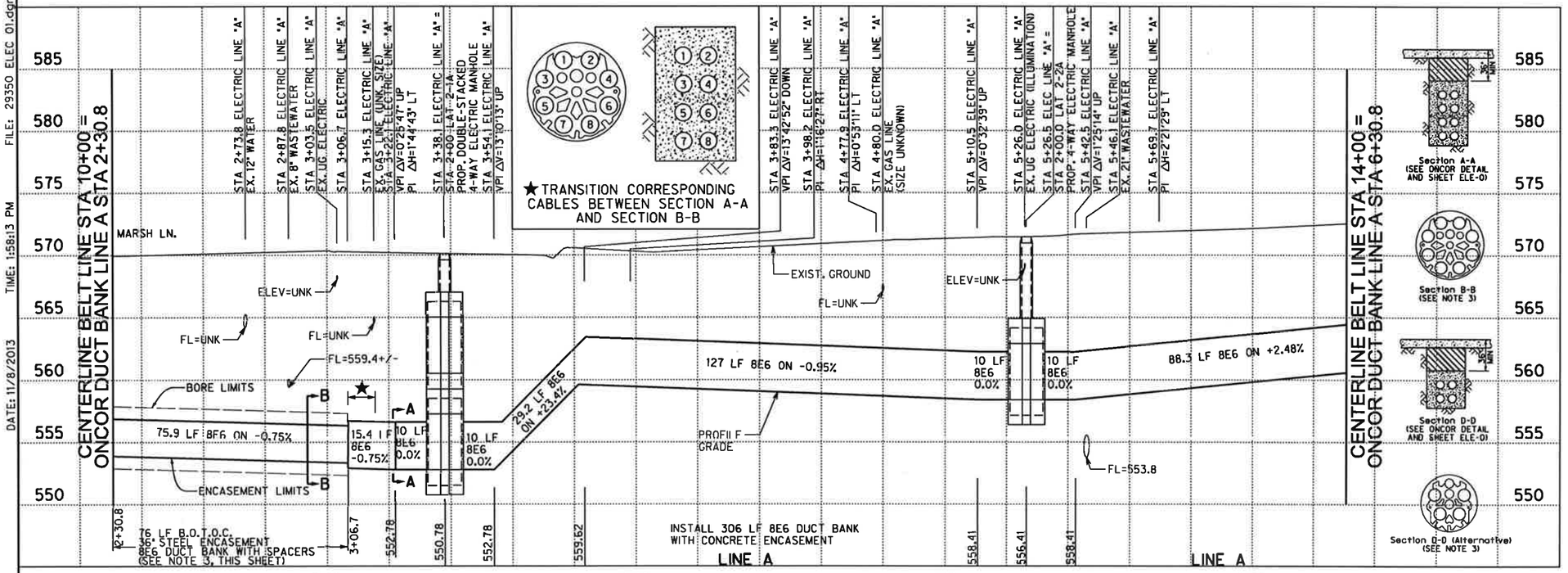


Section A-A (SEE ONCOR DETAIL AND SHEET ELE-0)

Section B-B (SEE NOTE 3)

Section D-D (SEE ONCOR DETAIL AND SHEET ELE-0)

Section D-D (Alternative) (SEE NOTE 3)

STATE OF TEXAS
CHARLIE BARTHELL MORAN
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 11-8-2013 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

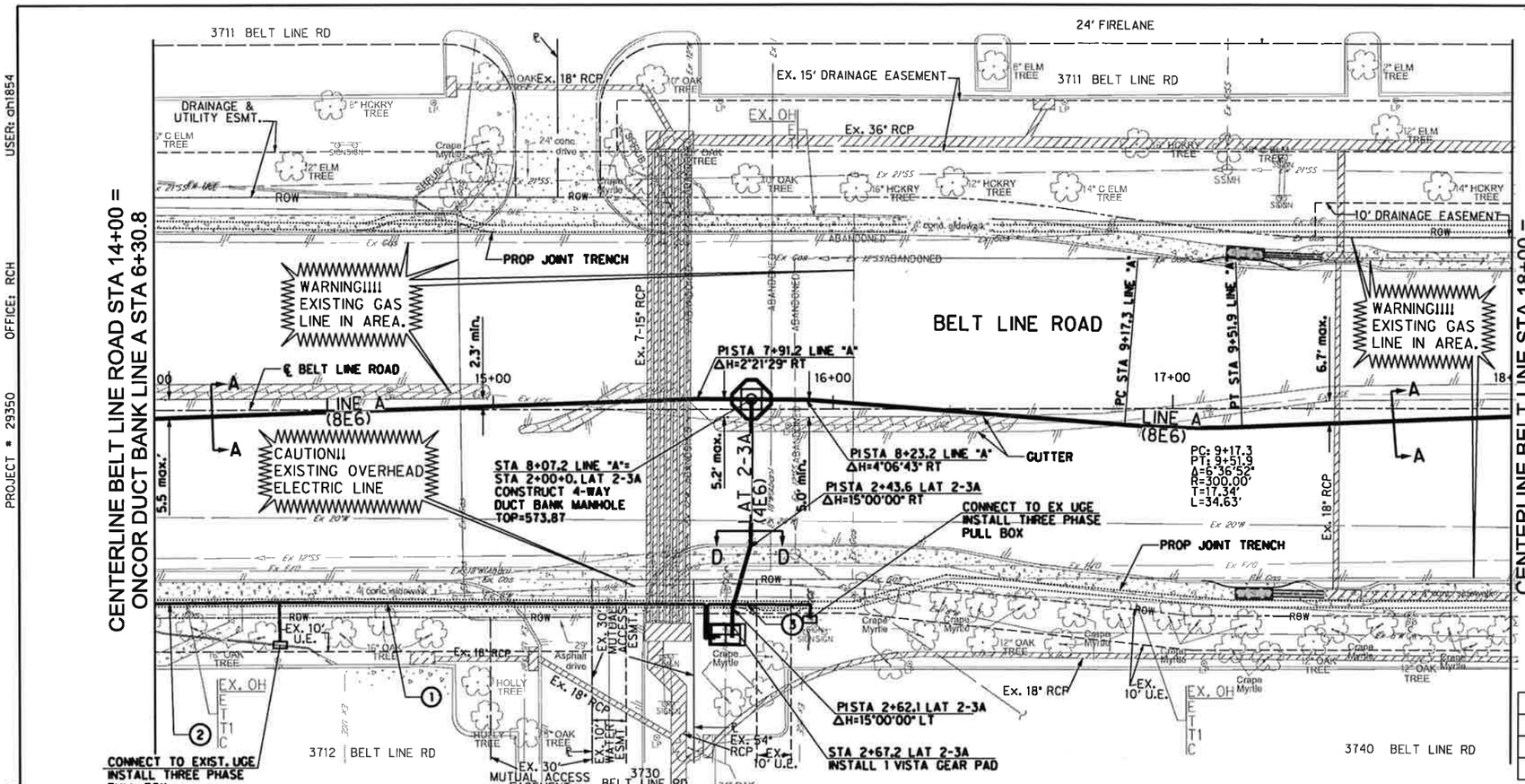
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK PLAN AND PROFILE
BELT LINE RD STA 10+00 TO STA 14+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 ELEC 01	ELE-1



LOAD CABLES
(SEE NOTE 4)

	L	TYPE
①	130'	6E4
②	40'	4E4
③	35'	2E4

0 10 20 30 40 60
HORIZONTAL SCALE: 1"=40'
0 5 10 15
VERTICAL SCALE: 1"=10'

N

EXISTING UTILITY LOCATIONS SHOWN ARE SCHEMATIC IN NATURE AND MAY NOT ACCURATELY REFLECT THE SIZE AND LOCATION OF EACH PARTICULAR UTILITY. SOME UTILITY LINES MAY NOT BE SHOWN. CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ACTUAL FIELD LOCATION AND PROTECTION OF ALL EXISTING UTILITIES WHETHER SHOWN OR NOT. CONTRACTOR SHALL ALSO ASSUME RESPONSIBILITY FOR REPAIRS TO EXISTING UTILITIES, WHETHER SHOWN OR NOT, DAMAGED BY CONTRACTOR'S ACTIVITIES. DIFFERENCES IN HORIZONTAL OR VERTICAL LOCATION OF EXISTING UTILITIES SHALL NOT BE A BASIS FOR ADDITIONAL COMPENSATION. CALL 1-800-344-8377 TWO WORKING DAYS PRIOR TO CONSTRUCTION FOR ONSITE LOCATIONS.

LEGEND

- PROPOSED PULL OR SERVICE BOX (AS NOTED)
- PROPOSED POWER POLE WITH RISER (POWER POLE BY OTHERS)
- PROPOSED TRANSFORMER PAD
- PROPOSED VISTA GEAR PAD
- PROPOSED PME PAD
- PROPOSED ELECTRICAL DUCT BANK MANHOLE
- PROPOSED ELECTRIC DUCT BANK BY OTHER THAN OPEN CUT (B.O.T.O.C.)
- PROPOSED ELECTRICAL DUCT BANK BY OPEN CUT (SIZE)
- PROP JOINT TRENCH (FRANCHISE & ONCOR) (SEE NOTE 4)
- (M) PROPOSED CABINET FOR ONCOR PROVIDED METER

NOTE:
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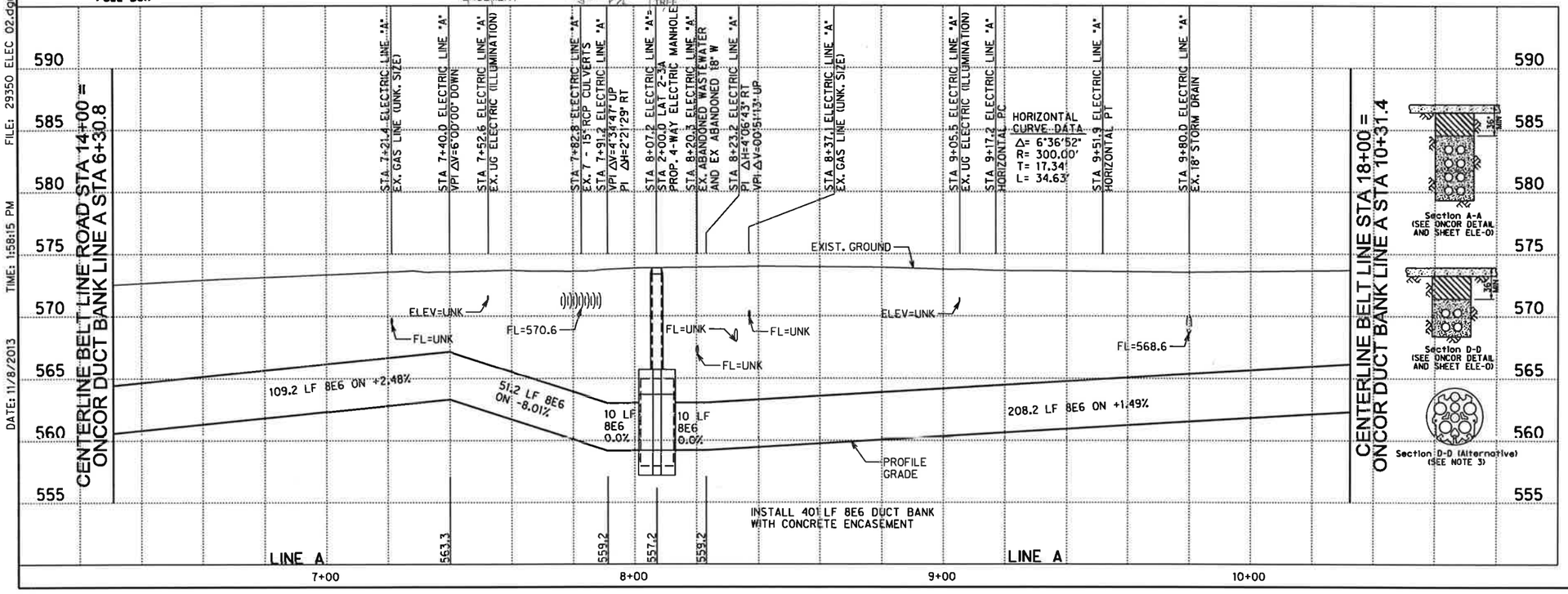


STATE OF TEXAS
CHARLIE BARTHELL MORAN
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 11-8-2013 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

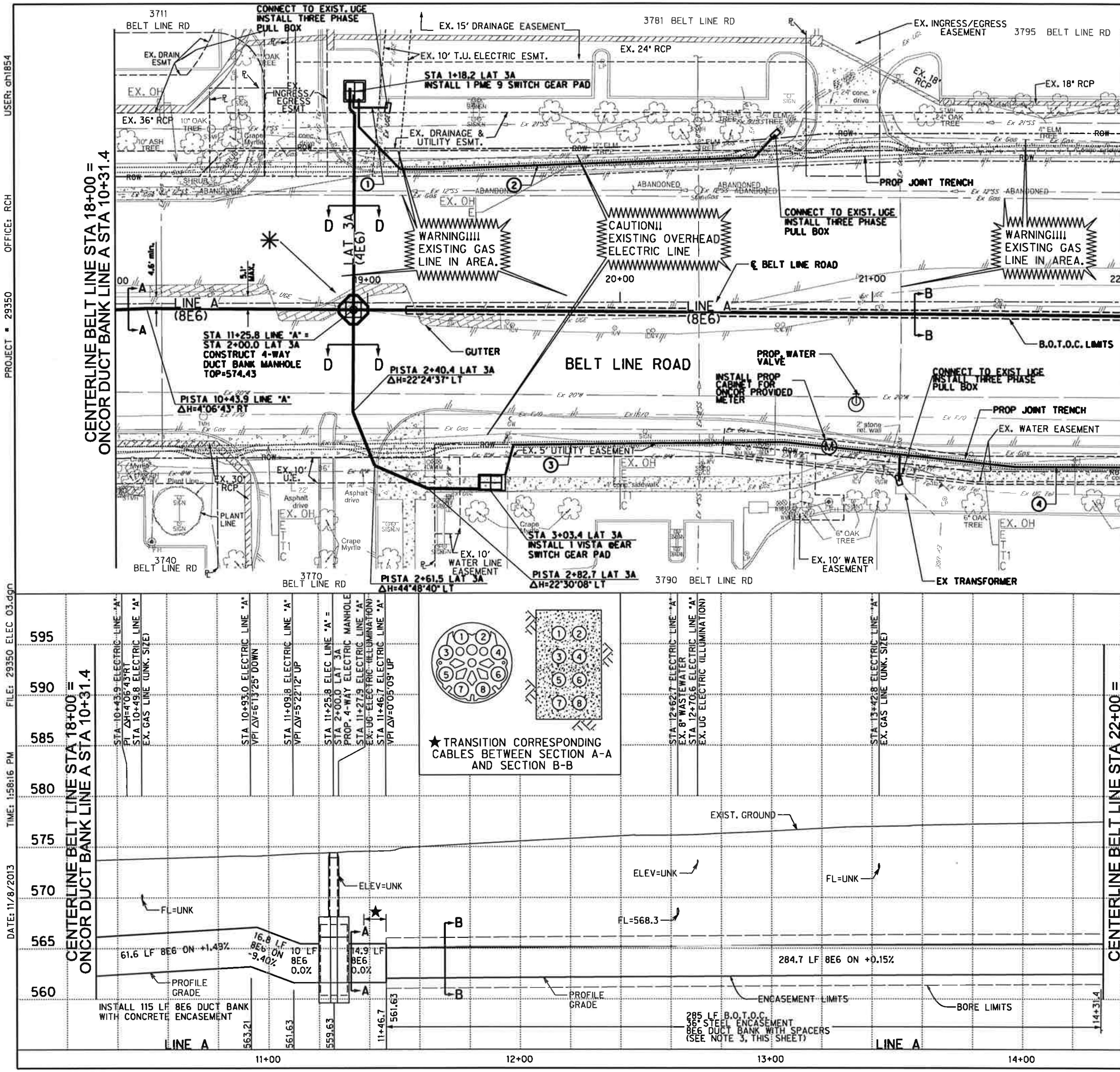
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK PLAN AND PROFILE BELT LINE RD STA 14+00 TO STA 18+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 348-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 ELEC 02	ELE-2



0 10 20 30 40 60 HORIZONTAL SCALE: 1"=40'
0 5 10 15 VERTICAL SCALE: 1"=10'

N

EXISTING UTILITY LOCATIONS SHOWN ARE SCHEMATIC IN NATURE AND MAY NOT ACCURATELY REFLECT THE SIZE AND LOCATION OF EACH PARTICULAR UTILITY. SOME UTILITY LINES MAY NOT BE SHOWN. CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ACTUAL FIELD LOCATION AND PROTECTION OF ALL EXISTING UTILITIES WHETHER SHOWN OR NOT. CONTRACTOR SHALL ALSO ASSUME RESPONSIBILITY FOR REPAIRS TO EXISTING UTILITIES, WHETHER SHOWN OR NOT, DAMAGED BY CONTRACTOR'S ACTIVITIES. DIFFERENCES IN HORIZONTAL OR VERTICAL LOCATION OF EXISTING UTILITIES SHALL NOT BE A BASIS FOR ADDITIONAL COMPENSATION. CALL 1-800-344-8377 TWO WORKING DAYS PRIOR TO CONSTRUCTION FOR ONSITE LOCATIONS.

* CONTRACTOR TO MOVE EXISTING ELECTRICAL ILLUMINATION LINE PRIOR TO INSTALLATION OF MANHOLE

LEGEND

- PROPOSED PULL OR SERVICE BOX (AS NOTED)
- PROPOSED POWER POLE WITH RISER (POWER POLE BY OTHERS)
- PROPOSED TRANSFORMER PAD
- PROPOSED VISTA GEAR PAD
- PROPOSED PME PAD
- PROPOSED ELECTRICAL DUCT BANK MANHOLE
- PROPOSED ELECTRIC DUCT BANK BY OTHER THAN OPEN CUT — B.O.T.O.C.
- PROPOSED ELECTRICAL DUCT BANK BY OPEN CUT — SIZE
- PROP JOINT TRENCH (FRANCHISE & ONCOR) (SEE NOTE 4)
- (M) PROPOSED CABINET FOR ONCOR PROVIDED METER

LOAD CABLES
(SEE NOTE 4)

	L	TYPE
1	20'	2E4
2	185'	2E4
3	158'	4E4
4	90'	2E4

NOTE:

1. ALL PROFILE ELEVATIONS FOR ELECTRICAL DUCT BANK ARE FOR OUTSIDE BOTTOM OF DUCT BANK UNLESS OTHERWISE SPECIFIED.
2. ALL PROFILE ELEVATIONS FOR ELECTRICAL MANHOLES ARE FOR OUTSIDE BOTTOM OF MANHOLE FLOOR UNLESS OTHERWISE SPECIFIED.
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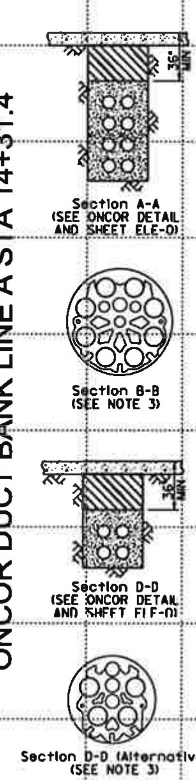


STATE OF TEXAS — CHARLIE BARTHELL MORAN, III — 101189 — LICENSED PROFESSIONAL ENGINEER

[signature] P.E. 11-8-2013
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK PLAN AND PROFILE
BELT LINE RD STA 18+00 TO STA 22+00

HALFF — 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275 TEL (214) 346-6200 FAX (214) 739-0095

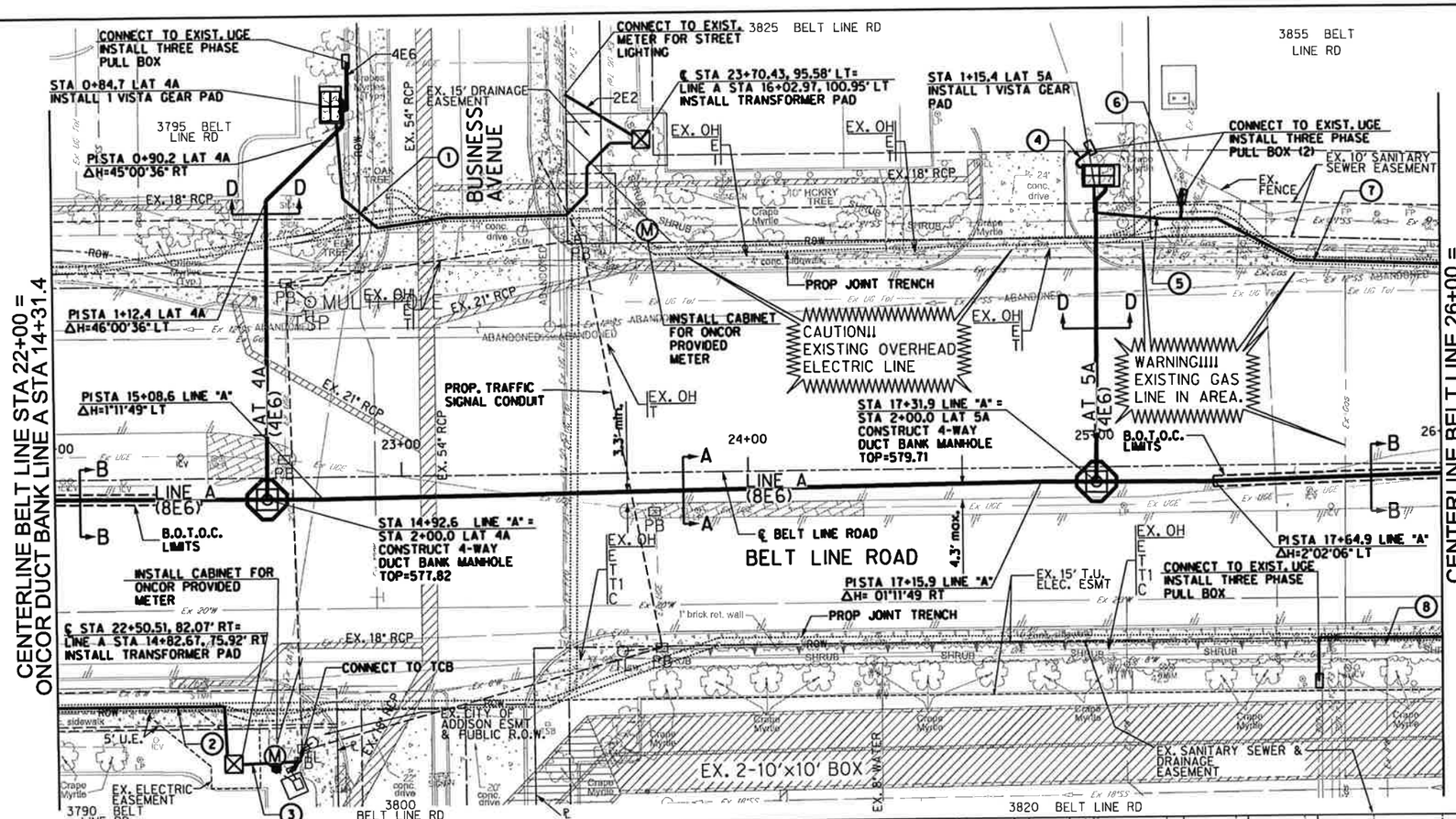
PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 ELEC 03	ELE-3

USER: ah1854 OFFICE: RCH PROJECT # 29350 FILE: 29350 ELEC 03.dgn TIME: 1:58:16 PM DATE: 11/8/2013

HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=10'

N

EXISTING UTILITY LOCATIONS SHOWN ARE SCHEMATIC IN NATURE AND MAY NOT ACCURATELY REFLECT THE SIZE AND LOCATION OF EACH PARTICULAR UTILITY. SOME UTILITY LINES MAY NOT BE SHOWN. CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ACTUAL FIELD LOCATION AND PROTECTION OF ALL EXISTING UTILITIES WHETHER SHOWN OR NOT. CONTRACTOR SHALL ALSO ASSUME RESPONSIBILITY FOR REPAIRS TO EXISTING UTILITIES, WHETHER SHOWN OR NOT, DAMAGED BY CONTRACTOR'S ACTIVITIES. DIFFERENCES IN HORIZONTAL OR VERTICAL LOCATION OF EXISTING UTILITIES SHALL NOT BE A BASIS FOR ADDITIONAL COMPENSATION. CALL 1-800-344-8377 TWO WORKING DAYS PRIOR TO CONSTRUCTION FOR ONSITE LOCATIONS.



LOAD CABLES
(SEE NOTE 4)

	L	TYPE
①	140'	2E4
②	58'	2E4
③	17'	2E2
④	20'	2E4
⑤	35'	6E4
⑥	6'	2E4
⑦	76'	4E4
⑧	36'	2E4

LEGEND

- PROPOSED PULL OR SERVICE BOX (AS NOTED)
- PROPOSED POWER POLE WITH RISER (POWER POLE BY OTHERS)
- PROPOSED TRANSFORMER PAD
- PROPOSED VISTA GEAR PAD
- PROPOSED PME PAD
- PROPOSED ELECTRICAL DUCT BANK MANHOLE
- PROPOSED ELECTRIC DUCT BANK BY OTHER THAN OPEN CUT (B.O.T.O.C.)
- PROPOSED ELECTRICAL DUCT BANK BY OPEN CUT (SIZE)
- PROP JOINT TRENCH (FRANCHISE & ONCOR) (SEE NOTE 4)
- (M) PROPOSED CABINET FOR ONCOR PROVIDED METER

NOTE:
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2. ALL PROFILE ELEVATIONS FOR ELECTRICAL MANHOLES ARE FOR OUTSIDE BOTTOM OF MANHOLE FLOOR UNLESS OTHERWISE SPECIFIED.

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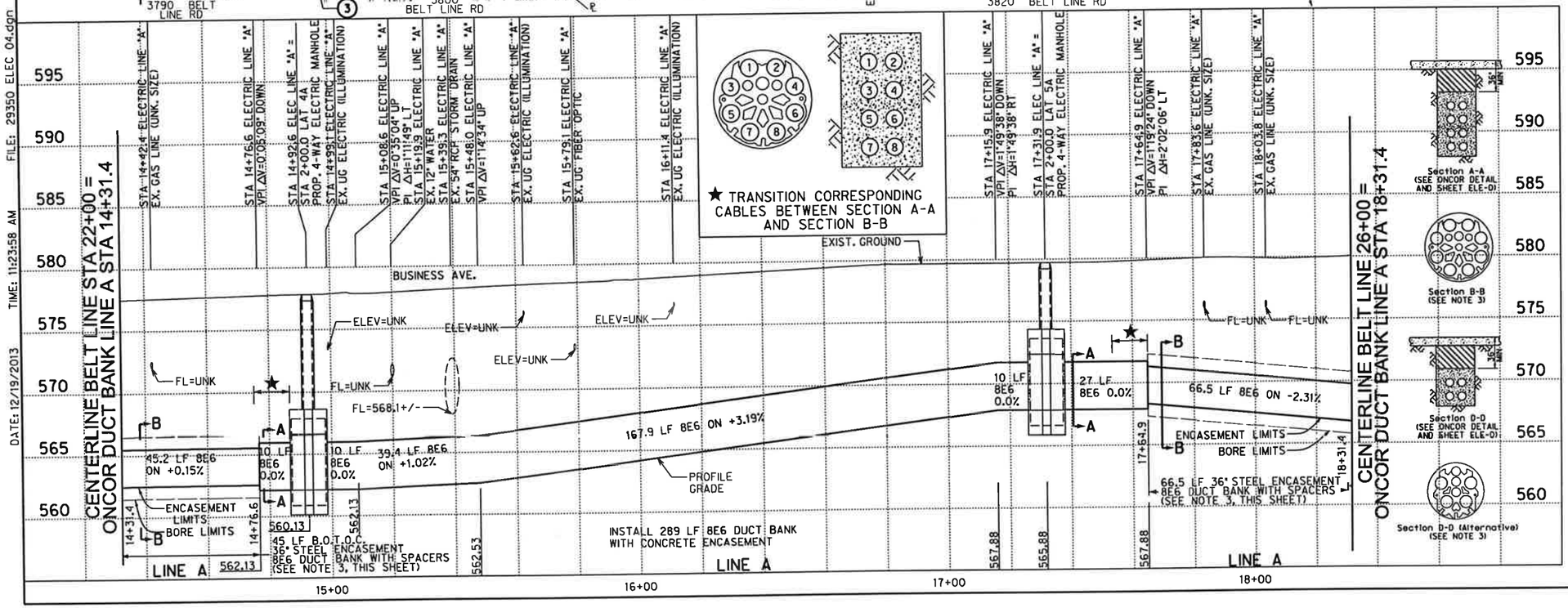


STATE OF TEXAS
CHARLIE BARTHELL MORAN III
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 12-19-2013 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

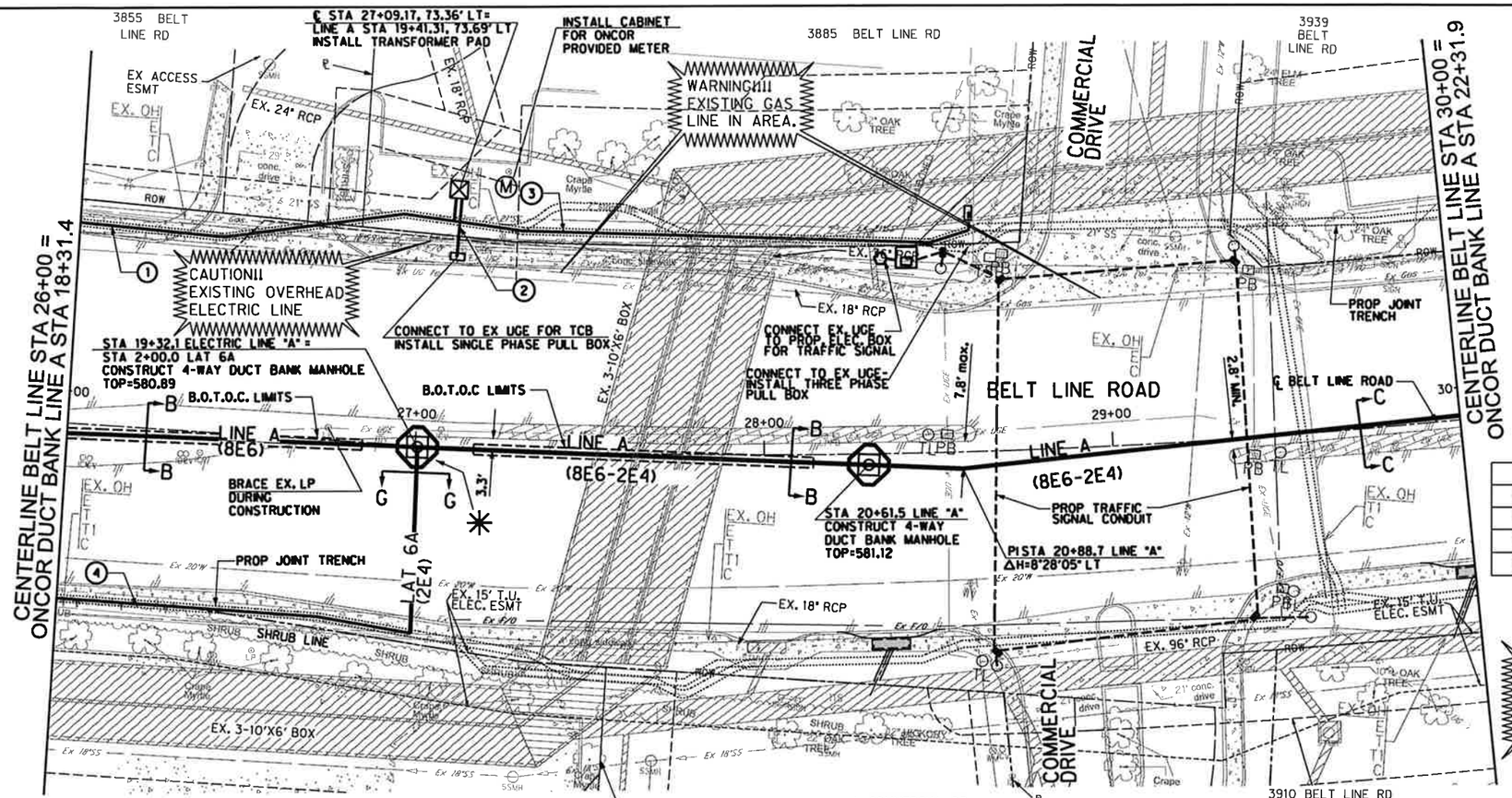
BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK PLAN AND PROFILE
BELT LINE RD STA 22+00 TO STA 26+00

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275 TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 ELEC 04	ELE-4

SHEET 77 OF 235



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HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=10'

LOAD CABLES
(SEE NOTE 4)

	L	TYPE
①	108'	4E4
②	20'	2E4
③	150'	2E4
④	105'	2E4

CONTRACTOR TO MOVE EXISTING ELECTRICAL ILLUMINATION LINE PRIOR TO INSTALLATION OF MANHOLE

LEGEND
- PROPOSED PULL OR SERVICE BOX (AS NOTED)
- PROPOSED POWER POLE WITH RISER (POWER POLE BY OTHERS)
- PROPOSED TRANSFORMER PAD
- PROPOSED VISTA GEAR PAD
- PROPOSED PME PAD
- PROPOSED ELECTRICAL DUCT BANK MANHOLE
- PROPOSED ELECTRIC DUCT BANK BY OTHER THAN OPEN CUT (B.O.T.O.C.)
- PROPOSED ELECTRICAL DUCT BANK BY OPEN CUT (SIZE)
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- (M) PROPOSED CABINET FOR ONCOR PROVIDED METER

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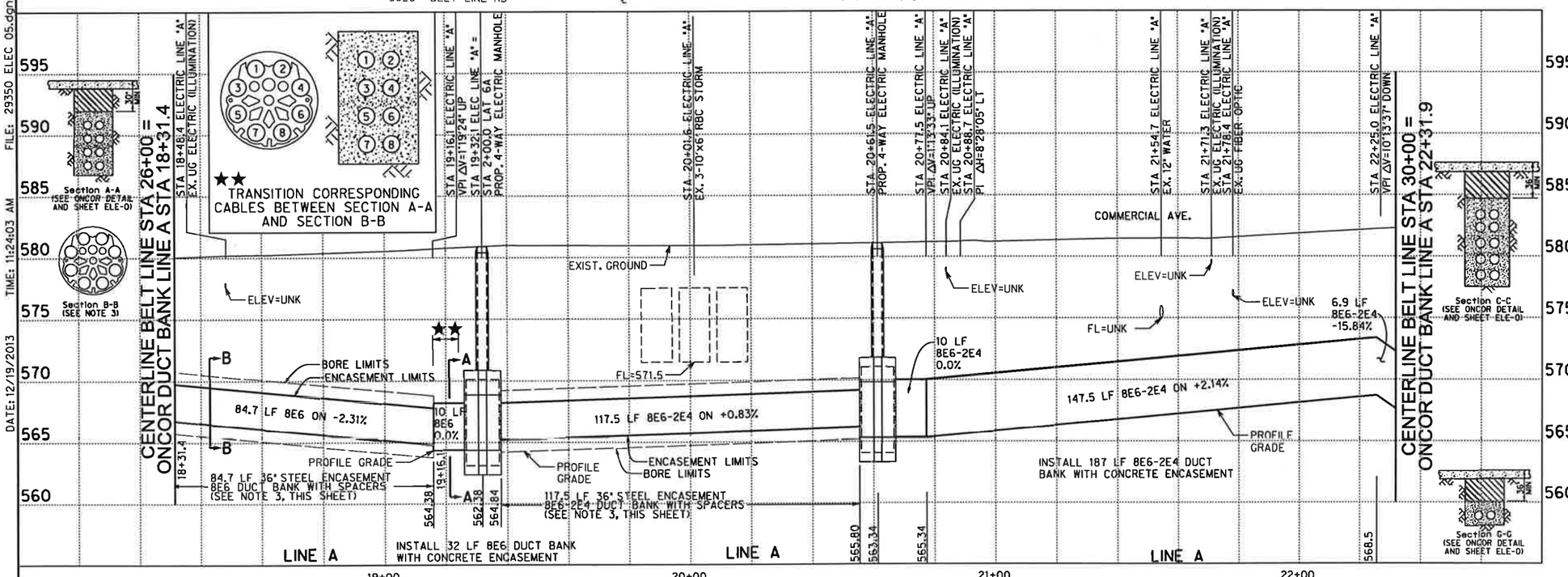


CHARLIE BARTHELL MORAN III 101189 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Signature of Registrant, P.E. 12-19-2013 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK PLAN AND PROFILE
BELT LINE RD STA 26+00 TO STA 30+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 ELEC 05	ELE-5

SEE SHEET ELE-6A FOR ELECTRICAL LAYOUT ON ONCOR TRANSMISSION PROPERTY 3800 BELT LINE RD LINES A, B, AND D.

HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=10'

LEGEND

- PROPOSED PULL OR SERVICE BOX (AS NOTED)
- PROPOSED POWER POLE WITH RISER (POWER POLE BY OTHERS)
- PROPOSED TRANSFORMER PAD
- PROPOSED VISTA GEAR PAD
- PROPOSED PME PAD
- PROPOSED ELECTRICAL DUCT BANK MANHOLE
- PROPOSED ELECTRIC DUCT BANK BY OTHER THAN OPEN CUT (B.O.T.O.C.)
- PROPOSED ELECTRICAL DUCT BANK BY OPEN CUT (SIZE)
- PROP JOINT TRENCH (FRANCHISE & ONCOR) (SEE NOTE 4)
- (M) PROPOSED CABINET FOR ONCOR PROVIDED METER

1 LINE A (8E6) A A

2 and 3 SEE SHEET ELE-6A FOR LINE B PROFILE

Section A-A (SEE ONCOR DETAIL AND SHEET ELE-0)

Section C-C (SEE ONCOR DETAIL AND SHEET ELE-0)

NOTE:
1. ALL PROFILE ELEVATIONS FOR ELECTRICAL DUCT BANK ARE FOR OUTSIDE BOTTOM OF DUCT BANK UNLESS OTHERWISE SPECIFIED.

2. ALL PROFILE ELEVATIONS FOR ELECTRICAL MANHOLES ARE FOR OUTSIDE BOTTOM OF MANHOLE FLOOR UNLESS OTHERWISE SPECIFIED.

3. STEEL ENCASEMENT PIPE SIZES SHOWN ARE APPROXIMATE AND SHALL BE AS REQUIRED FOR CONSTRUCTION AND RECOMMENDED BY PIPE SPACER MANUFACTURER. PIPE SPACERS SHALL BE DESIGNED AND SUPPLIED BY UNDERGROUND DEVICES, INC. OR APPROVED EQUAL.

4. ALL ELECTRIC LOAD CABLES TO BE INSTALLED IN JOINT TRENCH WITH RELOCATED FRANCHISE UTILITIES, EXCEPT AS NECESSARY TO CONNECT TO ELECTRICAL EQUIPMENT OR AS NOTED ON THE PLANS. FOR JOINT TRENCH SEE TELECOM RELOCATION PLAN SHEETS.

LOAD CABLES
(SEE NOTE 4)

	L	TYPE
1	70.0'	2E2
2	49'	2E4

Section D-D (Alternative) (SEE NOTE 3)

Section F-F (SEE ONCOR DETAIL AND SHEET ELE-0)

Section H-H (SEE ONCOR DETAIL AND SHEET ELE-0)

STATE OF TEXAS — CHARLIE BARTHELL MORAN III — 101189 — LICENSED PROFESSIONAL ENGINEER

Signature of Registrant ,P.E. 12-11-2013 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

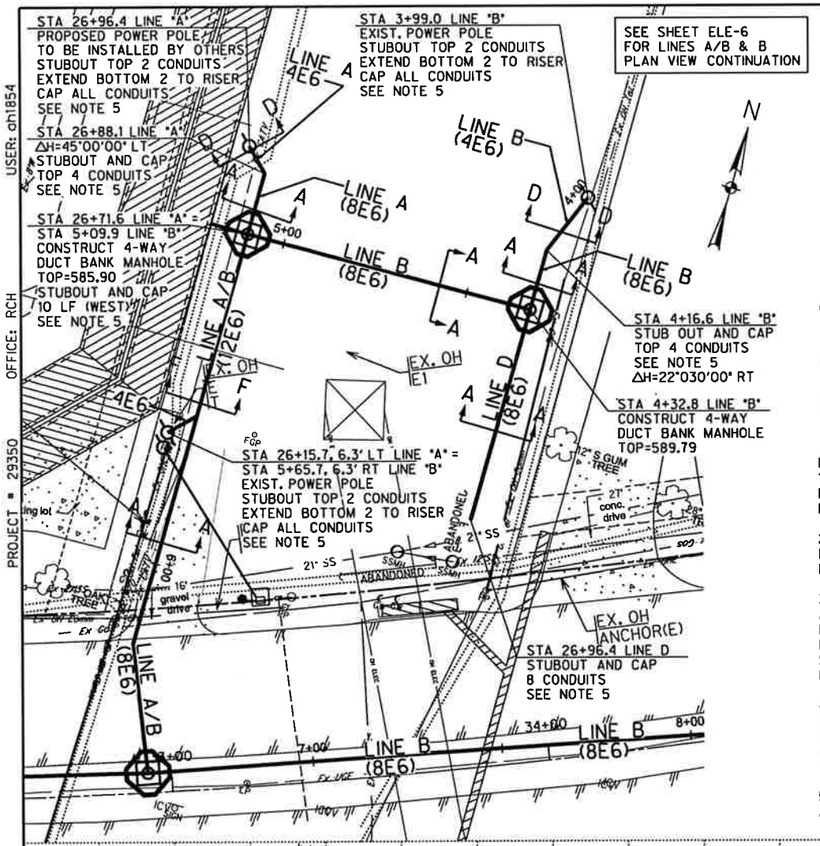
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK PLAN AND PROFILE BELT LINE RD STA 30+00 TO STA 34+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 ELEC 06	ELE-6



LEGEND

- PROPOSED PULL OR SERVICE BOX (AS NOTED)
- PROPOSED POWER POLE WITH RISER (POWER POLE BY OTHERS)
- PROPOSED TRANSFORMER PAD
- PROPOSED VISTA GEAR PAD
- PROPOSED PME PAD
- PROPOSED ELECTRICAL DUCT BANK MANHOLE
- PROPOSED ELECTRIC DUCT BANK BY OTHER THAN OPEN CUT (B.O.T.O.C.)
- PROPOSED ELECTRICAL DUCT BANK BY OPEN CUT (SIZE)
- PROP JOINT TRENCH (FRANCHISE & ONCOR) (SEE NOTE 4)
- (M) PROPOSED CABINET FOR ONCOR PROVIDED METER

NOTE:
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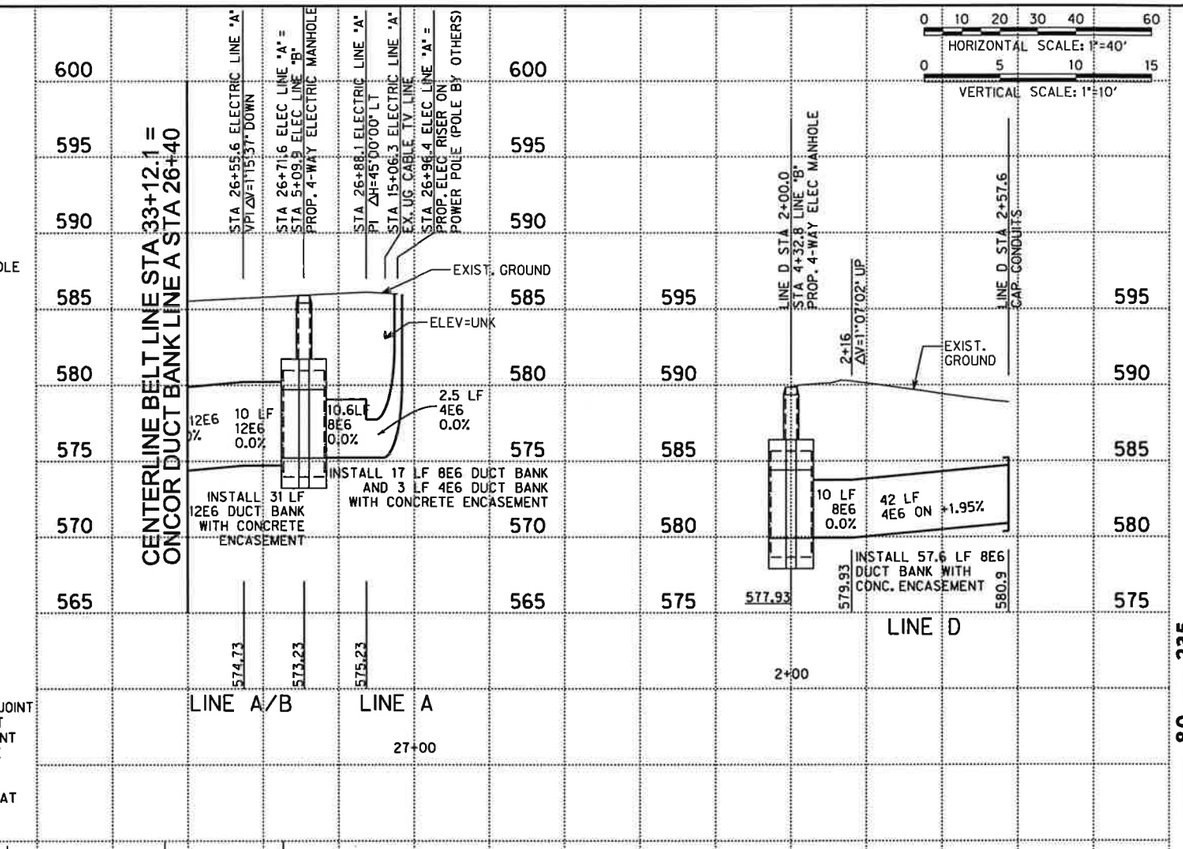
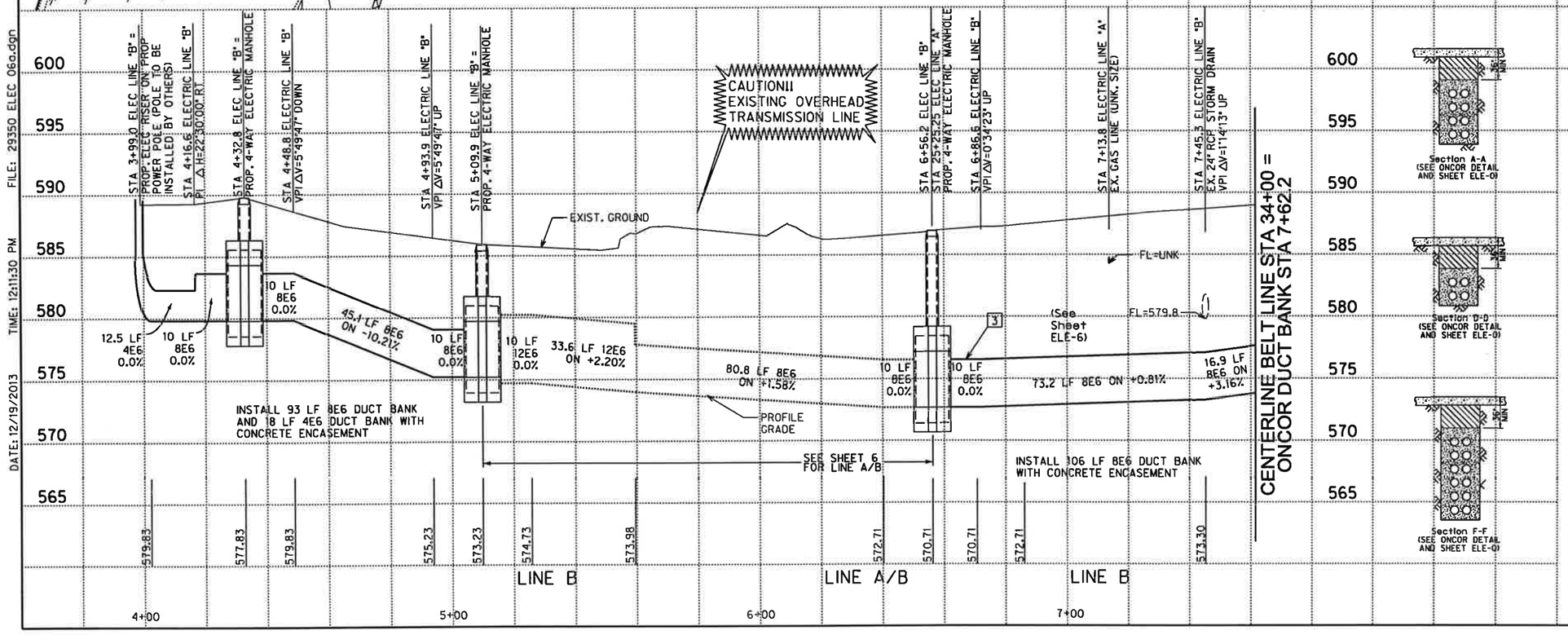
4. ALL ELECTRIC LOAD CABLES TO BE INSTALLED IN JOINT TRENCH WITH RELOCATED FRANCHISE UTILITIES, EXCEPT AS NECESSARY TO CONNECT TO ELECTRICAL EQUIPMENT OR AS NOTED ON THE PLANS. FOR JOINT TRENCH SEE TELECOM RELOCATION PLAN SHEETS.

5. INSTALL ELECTRICAL MARKER PROVIDED BY ONCOR AT ALL BURIED STUBOUTS.





CHARLIE BARTHELL MORAN 101189 LICENSED PROFESSIONAL ENGINEER

Signature of Registrant ,P.E. 12-19-2013 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK PROFILE
LINE A AND LINE B

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 348-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 ELEC 06A	ELE-6A

USER: dh1854
OFFICE: RCH
PROJECT = 29350
FILE: 29350 ELEC 06a.dgn
TIME: 12:11:30 PM
DATE: 12/19/2013

PRIOR TO ANY CONSTRUCTION CONTRACTOR TO VERIFY LOCATION OF EXISTING WASTEWATER AND STORM SEWER AND CONFIRM ADEQUATE CLEARANCE BETWEEN EX. OHE AND EXISTING UTILITIES FOR CONSTRUCTION OF PAD AND SAFE INSTALLATION OF SWITCHGEARS. NOTIFY ENGINEER OF INADEQUATE CLEARANCES.

WARNING!!!! EXISTING GAS LINE IN AREA.

CENTERLINE BELT LINE STA 34+00 = ONCOR DUCT BANK LINE B STA 7+62.2 = ONCOR DUCT BANK LAT 1-3B STA 3+01.5

CENTERLINE BELT LINE STA 38+00 = ONCOR DUCT BANK LINE B STA 11+62.2

BELT LINE ROAD

SURVEYOR BLVD.

3953 BELT LINE RD

4002 BELT LINE RD

TEXAS UTILITIES ELEC. CO.
3800 BELT LINE RD

EX. 10' SAN. SEW. ESMT

EX. 10' STORM AND SANITARY SEWER EASEMENT

EX. 10' STORM EASEMENT

CAP 8E6 PVC
INSTALL ELECTRICAL MARKER TO BE PROVIDED BY ONCOR

CAUTION!! EXISTING OVERHEAD ELECTRIC LINE

EX. OH ANCHOR(E)

LINE B (8E6)

LAT 1-2B (8E6)

LAT 1-3B (2E6)

LAT 1-2B (2E6)

LAT 1-1B (4E6)

LAT 1-2B (4E6)

8" WATERLINE "B"

EX. 10" WW

EX. 96" RCP

EX. 72" RCP

EX. 21" RCP

EX. DRAIN. AND UTILITY ESMT.

PROP. TRAFFIC SIGNAL CONDUIT

PROP JOINT TRENCH

GUTTER

BRACE EX. LP DURING CONSTRUCTION

INSTALL CABINET FOR ONCOR PROVIDED METER

STA 8+63.8 ELECTRIC LINE "B" = STA 2+00.0 ELECTRIC LAT "1-2B" CONSTRUCT 4-WAY DUCT BANK MANHOLE TOP=590.73

STA 10+97.4 ELECTRIC LINE "B" CONSTRUCT 4-WAY DUCT BANK MANHOLE TOP=593.70

PISTA 8+27.8 LINE "B" ΔH=5°51'04" LT

STA 8+43.8 LINE "B" = STA 2+00.0 LAT "1-1B" CONSTRUCT 4-WAY DUCT BANK MANHOLE TOP=590.32

PISTA 10+30.1 LINE "B" ΔH=1°37'56" LT

STA 2+55.1 LAT 1-2B INSTALL 1 VISTA GEAR PAD

STA 2+54.8 LAT 1-1B INSTALL 1 VISTA GEAR PAD

LAT 1-3B STA 2+00 VISTA GEAR

STA 3+03.3 LAT 1-2B TWO PROPOSED POWER POLES TO BE NSTALLED BY OTHERS (COORDINATE SCHEDULING WITH ONCOR). INSTALL 2E6 CONDUIT TO POLE AND ATTACH RISER PER STANDARD DETAIL ON SHEET (ELE-26)

CONTRACTOR TO MOVE EXISTING ELECTRICAL ILLUMINATION LINE PRIOR TO INSTALLATION OF MANHOLE

① INSTALL 20 LF - 2E4

4.7' max.

4.7' min.

1.67'

0 10 20 30 40 60
HORIZONTAL SCALE: 1"=40'
0 5 10 15
VERTICAL SCALE: 1"=10'

EXISTING UTILITY LOCATIONS SHOWN ARE SCHEMATIC IN NATURE AND MAY NOT ACCURATELY REFLECT THE SIZE AND LOCATION OF EACH PARTICULAR UTILITY. SOME UTILITY LINES MAY NOT BE SHOWN. CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ACTUAL FIELD LOCATION AND PROTECTION OF ALL EXISTING UTILITIES WHETHER SHOWN OR NOT. CONTRACTOR SHALL ALSO ASSUME RESPONSIBILITY FOR REPAIRS TO EXISTING UTILITIES, WHETHER SHOWN OR NOT, DAMAGED BY CONTRACTOR'S ACTIVITIES. DIFFERENCES IN HORIZONTAL OR VERTICAL LOCATION OF EXISTING UTILITIES SHALL NOT BE A BASIS FOR ADDITIONAL COMPENSATION. CALL 1-800-344-8377 TWO WORKING DAYS PRIOR TO CONSTRUCTION FOR ONSITE LOCATIONS.

LEGEND

- PROPOSED PULL OR SERVICE BOX (AS NOTED)
- PROPOSED POWER POLE WITH RISER (POWER POLE BY OTHERS)
- PROPOSED TRANSFORMER PAD
- PROPOSED VISTA GEAR PAD
- PROPOSED PME PAD
- PROPOSED ELECTRICAL DUCT BANK MANHOLE
- PROPOSED ELECTRIC DUCT BANK BY OTHER THAN OPEN CUT (B.O.T.O.C.)
- PROPOSED ELECTRICAL DUCT BANK BY OPEN CUT (SIZE)
- PROP JOINT TRENCH (FRANCHISE & ONCOR) (SEE NOTE 4)
- (M) PROPOSED CABINET FOR ONCOR PROVIDED METER

NOTE:
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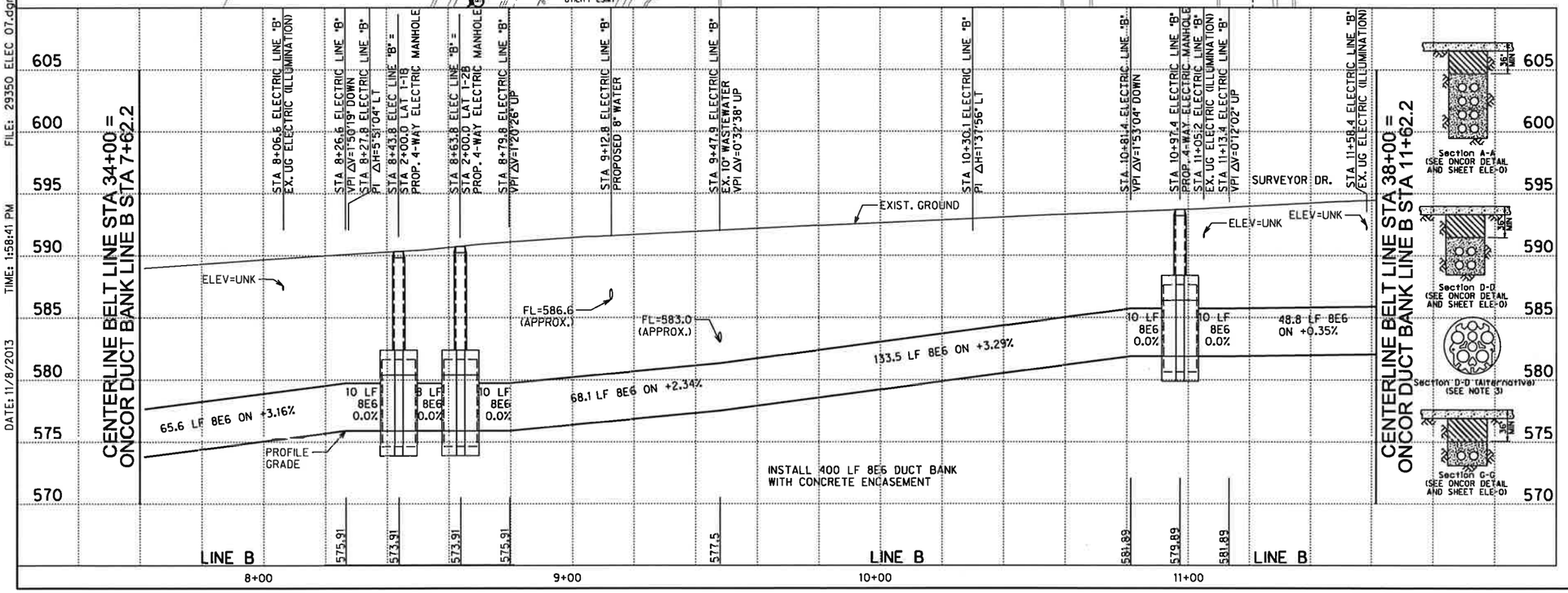


Section A-A (SEE ONCOR DETAIL AND SHEET ELE-01)

Section D-D (SEE ONCOR DETAIL AND SHEET ELE-01)

Section D-D (Alternative) (SEE NOTE 3)

Section G-G (SEE ONCOR DETAIL AND SHEET ELE-01)

STATE OF TEXAS
CHARLIE BARTHELL MORAN, III
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant ,P.E. 11-8-2013 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

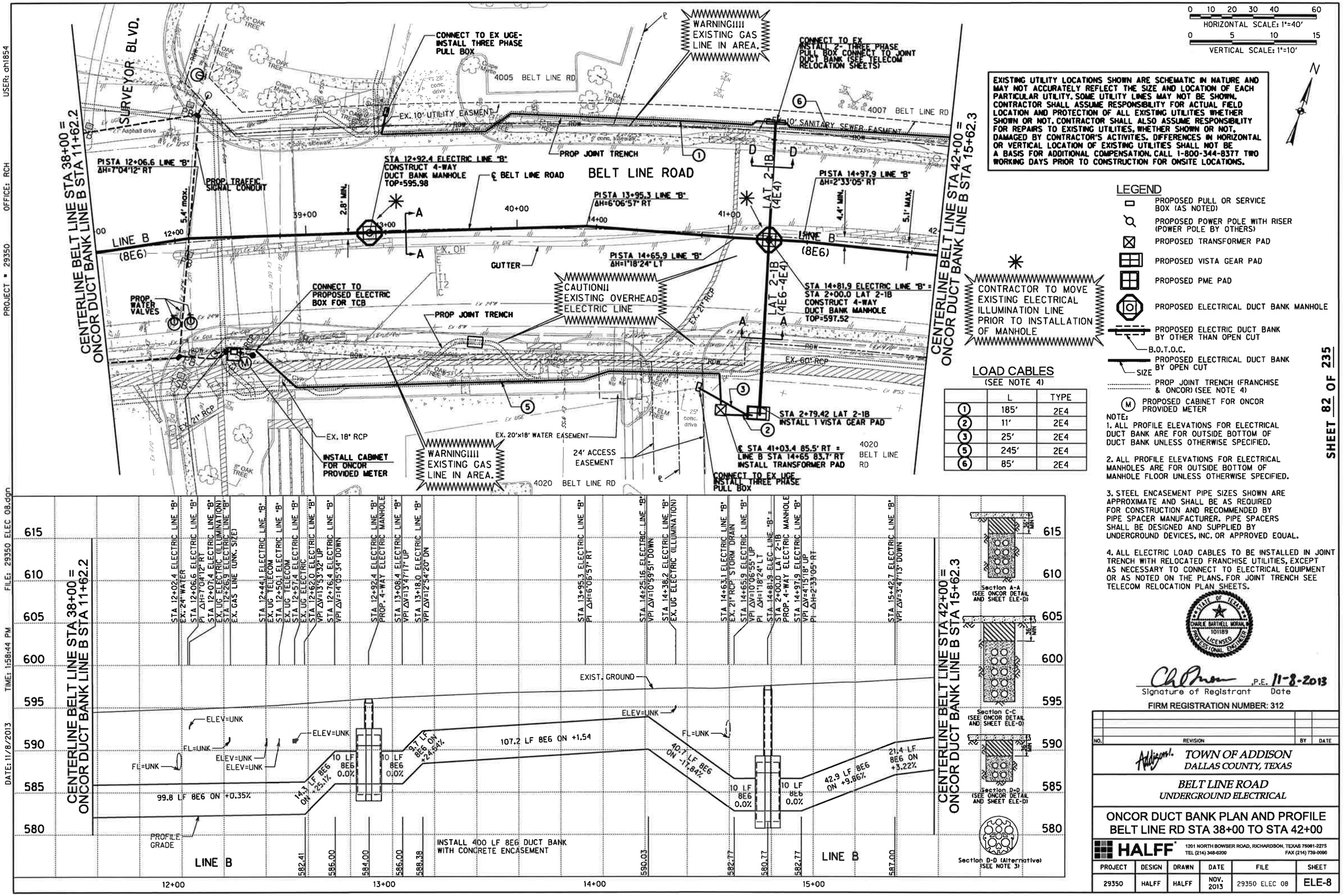
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK PLAN AND PROFILE BELT LINE RD STA 34+00 TO STA 38+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 ELEC 07	ELE-7



0 10 20 30 40 60
HORIZONTAL SCALE: 1"=40'
0 5 10 15
VERTICAL SCALE: 1"=10'

N

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LEGEND

- PROPOSED PULL OR SERVICE BOX (AS NOTED)
- PROPOSED POWER POLE WITH RISER (POWER POLE BY OTHERS)
- PROPOSED TRANSFORMER PAD
- PROPOSED VISTA GEAR PAD
- PROPOSED PME PAD
- PROPOSED ELECTRICAL DUCT BANK MANHOLE
- PROPOSED ELECTRIC DUCT BANK BY OTHER THAN OPEN CUT (B.O.T.O.C.)
- PROPOSED ELECTRICAL DUCT BANK BY OPEN CUT (SIZE)
- PROP JOINT TRENCH (FRANCHISE & ONCOR) (SEE NOTE 4)
- (M) PROPOSED CABINET FOR ONCOR PROVIDED METER

LOAD CABLES
(SEE NOTE 4)

	L	TYPE
1	185'	2E4
2	11'	2E4
3	25'	2E4
5	245'	2E4
6	85'	2E4

NOTE:
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STATE OF TEXAS
CHARLIE BARTHELL MORAN III
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant ,P.E. 11-8-2013 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

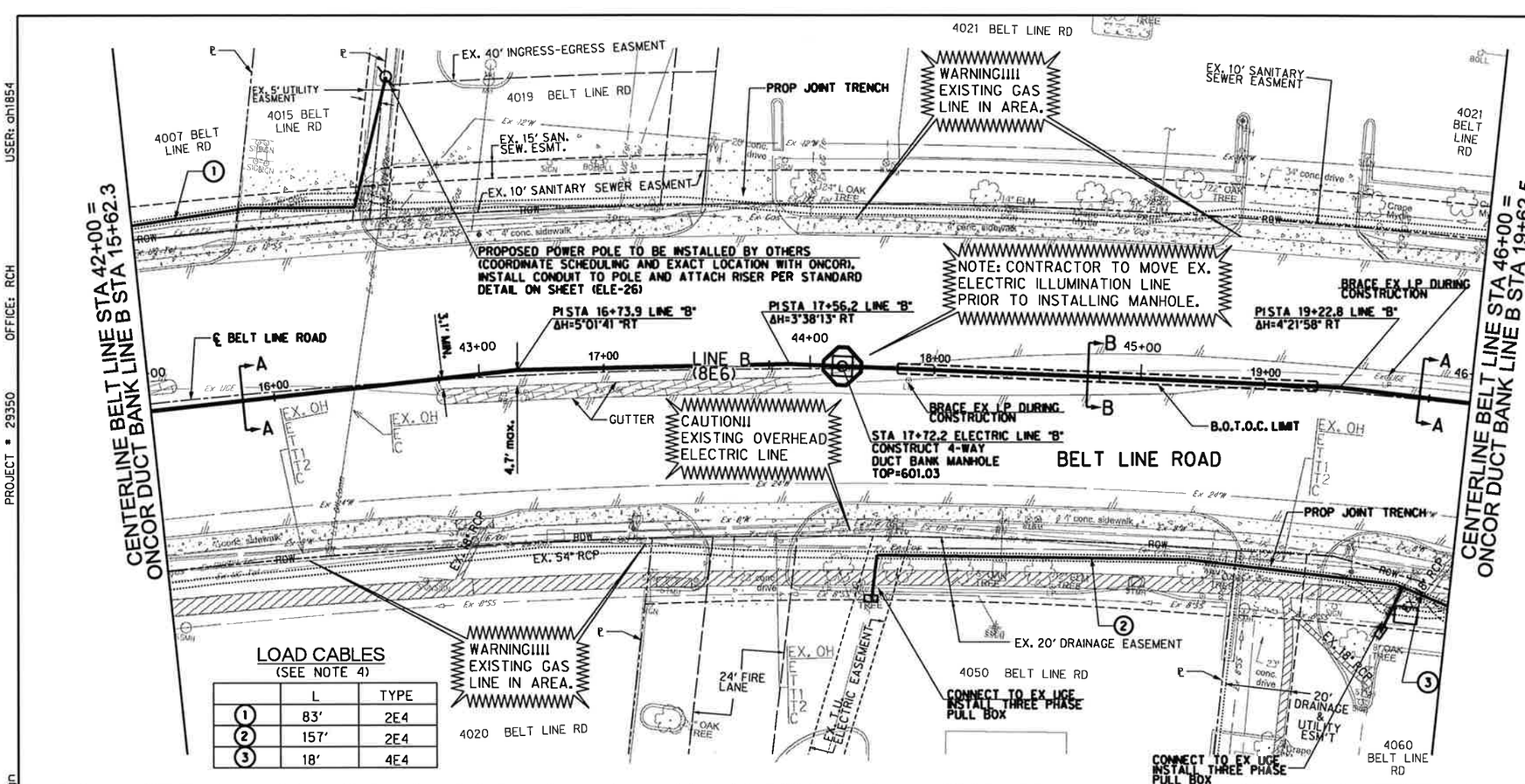
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK PLAN AND PROFILE
BELT LINE RD STA 38+00 TO STA 42+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 ELEC 08	ELE-8



HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=10'

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N

LEGEND

- PROPOSED PULL OR SERVICE BOX (AS NOTED)
- PROPOSED POWER POLE WITH RISER (POWER POLE BY OTHERS)
- PROPOSED TRANSFORMER PAD
- PROPOSED VISTA GEAR PAD
- PROPOSED PME PAD
- PROPOSED ELECTRICAL DUCT BANK MANHOLE
- PROPOSED ELECTRIC DUCT BANK BY OTHER THAN OPEN CUT (B.O.T.O.C.)
- PROPOSED ELECTRICAL DUCT BANK BY OPEN CUT (SIZE)
- PROP JOINT TRENCH (FRANCHISE & ONCOR) (SEE NOTE 4)
- (M) PROPOSED CABINET FOR ONCOR PROVIDED METER

NOTE:
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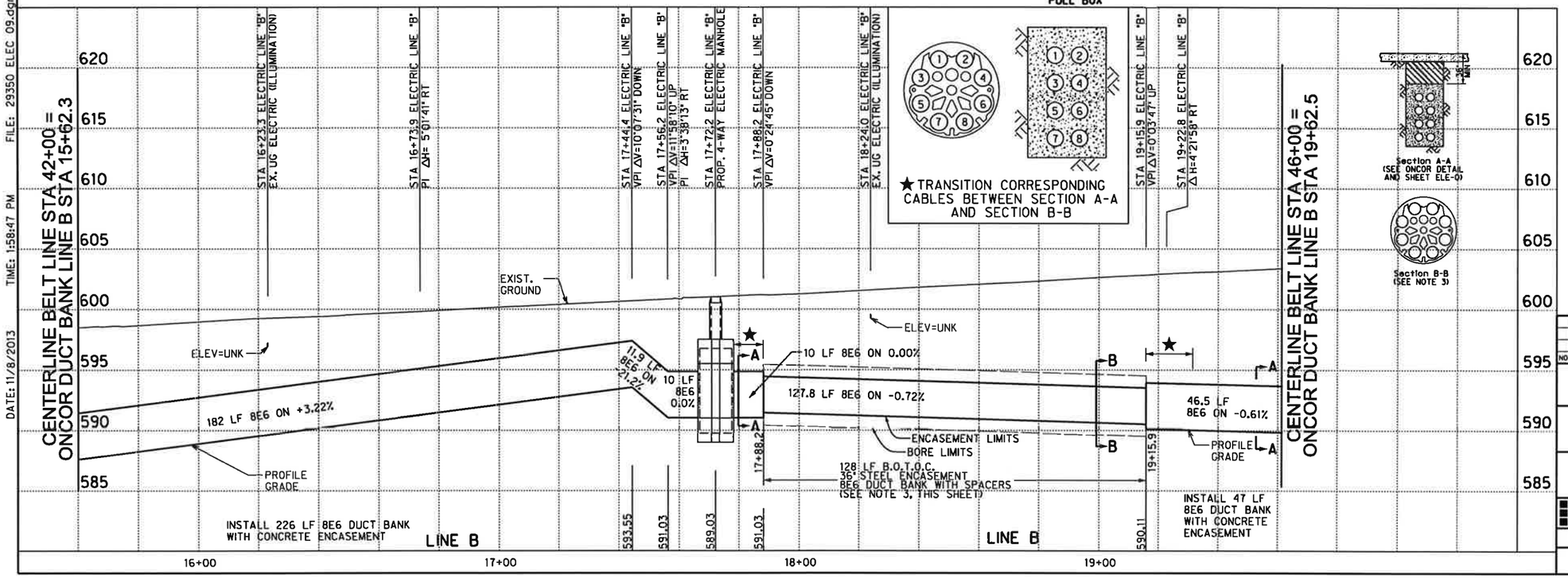

STATE OF TEXAS
CHARLIE BARTHELL MORAN III
101189
LICENSED PROFESSIONAL ENGINEER

Signature of Registrant P.E. 11-8-2013
Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK PLAN AND PROFILE
BELT LINE RD STA 42+00 TO STA 46+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 ELEC 09	ELE-9

SHEET 83 OF 235

HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=10'

EXISTING UTILITY LOCATIONS SHOWN ARE SCHEMATIC IN NATURE AND MAY NOT ACCURATELY REFLECT THE SIZE AND LOCATION OF EACH PARTICULAR UTILITY. SOME UTILITY LINES MAY NOT BE SHOWN. CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ACTUAL FIELD LOCATION AND PROTECTION OF ALL EXISTING UTILITIES WHETHER SHOWN OR NOT. CONTRACTOR SHALL ALSO ASSUME RESPONSIBILITY FOR REPAIRS TO EXISTING UTILITIES, WHETHER SHOWN OR NOT, DAMAGED BY CONTRACTOR'S ACTIVITIES. DIFFERENCES IN HORIZONTAL OR VERTICAL LOCATION OF EXISTING UTILITIES SHALL NOT BE A BASIS FOR ADDITIONAL COMPENSATION. CALL 1-800-344-8377 TWO WORKING DAYS PRIOR TO CONSTRUCTION FOR ONSITE LOCATIONS.

N

CENTERLINE BELT LINE STA 46+00 = ONCOR DUCT BANK LINE B STA 19+62.5

CENTERLINE BELT LINE STA 50+00 = ONCOR DUCT BANK LINE B STA 23+62.5

℄ STA 47+20.6, 111.3' LT= LINE B STA 20+85.3, 110.0' LT
INSTALL TRANSFORMER PAD
STA 0+94.15 LAT 3B
INSTALL 1 PME PAD
CONNECT TO EX UGE
INSTALL SINGLE PHASE
PULL BOX

PROPOSED POWER POLE TO BE INSTALLED BY OTHERS (COORDINATE SCHEDULING WITH ONCOR). INSTALL 4E6 CONDUIT TO POLE AND ATTACH RISER PER STANDARD DETAIL ON SHEET (ELE-26)

EX. WW SERVICE

4041 BELT LINE RD

PI STA 1+25.2 LAT 3B
ΔH=45°00'00" LT

RUNYON ROAD

PROP JOINT TRENCH

4101 BELT LINE RD

WARNING!!!! EXISTING GAS LINE IN AREA.

EX. 10' SAN. SEW. ESMT.

STA 20+55.7 LINE B= STA 2+00 LAT 3B
CONSTRUCT 4-WAY MANHOLE DUCT BANK MANHOLE
TOP=604.48

PI STA 21+73.5 LINE B
ΔH=01°05'38" RT

PI STA 20+71.2 LINE B
ΔH=0°57'47" LT

STA 23+10.9 LINE B
CONSTRUCT 4-WAY MANHOLE DUCT BANK MANHOLE
TOP=607.93

PI STA 23+47.3 LINE B
ΔH=2°46'49" RT

LINE B (8E6)

PI STA 20+39.2 LINE B
ΔH=0°24'38" LT

LAT 3B (4E6)

℄ STA 46+16.82, 79.30' RT= LINE B STA 20+77.7, 79.58' RT
INSTALL 1-TRANSFORMER PAD

CAUTION!! EXISTING OVERHEAD ELECTRIC LINE

INSTALL PROP CABINET FOR ONCOR PROVIDED METER

BELT LINE ROAD

℄ BELT LINE ROAD

GUTTER

EX. 20' DRAINAGE, UTILITY & SIDEWALK ESMT

PROP JOINT TRENCH

EX. 54" RCP

EX. 36" RCP

EX. DRAIN. ESMT.

WARNING!!!! EXISTING GAS LINE IN AREA.

STA 2+73.7 LAT 3B
INSTALL 1 VISTA GEAR PAD

4060 BELT LINE RD

EX 10" WATER ESMT

4090 BELT LINE RD

CONNECT TO PROP ELECTRIC BOX FOR TCB

EX. 10' X 40' SIGN ESMT.

EX. 20' DRAINAGE & UTILITY ESMT

CONNECT TO EX UGE
INSTALL THREE PHASE
PULL BOX

4080 BELT LINE RD

EX. DRAIN. & UTILITY ESMT

4100 BELT LINE RD

15' UTILITY ESMT.

CONTRACTOR TO MOVE EXISTING ELECTRICAL ILLUMINATION LINE PRIOR TO INSTALLATION OF MANHOLE

LEGEND

- PROPOSED PULL OR SERVICE BOX (AS NOTED)
- PROPOSED POWER POLE WITH RISER (POWER POLE BY OTHERS)
- PROPOSED TRANSFORMER PAD
- PROPOSED VISTA GEAR PAD
- PROPOSED PME PAD
- PROPOSED ELECTRICAL DUCT BANK MANHOLE
- PROPOSED ELECTRIC DUCT BANK BY OTHER THAN OPEN CUT (B.O.T.O.C.)
- PROPOSED ELECTRICAL DUCT BANK BY OPEN CUT (SIZE)
- PROP JOINT TRENCH (FRANCHISE & ONCOR) (SEE NOTE 4)
- (M) PROPOSED CABINET FOR ONCOR PROVIDED METER

LOAD CABLES
(SEE NOTE 4)

	L	TYPE
1	20'	2E4
2	15'	2E4
3	98'	4E4
4	30'	2E2
5	75'	2E4-2E2
6	30'	2E4

NOTE:
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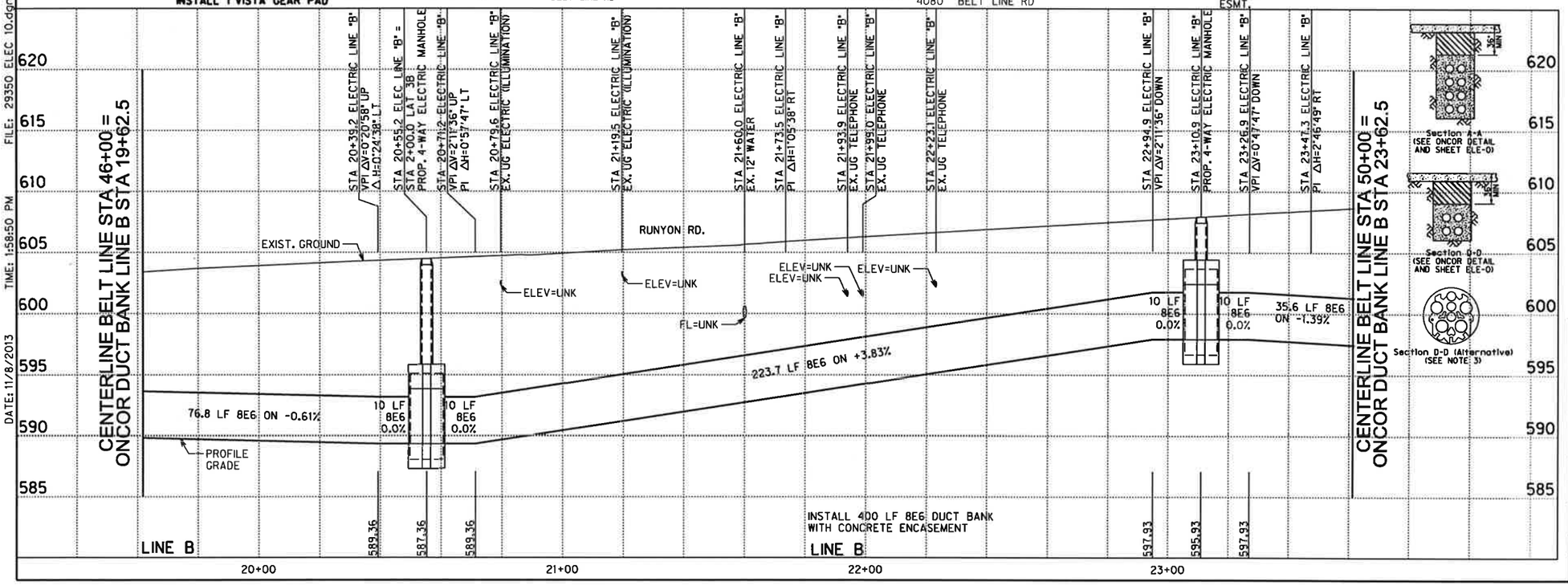


Section A-A (SEE ONCOR DETAIL AND SHEET ELE-0)

Section D-D (SEE ONCOR DETAIL AND SHEET ELE-0)

Section D-D (Alternative) (SEE NOTE 3)

STATE OF TEXAS
CHARLIE BARTHELL MORAN III
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 11-8-2013 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK PLAN AND PROFILE
BELT LINE RD STA 46++00 TO STA 50+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0093

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 ELEC 10	ELE-10

CONTRACTOR TO MOVE EXISTING ELECTRICAL ILLUMINATION LINE PRIOR TO INSTALLATION OF MANHOLE

CAUTION!! MAINTAIN REQUIRED CLEARANCES FROM EXISTING OHE DURING CONSTRUCTION

4135 BELT LINE RD

4101 BELT LINE RD

4103 BELT LINE RD

PROP JOINT TRENCH

STA 26+37.5 ELECTRIC LINE "B"
CONSTRUCT 4-WAY
DUCT BANK MANHOLE
TOP=610.18
CONNECT TO EX UGE
INSTALL THREE PHASE
PULL BOX

PI STA 26+88.8 LINE "B"
ΔH=0°20'36" RT

24' FIRE LANE ACCESS AND UTILITY ESMT.

EX. 18" RCP

EX. OH E

LINE B (8E6-2E4)

WARNING!!!! EXISTING GAS LINE IN AREA.

CAUTION!! EXISTING OVERHEAD ELECTRIC LINE

℄ BELT LINE ROAD

BELT LINE ROAD

LINE B (8E6)

A A B B (ALTERNATIVE)

WARNING!!!! EXISTING GAS LINE IN AREA.

EX. OH E T T1 T2 C

PI STA 24+60.1 LINE "B"
ΔH=2°51'49" LT

CONNECT TO EX UGE
INSTALL THREE PHASE
PULL BOX

PI STA 2+51.1 LAT 4B
ΔH=15°00'00" RT

STA 25+70.9 ELECTRIC LINE "B"
STA 2+00.0 LAT 4B
CONSTRUCT 4-WAY
DUCT BANK MANHOLE
TOP=610.95

LAT 4B (4E6)

GUTTER

CONNECT TO EX LIGHTING CONTROL BOX

℄ STA 52+20.42, 91.00' RT=
LINE B STA 25+79.7, 89.21' RT
INSTALL 1-TRANSFORMER PAD

PI STA 2+64.1 LAT 4B
ΔH=15°00'00" LT

Prop. 18" RCP

EX. 21" RCP

EX. 20' DRAINAGE, UTILITY & SIDEWALK EASEMENT

PROP JOINT TRENCH

EX. 54" RCP

EX. 20' DRAINAGE, UTILITY & SIDEWALK EASEMENT

CONNECT TO EX UGE
INSTALL THREE PHASE
PULL BOX

EX. 36" RCP

EX TRANSFORMER

DRAIN & UTIL EASEMENT

EX. DRAINAGE & UTILITY EASEMENT

DRAIN & UTIL EASEMENT

10' UTILITY EASEMENT

STA 2+90.6 LAT 4B
INSTALL 1 VISTA GEAR PAD

4100 BELT LINE RD

4150 BELT LINE RD

CENTERLINE BELT LINE STA 50+00 = ONCOR DUCT BANK LINE B STA 23+62.5

CENTERLINE BELT LINE STA 54+00 = ONCOR DUCT BANK LINE B STA 28+29.4

0 10 20 30 40 60
HORIZONTAL SCALE: 1"=40'
0 5 10 15
VERTICAL SCALE: 1"=10'

N

EXISTING UTILITY LOCATIONS SHOWN ARE SCHEMATIC IN NATURE AND MAY NOT ACCURATELY REFLECT THE SIZE AND LOCATION OF EACH PARTICULAR UTILITY. SOME UTILITY LINES MAY NOT BE SHOWN. CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ACTUAL FIELD LOCATION AND PROTECTION OF ALL EXISTING UTILITIES WHETHER SHOWN OR NOT. CONTRACTOR SHALL ALSO ASSUME RESPONSIBILITY FOR REPAIRS TO EXISTING UTILITIES, WHETHER SHOWN OR NOT, DAMAGED BY CONTRACTOR'S ACTIVITIES. DIFFERENCES IN HORIZONTAL OR VERTICAL LOCATION OF EXISTING UTILITIES SHALL NOT BE A BASIS FOR ADDITIONAL COMPENSATION. CALL 1-800-344-8377 TWO WORKING DAYS PRIOR TO CONSTRUCTION FOR ONSITE LOCATIONS.

Section A-A (SEE ONCOR DETAIL AND SHEET ELE-01)

Section B-B (SEE NOTE 3)

Section C-C (SEE ONCOR DETAIL AND SHEET ELE-01)

Section D-D (SEE ONCOR DETAIL AND SHEET ELE-01)

Section D-D (Alternative) (SEE NOTE 3)

LEGEND

- PROPOSED PULL OR SERVICE BOX (AS NOTED)
- PROPOSED POWER POLE WITH RISER (POWER POLE BY OTHERS)
- PROPOSED TRANSFORMER PAD
- PROPOSED VISTA GEAR PAD
- PROPOSED PME PAD
- PROPOSED ELECTRICAL DUCT BANK MANHOLE
- PROPOSED ELECTRIC DUCT BANK BY OTHER THAN OPEN CUT — B.O.T.O.C.
- PROPOSED ELECTRICAL DUCT BANK BY OPEN CUT — SIZE
- PROP JOINT TRENCH (FRANCHISE & ONCOR) (SEE NOTE 4)
- (M) PROPOSED CABINET FOR ONCOR PROVIDED METER

NOTE:

1. ALL PROFILE ELEVATIONS FOR ELECTRICAL DUCT BANK ARE FOR OUTSIDE BOTTOM OF DUCT BANK UNLESS OTHERWISE SPECIFIED.

2. ALL PROFILE ELEVATIONS FOR ELECTRICAL MANHOLES ARE FOR OUTSIDE BOTTOM OF MANHOLE FLOOR UNLESS OTHERWISE SPECIFIED.

3. STEEL ENCASEMENT PIPE SIZES SHOWN ARE APPROXIMATE AND SHALL BE AS REQUIRED FOR CONSTRUCTION AND RECOMMENDED BY PIPE SPACER MANUFACTURER. PIPE SPACERS SHALL BE DESIGNED AND SUPPLIED BY UNDERGROUND DEVICES, INC. OR APPROVED EQUAL.

4. ALL ELECTRIC LOAD CABLES TO BE INSTALLED IN JOINT TRENCH WITH RELOCATED FRANCHISE UTILITIES, EXCEPT AS NECESSARY TO CONNECT TO ELECTRICAL EQUIPMENT OR AS NOTED ON THE PLANS. FOR JOINT TRENCH SEE TELECOM RELOCATION PLAN SHEETS.

LOAD CABLES
(SEE NOTE 4)

	L	TYPE
(2)	40'	2E4
(3)	86'	4E4
(4)	11'	2E4
(5)	160'	2E2

STA 24+05.3 ELECTRIC LINE "B" (ILLUMINATION)
EX. UG ELECTRIC (ILLUMINATION)

STA 24+45.3 ELECTRIC LINE "B"
EX. GAS LINE (UNK. SIZE)

STA 24+60.1 ELECTRIC LINE "B"
PI ΔH=2°51'49" LT

STA 25+24.3 ELECTRIC LINE "B"
EX. 18" RCP STORM DRAIN

STA 25+54.9 ELECTRIC LINE "B"
VPI ΔV=0°47'47" UP

STA 25+70.9 ELEC LINE "B" =
STA 2+00.0 LAT 4B
PROP. 4-WAY ELECTRIC MANHOLE

STA 25+74.7 ELECTRIC LINE "B"
EX. UG ELECTRIC (ILLUMINATION)

STA 25+81.9 ELECTRIC LINE "B"
VPI ΔV=1°08'45" UP

STA 26+18.0 ELECTRIC LINE "B"
EX. UG TELEPHONE

STA 26+21.6 ELECTRIC LINE "B"
VPI ΔV=1°08'45" DOWN

STA 26+25.7 ELECTRIC LINE "B"
EX. UG ELECTRIC

STA 26+26.8 ELECTRIC LINE "B"
EX. GAS LINE (SIZE UNKNOWN)

STA 26+37.5 ELEC LINE "B" =
PROP. 4-WAY ELECTRIC MANHOLE

STA 26+53.5 ELECTRIC LINE "B"
VPI ΔV=16°34'57" UP

STA 26+62.2 ELECTRIC LINE "B"
VPI ΔV=16°09'52" DOWN

STA 26+88.8 ELECTRIC LINE "B"
PI ΔH=0°20'36" RT

STA 27+01.0 ELECTRIC LINE "B"
EX. UG TELEPHONE

STA 28+21.7 ELECTRIC LINE "B"
VPI ΔV=0°25'47" DOWN

EXIST. GROUND

FL=UNK
ELEV=UNK

FL=UNK

ELEV=UNK
FL=UNK
ELEV=UNK
ELEV=UNK

ELEV=UNK

192.4 LF 8E6 ON -1.39%

10 LF 8E6 0.0%

5 LF 8E6 0.0%

39.8 LF 8E6 ON +2.00%

10 LF 8E6 0.0%

10 LF 8E6-2E4 0.0%

9 LF 8E6-2E4 ON +23.8%

159.4 LF 8E6-2E4 ON +0.75%

9.8 LF 8E6-2E4 0.0%

PROFILE GRADE

INSTALL 275 LF 8E6 DUCT BANK WITH CONCRETE ENCASEMENT

LINE B

INSTALL 191 LF 8E6-2E4 DUCT BANK WITH CONCRETE ENCASEMENT

LINE B

594.77 592.77 594.77 595.56 593.56 595.56 598.24 599.44

625 620 615 610 605 600 595 590

24+00 25+00 26+00 27+00 28+00

CENTERLINE BELT LINE STA 50+00 = ONCOR DUCT BANK LINE B STA 23+62.5

CENTERLINE BELT LINE STA 54+00 = ONCOR DUCT BANK LINE B STA 28+28.6

STATE OF TEXAS
DARLE BARTHELL MORAN III
101189
LICENSED
PROFESSIONAL ENGINEER

P.E. 11-8-2013
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison. TOWN OF ADDISON
DALLAS COUNTY, TEXAS

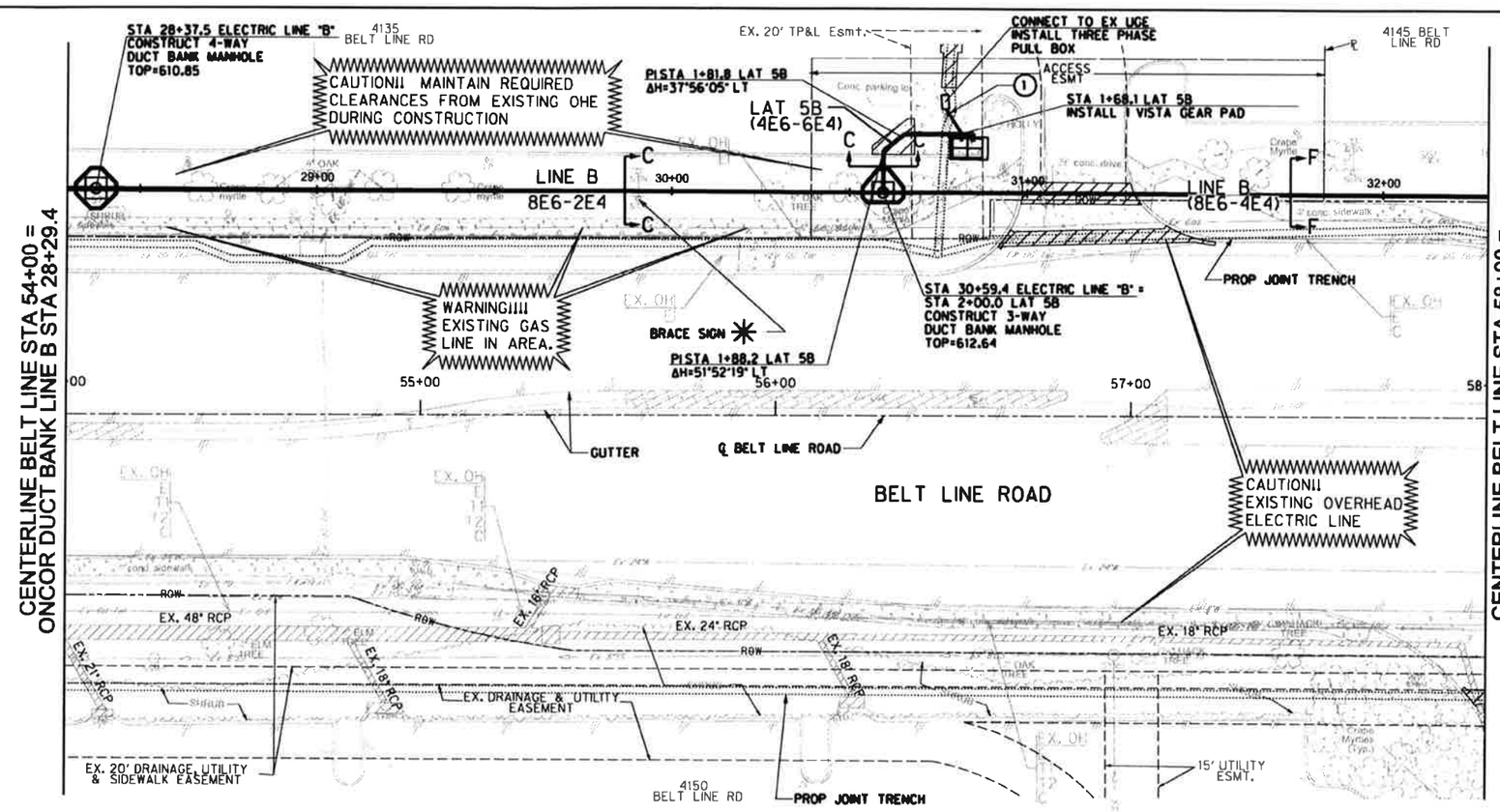
BELT LINE ROAD
UNDERGROUND ELECTRICAL

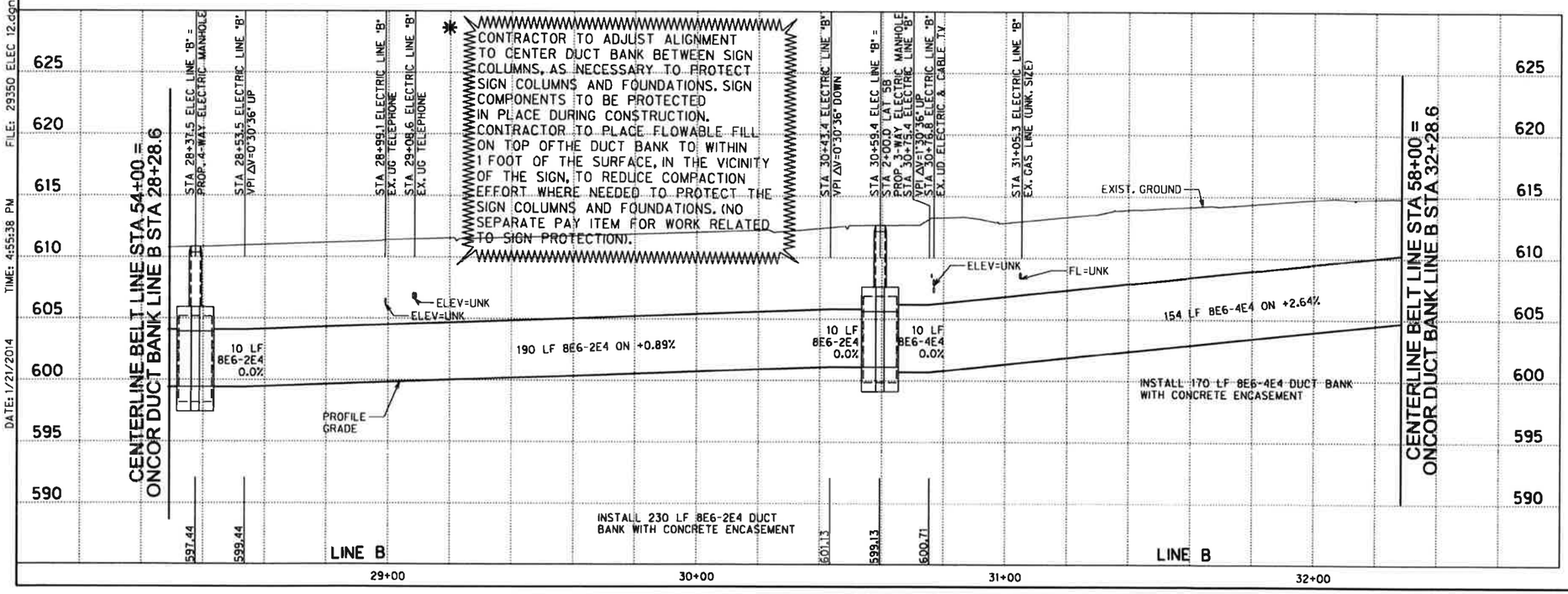
ONCOR DUCT BANK PLAN AND PROFILE
BELT LINE RD STA 50+00 TO STA 54+00

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 ELEC 11	ELE-11

SHEET 85 OF 235





0 10 20 30 40 60
HORIZONTAL SCALE: 1"=40'
0 5 10 15
VERTICAL SCALE: 1"=10'

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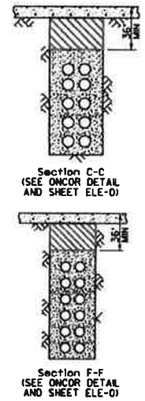

LEGEND

- PROPOSED PULL OR SERVICE BOX (AS NOTED)
- PROPOSED POWER POLE WITH RISER (POWER POLE BY OTHERS)
- PROPOSED TRANSFORMER PAD
- PROPOSED VISTA GEAR PAD
- PROPOSED PME PAD
- PROPOSED ELECTRICAL DUCT BANK MANHOLE
- PROPOSED ELECTRIC DUCT BANK BY OTHER THAN OPEN CUT (B.O.T.O.C.)
- PROPOSED ELECTRICAL DUCT BANK BY OPEN CUT (SIZE)
- PROP JOINT TRENCH (FRANCHISE & ONCOR) (SEE NOTE 4)
- (M) PROPOSED CABINET FOR ONCOR PROVIDED METER

LOAD CABLES
(SEE NOTE 4)

	L	TYPE
①	8'	2E4

NOTE:
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STATE OF TEXAS
CHARLIE BARTHELL MORAN II
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 1-21-14 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

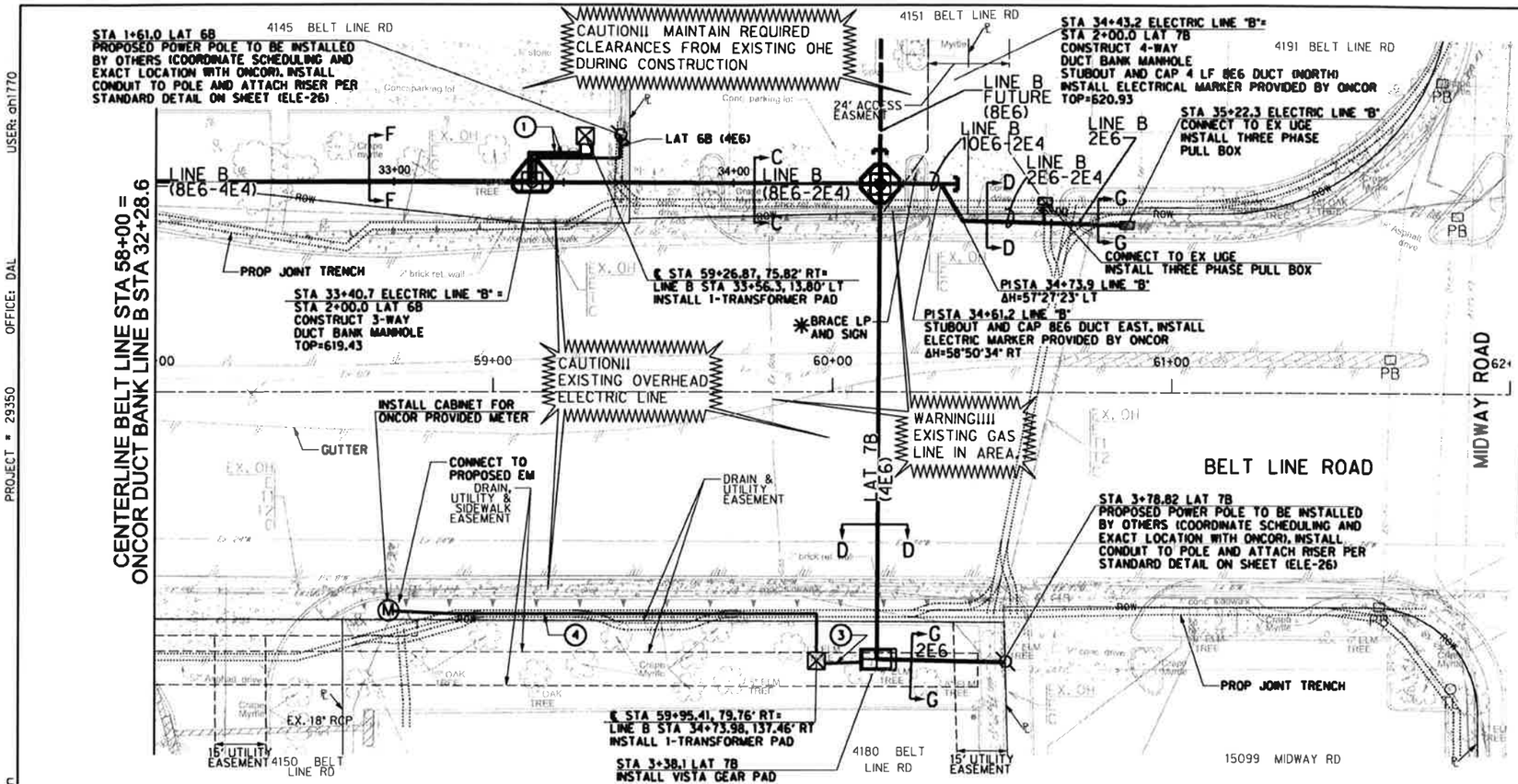
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

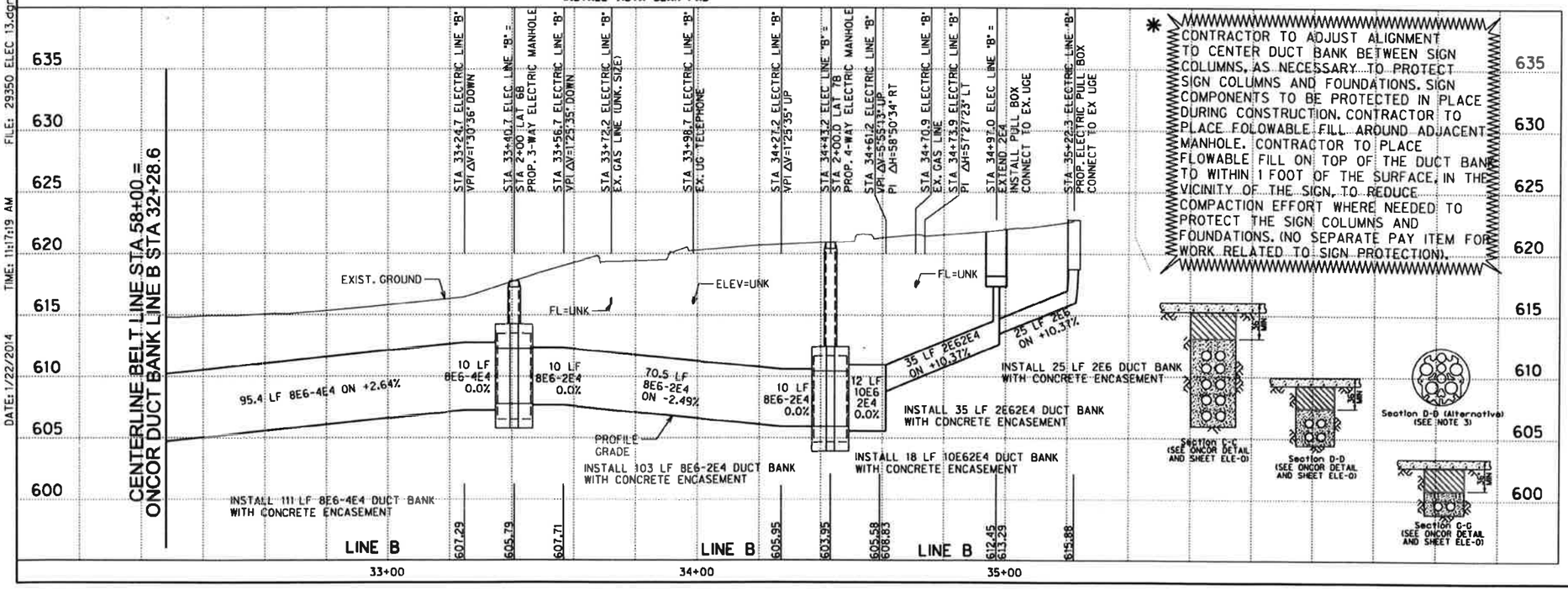
BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK PLAN AND PROFILE BELT LINE RD STA 54+00 TO STA 58+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 ELEC 12	ELE-12





* CONTRACTOR TO ADJUST ALIGNMENT TO CENTER DUCT BANK BETWEEN SIGN COLUMNS, AS NECESSARY TO PROTECT SIGN COLUMNS AND FOUNDATIONS. SIGN COMPONENTS TO BE PROTECTED IN PLACE DURING CONSTRUCTION. CONTRACTOR TO PLACE FOLOWABLE FILL AROUND ADJACENT MANHOLE. CONTRACTOR TO PLACE FLOWABLE FILL ON TOP OF THE DUCT BANK TO WITHIN 1 FOOT OF THE SURFACE, IN THE VICINITY OF THE SIGN, TO REDUCE COMPACTION EFFORT WHERE NEEDED TO PROTECT THE SIGN COLUMNS AND FOUNDATIONS. (NO SEPARATE PAY ITEM FOR WORK RELATED TO SIGN PROTECTION).

Section C-C (SEE ONCOR DETAIL AND SHEET ELE-0)

Section D-D (SEE ONCOR DETAIL AND SHEET ELE-0)

Section D-D (Alternative) (SEE NOTE 3)

Section G-G (SEE ONCOR DETAIL AND SHEET ELE-0)

HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=10'

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N

LOAD CABLES
(SEE NOTE 4)

	L	TYPE
1	32'	4E4
3	11'	2E4
4	131'	2E2

LEGEND

- PROPOSED PULL OR SERVICE BOX (AS NOTED)
- PROPOSED POWER POLE WITH RISER (POWER POLE BY OTHERS)
- PROPOSED TRANSFORMER PAD
- PROPOSED VISTA GEAR PAD
- PROPOSED PME PAD
- PROPOSED ELECTRICAL DUCT BANK MANHOLE
- PROPOSED ELECTRIC DUCT BANK BY OTHER THAN OPEN CUT (B.O.T.O.C.)
- PROPOSED ELECTRICAL DUCT BANK BY OPEN CUT (SIZE)
- PROP JOINT TRENCH (FRANCHISE & ONCOR) (SEE NOTE 4)
- (M) PROPOSED CABINET FOR ONCOR PROVIDED METER

NOTE:
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STATE OF TEXAS — CHARLE BARTHELL MORAN — 101189 — LICENSED — PROFESSIONAL ENGINEER

Signature of Registrant — P.E. 1-22-14 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK PLAN AND PROFILE BELT LINE RD STA 58+00 TO STA 62+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 780-0086

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 ELEC 13	ELE-13

SHEET 87 OF 235

USER: ah1770
OFFICE: DAL
PROJECT # 29350
FILE: 29350 ELEC 14x.dgn
TIME: 11:24:24 AM
DATE: 12/19/2013

✳ NOTE
INSTALL 2E6 CONDUIT TO PROP. POLE AND ATTACH RISER PER STANDARD DETAIL ON SHEET (ELE-26) (PROP. POLE BY OTHERS, COORDINATE SCHEDULING WITH ONCOR)

LAT 1A STA 0+00.0 TURN UP TO POWER POLE SEE NOTE ✳
STA 0+51.6 ΔH=26°09'53" LT
STA 0+61.0 ΔH=28°31'45" LT
STA 0+76.9 ΔH=34°09'49" LT
STA 0+91.5 ΔH=8°20'57" LT
0+59
0+61
0+83.9
LAT 1A STA 1+62.1 TURN UP TO POWER POLE SEE NOTE ✳
LAT 1A STA 1+55.4 CAP 6E6 INSTALL ELECTRIC MARKER PROVIDED BY ONCOR
1+59.0
1+71.9
1+89.0 ΔV=1°12'52" UP
1+92.6
LAT 1A STA 2+00.0 STA 1+00.0 LINE "A" PROP. 4-WAY ELEC MANHOLE
ΔV=0°40'34" UP
2+11
LAT 1A STA 2+62 CAP 2E6 INSTALL ELECTRIC MARKER PROVIDED BY OWNER
2+59.4
LAT 1A STA 2+63.8 TURN UP TO POWER POLE SEE NOTE ✳
2+78.7
STA 3+16 ΔH=28°44'55" RT
3+18.9
3+24.6
3+37.9
STA 3+48 ΔH=41°48'30" RT
3+39.3
3+43.2
3+44.3
STA 3+52 ΔH=19°23'03" RT
3+48.1
LAT 1A STA 3+98.5 TURN UP TO POWER POLE SEE NOTE ✳
LAT 2-1A STA 1+49.4 CAP 4E6 PVC INSTALL ELECTRIC MARKER PROVIDED BY ONCOR
1+89 ΔV=5°48'05" UP
LAT 2-1A STA 2+00.0 STA 3+38.1 LINE "A" PROP. DOUBLE STACKED 4-WAY ELEC MANHOLE
2+07.1
2+11 ΔV=6°42'26" UP
STA 2+23.1
2+29.7
2+45.2
2+45.4
2+46.5
LAT 2-1A STA 2+48.3 CAP 4E6 PVC INSTALL ELECTRIC MARKER PROVIDED BY ONCOR

EX 24" RCP STRM ELEV= 564+/-
EXIST. GROUND
EX UGE ELEC ELEV=UNK
EX 10" GAS ELEV=UNK
162 LF 2E6 ON -2.00%
INSTALL 162 LF 2E6 DUCT BANK WITH CONCRETE ENCASEMENT
556.2
559.3
0+00.0
LINE C
1+00.0

EX 12" WATER FL=UNK
EX UGE ELEC ELEV=UNK
EX 12" WW FL=559
EXIST. GROUND
EX 12" WATER FL=UNK
5 LF 0.0%
5 LF 0.0%
34 LF 6E6 ON -2.00%
51 LF 6E6 ON 3.18%
2 LF 2E6 ON 1.18%
INSTALL 45 LF 6E6 DUCT BANK WITH CONCRETE ENCASEMENT
INSTALL 62 LF 6E6 AND 2 LF 2E6 DUCT BANK WITH CONCRETE ENCASEMENT
555.04
554.33
552.33
554.33
2+00.0
LAT 1A

EX UGE ELEC ELEV=UNK
EX UGE ELEC ELEV=UNK
EX XX" WATER FL=UNK
EX TELE ELEV=UNK
EX TELE ELEV=UNK
EX TELE ELEV=UNK
EX 12" WATER FL=UNK
EX 10" GAS FL=UNK
137 LF 2E6 ON +1.18%
INSTALL 137 LF 2E6 DUCT BANK WITH CONCRETE ENCASEMENT
3+00.0

EX UGE ELEC ELEV=UNK
EXIST. GROUND
EX GAS FL=UNK
EX FIBER ELEV=UNK
EX 20" WATER FL=UNK
EX 18" WATER (ABANDONED) FL=UNK
EX 21" RCP STRM ELEV= UNK
4E6 ON +10.16%
40 LF
5 LF 0.0%
4E6 ON +11.76%
38 LF
5 LF 0.0%
556.81
552.78
552.78
557.45
EX 21" WW FL=553.5
INSTALL 51 LF 4E6 DUCT BANK WITH CONCRETE ENCASEMENT
550.78
INSTALL 49 LF 4E6 DUCT BANK WITH CONCRETE ENCASEMENT
2+00.0
LAT 2-1A

INSTALL 2E4 CONDUIT TO EXIST. POLE AND ATTACH RISER TO POLE PER STANDARD DETAIL ON SHEET (ELE-26).
155 LF 2E4
EX. OH E T1 C
CONNECT TO EXIST. UGE SERVICE INSTALL THREE PHASE PULL BOX
EX. OH E T1 C 2745 E.BELT LINE RD.
EX. OH E T1 C
EX. 24" RCP
MARSH LANE
LINE C
2E6
ROW
62' conc. drive
SEE SHEET ELE-0 FOR LINE C PLAN
EX. 21" RCP
EX. 42" RCP
BELT LINE RD.

LAT 2-2A STA 1+11.20 TURN UP TO VISTA GEAR
1+28.9
1+45.6
1+89 ΔV=1°06'20" UP
1+99.9
LAT 2-2A STA 2+00.0 STA 5+26.5 LINE "A" PROP. 4-WAY ELEC MANHOLE
EXIST. GROUND
EX UGE ELEC ELEV=UNK
EX 1.25" GAS FL=UNK
EX UGE STREET LIGHTS FL=UNK
85 LF 4E6 ON -1.93%
5 LF 0.0%
INSTALL 96 LF 4E6 DUCT BANK WITH CONCRETE ENCASEMENT
560.05
558.41
556.41
1+00.0
2+00.0
LAT 2-2A

LAT 2-3A STA 2+00.0 STA 8+07.2 LINE "A" PROP. 4-WAY ELEC MANHOLE
2+07.1
2+11 VPI ΔV=0°34'23"
2+36.8
2+43.6 VPI ΔH=15°80'00" RT
2+45.7 VPI ΔV=0°54'59"
2+49.3
2+54.7
2+58.7
2+67.2 VPI ΔH=15°00'00" LT
LAT 2-3A STA 2+67.32 TURN UP TO VISTA GEAR
EX UGE ELEC ELEV=UNK
EX TELE ELEV=UNK
EX 20" WATER FL=UNK
EX 8" WATER FL=UNK
EX 12" WW FL=564 +/-
5 LF 0.0%
35 LF 4E6 ON +1.0%
29 LF 4E6 ON +2.6%
559.55
557.2
559.2
560.30
INSTALL 74 LF 4E6 DUCT BANK WITH CONCRETE ENCASEMENT
2+00.0
LAT 2-3A

CHARLIE BARTHELL MORAN 101189 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
Signature of Registrant P.E. 12-19-2013 Date
FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison. TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK PROFILES
LINE C, LAT 1A, 2-1A, 2-2A, 2-3A

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
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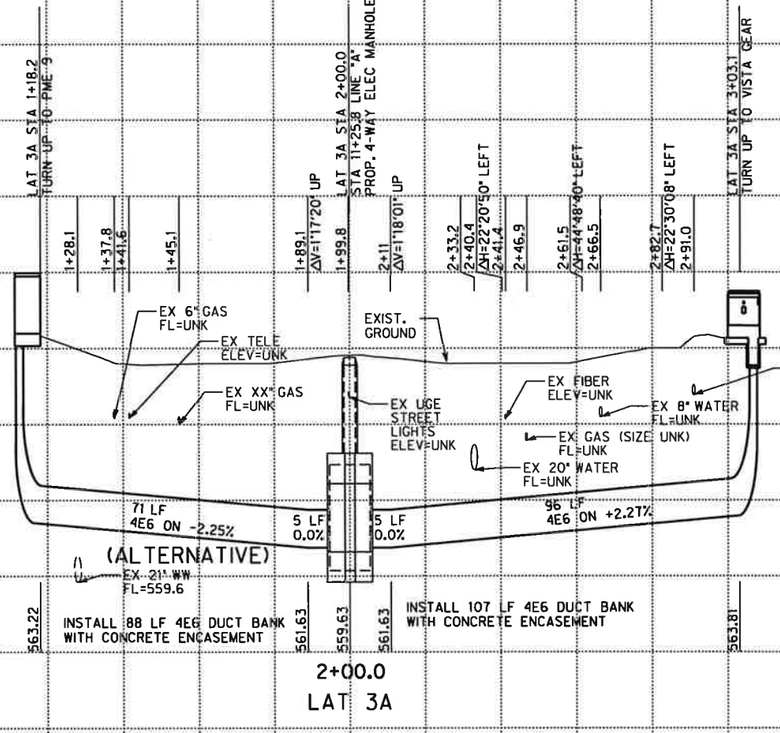
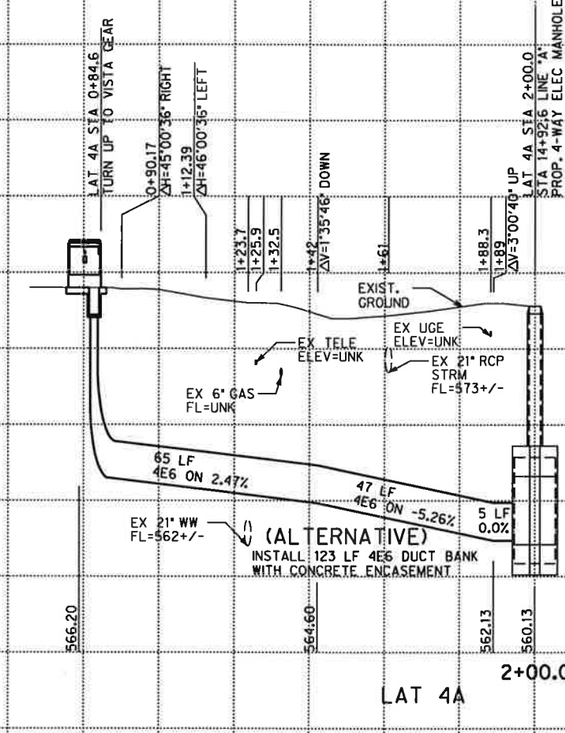
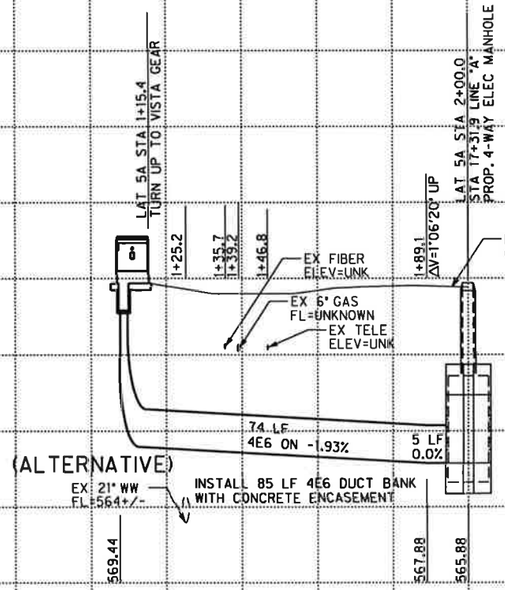
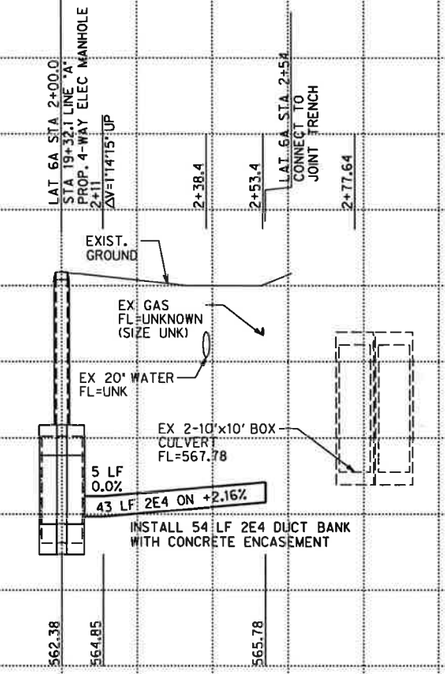
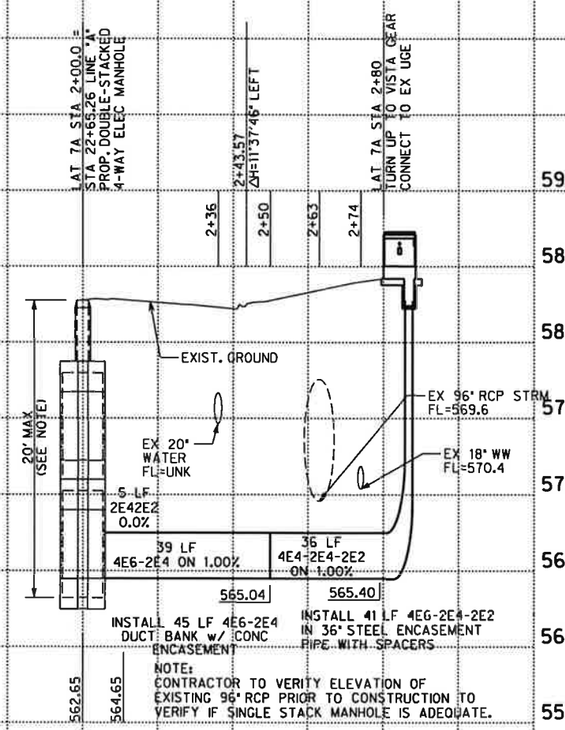










CHARLIE BARTHELL MORAN, III
101189
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

Signature of Registrant P.E. 11-8-2013 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

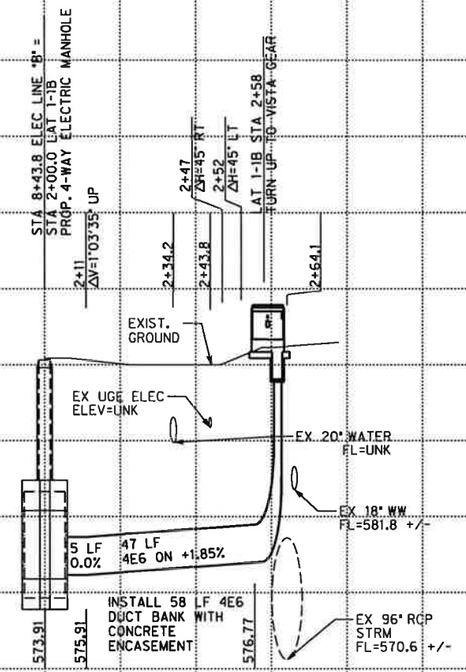
ONCOR DUCT BANK PROFILES
LAT 3A, LAT 4A, LAT 5A, LAT 6A, LAT 7A

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

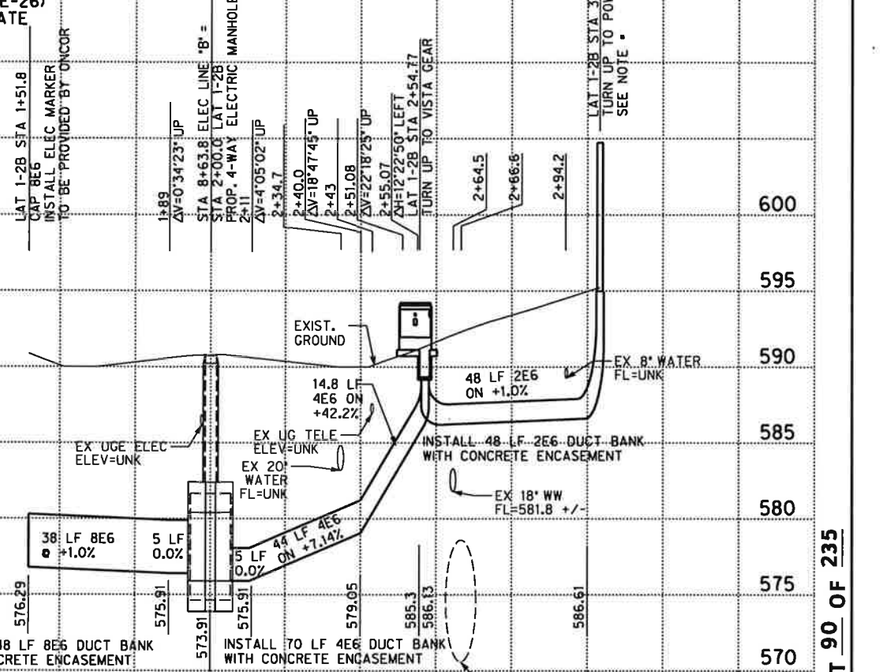
PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 ELEC 15x	ELE-15

USER: gh1854
OFFICE: RCH
PROJECT # 29350
FILE: 29350 ELEC 15x.dgn
TIME: 1:58:59 PM
DATE: 11/8/2013

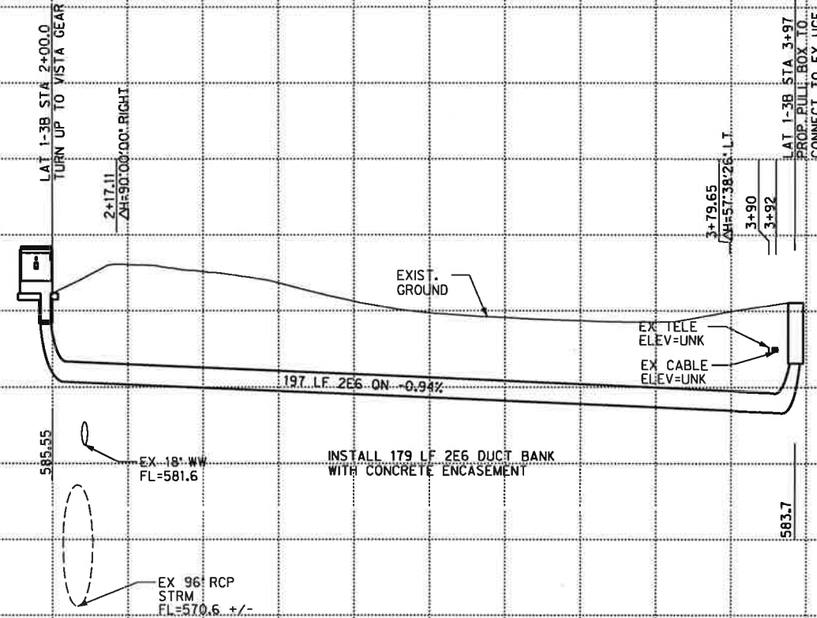
• NOTE
INSTALL CONDUIT TO PROP. POLE AND ATTACH RISER PER STANDARD DETAIL ON SHEET (ELE-26) (PROP. POLE BY OTHERS, COORDINATE SCHEDULING WITH ONCOR)



2+00.0
LAT 1-1B



2+00.0
LAT 1-2B



2+00.0
LAT 1-3B

CHARLIE BARTHELL MORAN III 101189 LICENSED PROFESSIONAL ENGINEER
Signature of Registrant P.E. 11-8-2013 Date
FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK PROFILES
LAT 1-1B, LAT 1-2B, LAT 1-3B

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275 TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 ELEC 16x	ELE-16

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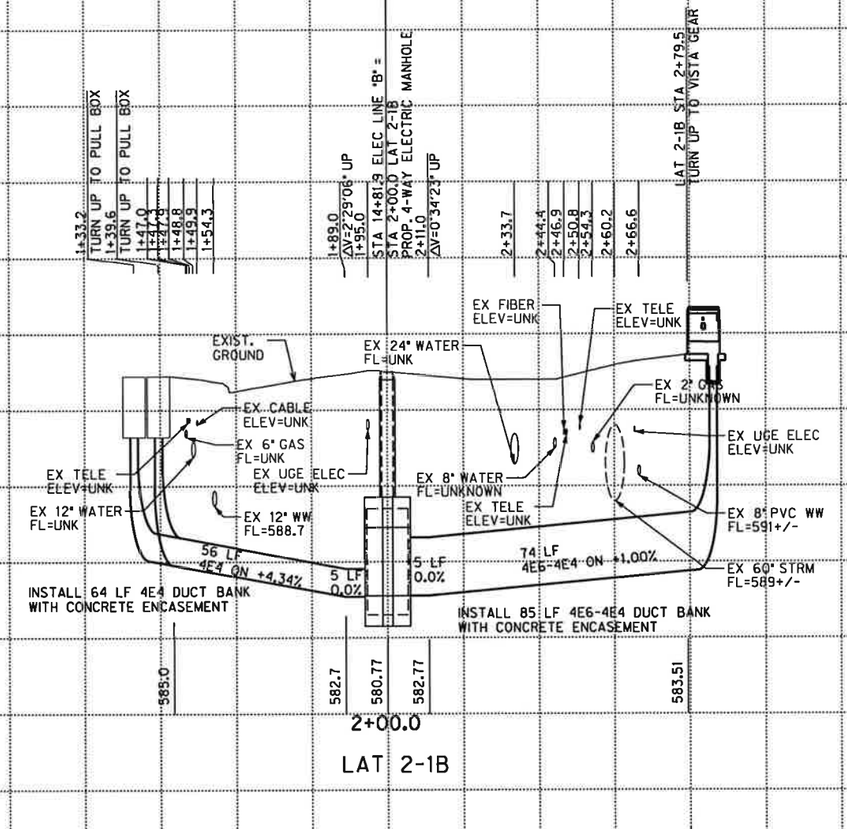
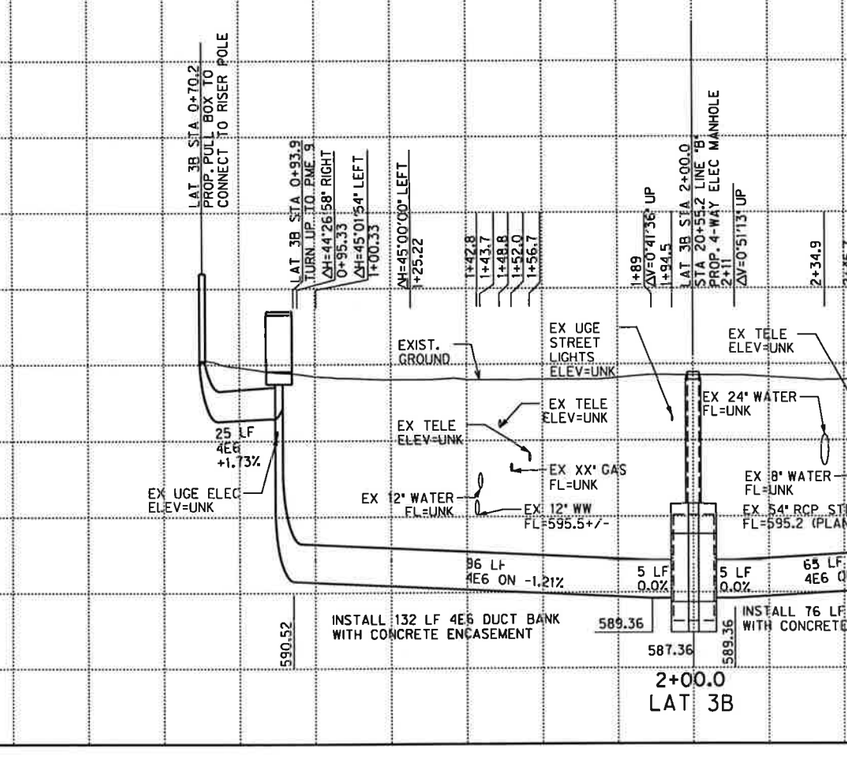
OFFICE: RCH
PROJECT # 29350
FILE: 29350 ELEC 16x.dgn
TIME: 1:59:00 PM
DATE: 11/8/2013





USER: ah1770
OFFICE: DAL
PROJECT # 29350
FILE: 29350 ELEC 17x.dgn
TIME: 11:24:27 AM
DATE: 12/19/2013

SHEET 91 OF 235

CHARLIE BARTHELL MORAN
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant Date 12-19-2013 P.E.

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison

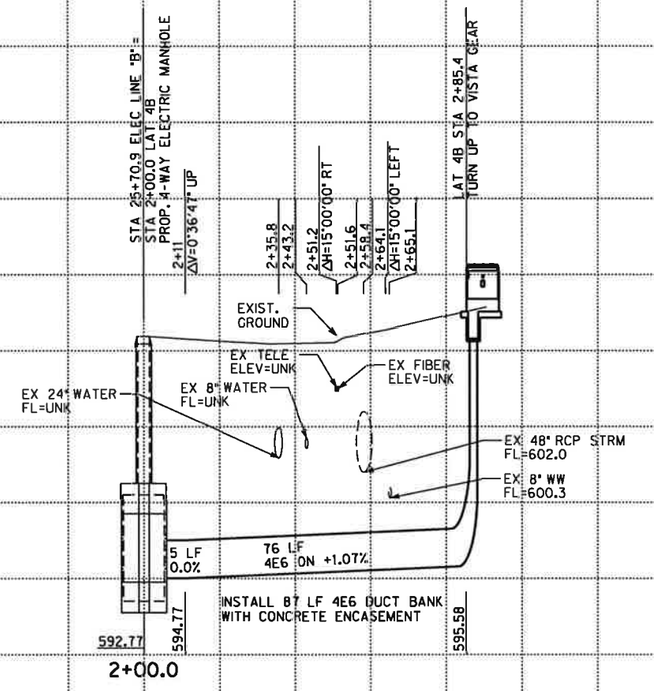
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

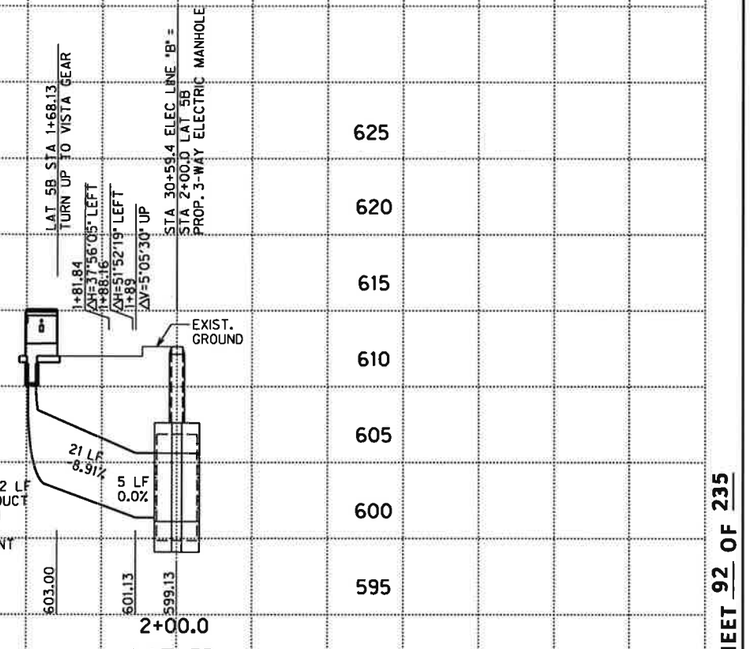
ONCOR DUCT BANK PROFILES
LAT 2-1B, LAT 3B

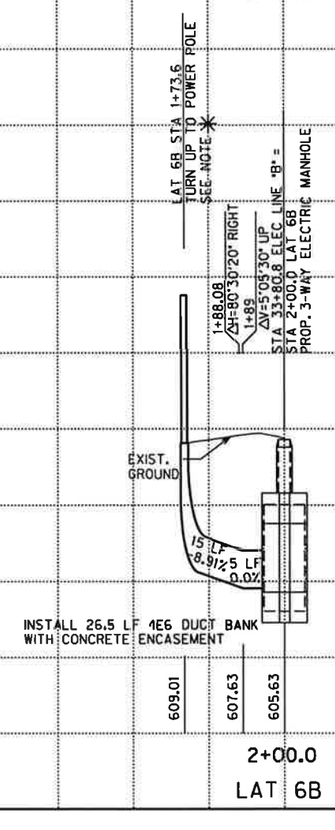
HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

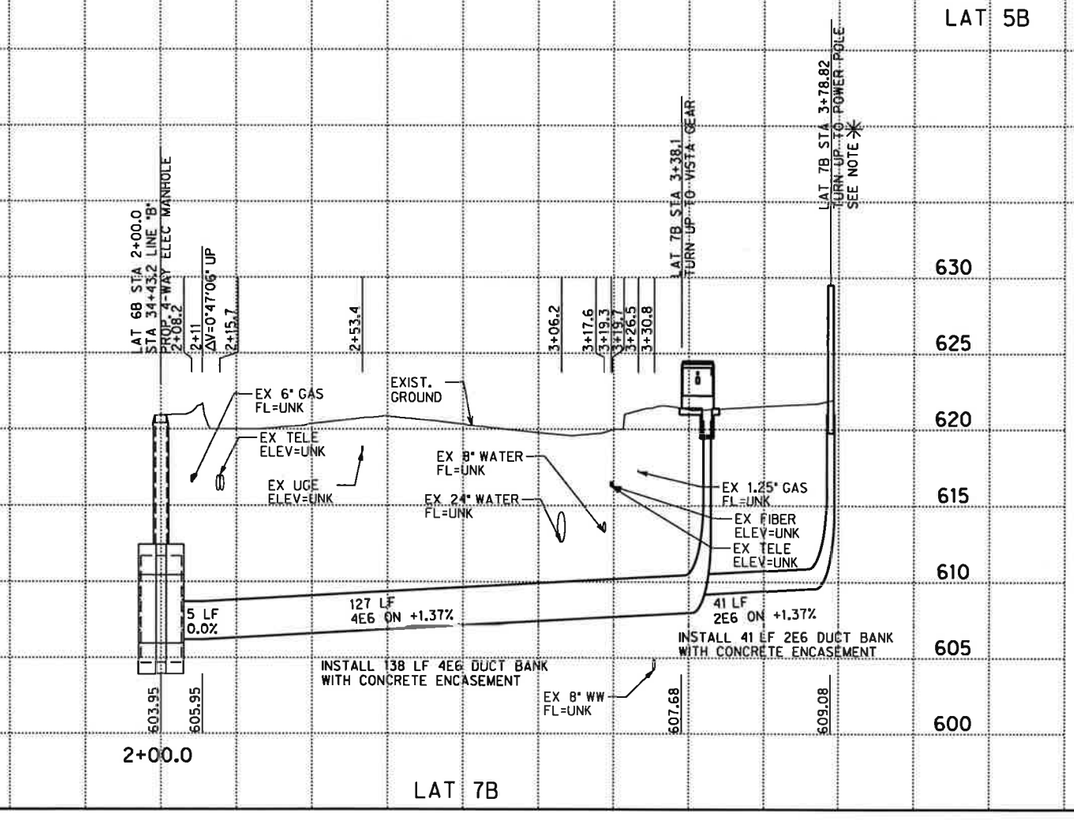
PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 ELEC 17x	ELE-17



✳NOTE
INSTALL CONDUIT TO PROP. POLE AND ATTACH RISER PER STANDARD DETAIL ON SHEET (ELE-26) (PROP. POLE BY OTHERS, COORDINATE SCHEDULING WITH ONCOR)







STATE OF TEXAS
CHARLIE BARTHELL MORAN
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 11-8-2013 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

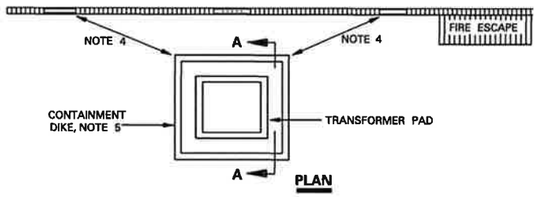
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

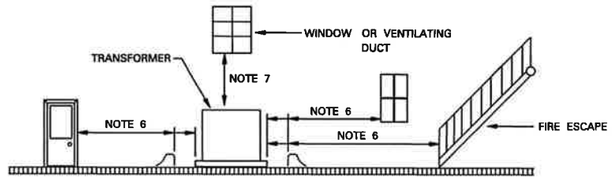
ONCOR DUCT BANK PROFILES LAT 4B, LAT 5B, LAT 6B, LAT 7B

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 ELEC 18x	ELE-18



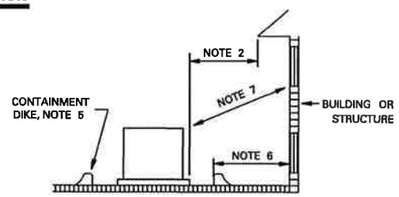
PLAN



ELEVATION

TRANSF. TYPE	BUILDING CONSTRUCTION		WINDOWS, DOORS & VENTS	FIRE ESCAPES
	FIRE RESISTIVE NOTE 3	NON- FIRE RESISTIVE		
1 PHASE	5'-0"	10'-0"	10'-0"	20'-0"
3 PHASE	5'-0"	15'-0"	15'-0"	20'-0"

CLEARANCE TABLE



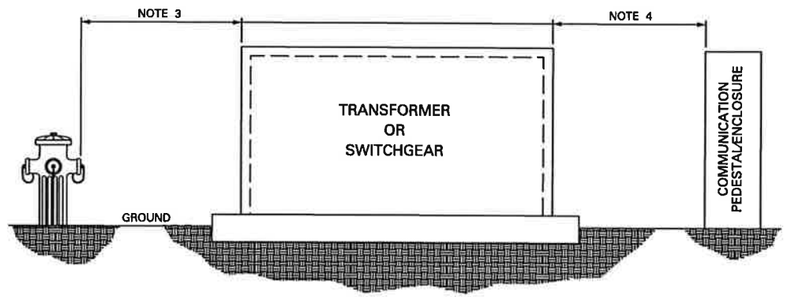
DETAIL "A-A"

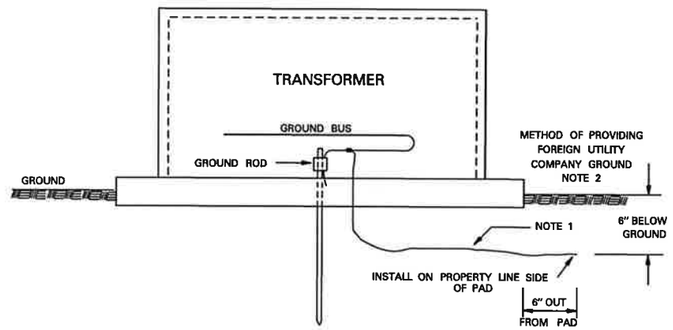
NOTES:

1. CLEARANCE FROM BUILDING WALLS SHALL COMPLY WITH THE CLEARANCE TABLE. ALL DIMENSIONS SHOWN ARE MINIMUM DIMENSIONS.
2. WHERE THERE ARE BUILDING EAVES OR OVERHANGS WITHIN 25'- 0" ABOVE GROUND, CLEARANCE SHALL BE MEASURED HORIZONTALLY BEGINNING FROM THE EDGE OF THE EAVE OR OVERHANG.
3. FIRE RESISTIVE BUILDING WALLS INCLUDE BRICK AND MASONRY STRUCTURES THAT HAVE A 2 HOUR FIRE RATING.
4. CLEARANCE TO BUILDING DOORS, WINDOWS, VENTS AND FIRE ESCAPES TO BE MEASURED RADIALLY.
5. LIQUID FLOW OF AREA SURROUNDING TRANSFORMER SHOULD BE AWAY FROM BUILDING. WHERE GROUND IS FLAT OR SLOPES TOWARD BUILDING, A DIKE SUFFICIENT TO CONTAIN ALL TRANSFORMER OIL FOR TRANSFORMERS 500 KVA AND LARGER SHALL BE PROVIDED.
6. CLEARANCES ARE MEASURED FROM PAD EDGE TO BUILDING WALL, OPENING, OVERHANG OR FIRE ESCAPE UNLESS A CONTAINMENT DIKE IS UTILIZED. IF A CONTAINMENT DIKE IS UTILIZED, CLEARANCE IS MEASURED FROM DIKE.
7. CLEARANCES FOR WINDOWS AND VENTS ABOVE TRANSFORMER ARE MEASURED RADIALLY FROM CLOSEST POINT ON TRANSFORMER.
8. PADMOUNTED TRANSFORMERS SHALL BE POSITIONED SUCH THAT HOTSTICK USE IS NOT REQUIRED ON THE SIDE FACING THE BUILDING. IF HOTSTICK USE IS REQUIRED ON THE BUILDING SIDE, CLEARANCES SHOWN IN DETAIL SHEET 1 SHALL BE MAINTAINED.
9. THERE SHOULD NOT BE ANY ABOVE GROUND OBSTRUCTIONS, SUCH AS SHRUBS, COOLING TOWERS, GAS METERS, FENCING, PEDESTALS ETC. WITHIN 5'- 0' OF PAD OR OVERHANGS ABOVE PAD FACILITIES. REFERENCE DETAIL SHEET 1 FOR SCREENING CLEARANCES AROUND PADMOUNTED EQUIPMENT.
10. THERE SHOULD NOT BE ANY PIPING OR CONDUIT UNDER THE PAD (EXCEPTION: MUTUALLY AGREED UPON COMMUNICATION CONDUITS) OTHER THAN THOSE ENTERING THE TRANSFORMER.
11. TRANSFORMERS SHALL NOT OBSTRUCT FIRE LANE.
12. IT IS THE OWNER'S RESPONSIBILITY TO COMPLY WITH ANY INSURANCE REGULATIONS AFFECTING THE PREMISES.

APPROVED BY ONCOR	CLEARANCES BETWEEN PADMOUNTED EQUIPMENT AND STRUCTURES
	DCS-5 DETAIL SHEET 2 OF 19

04 - 13





NOTES:

1. ON NEW INSTALLATIONS, INSTALL NO. 6 S.D. BARE COPPER AS SHOWN FOR FOREIGN UTILITY COMPANY BONDING.
2. THE NATIONAL ELECTRICAL SAFETY CODE RULE 384C RECOMMENDS BONDING OF ALL ABOVE GROUND METALLIC POWER AND COMMUNICATIONS APPARATUS (PEDESTALS, TERMINALS, APPARATUS CASES, TRANSFORMER CASES, ETC.) THAT ARE SEPARATED BY A DISTANCE OF 6 FEET OR LESS.
3. PADMOUNTED EQUIPMENT, PEDESTALS AND OTHER ABOVE GROUND ENCLOSURES SHOULD BE LOCATED NOT LESS THAN 4 FEET FROM FIRE HYDRANTS. WHERE CONDITIONS DO NOT PERMIT A CLEARANCE OF 4 FEET, A CLEARANCE OF NOT LESS THAN 3 FEET IS ALLOWED.
4. ALL ABOVE GROUND METALLIC POWER AND COMMUNICATION EQUIPMENT (PEDESTALS, TRANSFORMER CASES, APPARATUS CASES, ETC.) THAT ARE SEPARATED BY A DISTANCE OF 6 FEET OR LESS SHALL BE BONDED.
5. HORIZONTAL CLEARANCES FROM ALL ADJACENT SURFACE STRUCTURES WITH THE EXCEPTION OF FIRE HYDRANTS, SHALL HAVE A MINIMUM CLEARANCE OF 5 FOOT SEPERATION ON "NON-OPERATION SIDES AND 10 FOOT OF SEPERATION ON OPERATION SIDES.

APPROVED BY ONCOR	CLEARANCES BETWEEN PADMOUNTED EQUIPMENT AND FOREIGN UTILITY ENCLOSURES AND EQUIPMENT
	DCS-5 DETAIL SHEET 3 OF 19

04 - 13

SHEET 93 OF 235

STATE OF TEXAS
CHARLIE BARTHELL MORAN, JR.
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10-24-13
Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

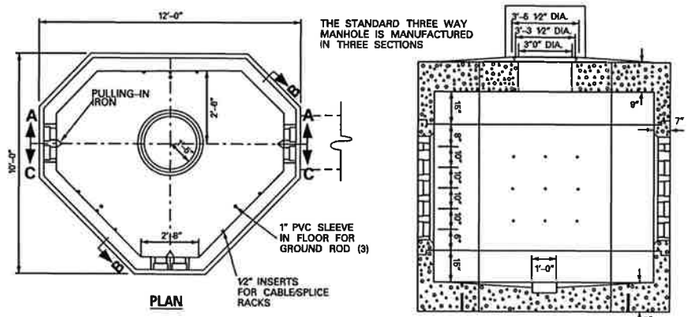
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK DETAIL 4E6

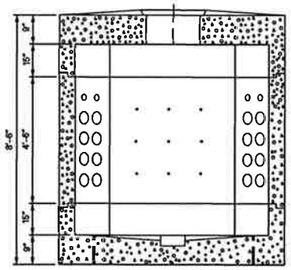
HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 348-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 ELEC 19d	ELE-19

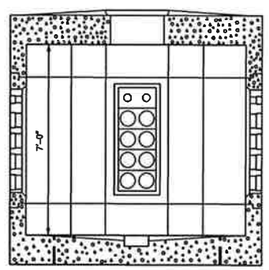


PLAN

SECTION A–A



SECTION B–B



SECTION C–C

NOTES:

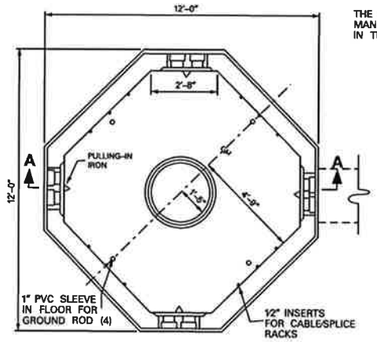
1. THE MAXIMUM DESIGN DEPTH FOR A MANHOLE IS 20 FEET TO THE FINISHED FLOOR. THIS INCLUDES 12 FEET OF NECK (FOR DEPTHS GREATER THAN THIS CONTACT AUTHORIZED ONCOR REPRESENTATIVE).
2. ALL JOINTS BETWEEN MANHOLE SECTIONS AND MANHOLE NECK SECTIONS SHALL BE PAINTED WITH RAM-NEK PRIMER OR APPROVED EQUAL BY MANHOLE SUPPLIER. ALL JOINTS ARE TO BE MADE WATERTIGHT AT THE TIME OF INITIAL INSTALLATION.
3. TO PREVENT WATER AND DEBRIS MIGRATION INTO THE MANHOLE, DO NOT REMOVE THE KNOCK OUT MEMBRANES FROM UNUSED TERMINATOR POSITIONS. ALSO, DUCT PLUGS SHOULD BE INSTALLED IN ALL CONDUITS THAT ARE UNOCCUPIED BY CABLE.
4. A MINIMUM OF THREE 5⁄8 IN. X 8 FT. COPPER CLAD GROUND RODS SHALL BE INSTALLED IN EACH MANHOLE.
5. PRECAST CONCRETE MANHOLES ARE TO BE INSTALLED ON A MINIMUM 18" GRAVEL BASE TO FACILITATE LEVELING.

APPROVED VENDORS FOR 3-WAY PRECAST CONCRETE MANHOLE (TSN 323108) W/COVER & FRAME.

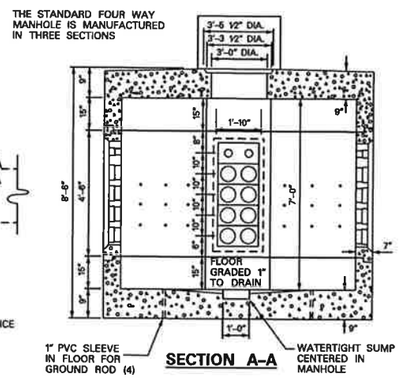
1). OLD CASTLE PRECAST (PART NUMBER – 913 SERIES)
2). HANSON PIPE & PRECAST (PART NUMBER – HANSON-3WAY)
3). THE TURNER COMPANY (PART NUMBER – ELMH3WAY)

APPROVED BY ONCOR	PRECAST THREE WAY MANHOLE
	DCS – 5 DETAIL SHEET 7 of 19

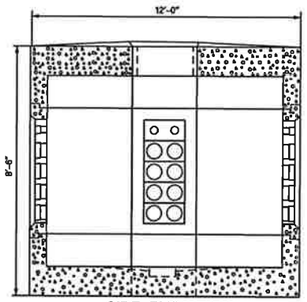
04 – 13



PLAN



SECTION A–A



SIDE ELEVATION

NOTES:

1. THE MAXIMUM DESIGN DEPTH FOR A MANHOLE IS 20 FEET TO THE FINISHED FLOOR. THIS INCLUDES 12 FEET OF NECK (FOR DEPTHS GREATER THAN THIS CONTACT AUTHORIZED ONCOR REPRESENTATIVE).
2. ALL JOINTS BETWEEN MANHOLE SECTIONS AND MANHOLE NECK SECTIONS SHALL BE PAINTED WITH RAM-NEK PRIMER OR APPROVED EQUAL BY MANHOLE SUPPLIER. ALL JOINTS ARE TO BE MADE WATERTIGHT AT THE TIME OF INITIAL INSTALLATION.
3. TO PREVENT WATER AND DEBRIS MIGRATION INTO THE MANHOLE, DO NOT REMOVE THE KNOCK OUT MEMBRANES FROM UNUSED TERMINATOR POSITION. ALSO, DUCT PLUGS SHOULD BE INSTALLED IN ALL CONDUITS THAT ARE UNOCCUPIED BY CABLE.
4. A MINIMUM OF FOUR 5⁄8 IN. X 8 FT. COPPER CLAD GROUND RODS SHALL BE INSTALLED IN EACH FOUR WAY MANHOLE.
5. PRECAST CONCRETE MANHOLES ARE TO BE INSTALLED ON A MINIMUM 18" GRAVEL BASE TO FACILITATE LEVELING.

APPROVED VENDORS FOR 4-WAY PRECAST CONCRETE MANHOLE (TSN 316942) W/COVER & FRAME.

1). OLD CASTLE PRECAST (PART NUMBER – 914 SERIES)
2). HANSON PIPE & PRECAST (PART NUMBER – HANSON-4WAY)
3). THE TURNER COMPANY (PART NUMBER – ELMH4WAY)

APPROVED BY ONCOR	PRECAST FOUR WAY MANHOLE
	DCS – 5 DETAIL SHEET 8 of 19

04 – 13

SHEET 94 OF 235

STATE OF TEXAS
CHARLIE BARTHELL MORAN, JR.
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant, P.E. 10-24-13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

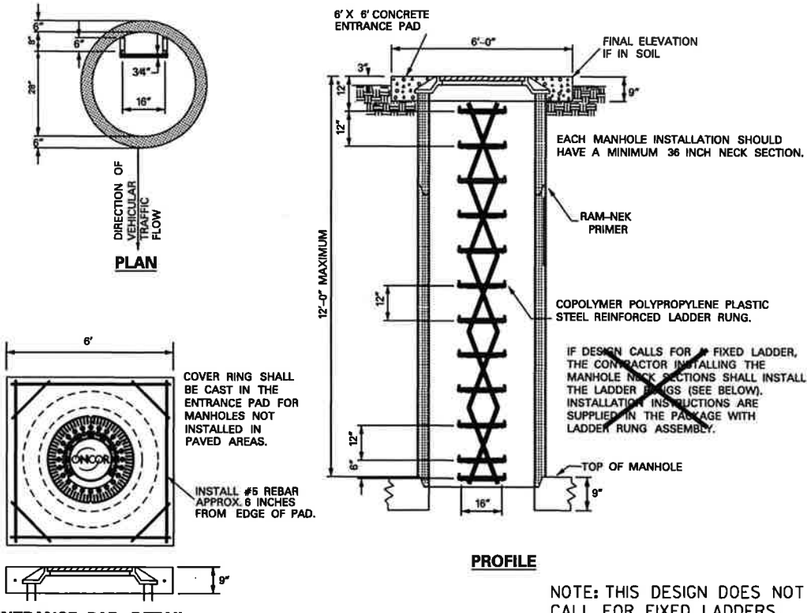
Addison. TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK DETAIL 4E6

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 ELEC 20d	ELE-20



NOTE: THIS DESIGN DOES NOT CALL FOR FIXED LADDERS.

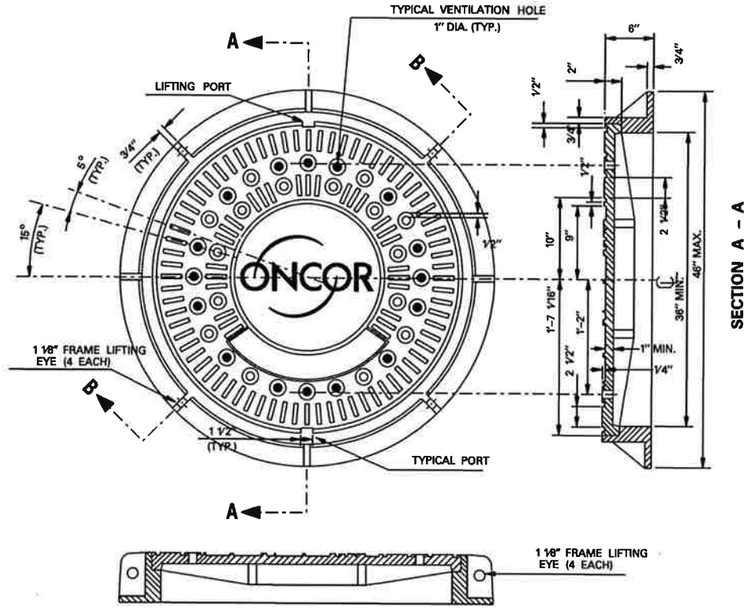
DESCRIPTION & APPROVED VENDORS	ONCOR TSN	VENDOR PART#
12 IN. X 36 IN. PRECAST CONCRETE NECK SECTION.	320774	
OLD CASTLE PRECAST		048080
HANSON PIPE & PRECAST		HANSON- 12NECK36
THE TURNER COMPANY		ELGR3612
18 IN. X 36 IN. PRECAST CONCRETE NECK SECTION.	320775	
OLD CASTLE PRECAST		048080
HANSON PIPE & PRECAST		HANSON-18NECK36
THE TURNER COMPANY		ELGR3618
24 IN. X 36 IN. PRECAST CONCRETE NECK SECTION.	320776	
OLD CASTLE PRECAST		048090
HANSON PIPE & PRECAST		HANSON-24NECK36
THE TURNER COMPANY		ELGR3624
36 IN. X 36 IN. PRECAST CONCRETE NECK SECTION.	320777	
OLD CASTLE PRECAST		048110
HANSON PIPE & PRECAST		HANSON-36NECK36
THE TURNER COMPANY		ELGR3636
MANHOLE STEP, PLASTIC STEEL REINFORCED, DRIVE IN SINGLE RUNG	482911	
M.A. INDUSTRIES		PS-3-PCF004-516

APPROVED BY ONCOR

MANHOLE NECK, LADDER, AND ENTRANCE PAD

DCS – 5 DETAIL SHEET 9 of 19

04 – 13



APPROVED VENDORS FOR (TSN 327563) MANHOLE COVER AND FRAME.

1). OLD CASTLE PRECAST (PART NUMBER – MHRL2010)

2). THE TURNER COMPANY (PART NUMBER – ELCVR36)

APPROVED BY ONCOR

MANHOLE COVER AND FRAME

DCS – 5 DETAIL SHEET 10 of 19

04 – 13

STATE OF TEXAS · CHARLIE BARTHELL MORAN, III · 101189 · LICENSED · PROFESSIONAL ENGINEER

Signature of Registrant P.E. 11-8-2013 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

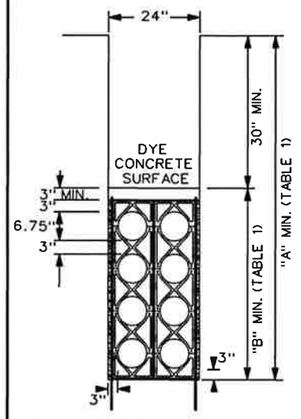
BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK DETAIL 4E6

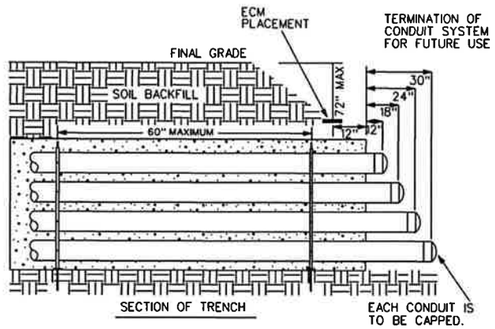
HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275 TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 ELEC 21d	ELE-21

PROJECT # 29350 OFFICE: RCH USER: ah1854
FILE: 29350 ELEC 21d.dgn TIME: 1:59:59 PM DATE: 11/8/2013



TRENCH VIEW OF 2WX4H CONDUIT SYSTEM



ENCASED 6 INCH CONDUIT SYSTEM DIMENSIONS					
DIMENSION	2WX1H	2WX2H	2WX3H	2WX4H	2WX5H
A (MIN.)	46"	56"	66"	76"	86"
B (MIN.)	16"	26"	36"	46"	56"

TABLE 1 (DIMENSION HAS BEEN ROUNDED UP TO NEAREST INCH)

POLYURETHANE DISK MANDREL	MAX. DISK DIAMETER	TOTAL WEIGHT
6 INCH DUCT CONDUIT	5½INCH	6.20 LB.

NOTES:

1). CONDUIT FOR CONCRETE ENCASEMENTS IS TO BE SOLID WALL PVC DB-60 AND SHALL NOT BE A CELLULAR CORE PVC PRODUCT.
2). ALL CONCRETE OF THE ENCASEMENT IS TO HAVE A COMPRESSION TEST STRENGTH OF 3000 PSI AT TWENTY EIGHT DAYS.
3). INSTALL APPROVED DUCT SPACERS (SEE BELOW) EVERY 5 FEET ALONG THE ENTIRE LENGTH OF THE CONDUIT SYSTEM.
4). THE DUCT SPACERS ARE TO PROVIDE 3 INCHES OF VERTICAL AND HORIZONTAL SEPARATION BETWEEN CONDUITS.
5). THE DUCT LINE SHALL BE SECURED TO EARTH AT A MINUMIM OF EACH FOURTH SPACER LOCATION, OR EVERY 20 FT. ALONG THE DUCT PRIOR TO POURING CONCRETE TO PREVENT THE CONDUIT FROM FLOATING.
6). ALL CONDUIT/DUCT SPANS SHOULD SLOPE TOWARD ADJACENT MANHOLES TO PROVIDE DRAINAGE TO A PUMPABLE LOCATION.
7). ALL BACKFILL OF A CONDUIT/DUCT TRENCH SHALL BE REPLACED TO A MINIMUM COMPACTION OF 95%.
8). RED POWDER CONCRETE DYE IS TO BE PLACED ON TOP OF THE ENCASEMENT IMMEDIATELY AFTER THE CONCRETE IS POURED.
9). CONDUIT ENDS FOR INCOMPLETE DUCT LINES (STUBS) ARE TO REMAIN EXPOSED FROM THE ENCASEMENT FOR FUTURE RETRIEVAL. THE ENDS SHALL BE CAPPED WATERTIGHT AND HAVE AN ELECTRONIC MARKER INSTALLED.
10). EACH CONDUIT OF A CONCRETE ENCASED DUCT SHALL BE INSPECTED BY PULLING A DISK MANDREL OF PROPER SIZE THRU IT'S ENTIRE LENGTH AS SOON AS POSSIBLE AFTER ENCASEMENT TO VERIFY INTEGRITY.
11). EACH 6" CONDUIT SHALL HAVE A 6000 LB. PULL TAPE INSTALLED.

APPROVED VENDORS FOR (TSN 300325) 6" BASE SPACER & (TSN 300332) 6" INTERMEDIATE SPACER.

1). CARLON (BASE PART NUMBER – S288RLN) & ((INTERMEDIATE PART NUMBER – S289RLN).
2). CANTEX INDUSTRIES (BASE PART NUMBER – 5336039) & ((INTERMEDIATE PART NUMBER – 5336038))

APPROVED VENDORS FOR (TSN 300398) 6" TYPE II DB-60 PVC SOLID WALL CONDUIT.

1). CANTEX INDUSTRIES (PART NUMBER – A79GA42)
2). PRIME CONDUIT (PART NUMBER – 48817)
3). HERITAGE PLASTICS (PART NUMBER – 53602)

APPROVED BY ONCOR	CONCRETE ENCASED CONDUIT SYSTEMS
	DCS – 5 DETAIL SHEET 11 of 19

04 – 13

THE CHEMICALS USED IN SOLVENT WELDING OF CONDUIT ARE INTENDED TO PENETRATE THE SURFACE OF BOTH PIPE AND FITTING, WHICH AFTER CURING RESULT IN A COMPLETE FUSION AT THE JOINT. THE OVER USE OR UNDER USE OF CHEMICALS RESULTS IN LEAKY JOINTS OR WEAKENED PIPE.

A. REMOVE ALL DUST, DIRT, AND MOISTURE FROM SURFACES TO BE CEMENTED EITHER BY MECHANICAL OR CHEMICAL CLEANING.

1. MECHANICAL CLEANING – FINE ABRASIVE PAPER OR CLOTH (180 GRIT OR FINER) OR CLEAN OIL-FREE STEEL WOOL.

2. CHEMICAL CLEANING – CLEANER RECOMMENDED BY MANUFACTURER OR EQUIVALENT (METHYL ETHYL KETONE – MEK).

B. WITH A NON-SYNTHETIC BRISTLE BRUSH APPLY AN EVEN COATING OF CEMENT TO THE OUTSIDE OF THE PIPE AND INSIDE THE SOCKET. MAKE SURE THAT THE AMOUNT OF CEMENT APPLIED TO THE CONDUIT IS EQUAL TO THE DEPTH OF THE SOCKET. BEFORE ASSEMBLY, IF SOME EVAPORATION OF SOLVENT FROM THE SURFACES TO BE JOINED IS NOTED, REAPPLY CEMENT, THEN ASSEMBLE.

IF CEMENT BEING USED HAS AN APPRECIABLE CHANGE IN VISCOSITY OR SHOWS SIGNS OF JELLING, IT SHALL BE DISCARDED. IN NO CASE SHALL THINNER BE USED IN AN ATTEMPT TO RESTORE JELLED PVC CEMENT. THINNER MAY ONLY BE USED TO CHANGE THE VISCOSITY OF A MEDIUM BODIED CEMENT TO THAT OF A REGULAR BODIED CEMENT FOR APPLICATION ON PVC PIPE SMALLER THAN 2 1/2 INCH DIAMETER A MEDIUM BODIED CEMENT SHALL BE USED ON 2 1/2 TO 6 INCH PVC PIPE.

IN COLD WEATHER, USE A PRIMER TO SOFTEN THE JOINING SURFACES BEFORE APPLYING CEMENT. ALLOW LONGER CURE TIME. (SEE ITEM E).

C. JOIN PIPE WITHIN 20 SECONDS OF APPLYING CEMENT. TURN THE PIPE 1/4 TURN TO ENSURE EVEN DISTRIBUTION OF CEMENT ON SURFACES TO BE BONDED. MAKE SURE THAT PIPE IS INSERTED TO THE FULL DEPTH OF THE SOCKET.

D. CLEAN OFF ANY BEAD OR EXCESS CEMENT THAT APPEARS AT THE OUTER SHOULDER OF THE FITTING. EXCESS CEMENT ALLOWED TO REMAIN IN CONTACT WITH THE MATERIAL CAN CAUSE WEAKENING OF THE MATERIAL, AND SUBSEQUENT FAILURE.

E. NEWLY ASSEMBLED JOINTS SHOULD BE HANDLED CAREFULLY UNTIL THE CEMENT HAS CURED TO THE RECOMMENDED SET PERIOD. SET PERIODS ARE RELATED TO THE AMBIENT TEMPERATURE AS FOLLOWS:

30 MIN. MINIMUM AT 60^{o} TO 100^{o}F
1 HR. MINIMUM AT 40^{o} TO 60^{o}F
2 HR. MINIMUM AT 20^{o} TO 40^{o}F
4 HR. MINIMUM AT 0^{o} TO 20^{o}F

APPROVED BY ONCOR	INSTRUCTIONS FOR JOINING PVC CONDUIT
	DCS-5 DETAIL SHEET 12 OF 19

04 – 13

SHEET 96 OF 235

STATE OF TEXAS
CHARLIE BARTHELL MORAN, III
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant Date ,P.E. 10-24-13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

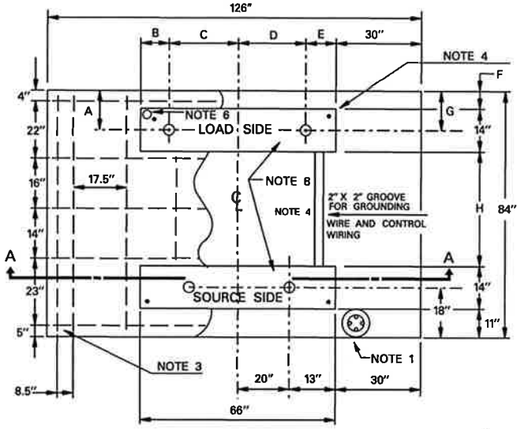
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

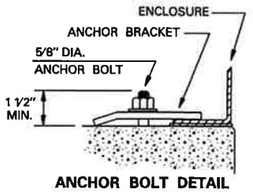
BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK DETAIL 4E6

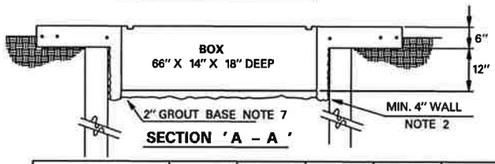
HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 ELEC 22d	ELE-22





ANCHOR BOLT DETAIL



SECTION 'A – A'

REINFORCING SCHEDULE		
NUMBER OF #3 BARS	LENGTH	WEIGHT (LBS)
5	122"	19.1
6	80"	15.0
3	33"	3.1

TOTAL WEIGHT (CONCRETE & REBAR) 7040 LBS.

25KV	A	B	C	D	E	F	G	H
PMH – 9	15"	11"	22"	22"	11"	8"	15"	37"
PMH – 10	18"	13"	20"	20"	13"	11"	18"	34"
PMH – 11	15"	11"	22"	20"	13"	8"	18"	37"

NOTES:

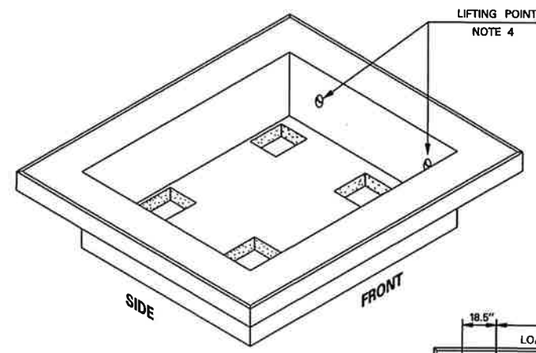
1. PIERS ARE REQUIRED ON ALL SWITCHGEAR PADS UNLESS WAIVED BY THE COMPANY INSPECTOR.
2. USE WIRE MESH FOR CONCRETE REINFORCEMENT AROUND DEEPWELL BOX.
3. ENDS OF RE-BAR SHALL REMAIN A MINIMUM OF 2" INSIDE OF CONCRETE AND SHALL BE INTERMEDIATE GRADE 60 AND CONFORM TO ASTM A615.
4. CONTACT COMPANY REPRESENTATIVE ON WHERE TO ACQUIRE 5/8" X 10' COPPER CLAD GROUND RODS. GROUND RODS TO BE OBTAINED AND INSTALLED BY CONTRACTOR. INSTALLATION DEPTH SHALL BE 7' – 6".
5. FOR CLEARANCES ON ALL SIDES OF THE SWITCHGEAR SEE DETAIL SHEETS 1, 2, 3 AND 4.
6. FOR PADS PLUMBED INTO DUCT BANKS, INSTALL 3" COMMUNICATION CONDUIT FROM MANHOLE TO FRONT RIGHT CORNER OF LOAD SIDE CONDUIT OPENING OF PAD.
7. GROUT CONDUIT WINDOW OPENINGS.

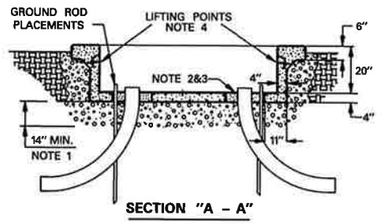
APPROVED BY ONCOR

POURED IN PLACE PAD FOR 25KV SUPERVISORY CONTROL LIVE FRONT SWITCHGEAR

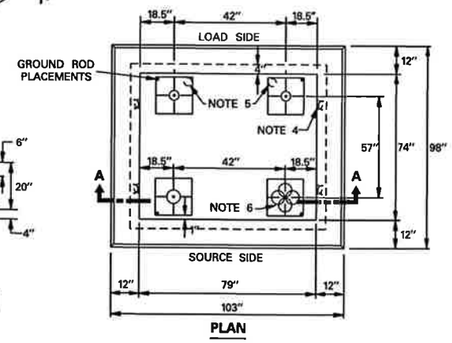
DCS-5 DETAIL SHEET 13 OF 19

04 – 13





SECTION "A – A"



PLAN

NOTES:

1. TO PREVENT SETTLING AND IMPROVE PAD STABILIZATION ADD A MINIMUM OF 14 INCHES MEDUM SIZE GRAVEL BOTTOM & SIDES.
2. CONDUIT SHALL NOT EXTEND MORE THAN 2 INCHES ABOVE CONDUIT WINDOW OPENING.
3. TO ALLOW FOR ADEQUATE DRAINAGE DO NOT SEAL CONDUIT WINDOW OPENINGS WITH GROUT. FILL WITH AGGREGATE ONLY.
4. LIFTING POINTS (4) RATED AT 2000 LBS EACH. TOTAL PAD WEIGHT IS 6100 LBS.
5. FOR PADS PLUMBED TO CONCRETE ENCASED DUCT, INSTALL 3 INCH COMMUNICATION CONDUIT FROM MANHOLE TO A LOAD SIDE OPENING.
6. EXAMPLE OF CONDUIT PLACEMENTS (VERTICAL OR HORIZONTAL) WHEN SPARE CONDUITS ARE REQUIRED.

DESCRIPTION & APPROVED VENDORS	ONCOR TSN	VENDOR PART#
PAD,PRECAST,20" DEEPWELL,SWITHCGEAR,25KV PMH-9ME TYPE,103" X 98"	329429	
OLD CASTLE PRECAST		1804702
THE TURNER COMPANY		ELPAD25KV
ROD,GRD,CU CLAD STL,5/8" X 10', UL LABEL & DIMEN STAMPED ON TOP	306212	
ERITECH		615800

APPROVED BY ONCOR

PRECAST WELLED PAD FOR DEAD FRONT SWITCHGEAR

DCS – 5 DETAIL SHEET 14 OF 19

04 – 13

SHEET 97 OF 235

Signature of Registrant P.E. 10-24-13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

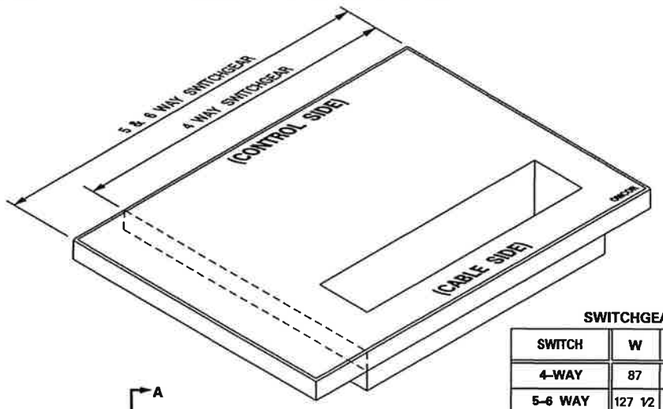
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK DETAIL 4E6

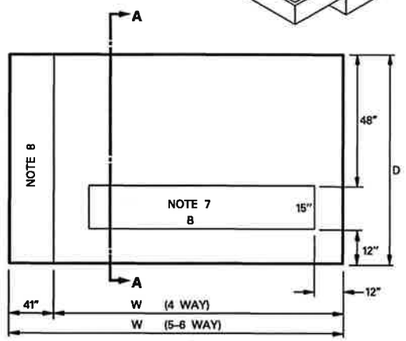
HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 ELEC 23d	ELE-23

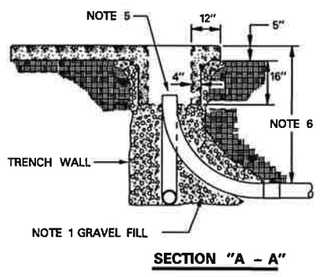


SWITCHGEAR WAYS

SWITCH	W	B	D	WEIGHT
4-WAY	87	64	75	3750LBS
5-6 WAY	127 1/2	94	75	5465LBS
4-5 WAY ATO	127 1/2	94	75	
4-5 WAY RSC	127 1/2	94	75	



PLAN



SECTION "A - A"

NOTES:

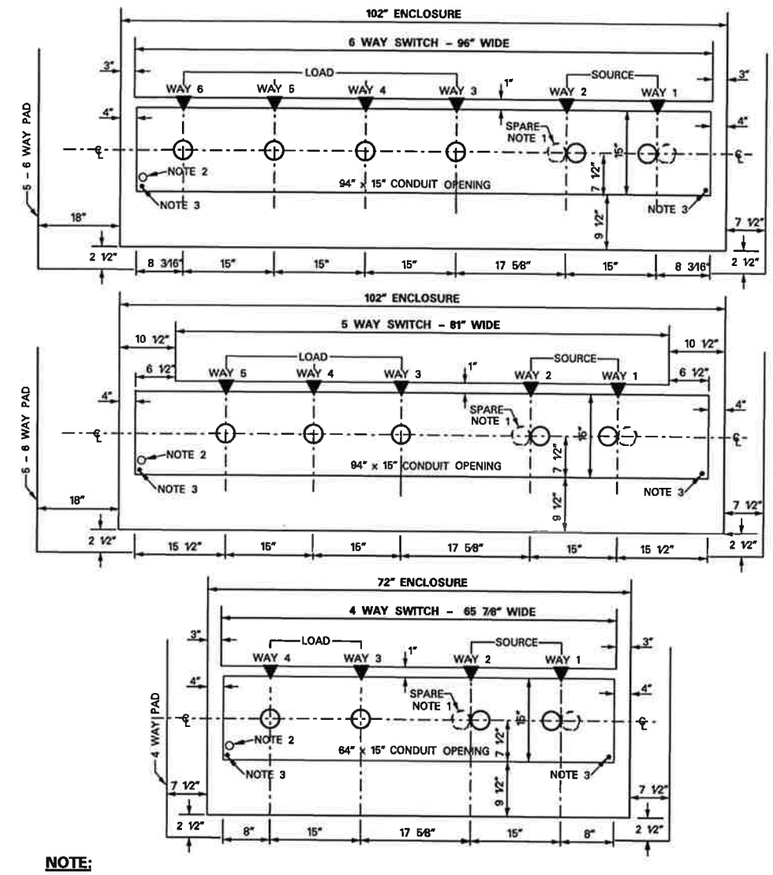
1. FOR STABILIZATION AND DRAINAGE INSTALL SMALL TO MEDIUM GRAVEL UNDER PAD DEEP WELL.
2. FOR CLEARANCES ON ALL SIDES OF THE SWITCHGEAR SEE DETAIL SHEETS 1, 2, 3 AND 4.
3. PIERS ARE REQUIRED ON ALL SWITCHGEAR PADS UNLESS WAIVED BY THE COMPANY INSPECTOR.
4. LIFT PAD WITH PROVIDED LIFTING POINTS ONLY. SEE LIFTING RINGS INSIDE WALL OF DEEP WELL.
5. CONDUIT NOT TO EXTEND MORE THAN 3" ABOVE BOTTOM OF DEEP WELL.
6. MINIMUM TRENCH DEPTH AT PAD TO TOP OF CONDUIT FOR THE FOLLOWING CONDUITS:
   - 6" CONDUIT — 61"
   - 4" CONDUIT — 47"
   - 2" CONDUIT — 40"
7. REFER TO DETAIL SHEET 16 FOR CONDUIT LOCATIONS.
8. ADDITIONAL AREA FOR CONTROL CABINET WHEN MOUNTING REMOTE SUPERVISORY CONTROLLED SWITCHGEAR.
9. CONTACT COMPANY REPRESENTATIVE ON WHERE TO ACQUIRE 5/8" X 10' COPPER CLAD GROUND RODS. GROUND RODS TO BE OBTAINED AND INSTALLED BY CONTRACTOR. INSTALLATION DEPTH SHALL BE 7' - 6".
10. CONTACT COMPANY REPRESENTATIVE ON WHERE TO ACQUIRE PRECAST CONCRETE PAD.

APPROVED BY ONCOR

PRECAST WELLED PAD FOR SF6 DEAD FRONT SWITCHGEAR

DCS-5 DETAIL SHEET 15 OF 19

04 - 13



NOTE:

1. CONDUIT SHALL BE CENTERED ON CENTER BUSHING OF EACH SWITCHED WAY. IF SPARE CONDUIT IS REQUIRED, BOTH SHALL BE CENTERED AS SHOWN ON CENTER BUSHING OF SWITCHED WAY.
2. FOR PADS PLUMBED INTO DUCT BANKS, INSTALL 3" COMMUNICATION CONDUIT FROM MANHOLE TO FRONT LEFT CORNER OF THE CONDUIT OPENING OF PAD.
3. INSTALL 5/8" X 10' COPPER CLAD GROUND RODS IN FRONT CORNERS OF WINDOW.

APPROVED BY ONCOR

CONDUIT LOCATIONS FOR SF6 DEAD FRONT SWITCHGEAR

DCS-5 DETAIL SHEET 16 OF 19

04 - 13

SHEET 98 OF 235

STATE OF TEXAS
CHARLIE BARTHELL MORAN, III
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10-24-13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

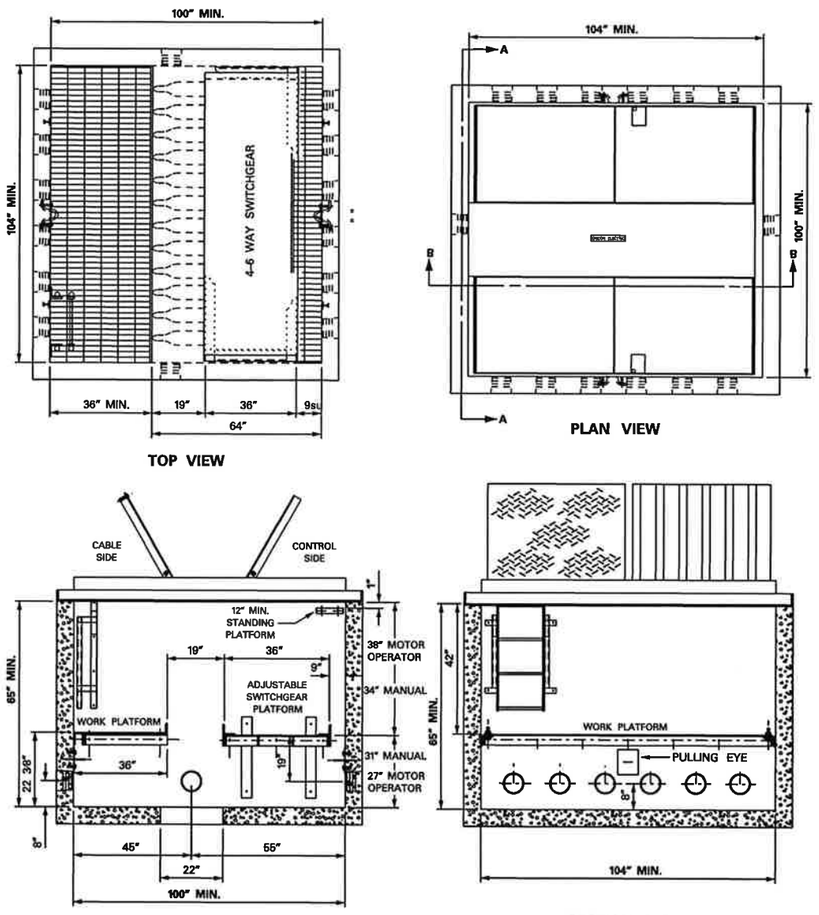
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

ONCOR DUCT BANK DETAIL 4E6

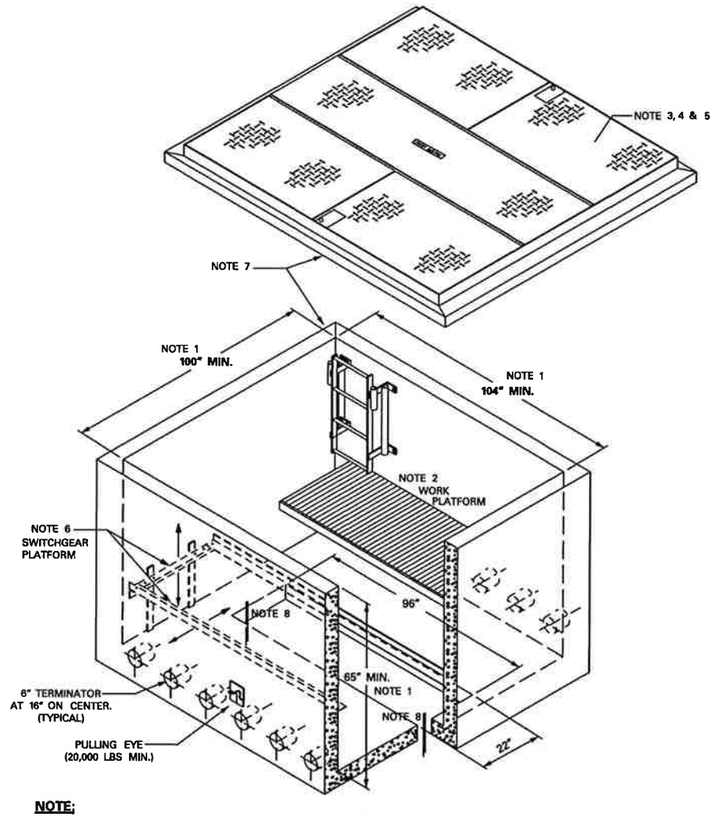
HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 ELEC 24d	ELE-24



APPROVED BY ONCOR	PRECAST VAULT FOR SF6 DEAD FRONT SWITCHGEAR
	DCS-5 DETAIL SHEET 17 OF 19

04 - 13



NOTE;

1. ALL DIMENSIONS SHOWN ARE MINIMUM INSIDE MEASUREMENTS. CONTACT DISTRIBUTION STANDARDS FOR ACTUAL MFG. DIMENSIONS.
2. LADDER, PLATFORMS, SUPPORT ANGLES AND COVER ARE PRE-INSTALLED.
3. STEEL DIAMOND PLATE TORSION ASSISTED COVERS.
4. VERTICAL LOADS TO COVER SHALL NOT EXCEED 16,000 LBS LIVE WHEEL WEIGHT.
5. VAULTS SHALL NOT BE INSTALLED IN LOCATIONS DESIGNATED ACCESSIBLE BY VEHICULAR TRAFFIC.
6. ADJUSTABLE SWITCHGEAR PLATFORM FOR 4- 6 WAY SWITCHGEAR.
7. FOR CLEARANCES ON ALL SIDES OF THE SWITCHGEAR SEE DETAIL SHEETS 1, 2, 3 & 4.
8. TWO 5/8" X 10' COPPER CLAD GROUND RODS TO BE OBTAINED AND INSTALLED BY CONTRACTOR.
9. CONTACT COMPANY REPRESENTATIVE FOR VAULT ORDERING INFORMATION.

APPROVED BY ONCOR	PRECAST VAULT FOR SF6 DEAD FRONT SWITCHGEAR
	DCS-5 DETAIL SHEET 18 OF 19

04 - 13

SHEET 99 OF 235

STATE OF TEXAS
CHARLIE BARTHELL MORAN, III
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10-24-13
Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

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1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
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PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
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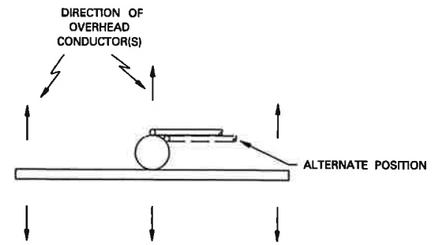
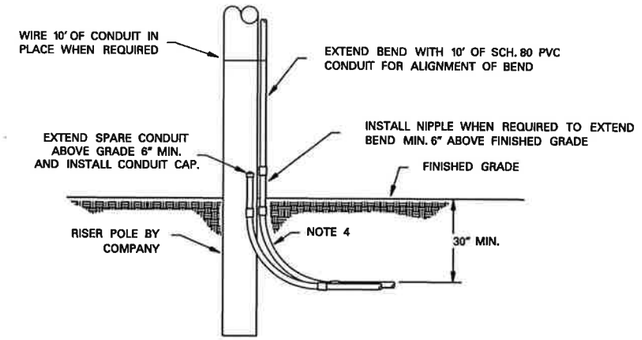


TOP VIEW



PLAN VIEW

NOTES

1. CONTACT COMPANY REPRESENTATIVE FOR (1) ROUTING OF CONDUIT LINE, (2) SIZE OF CONDUIT, AND (3) INSTALLATIONS REQUIRING MORE THAN ONE RISER ON POLE.
2. LIMIT CONDUIT RUN TO THREE 90° BENDS. IF MORE THAN THREE 90° BENDS ARE REQUIRED, CONTACT COMPANY REPRESENTATIVE.
3. DISTANCE BETWEEN 90° BENDS SHALL BE FIVE FEET MINIMUM.
4. ALL PRIMARY HORIZONTAL AND VERTICAL CONDUIT BENDS SHALL BE 90° WITH 36 INCH MINIMUM RADIUS.

APPROVED BY ONCOR

TERMINATION OF PRIMARY CONDUIT AT RISER POLE

DCS-5 DETAIL SHEET 19 OF 19

04 – 13

SHEET 100 OF 235

STATE OF TEXAS
CHARLIE BARTHELL MORAN III
101189
LICENSED
PROFESSIONAL ENGINEER

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Addison TOWN OF ADDISON
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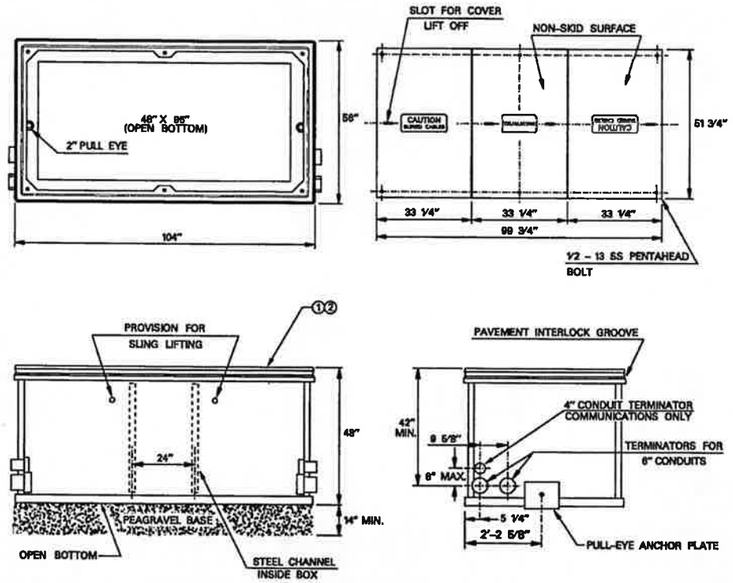
PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 ELEC 26d	ELE-26

205 – 215
01 – 00

THREE PHASE PRIMARY SUBSURFACE SPLICE/PULL BOX 48" X 96" X 48"

205 – 215
01 – 00



NOTES:

1. H10 LOADING (8000 LBS. LIVE WHEEL /10,400 LBS. ROLL OVER). FOR USE IN AREAS SUBJECT TO PEDESTRIANS, MOWERS AND OCCASSIONAL LIGHT VEHICULAR TRAFFIC.
2. A16 LOADING (HEAVY OCCASSIONAL VEHICULAR TRAFFIC 16,000 LBS. LIVE WHEEL /20,800 LBS. ROLL OVER) FOR USE IN ALLEY WAYS AND PARKING LOTS. NOT FOR CONTINOUS VEHICULAR TRAFFIC.
3. FOR LOCATIONS IN ALL ROADWAYS SUBJECT TO CONTINOUS DAILY VEHICULAR TRAFFIC, CONTACT DISTRIBUTION STANDARDS.
4. NUMBER AND LOCATION OF PENTAHEAD BOLTS AND LIFTING PROVISIONS MAY VARY AMONG MANUFACTURERS.
5. LIMIT TO 3 – 500 KCMIL THRU 3 – 1000 KCMIL.

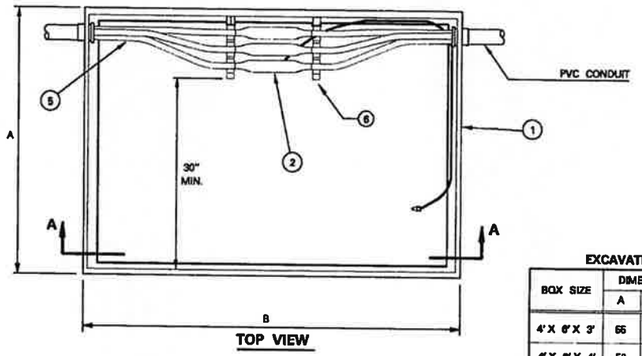
ITEM	QTY	DESCRIPTION	TSN/REF	CU	MU
1	1	BOX, SPLICE/PULL, 48"X96"X48" H10 (LOADING SEE NOTE 1)	316043	BPSP396	
2	1	BOX, SPLICE/PULL, 48"X96"X48" A16 (LOADING SEE NOTE 2)	408734	BXSPLA16	

APPROVED BY TXU

205 – 270
05 – 04

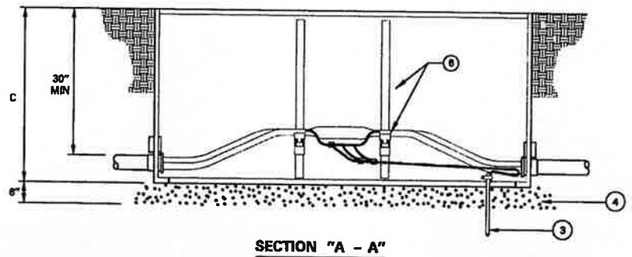
THREE PHASE PRIMARY SUBSURFACE SPLICE/PULL BOX INSTALLATION

205 – 270
05 – 04



EXCAVATION

BOX SIZE	DIMENSIONS (IN)		
	A	B	C
4' X 8' X 3'	55	79	36
4' X 8' X 4'	58	104	48



SECTION "A – A"

NOTES:

1. SPLICE/PULL BOX DESIGNED FOR PARKWAY INSTALLATION WITH H-10 LOADING (LIGHT VEHICULAR TRAFFIC).
2. THIS BOX IS INTENDED FOR USE AS AN INTERMEDIATE SPLICE BOX AS NEEDED DUE TO LONG PULLING DISTANCES AND RESTRICTED TO ONE 3ø CIRCUIT.

ITEM	QTY	DESCRIPTION	TSN/REF	CU	MU
1		BOX, SPLICE/PULL	205-210/215	BPSP3 _ _	
2		SPLICE, PRIMARY, STRAIGHT	206-100/101	PSS _ _	
3		DRIVEN GROUND	204-270	GSSPB _ _	
4		GRAVEL FILL	–		
5		CABLE, PRIMARY	SECTION 8		
NEW CONSTRUCTION					
6		CABLE RACKS, NON-METALLIC	205-070	CRA _ _	MCRA _ _
MAINTENANCE ONLY					
8		CABLE RACKS WITH PORCELAIN INSULATORS	205-070	CRB _ _	

APPROVED BY ONCOR

STATE OF TEXAS
CHARLIE BARTHELL MORAN, III
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10-24-13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

SPLICE/ PULL BOX
INSTALLATION DETAIL

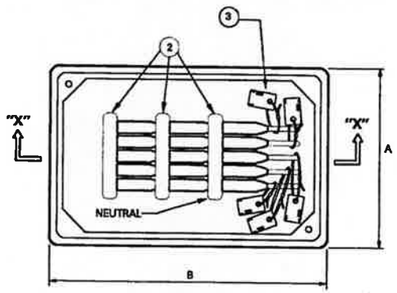
HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 ELEC 27d	ELE-27

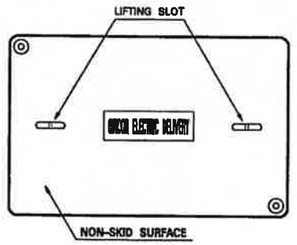
212 – 130
06 – 07

SUBSURFACE SECONDARY/SERVICE BOX

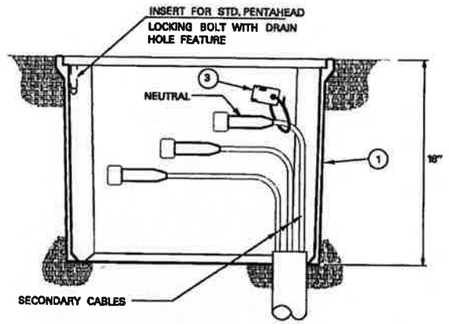
212 – 130
06 – 07



PLAN
WITH COVER REMOVED



COVER – TOP VIEW



SECTION "X-X"

BOX SIZE (IN.)	OVERALL DIM. (IN.) A	B	MAX. NO. CIRCUITS
13 X 24	16	26	5
17 X 30	20	33	8

BOX SIZE (IN.)	REPLACEMENT LID TSN
13 X 24	326506
17 X 30	326509

NOTES:
1. BOXES ARE DESIGNED FOR LIGHT VEHICULAR TRAFFIC H-10 LOADING.
2. MANUFACTURERS COVERS ARE INTERCHANGEABLE.
3. BOXES DEPTH IS 16 INCHES.
4. BOXES COME WITH LID.

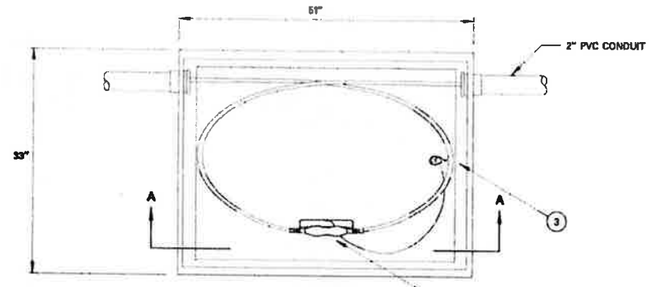
ITEM	QTY	DESCRIPTION	TSN/REF	CU	MU
1		BOX, SECONDARY, 17" X 30" X 16"	300306	SSB17	
1		BOX, SECONDARY, 13" X 24" X 16"	316037	SSB13	
2		CONNECTOR, MOLE, URD	212-112	UMBH - - -	
3		TAG, ADDRESS OR "PLN", WITH CABLE TIE	215-020		

APPROVED BY ONCOR

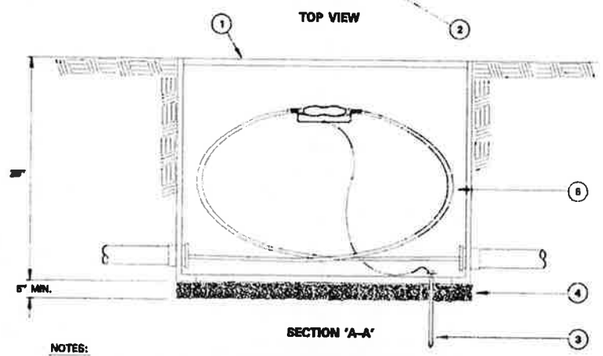
205 – 260
10 – 95

SINGLE PHASE PRIMARY SUBSURFACE SPLICE / PULL BOX INSTALLATION

205 – 260
10 – 95



TOP VIEW



SECTION 'A-A'

NOTES:
1. SPLICE/ PULL BOX DESIGNED FOR PARKWAY INSTALLATION WITH H-10 LOADING (LIGHT TRAFFIC).
2. THIS BOX IS INTENDED FOR USE AS AN INTERMEDIATE SPLICE BOX AS NEEDED DUE TO LONG PULLING DISTANCES AND RESTRICTED TO SINGLE #1/0 CABLE.

ITEM	QTY	DESCRIPTION	TSN/ REF	CU	MU
1		BOX, SPLICE/ PULL, 30 X 48 X 36 IN.	206-200	BPSP1	
2		SPLICE, PRIMARY, STRAIGHT	206-100	PSS_ _	
3		GROUNDING	204-200	GPSB	
4		GRAVEL FILL			
5		CABLE, PRIMARY	209-		

APPROVED BY TU ELECTRIC

STATE OF TEXAS
CHARLIE BARTHELL MORAN III
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10-24-13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

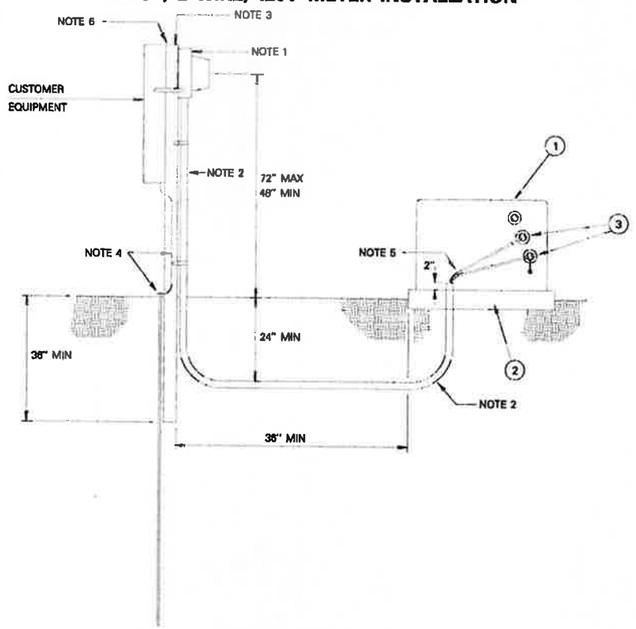
SPLICE/ PULL BOX INSTALLATION DETAIL

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 ELEC 28d	ELE-28

SECONDARY SERVICE FROM PADMOUNTED TRANSFORMER FOR CATV
1 PHASE, 2 WIRE, 120V METER INSTALLATION

212 – 315
11 – 94



NOTES:

1. METER SOCKET INSTALLED BY CUSTOMER. CUSTOMER TO MAKE ALL SERVICE CONDUCTOR CONNECTIONS.
2. ALL RACEWAY (CONDUIT, HARDWARE, ACCESSORIES, ETC.) SERVICE ENTRANCE CONDUCTORS, PROVIDED AND INSTALLED BY CUSTOMER. RACEWAY AND SERVICE LATERAL CONDUCTORS TO BE FURNISHED AND INSTALLED BY CUSTORMER. RACEWAY FOR SERVICE LATERAL CONDUCTORS TO BE MINIMUM OF 2 INCH APPROVED SCHEDULE 40 PVC.
3. POLE TO BE A MINIMUM OF 3 INCH RIGID GALVANIZED STEEL PIPE AND CONCRETE BACKFILLED. POLE LOCATION TO BE APPROVED BY TUELECTRIC.
4. CUSTOMER TO PROVIDE AND INSTALL 8 FT. GROUND ROD AND AT MINIMUM A #6 SOLID BARE CU. GROUND WIRE.
5. CUSTOMER TO LEAVE SUFFICIENT LENGTH OF SERVICE LATERAL CONDUCTORS TO FACILITATE CONNECTIONS BY TUELECTRIC.
6. INSTALLATION TO BE ACCORDING TO THE NATIONAL ELECTRICAL CODE. INSPECTION AUTHORITY APPROVAL REQUIRED IN INSPECTION LIMITS.

ITEM	QTY	DESCRIPTION	TSN/ REF	CU	MU
1		TRANSFORMER	209-210,211		
2		PAD, TRANSFORMER, 44" X 56"	205-155		
3		CONNECTOR, SECONDARY	212-105		

APPROVED BY TUELECTRIC

STATE OF TEXAS
CHARLIE BARTHELL MORAN, III
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10-24-13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

SPLICE/ PULL BOX
INSTALLATION DETAIL

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

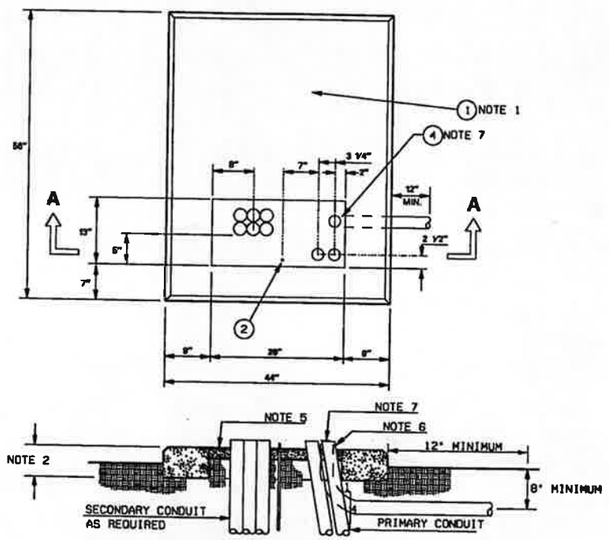
PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 ELEC 29d	ELE-29

DATE: 10/24/2013 TIME: 1:58:12 PM FILE: 29350 ELEC 29d.dgn PROJECT # 29350 OFFICE: RCH USER: ah1299

205 – 155
12 – 08

TRANSFORMER PAD – PRECAST SINGLE PHASE DEADFRONT (TYPE III)

205 – 155
12 – 08



SECTION "A – A"

NOTES:

1. A PRECAST CONCRETE PAD SHALL BE USED UNLESS LIFTING EQUIPMENT IS UNAVAILABLE OR CANNOT ACCESS THE SITE. USE POLYMER PADS ONLY WHEN SETTING PAD BY HAND.
2. THIS DIMENSION IS 6 INCHES FOR PRECAST CONCRETE PAD AND 3 1/4 INCHES FOR POLYMER CONCRETE PADS.
3. REFERENCE STANDARD 202-350 FOR FOREIGN UTILITY COMPANY EQUIPMENT GROUND.
4. PIERS SHALL BE INSTALLED UNDER PAD WHEN DIRT HAS BEEN DISTURBED UNDER THE LOAD BEARING AREA OF THE PAD. REFERENCE STANDARD 205-165 FOR PIER INSTALLATION.
5. GROUTING DETAIL SEE STANDARD DRAWING 206-160.
6. THE CONDUITS MUST BE INSTALLED TO ENSURE THAT THE TOTAL MAXIMUM BENDING RADIUS FOR THE PRIMARY CABLE DOES NOT EXCEEDE 9 INCHES. (ANGLE PRIMARY CONDUIT WHENEVER POSSIBLE).
7. THE 3" FLEX CONDUIT (TSN 306205) SHALL HAVE A MINIMUM OF 8" OF COVER AS IT EXITS ON THE RIGHT HAND SIDE OF THE TRANSFORMER PAD.

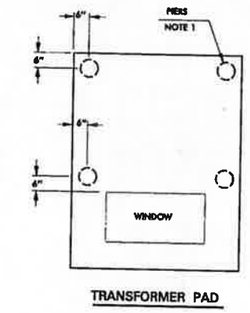
ITEM	QTY	DESCRIPTION	TSN/REF	CU	MU
1	1	PAD, TRANSFORMER, PRECAST CONCRETE 44 x 56 IN.	304037	PPRCTII	
1	1	PAD, TRANSFORMER, POLYMER CONCRETE 44 x 56 IN.	319332	PPOCTII	
2	1	ROD, GROUND 5/8" x 8' CU	204-150		
4	3	CONDUIT, HDPE, FLEX, 3 "	306206		

APPROVED BY ONCOR

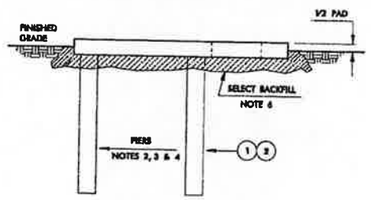
205 – 165
09 – 05

SINGLE PHASE TRANSFORMER PAD AND 44" X 52" X 24" SERVICE ENCLOSURE PIER INSTALLATION

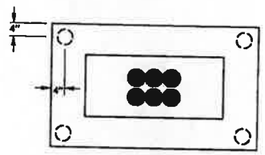
205 – 165
09 – 05



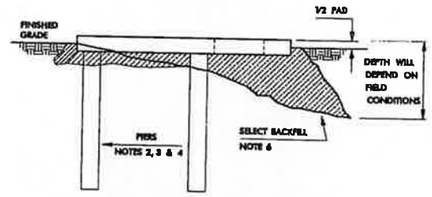
TRANSFORMER PAD



SIDE VIEW FOR LEVEL TERRAIN



SERVICE ENCLOSURE



SIDE VIEW FOR SLOPING TERRAIN

NOTES:

1. PIERS SHALL BE INSTALLED UNDER PAD WHEN DIRT HAS BEEN DISTURBED UNDER THE LOAD BEARING AREA OF PAD. TAMP BACKFILL (95% COMPACTION) TO TOP OF PIER SUPPORTS (USE DITCH SPOIL WHEN POSSIBLE).
2. CUT SUPPORT PIERS FROM SECTION OF 4 IN. PVC CONDUIT.
3. PLACE PIERS AS SHOWN. FILL WITH CONCRETE.
4. TOP OF PIERS SHOULD BE LEVEL AND 3 IN. BELOW FINAL GROUND LEVEL TO A DEPTH OF:
   (1) MINIMUM OF 24 IN. IN UNDISTURBED EARTH (SOIL).
   (2) BOTTOM OF DITCH.
   (3) BEGINNING OF SOLID ROCK.
5. AFTER PLACING PAD, FILL VOIDS UNDER AND AROUND PAD WITH SELECT DITCH SPOIL.
6. ALL BACKFILL UNDER AND AROUND PAD SHALL BE WELL TAMPED.

ITEM	QTY	DESCRIPTION	TSN/REF	CU	MU
1	1	CONDUIT, PVC, 4 IN.	287687	PTIPX	
2	1	CONCRETE (AS REQUIRED)			

APPROVED BY TXU Electric Delivery

STATE OF TEXAS
CHARLIE BARTHELL MORAN III
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10-24-13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

SINGLE PHASE TRANSFORMER PAD INSTALLATION DETAIL

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

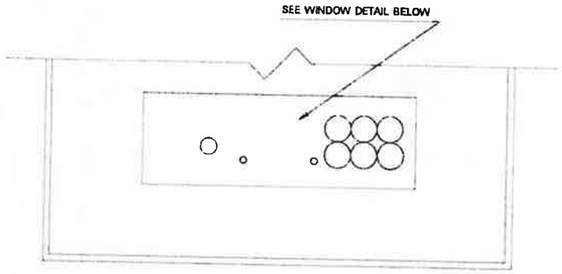
PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 ELEC 30d	ELE-30

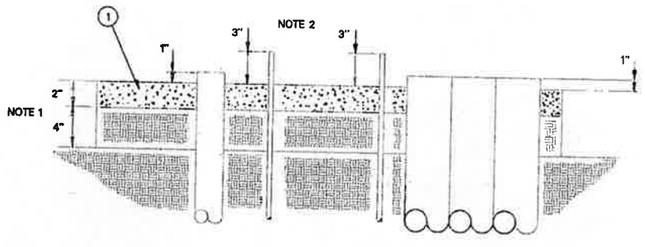
SHEET 104 OF 235

205 – 180
12 – 93

GROUTING DETAIL FOR TRANSFORMER PAD WINDOWS

205 – 180
12 – 93





PAD WINDOW DETAIL

NOTES:
1. FILL IN PAD WINDOW WITH 4 INCHES OF EARTH BACKFILL AND 2" OF GROUT.
2. GROUND RODS SHALL EXTEND A MAXIMUM OF 3 INCHES ABOVE GROUTING TO ASSURE ADEQUATE DRIVEN DEPTH AND ALLOW FOR ADEQUATE CONNECTING SPACE.

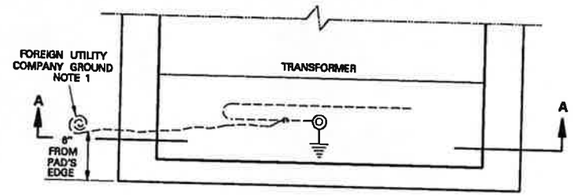
ITEM	QTY	DESCRIPTION	TSN	AUN	MACRO AUN
1	AS REQD	GROUT			

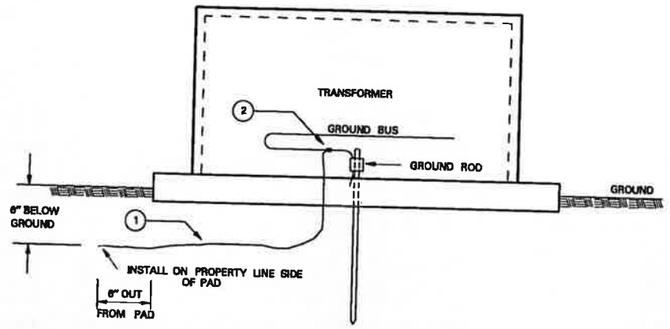
APPROVED BY TU ELECTRIC

202 – 350
10 – 06

METHOD FOR PROVIDING FOREIGN UTILITY COMPANY EQUIPMENT GROUND

202 – 350
10 – 06





SECTION A–A

NOTE:
1. ON NEW INSTALLATIONS, INSTALL NO. 6 S.D. BARE COPPER AS SHOWN FOR FOREIGN UTILITY COMPANY BONDING.
2. THE NATIONAL ELECTRICAL SAFETY CODE RULE 384 C RECOMMENDS BONDING OF ALL ABOVE GROUND METALLIC POWER AND COMMUNICATIONS APPARATUS (PEDESTALS, TERMINALS, APPARATUS CASES, TRANSFORMER CASES, ETC.) THAT ARE SEPARATED BY A DISTANCE OF 6 FEET OR LESS.

ITEM	QTY	DESCRIPTION	TSN/REF	CU	MU
1	1	WIRE, #6 CU, BARE	303244	FUCEG	
2	1	CONNECTOR, #2 CU – #6 CU	306838		

APPROVED BY TXU Electric Delivery

SHEET 105 OF 235

STATE OF TEXAS
CHARLIE BARTHELL MORAN, III
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10-24-13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

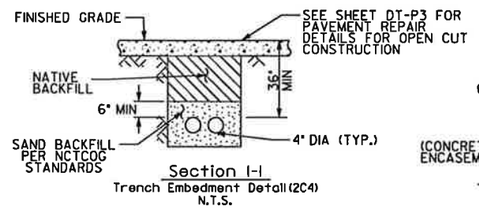
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

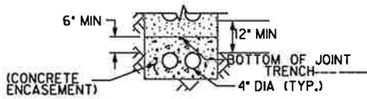
SINGLE PHASE TRANSFORMER PAD INSTALLATION DETAIL

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

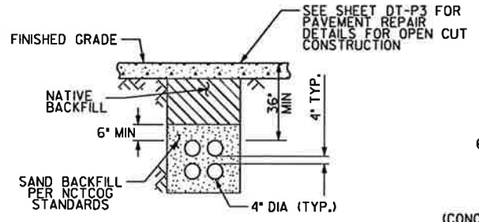
PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 ELEC 31d	ELE-31



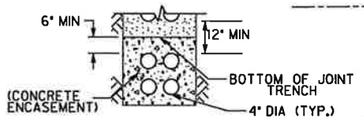
Section I-I
Trench Embedment Detail (2C4)
N.T.S.



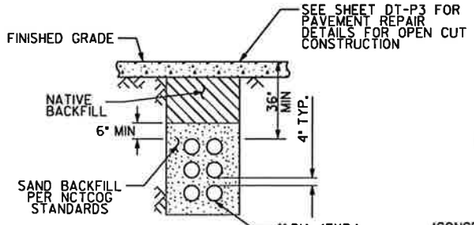
Continuation Section 2E4
Trench Embedment Detail
Continuation when 2E4 is Present
N.T.S.



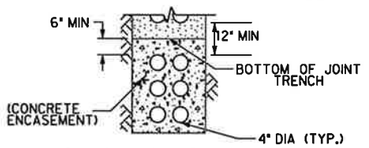
Section J-J
Trench Embedment Detail (4C4)
N.T.S.



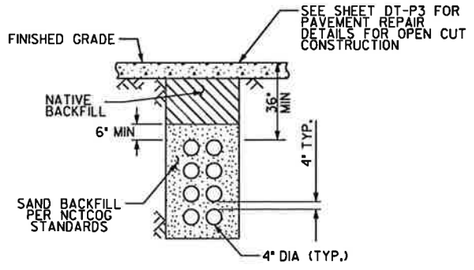
Continuation Section 4E4
Trench Embedment Detail
Continuation when 4E4 is Present
N.T.S.



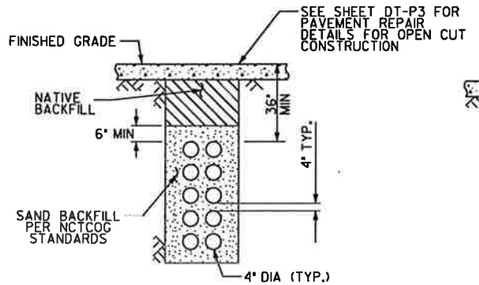
Section K-K
Trench Embedment Detail (6C4)
N.T.S.



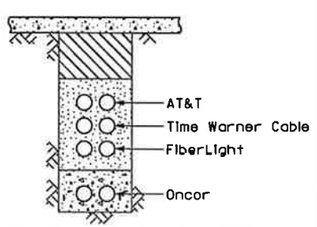
Continuation Section 6E4
Trench Embedment Detail
Continuation when 6E4 is Present
N.T.S.



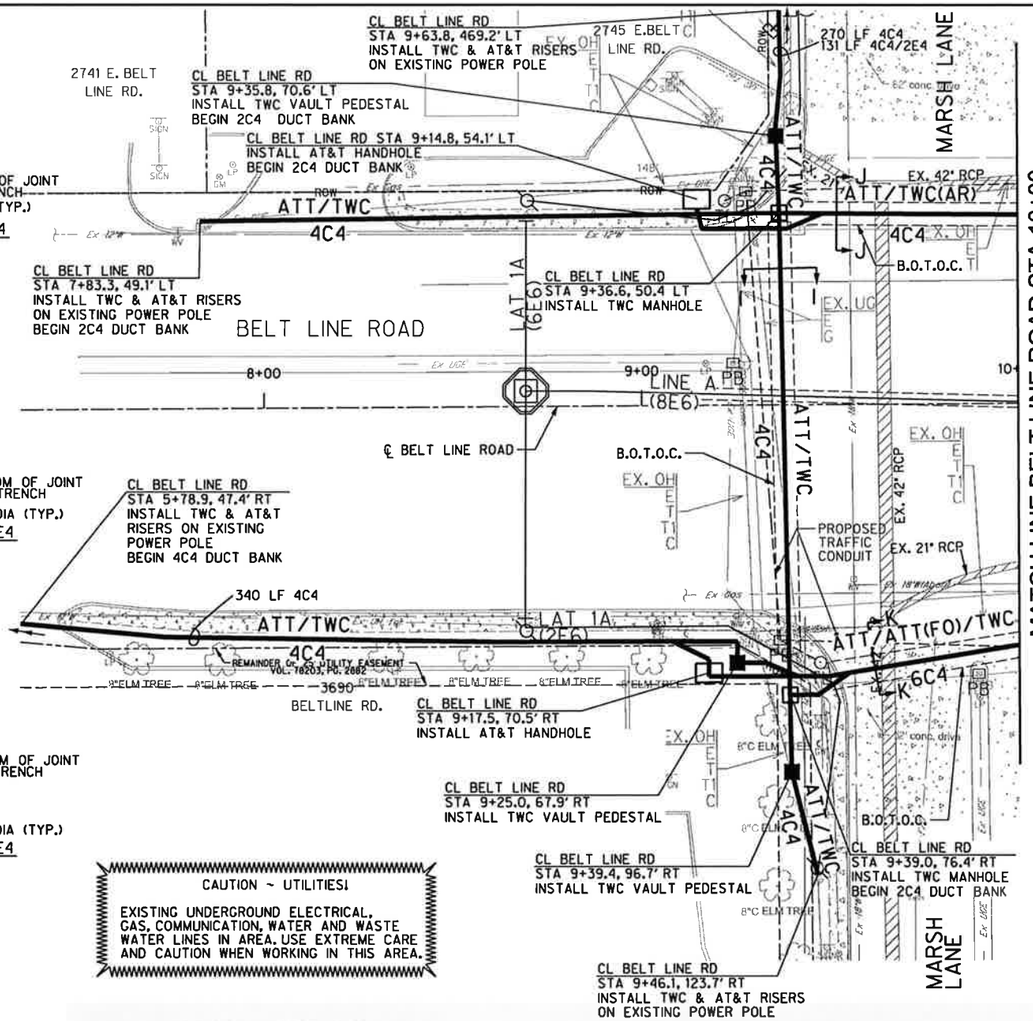
Section L-L
Trench Embedment Detail (8C4)
N.T.S.



Section M-M
Trench Embedment Detail (10C4)
N.T.S.



Typical Vertical Location By Utility
N.T.S.



MATCH LINE BELT LINE ROAD STA 10+00

N

0 10 20 30 40 60
SCALE IN FEET

EXISTING UTILITY LOCATIONS SHOWN ARE SCHEMATIC IN NATURE AND MAY NOT ACCURATELY REFLECT THE SIZE AND LOCATION OF EACH PARTICULAR UTILITY. SOME UTILITY LINES MAY NOT BE SHOWN. CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ACTUAL FIELD LOCATION AND PROTECTION OF ALL EXISTING UTILITIES WHETHER SHOWN OR NOT. CONTRACTOR SHALL ALSO ASSUME RESPONSIBILITY FOR REPAIRS TO EXISTING UTILITIES, WHETHER SHOWN OR NOT, DAMAGED BY CONTRACTOR'S ACTIVITIES. DIFFERENCES IN HORIZONTAL OR VERTICAL LOCATION OF EXISTING UTILITIES SHALL NOT BE A BASIS FOR ADDITIONAL COMPENSATION. CALL 1-800-344-8377 TWO WORKING DAYS PRIOR TO CONSTRUCTION FOR ONSITE LOCATIONS.

LEGEND

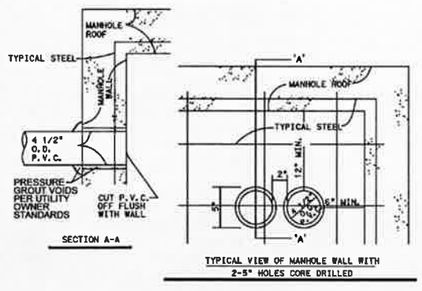
ONCOR	SEE ONCOR DUCT BANK PLAN SHEETS FOR ONCOR LOAD CABLES TO BE LOCATED IN JOINT TRENCH.
ATT	PROPOSED AT&T TELEPHONE LINE (2- 4" PVC)
ATT(FO)	PROPOSED AT&T FIBER OPTIC LINE (2- 4" PVC)
FL	PROPOSED FIBERLIGHT LINE (2- 4" PVC)
TWC	PROPOSED TIME WARNER CABLE LINE REQUIRED TO REPLACE EXISTING TIME WARNER CABLE (2-4" PVC)
TWC(AR)	ADDITIONAL REQUESTED PROPOSED TIME WARNER CABLE LINE (2-4" PVC)
□	PROPOSED TIME WARNER PULL BOX
■	PROPOSED TIME WARNER PEDESTAL/VAULT
□	PROPOSED AT&T HANDHOLE
□	PROPOSED FIBERLIGHT HANDHOLE
ATT/TWC/FL/ONCOR	PROPOSED AT&T, TIME WARNER CABLE ONCOR AND FIBERLIGHT LINE IN JOINT TRENCH
	BY OTHER THAN OPEN CUT
B.O.T.O.C.	

NOTE:
1. ALL LINES TO BE INSTALLED BY OPEN CUT UNLESS OTHERWISE NOTED.

CAUTION ~ UTILITIES!

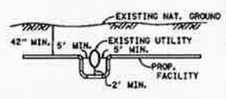
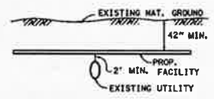
EXISTING UNDERGROUND ELECTRICAL, GAS, COMMUNICATION, WATER AND WASTE WATER LINES IN AREA. USE EXTREME CARE AND CAUTION WHEN WORKING IN THIS AREA.

TYPICAL CORE DRILL DETAIL

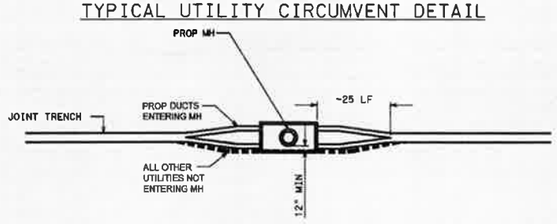


TYPICAL VIEW OF MANHOLE WALL WITH 2-5" HOLES CORE DRILLED

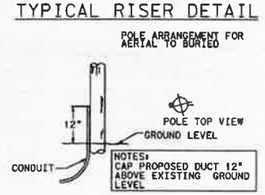
STANDARD REQUIREMENTS FOR UTILITY CROSSINGS

IF EXISTING UTILITY HAS LESS THAN 6' COVER	IF EXISTING UTILITY HAS MORE THAN 6' COVER
	
1. CONTRACTOR MUST FIELD VERIFY EXISTING UTILITY LOCATIONS AND DEPTHS PRIOR TO PERFORMING ANY EXCAVATION.	1. CONTRACTOR MUST FIELD VERIFY EXISTING UTILITY LOCATIONS AND DEPTHS PRIOR TO PERFORMING ANY EXCAVATION.

TYPICAL UTILITY CIRCUMVENT DETAIL



TYPICAL RISER DETAIL



WAITING ON DESIGN
AT&T
FIBERLIGHT
TIME WARNER

STATE OF TEXAS
CHARLIE BARTHELL MORAN III
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant ,P.E. 12-19-2013 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

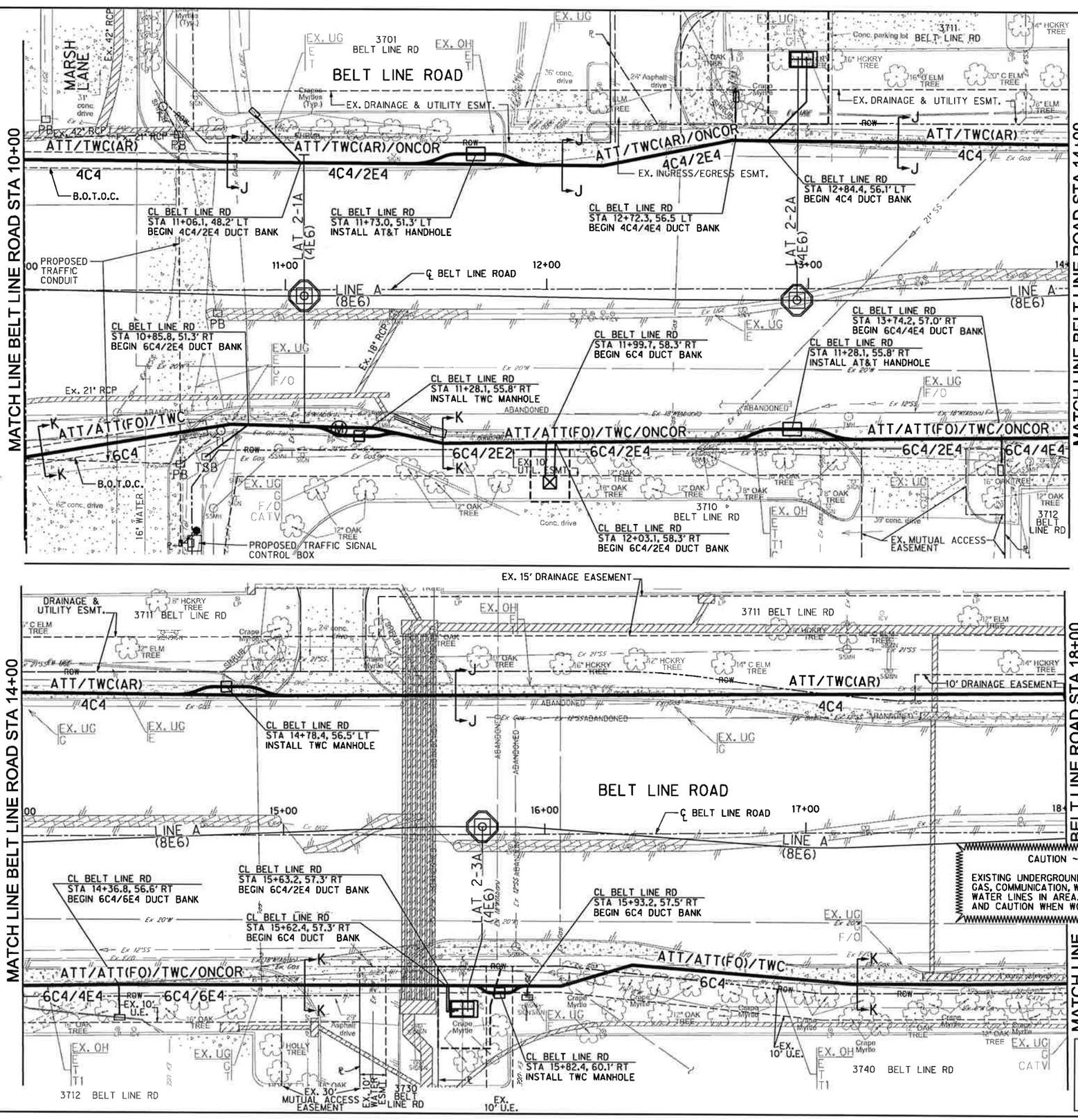
BELT LINE ROAD
UNDERGROUND ELECTRICAL

TELECOM RELOCATION PLAN
BELT LINE RD BEGIN TO STA 10+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 TEL 00	TEL-0

SHEET 106 OF 235



N

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LEGEND

ONCOR	SEE ONCOR DUCT BANK PLAN SHEETS FOR ONCOR LOAD CABLES TO BE LOCATED IN JOINT TRENCH.
ATT	PROPOSED AT&T TELEPHONE LINE (2- 4" PVC)
ATT(FO)	PROPOSED AT&T FIBER OPTIC LINE (2- 4" PVC)
FL	PROPOSED FIBERLIGHT LINE (2- 4" PVC)
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▭	PROPOSED AT&T HANDHOLE
▭	PROPOSED FIBERLIGHT HANDHOLE
ATT/TWC/FL/ONCOR	PROPOSED AT&T, TIME WARNER CABLE ONCOR AND FIBERLIGHT LINE IN JOINT TRENCH
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B.O.T.O.C.	

NOTE:
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CAUTION ~ UTILITIES!
EXISTING UNDERGROUND ELECTRICAL, GAS, COMMUNICATION, WATER AND WASTE WATER LINES IN AREA. USE EXTREME CARE AND CAUTION WHEN WORKING IN THIS AREA.

WAITING ON DESIGN
AT&T
FIBERLIGHT
TIME WARNER

STATE OF TEXAS
CHARLIE BARTHELL MORAN, III
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant, P.E. 11-8-2013
Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TELECOM RELOCATION PLAN
BELT LINE RD STA 10+00 TO STA 18+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 348-8200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 TEL 01	TEL-1

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OFFICE: RCH
PROJECT # 29350
FILE: 29350 TEL 01.dgn
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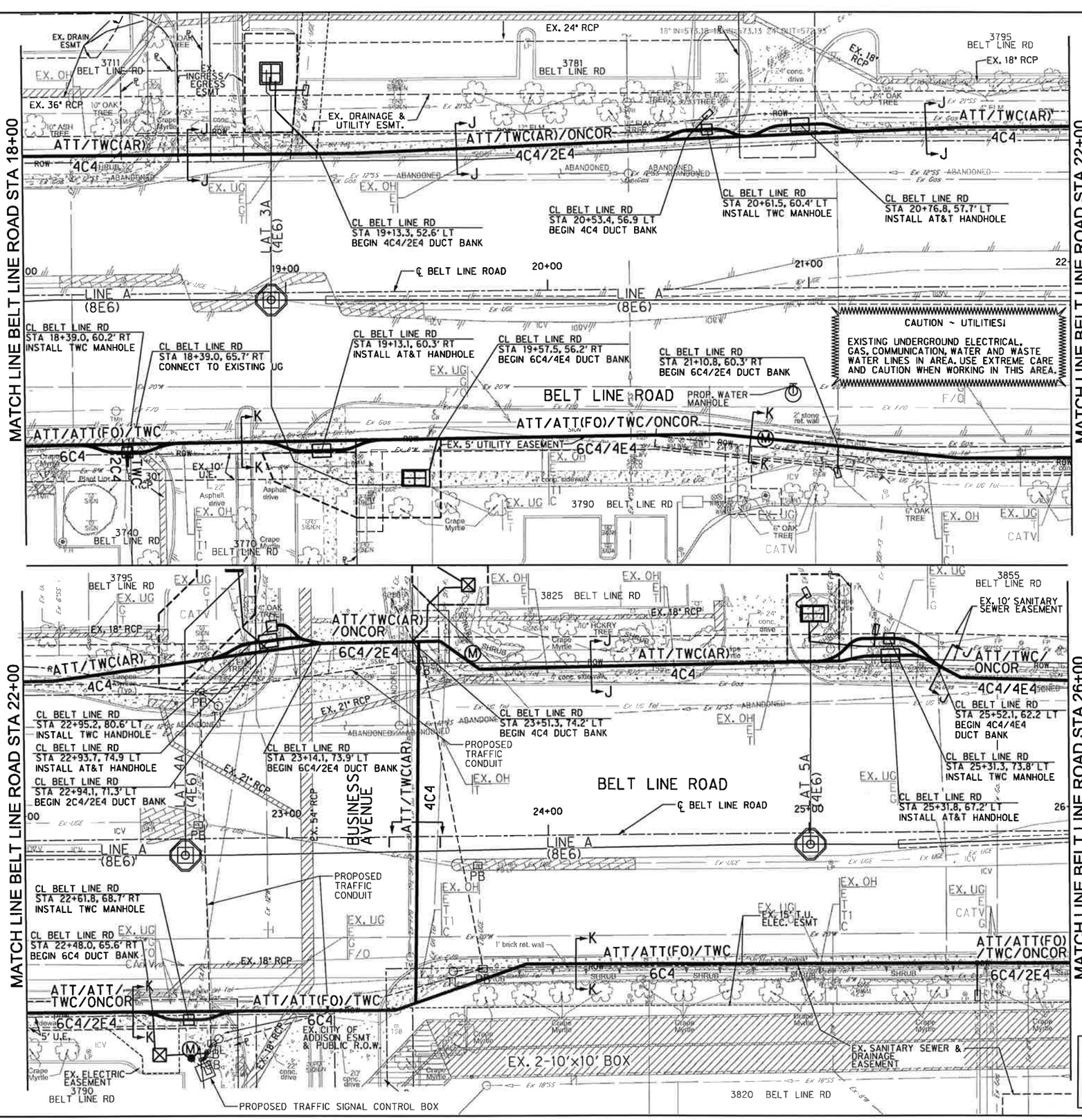
DATE: 11/8/2013



N

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LEGEND

ONCOR	SEE ONCOR DUCT BANK PLAN SHEETS FOR ONCOR LOAD CABLES TO BE LOCATED IN JOINT TRENCH.
ATT	PROPOSED AT&T TELEPHONE LINE (2- 4" PVC)
ATT(FO)	PROPOSED AT&T FIBER OPTIC LINE (2- 4" PVC)
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□	PROPOSED FIBERLIGHT HANDHOLE
ATT/TWC/FL/ONCOR	PROPOSED AT&T, TIME WARNER CABLE ONCOR AND FIBERLIGHT LINE IN JOINT TRENCH
═══	BY OTHER THAN OPEN CUT
═══ B.O.T.O.C.	B.O.T.O.C.

NOTE:
1. ALL LINES TO BE INSTALLED BY OPEN CUT UNLESS OTHERWISE NOTED.

WAITING ON DESIGN
AT&T
FIBERLIGHT
TIME WARNER

CHARLIE BARTHELL MORAN
101189
LICENSED
PROFESSIONAL ENGINEER

P.E. 12-19-2013
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

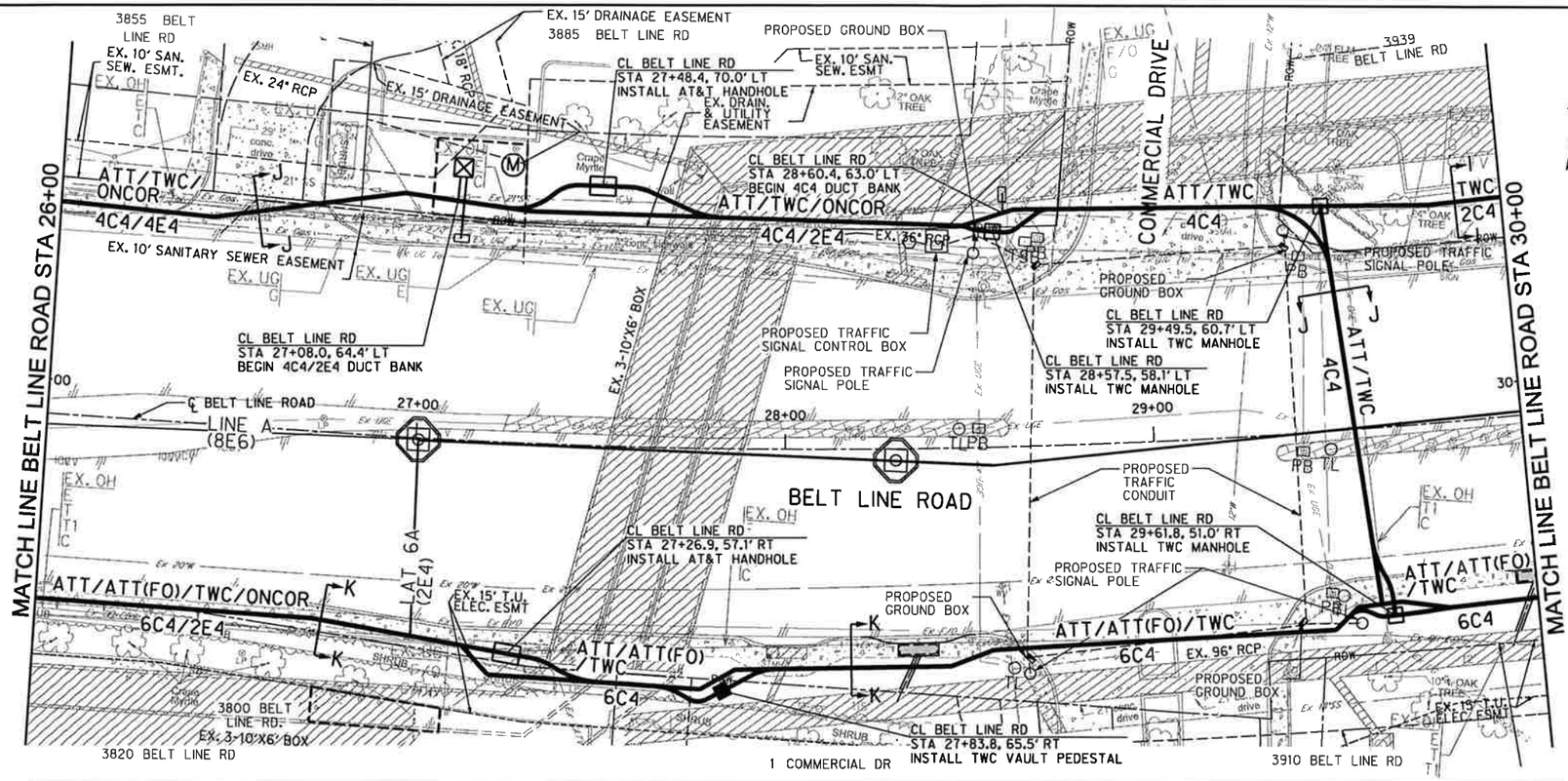
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

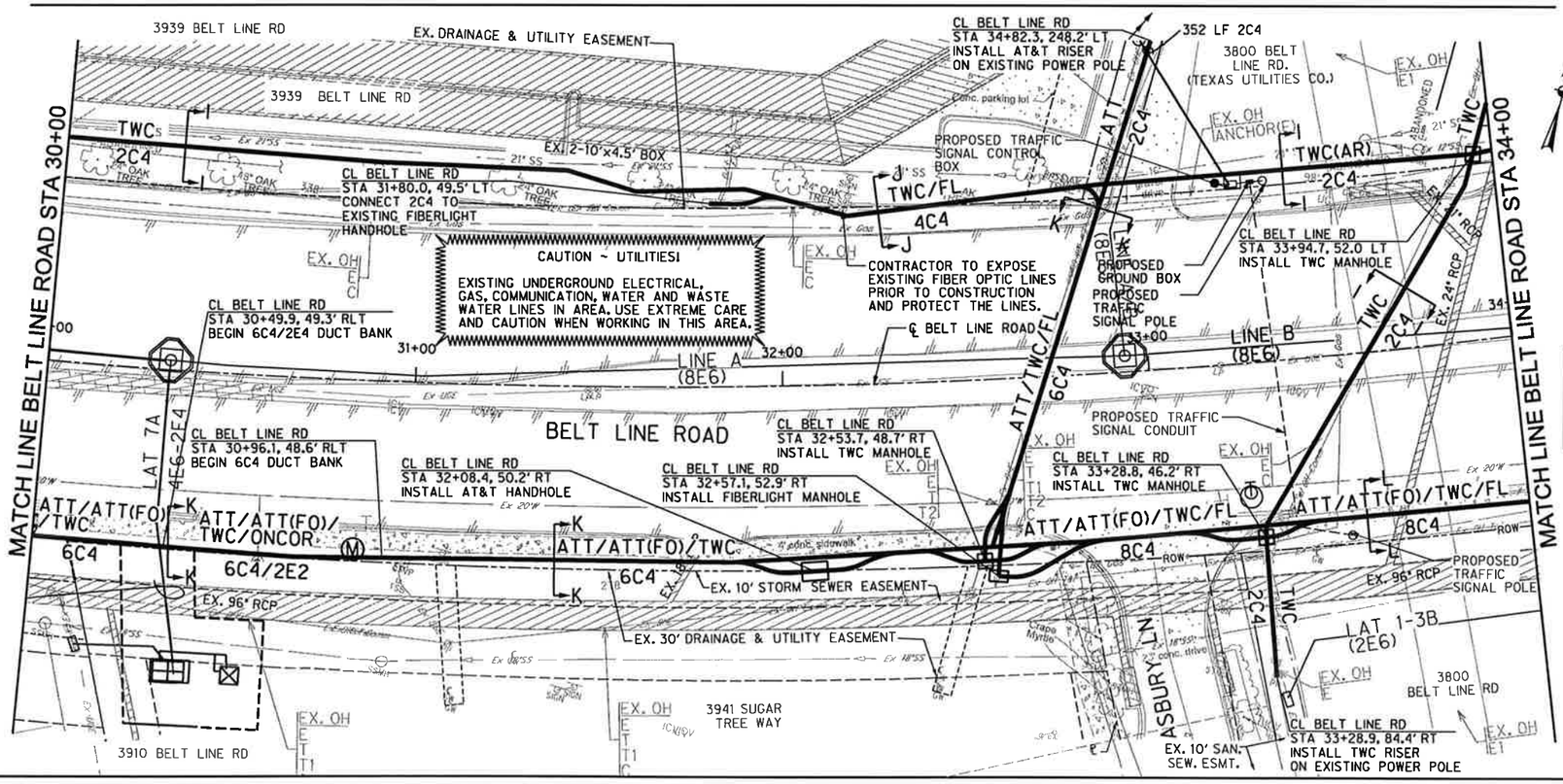
BELT LINE ROAD
UNDERGROUND ELECTRICAL

TELECOM RELOCATION PLAN
BELT LINE RD STA 18+00 TO STA 26+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 738-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 TEL 02	TEL-2





N

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LEGEND

ONCOR	SEE ONCOR DUCT BANK PLAN SHEETS FOR ONCOR LOAD CABLES TO BE LOCATED IN JOINT TRENCH.
ATT	PROPOSED AT&T TELEPHONE LINE (2- 4" PVC)
ATT(FO)	PROPOSED AT&T FIBER OPTIC LINE (2- 4" PVC)
FL	PROPOSED FIBERLIGHT LINE (2- 4" PVC)
TWC	PROPOSED TIME WARNER CABLE LINE REQUIRED TO REPLACE EXISTING TIME WARNER CABLE (2-4" PVC)
TWC(AR)	ADDITIONAL REQUESTED PROPOSED TIME WARNER CABLE LINE (2-4" PVC)
	PROPOSED TIME WARNER PULL BOX
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ATT/TWC/FL/ONCOR	PROPOSED AT&T, TIME WARNER CABLE ONCOR AND FIBERLIGHT LINE IN JOINT TRENCH
	BY OTHER THAN OPEN CUT
B.O.T.O.C.	

NOTE:
1. ALL LINES TO BE INSTALLED BY OPEN CUT UNLESS OTHERWISE NOTED.

WAITING ON DESIGN
AT&T
FIBERLIGHT
TIME WARNER

STATE OF TEXAS
CHARLIE BARTHELL MORAN III
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 12-19-2013 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TELECOM RELOCATION PLAN
BELT LINE RD STA 26+00 TO STA 34+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 738-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 TEL 03	TEL-3

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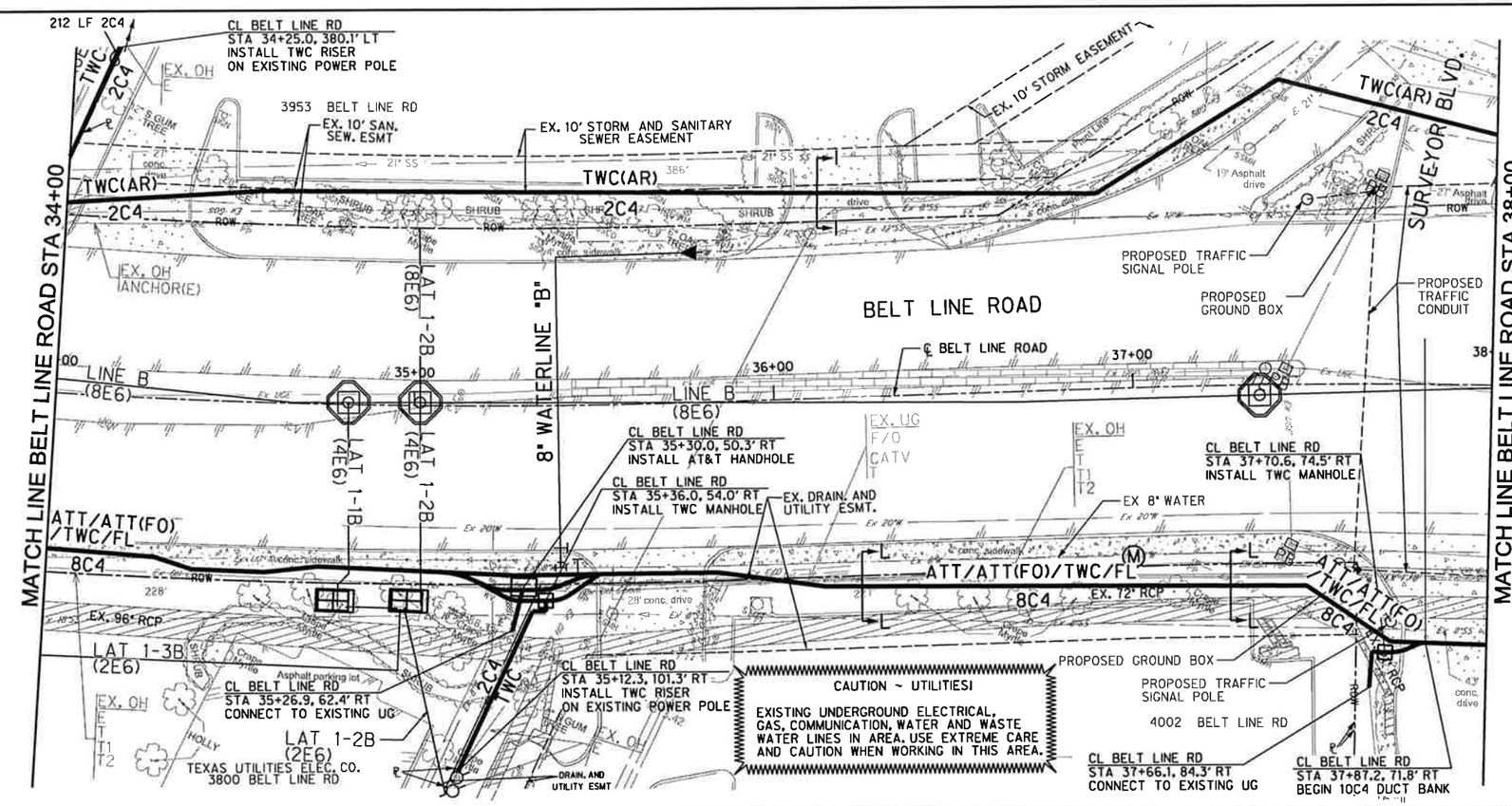
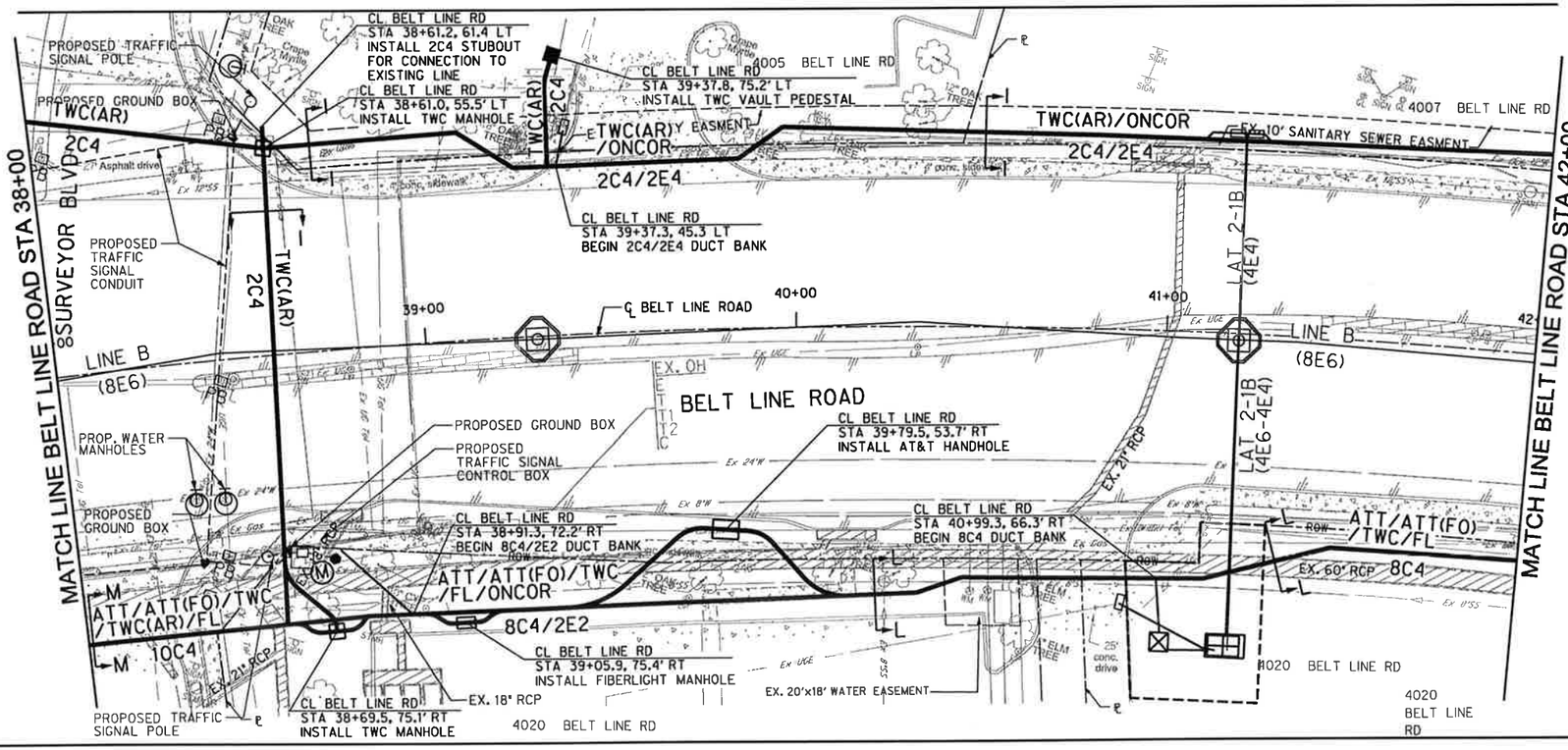
OFFICE: DAL
PROJECT # 29350
FILE: 29350 TEL 03.dgn
TIME: 11:22:14 AM
DATE: 12/19/2013





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LEGEND

ONCOR	SEE ONCOR DUCT BANK PLAN SHEETS FOR ONCOR LOAD CABLES TO BE LOCATED IN JOINT TRENCH.
ATT	PROPOSED AT&T TELEPHONE LINE (2- 4" PVC)
ATT(FO)	PROPOSED AT&T FIBER OPTIC LINE (2- 4" PVC)
FL	PROPOSED FIBERLIGHT LINE (2- 4" PVC)
TWC	PROPOSED TIME WARNER CABLE LINE REQUIRED TO REPLACE EXISTING TIME WARNER CABLE (2-4" PVC)
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□	PROPOSED AT&T HANDHOLE
□	PROPOSED FIBERLIGHT HANDHOLE
ATT/TWC/FL/ONCOR	PROPOSED AT&T, TIME WARNER CABLE ONCOR AND FIBERLIGHT LINE IN JOINT TRENCH
	BY OTHER THAN OPEN CUT
	B.O.T.O.C.

NOTE:
1. ALL LINES TO BE INSTALLED BY OPEN CUT UNLESS OTHERWISE NOTED.

STATE OF TEXAS
CHARLIE BARTHELL MORAN, III
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 12-19-2013 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison. TOWN OF ADDISON
DALLAS COUNTY, TEXAS

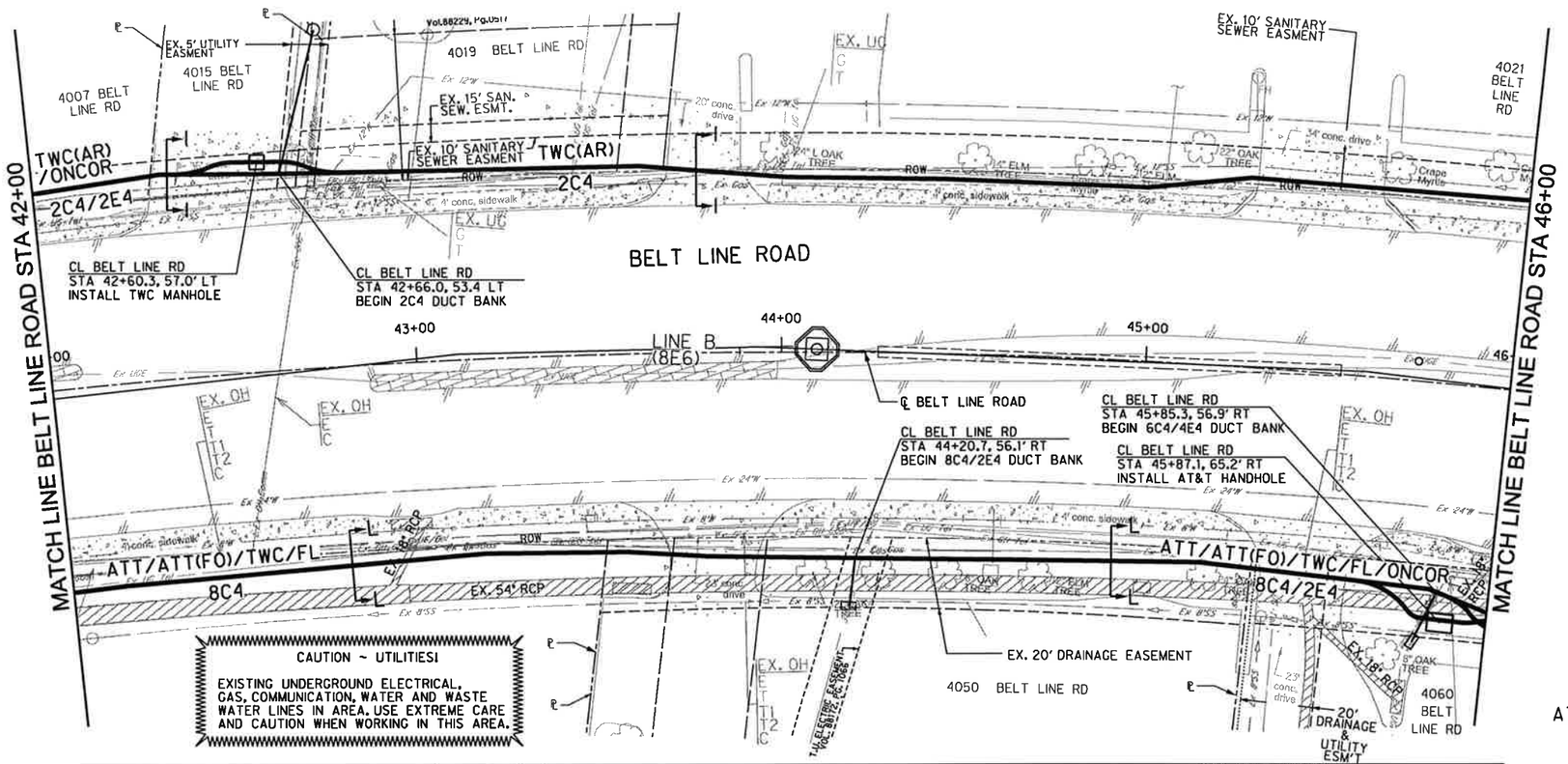
BELT LINE ROAD
UNDERGROUND ELECTRICAL

TELECOM RELOCATION PLAN
BELT LINE RD STA 34+00 TO STA 42+00

WAITING ON DESIGN
AT&T
FIBERLIGHT
TIME WARNER

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-8200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 TEL 04	TEL-4



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LEGEND

ONCOR	SEE ONCOR DUCT BANK PLAN SHEETS FOR ONCOR LOAD CABLES TO BE LOCATED IN JOINT TRENCH.
ATT	PROPOSED AT&T TELEPHONE LINE (2- 4" PVC)
ATT(FO)	PROPOSED AT&T FIBER OPTIC LINE (2- 4" PVC)
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ATT/TWC/FL/ONCOR	PROPOSED AT&T, TIME WARNER CABLE ONCOR AND FIBERLIGHT LINE IN JOINT TRENCH
	BY OTHER THAN OPEN CUT
	B.O.T.O.C.

N

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STATE OF TEXAS
CHARLIE BARTHELL MORAN III
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 12-19-2013 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

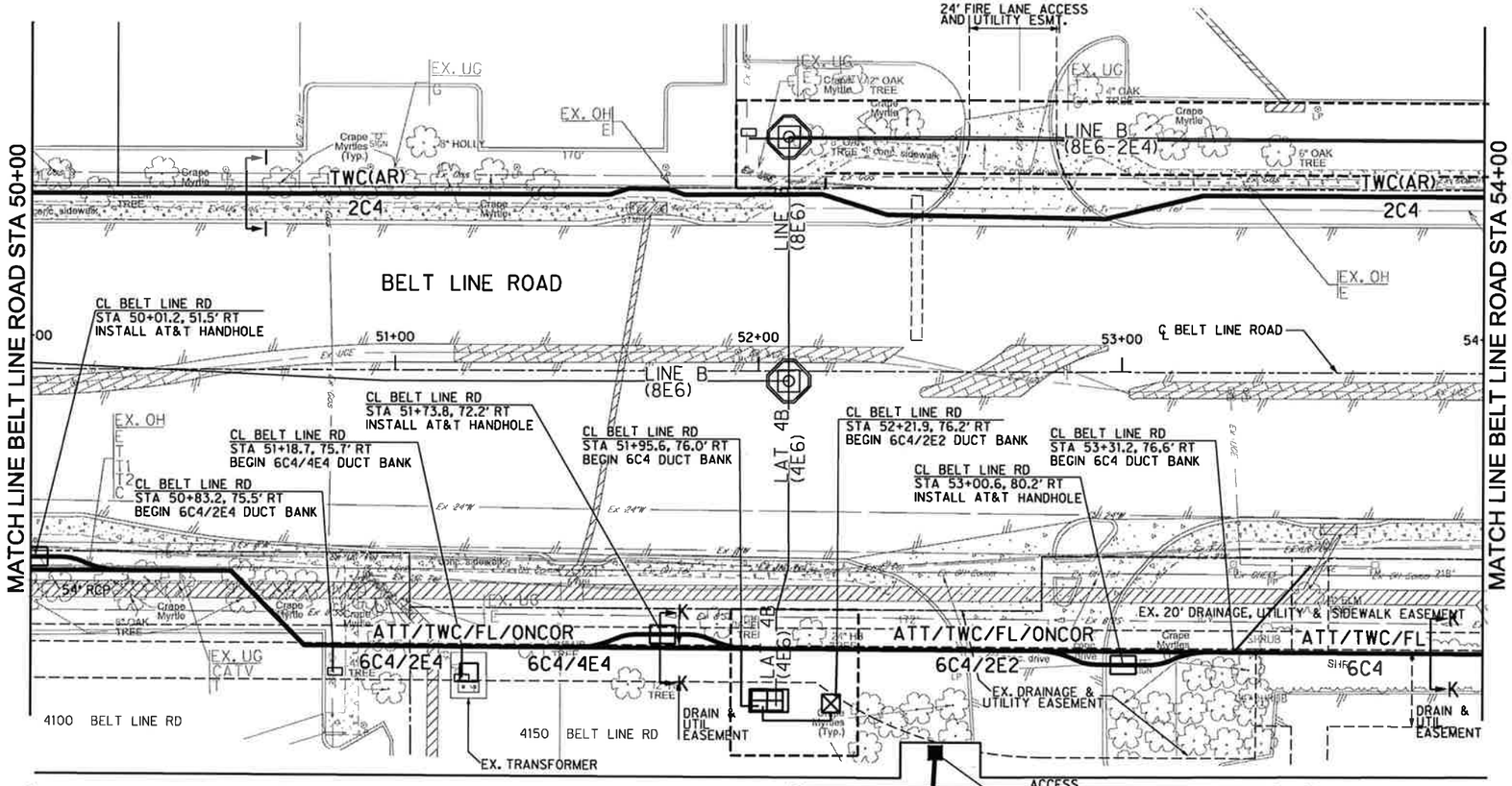
BELT LINE ROAD
UNDERGROUND ELECTRICAL

TELECOM RELOCATION PLAN
BELT LINE RD STA 42+00 TO STA 50+00

WAITING ON DESIGN
AT&T
FIBERLIGHT
TIME WARNER

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 TEL 05	TEL-5



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LEGEND

ONCOR	SEE ONCOR DUCT BANK PLAN SHEETS FOR ONCOR LOAD CABLES TO BE LOCATED IN JOINT TRENCH.
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NOTE:
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WAITING ON DESIGN
AT&T
FIBERLIGHT
TIME WARNER

STATE OF TEXAS
CHARLIE BARTHELL MORAN
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 11-8-2013 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

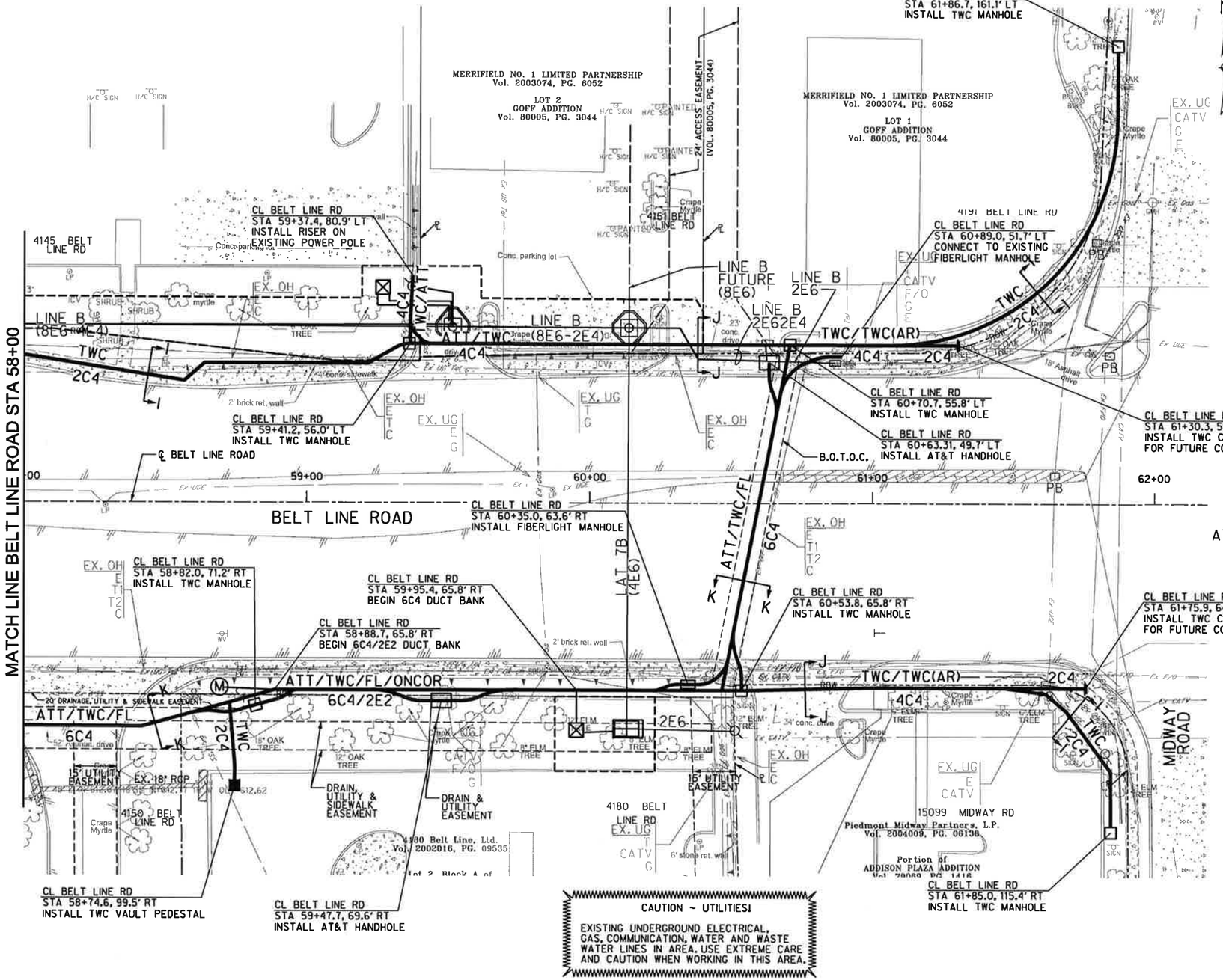
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TELECOM RELOCATION PLAN
BELT LINE RD STA 50+00 TO STA 58+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 TEL 06	TEL-6



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LEGEND

ONCOR	SEE ONCOR DUCT BANK PLAN SHEETS FOR ONCOR LOAD CABLES TO BE LOCATED IN JOINT TRENCH.
ATT	PROPOSED AT&T TELEPHONE LINE (2- 4" PVC)
ATT(FO)	PROPOSED AT&T FIBER OPTIC LINE (2- 4" PVC)
FL	PROPOSED FIBERLIGHT LINE (2- 4" PVC)
TWC	PROPOSED TIME WARNER CABLE LINE REQUIRED TO REPLACE EXISTING TIME WARNER CABLE (2-4" PVC)
TWC(AR)	ADDITIONAL REQUESTED PROPOSED TIME WARNER CABLE LINE (2-4" PVC)
□	PROPOSED TIME WARNER PULL BOX
■	PROPOSED TIME WARNER PEDESTAL/VAULT
▭	PROPOSED AT&T HANDHOLE
▭	PROPOSED FIBERLIGHT HANDHOLE
ATT/TWC/FL/ONCOR	PROPOSED AT&T, TIME WARNER CABLE ONCOR AND FIBERLIGHT LINE IN JOINT TRENCH
———	BY OTHER THAN OPEN CUT
	B.O.T.O.C.

NOTE:
1. ALL LINES TO BE INSTALLED BY OPEN CUT UNLESS OTHERWISE NOTED.

STATE OF TEXAS
CHARLIE BARTHELL MORAN III
101189
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant ,P.E. 11-8-2013 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

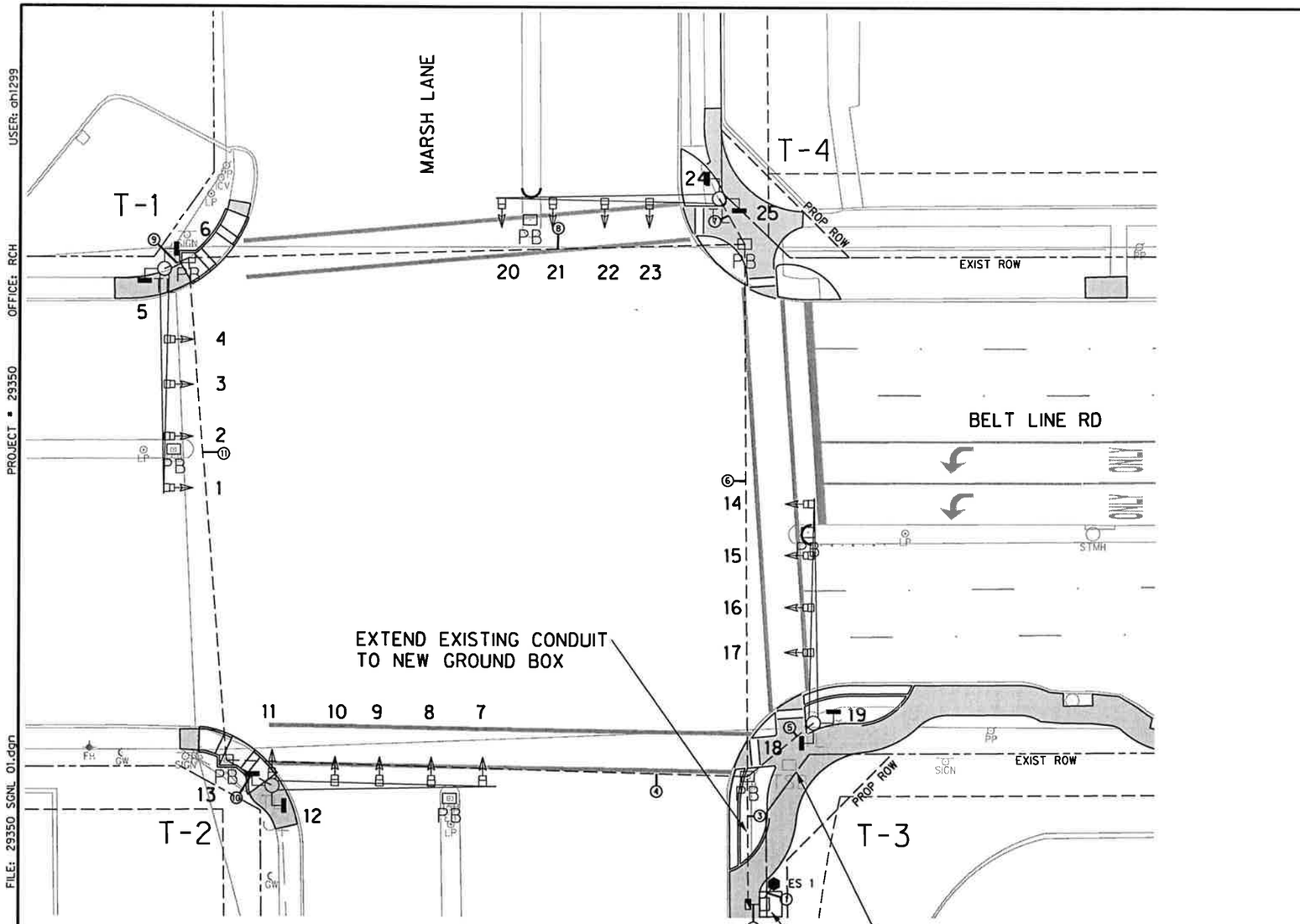
BELT LINE ROAD
UNDERGROUND ELECTRICAL

TELECOM RELOCATION PLAN
BELT LINE RD STA 58+00 TO STA 66+00

WAITING ON DESIGN
AT&T
FIBERLIGHT
TIME WARNER

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 TEL 07	TEL-7



0 15 30 45
SCALE IN FEET

N

LEGEND OF SYMBOLS	
	VIDEO DETECTION ZONES
	SIGNAL POLE/MAST ARM SET UP
2	SIGNAL HEAD NUMBERS
	CONTROLLER CABINET
	GROUND BOX TYPE D (LG)
	GROUND BOX TYPE E (SM)
	LUMINAIRE
*2	PHASE NUMBERS
T-2	POLE NUMBERS
(22)	CONDUIT RUN NUMBERS
R.O.W.	RIGHT OF WAY LINES
	VIVDS CAMERA
	ELECTRICAL SERVICE
	OPTICOM
	MAST ARM MOUNTED SIGN
	WIRELESS ETHERNET SUBSCRIBER

NOTES:

1) RELOCATE EXISTING SIGNAL CONTROLLER AND ELECTRICAL SERVICE AS SHOWN.
2) EXTEND EXISTING CONDUIT FROM EXISTING GROUND BOX ON SOUTHEAST CORNER OF INTERSECTION TO NEW GROUND BOX IN FRONT OF CABINET.
3) LOCATION OF CONDUIT IS APPROXIMATE BASED ON LOCATION OF EXISTING GROUND BOXES
4) EXISTING POLES, MAST ARMS, AND SIGNAL HEADS TO REMAIN. NEW CABLE TO EXISTING SIGNAL HEADS BE INSTALLED IN SIGNAL POLES AND MAST ARMS.
5) SPLICING OF SIGNAL CABLE, VIVDS CABLE, AND ELECTRICAL CABLE IS NOT PERMITTED. INSTALL NEW CABLE TO ALL EXISTING POLES AND EQUIPMENT.

ELECTRICAL SERVICE DATA

ELECTRICAL SERVICE DESCRIPTION SEE ED(4)	SERVICE CONDUIT SIZE (RMC)	SERVICE CONDUCTORS NO. / SIZE	MAIN CIRCUIT BREAKER POLE / AMP	TWO-POLE CONTACTOR AMPS	PANELBD / LOADCENTER AMP RATING (MIN)	CIRCUIT NO.	BRANCH CKT. BRK. POLE / AMPS	KVA LOAD
TY D (120/240) 70 (NS) SS (E) PS (U)	2"	3 / #6	2P / 100	30	100	T.S. ILSN	1P / 50 2P / 20	< 7.1

S.P. BOOTH 94903 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

S.P. Booth ,P.E. 1/24/2014
Signature of Registrant Date

NO.	REVISION	BY	DATE

Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

PROPOSED TRAFFIC SIGNAL LAYOUT
BELT LINE RD AT MARSH LANE

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 SGNL 01	TS-1

SHEET 114 OF 235

USER: dh1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 SGNL 01.dgn
TIME: 4:24:52 PM
DATE: 1/23/2014

CABLE TERMINATION CHART

CONDUCTOR COLOR	CABLE 1	CABLE 2	CABLE 3	CABLE 4
	20 CNDR	20 CNDR	20 CNDR	20 CNDR
	FROM CNTRL TO T-1 TERMINAL BLOCK	FROM CNTRL TO T-2 TERMINAL BLOCK	FROM CNTRL TO T-3 TERMINAL BLOCK	FROM CNTRL TO T-4 TERMINAL BLOCK
RED	SH 3, 4 Ø 2 R	SH 9, 10, 11 Ø 8 R	SH 16, 17 Ø 6 R	SH 22, 23 Ø 4 R
ORANGE	SH 3, 4 Ø 2 Y	SH 9, 10, 11 Ø 8 Y	SH 16, 17 Ø 6 Y	SH 22, 23 Ø 4 Y
GREEN	SH 3, 4 Ø 2 G	SH 9, 10, 11 Ø 8 G	SH 16, 17 Ø 6 G	SH 22, 23 Ø 4 G
RED/BLACK	SH 1, 2 Ø 5 R LT ARROW	SH 7, 8 Ø 3 R LT ARROW	SH 14, 15 Ø 1 R LT ARROW	SH 20, 21 Ø 7 R LT ARROW
ORANGE/BLACK	SPARE	SH 11 RT OL Ø 1 Y LT ARR	SPARE	SPARE
GREEN/BLACK	SPARE	SH 11 RT OL Ø 1 G LT ARR	SPARE	SPARE
WHITE/BLACK	SPARE	SPARE	SPARE	SPARE
BLUE/BLACK	Ø 2 PED CALL	Ø 6 PED CALL	Ø 6 PED CALL	Ø 2 PED CALL
BLUE/WHITE	SH 6 Ø 2 W	SH 12 Ø 6 W	SH 18 Ø 6 W	SH 24 Ø 2 W
BLACK/WHITE	SH 6 Ø 2 DW	SH 12 Ø 6 DW	SH 18 Ø 6 DW	SH 24 Ø 2 DW
BLACK	SH 1, 2 Ø5 Y LT ARROW	SH 7SH 7, 8	SH 14, 15 Ø1 Y LT ARROW	SH 20, 21 Ø7 Y LT ARROW
GREEN/WHITE	SH 5 Ø 8 W	SH 13 Ø 8 W	SH 19 Ø 4 W	SH 25 Ø 4 W
RED/WHITE	SH 5 Ø 8 DW	SH 13 Ø 8 DW	SH 19 Ø 4 DW	SH 25 Ø 4 DW
BLUE	SH 1, 2 Ø5 G LT ARROW	SH 7, 8 Ø8 G LT ARROW	SH 14, 15 Ø1 G LT ARROW	SH 20, 21 Ø7 G LT ARROW
WHITE	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON
BLACK/RED	Ø 8 PED CALL	Ø 8 PED CALL	Ø 4 PED CALL	Ø 4 PED CALL
WHITE/RED	SPARE	SPARE	SPARE	SPARE
ORANGE/RED	SPARE	SPARE	SPARE	SPARE
BLUE/RED	SPARE	SPARE	SPARE	SPARE
RED/GREEN	SPARE	SPARE	SPARE	SPARE

CONDUIT SUMMARY

RUN NO.	CONDUIT 2"	CONDUIT 3"	CONDUIT 4"	RUN LENGTH (FT)	INSTALL TYPE	ELECTRICAL CONDUCTORS XHHW #6	GROUND BARE #6	GROUND BARE #8	SIGNAL CABLES #14 AWG 20 CNDR TYP A	5 CNDR TYP A	7 CNDR TYP A	VIVDS CABLE	OPTICOM CABLE	ILSN CABLE 3/C #12
1	1			5	T	2	1							
2			2	5	T			2	4			4	4	4
3			3	7	T			3	4			4	4	4
4				125	EX			1	2			2	2	2
5				21	EX			1	1			1	1	1
6				125	EX			1	1			1	1	1
7				131	EX			1	1			1	1	1
8				77	EX			1						
9				7	EX			1	1			1	1	1
10				13	EX			1	1			1	1	1
11				120	EX			1	1			1	1	1
CABLE TOTALS						10	5	650	715	0	0	715	715	715

CONDUIT TOTALS			
	2" TRENCH	5	T = TRENCH B = BORE EX = EXISTING
	2" BORE	0	
	3" TRENCH	0	
	3" BORE	0	
	4" TRENCH	31	
	4" BORE	0	

SHEET 114A OF 235

STATE OF TEXAS
S.P. BOOTH
94903
LICENSED
PROFESSIONAL ENGINEER

S. P. Booth, P.E. 1/24/2014
Signature of Registrant Date

NO.	REVISION	BY	DATE

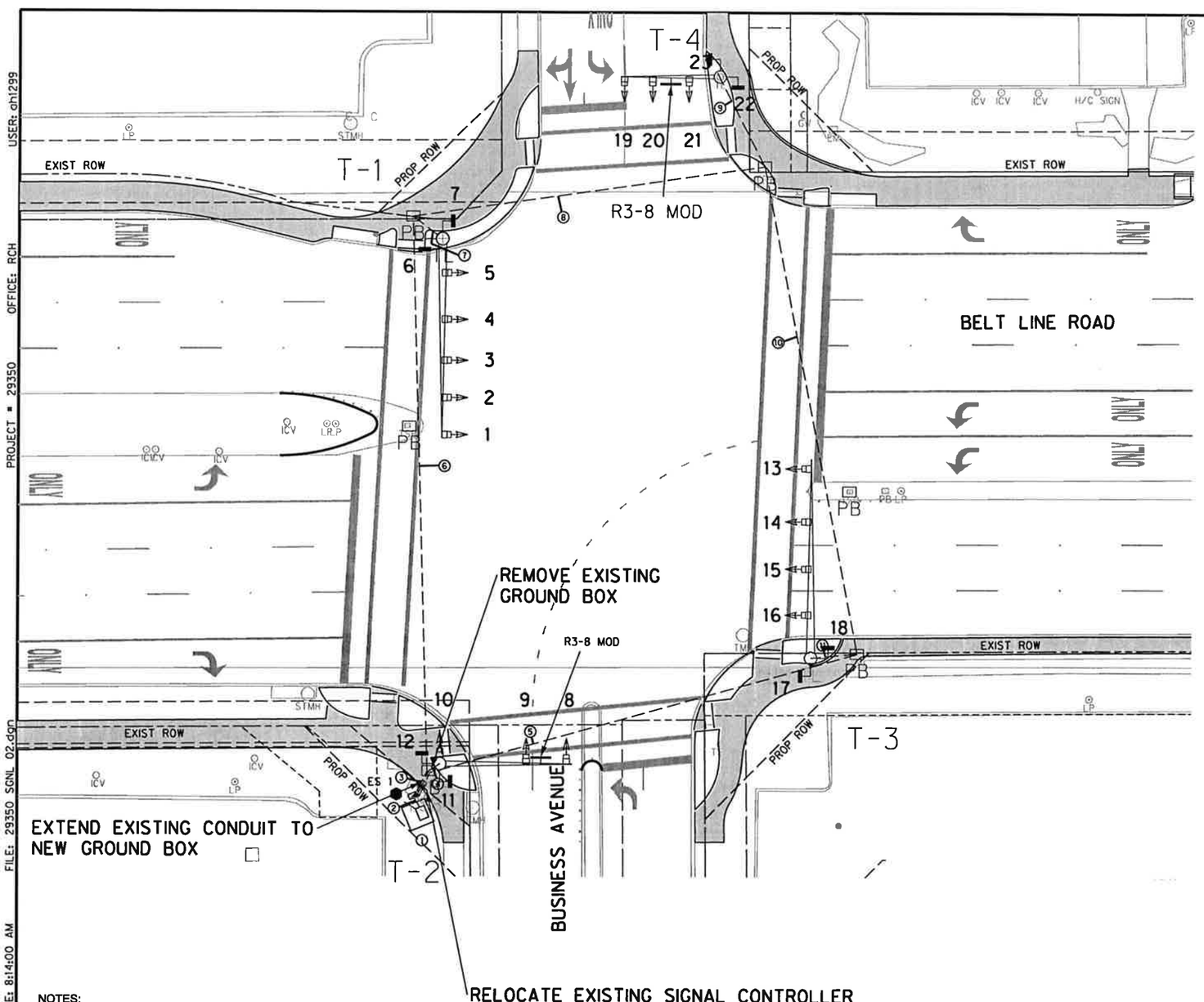
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

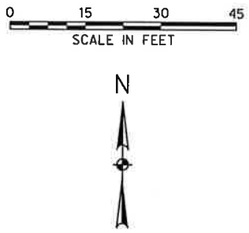
BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC SIGNAL DESIGN TABLES
BELT LINE RD AT MARSH LANE

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 738-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 SGNL 01A	TS-1A





R3-8 MOD
30" X 30"

0 15 30 45
SCALE IN FEET

N

LEGEND OF SYMBOLS	
	VIDEO DETECTION ZONES
	SIGNAL POLE/MAST ARM SET UP
2	SIGNAL HEAD NUMBERS
	CONTROLLER CABINET
	GROUND BOX TYPE D (LG)
	GROUND BOX TYPE E (SM)
	LUMINAIRE
Ø2	PHASE NUMBERS
T-2	POLE NUMBERS
22	CONDUIT RUN NUMBERS
R.O.W.	RIGHT OF WAY LINES
	VIVDS CAMERA
	ELECTRICAL SERVICE
	OPTICOM
	MAST ARM MOUNTED SIGN
	WIRELESS ETHERNET SUBSCRIBER

NOTES:

1) RELOCATE EXISTING SIGNAL CONTROLLER AND ELECTRICAL SERVICE AS SHOWN.
2) EXTEND EXISTING CONDUIT FROM EXISTING GROUND BOX ON SOUTHEAST CORNER OF INTERSECTION TO NEW GROUND BOX IN FRONT OF CABINET.
3) LOCATION OF CONDUIT IS APPROXIMATE BASED ON LOCATION OF EXISTING GROUND BOXES
4) EXISTING POLES, MAST ARMS, AND SIGNAL HEADS TO REMAIN. NEW CABLE TO EXISTING SIGNAL HEADS BE INSTALLED IN SIGNAL POLES AND MAST ARMS.
5) SPLICING OF SIGNAL CABLE, VIVDS CABLE, AND ELECTRICAL CABLE IS NOT PERMITTED. INSTALL NEW CABLE TO ALL EXISTING POLES AND EQUIPMENT.

NOTES:

1) RELOCATE EXISTING SIGNAL CONTROLLER AS SHOWN.
2) EXTEND EXISTING CONDUIT FROM EXISTING GROUND BOX (TO BE REMOVED) ON SOUTHWEST CORNER OF INTERSECTION TO NEW GROUND BOX ADJACENT TO CABINET.
3) EXISTING POLES, MAST ARMS, AND SIGNAL HEADS TO REMAIN. NEW CABLE TO EXISTING SIGNAL HEADS BE INSTALLED IN SIGNAL POLES AND MAST ARMS.
4) SPLICING OF SIGNAL CABLE, VIVDS CABLE, AND ELECTRICAL CABLE IS NOT PERMITTED. INSTALL NEW CABLE TO ALL EXISTING POLES AND EQUIPMENT.

ELECTRICAL SERVICE DATA

ELECTRICAL SERVICE DESCRIPTION SEE ED(4)	SERVICE CONDUIT SIZE (RMC)	SERVICE CONDUCTORS NO. / SIZE	MAIN CIRCUIT BREAKER POLE / AMP	TWO-POLE CONTACTOR AMPS	PANELBD./ LOADCENTER AMP RATING (MIN)	CIRCUIT NO.	BRANCH CKT. BRK. POLE / AMPS	KVA LOAD
TY D (120/240) 70 (NS) SS (E) PS (U)	2"	3 / #6	2P / 100	30	100	T.S. ILSN	1P / 50 2P / 20	< 7.1

STATE OF TEXAS
S.P. BOOTH
94903
LICENSED
PROFESSIONAL ENGINEER

S. P. Booth, P.E. 1/24/2014
Signature of Registrant Date

NO.	REVISION	BY	DATE

Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

PROPOSED TRAFFIC SIGNAL LAYOUT
BELT LINE RD AT BUSINESS AVENUE

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 SGNL 02	TS-2

USER: oh1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 SGNL 02.dgn
TIME: 8:14:00 AM
DATE: 1/29/2014

CABLE TERMINATION CHART

CONDUCTOR COLOR	CABLE 1	CABLE 2	CABLE 3	CABLE 4
	20 CNDR	20 CNDR	20 CNDR	20 CNDR
	FROM CNTRL TO T-1 TERMINAL BLOCK	FROM CNTRL TO T-2 TERMINAL BLOCK	FROM CNTRL TO T-3 TERMINAL BLOCK	FROM CNTRL TO T-4 TERMINAL BLOCK
RED	SH 3, 4, 5 Ø 2 R	SH 8, 9, 10 Ø 8 R	SH 13, 14, 15, 16 Ø 6 R	SH 19, 20, 21 Ø 4 R
ORANGE	SH 3, 4, 5 Ø 2 Y	SH 8, 9, 10 Ø 8 Y	SH 13, 14, 15, 16 Ø 6 Y	SH 19, 20, 21 Ø 4 Y
GREEN	SH 3, 4, 5 Ø 2 G	SH 8, 9, 10 Ø 8 G	SH 13, 14, 15, 16 Ø 6 G	SH 19, 20, 21 Ø 4 G
RED/BLACK	SH 1, 2 Ø 5 R LT ARROW	SPARE	SPARE	SPARE
ORANGE/BLACK	SPARE	SPARE	SPARE	SPARE
GREEN/BLACK	SPARE	SPARE	SPARE	SPARE
WHITE/BLACK	SPARE	SPARE	SPARE	SPARE
BLUE/BLACK	Ø 2 PED CALL	Ø 6 PED CALL	Ø 6 PED CALL	Ø 2 PED CALL
BLUE/WHITE	SH 7 Ø 2 W	SH 11 Ø 6 W	SH 17 Ø 6 W	SH 23 Ø 2 W
BLACK/WHITE	SH 7 Ø 2 DW	SH 11 Ø 6 DW	SH 17 Ø 6 DW	SH 23 Ø 2 DW
BLACK	SH 1, 2 Ø5 Y LT ARROW	SH 8 Ø3 Y LT ARROW	SH 13 Ø1 Y LT ARROW	SH 19 Ø7 Y LT ARROW
GREEN/WHITE	SH 6 Ø 8 W	SH 12 Ø 8 W	SH 18 Ø 4 W	SH 22 Ø 4 W
RED/WHITE	SH 6 Ø 8 DW	SH 12 Ø 8 DW	SH 18 Ø 4 DW	SH 22 Ø 4 DW
BLUE	SH 1, 2 Ø5 G LT ARROW	SH 8 Ø8 G LT ARROW	SH 13 Ø1 G LT ARROW	SH 19 Ø7 G LT ARROW
WHITE	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON
BLACK/RED	Ø 8 PED CALL	Ø 8 PED CALL	Ø 4 PED CALL	Ø 4 PED CALL
WHITE/RED	SPARE	SPARE	SPARE	SPARE
ORANGE/RED	SPARE	SPARE	SPARE	SPARE
BLUE/RED	SPARE	SPARE	SPARE	SPARE
RED/GREEN	SPARE	SPARE	SPARE	SPARE

CONDUIT SUMMARY

RUN NO.	CONDUIT 2"	CONDUIT 3"	CONDUIT 4"	RUN LENGTH (FT)	INSTALL TYPE	ELECTRICAL CONDUCTORS XHHW #6	GROUND BARE #6	GROUND BARE #8	SIGNAL CABLES #14 AWG 20 CNDR TYP A	SIGNAL CABLES #14 AWG 5 CNDR TYP A	SIGNAL CABLES #14 AWG 7 CNDR TYP A	VIVDS CABLE	OPTICOM CABLE	ILSN CABLE 3/C #12
1	1			5	T	2	1							
2			2	5	T			2	4			4	4	4
3			3	7	T			2	4			4	4	4
4				5	EX			2	1			1	1	1
5				110	EX			1	2			2	2	2
6				135	EX			1	1			1	1	1
7				10	EX			2	1			1	1	1
8				85	EX			1						
9				26	EX			2	1			1	1	1
10				120	EX			1	1			1	1	1
11				12	EX			2	1			1	1	1
CABLE TOTALS						10	5	580	576	0	0	576	576	576

CONDUIT TOTALS			
	2" TRENCH	5	T = TRENCH B = BORE
	2" BORE	0	
	3" TRENCH	0	
	3" BORE	0	
	4" TRENCH	31	
	4" BORE	0	

STATE OF TEXAS
S.P. BOOTH
94903
LICENSED PROFESSIONAL ENGINEER

S.P. Booth, P.E. 11/24/2014
Signature of Registrant Date

NO.	REVISION	BY	DATE

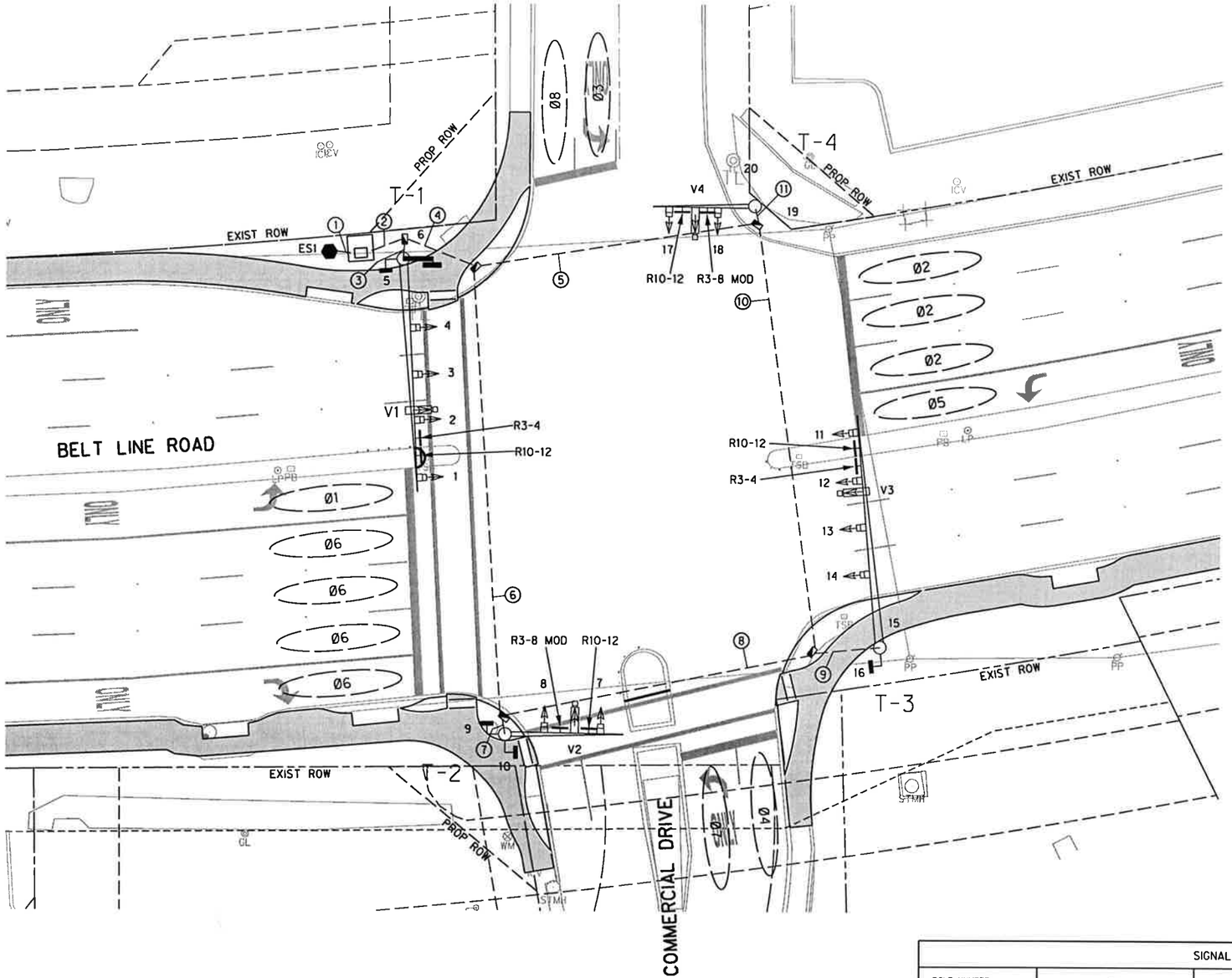
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC SIGNAL DESIGN TABLES
BELT LINE RD AT BUSINESS AVENUE

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 SGNL 02A	TS-2A



0 15 30 45
SCALE IN FEET

N

LEGEND OF SYMBOLS	
	VIDEO DETECTION ZONES
	SIGNAL POLE/MAST ARM SET UP
2	SIGNAL HEAD NUMBERS
	CONTROLLER CABINET
	GROUND BOX TYPE D (LG)
	GROUND BOX TYPE E (SM)
	LUMINAIRE
Ø2	PHASE NUMBERS
T-2	POLE NUMBERS
(22)	CONDUIT RUN NUMBERS
R.O.W.	RIGHT OF WAY LINES
	VIVDS CAMERA
	ELECTRICAL SERVICE
	OPTICOM
	MAST ARM MOUNTED SIGN
	WIRELESS ETHERNET SUBSCRIBER

R3-8 MOD
30" X 30"

R3-4
24" X 24"

R10-12
24" X 30"

SIGNAL HEAD TYPES

A

B

C

V3 PED

V4LT* (WITH COUNTDOWN)

*WITH BI-MODAL YELLOW AND GREEN ARROWS.

ELECTRICAL SERVICE DATA

ELECTRICAL SERVICE DESCRIPTION SEE ED(4)	SERVICE CONDUIT SIZE (RMC)	SERVICE CONDUCTORS NO. / SIZE	MAIN CIRCUIT BREAKER POLE / AMP	TWO-POLE CONTACTOR AMPS	PANELBD / LOADCENTER AMP RATING (MIN)	CIRCUIT NO.	BRANCH CKT. BRK. POLE / AMPS	KVA LOAD
TY D (120/240) 70 (NS) SS (E) PS (U)	2"	3 / #6	2P / 100	30	100	T.S. ILSN	1P / 50 2P / 20	< 7.1

NOTES:

1) SALVAGE EXISTING SIGNAL EQUIPMENT. RETURN TO TOWN OF ADDISON.
2) ALL POLES AND MAST ARMS TO BE POWDER COAT SILVER TO MATCH BELT LINE STREET LIGHTS.
3) ALL MAST ARM MOUNTED SIGNS SHALL HAVE HIGH INTENSITY PRISMATIC (HIP) SHEETING.
4) RELOCATE EXISTING STREET NAME SIGNS TO NEW POLES/MAST ARMS.
5) FURNISH AND INSTALL A 10' POLE EXTENSION ON T-1 SIGNAL ARM. CONTRACTOR TO INSTALL TOWN SUPPLIED WIRELESS ETHERNET SUBSCRIBER ON THE POLE EXTENSION. CONTRACTOR SHALL AIM THE ETHERNET SUBSCRIBER UNIT AS DIRECTED BY THE TOWN ENGINEER. WIRELESS RADIO TO BE MOUNTED BY OPTICOM HEAD ON T-1.
6) CONTRACTOR SHALL FURNISH AND INSTALL THE VIDEO SERVER AND HARDENED ETHERNET SWITCH INSIDE THE TRAFFIC SIGNAL CONTROLLER CABINET.
7) THE VIDEO SERVER SHALL BE INSTALLED BETWEEN THE VIVDS PROCESSOR AND HARDENED ETHERNET SWITCH (POLE T-1).
8) REMOVE ALL EXISTING FIELD WIRING AFTER NEW SIGNALS ARE PUT INTO SERVICE.
9) ALL EXISTING PULL BOXES TO TO BE REMOVED AND ABANDONED CONDUIT TO BE CUT AND CAPPED. SALVAGED PULL BOXES TO BE RETURNED TO TOWN OF ADDISON.

SIGNAL POLE CHART

POLE NUMBER	T-1						T-2				T-3						T-4			
MAST ARM LENGTH	55'						28'				55'						24'			
FOUNDATION TYPE	48-A						30-A				48-A						30-A			
WITH LUMINAIRES	NO						NO				NO						NO			
MAST ARM SIGNS	R3-4, R10-12						R10-12				R3-4, R10-12						R10-12			
SIZE OF LENS	12"																			
SIGNAL TYPE	B	A	A	A	C	C	B	A	C	C	B	A	A	A	C	C	B	A	C	C
SIGNAL FACE NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
LED SIGNAL INDICATIONS	R	R	R	R	DW	DW	R	R	DW	DW	R	R	R	R	DW	DW	R	R	DW	DW
	Y	Y	Y	Y	W	W	Y	Y	W	W	Y	Y	Y	Y	W	W	Y	Y	W	W
	G	G	G	G			G	G			G	G	G	G			G	G		
	~~GY~~						~~GY~~				~~GY~~						~~GY~~			

ALL SIGNAL HEADS SHALL HAVE BLACK PLASTIC BACK PLATES.
LEFT-TURN INDICATIONS WILL CONSIST OF 4 SECTION HEADS WITH BI-MODAL YELLOW AND GREEN ARROWS.
ALL MAST ARMS WILL HAVE LED ILLUMINATED STREET NAME SIGNS.

STATE OF TEXAS
S.P. BOOTH
94903
LICENSED
PROFESSIONAL ENGINEER

S. P. Booth P.E. 1/24/2014
Signature of Registrant Date

NO.	REVISION	BY	DATE

Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

PROPOSED TRAFFIC SIGNAL LAYOUT
BELT LINE RD AT COMMERCIAL DR

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 SGNL 03	TS-3

SHEET 116 OF 235

USER: ah1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 SGNL 03.dgn
TIME: 4:25:39 PM
DATE: 1/23/2014

CABLE TERMINATION CHART

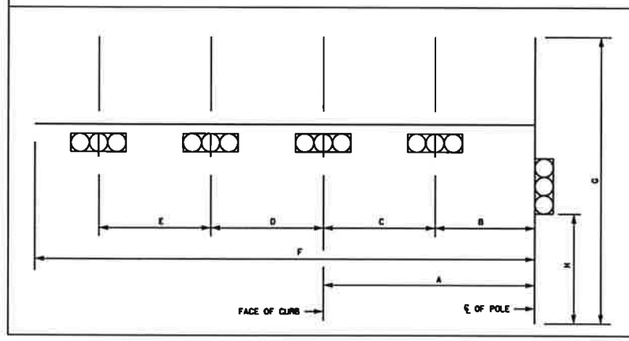
CONDUCTOR COLOR	CABLE 1	CABLE 2	CABLE 3	CABLE 4
	20 CNDR	10 CNDR	20 CNDR	20 CNDR
	FROM CNTRL TO T-1 TERMINAL BLOCK	FROM CNTRL TO T-2 TERMINAL BLOCK	FROM CNTRL TO T-3 TERMINAL BLOCK	FROM CNTRL TO T-4 TERMINAL BLOCK
RED	SH 1, 2, 3, 4 Ø 2 R	SH 7, 8 Ø 8 R	SH 11, 12, 13, 14 Ø 6 R	SH 17, 18 Ø 4 R
ORANGE	SH 1, 2, 3, 4 Ø 2 Y	SH 7, 8 Ø 8 Y	SH 11, 12, 13, 14 Ø 6 Y	SH 17, 18 Ø 4 Y
GREEN	SH 1, 2, 3, 4 Ø 2 G	SH 7, 8 Ø 8 G	SH 11, 12, 13, 14 Ø 6 G	SH 17, 18 Ø 4 G
RED/BLACK	SPARE	SPARE	SPARE	SPARE
ORANGE/BLACK	SPARE	SPARE	SPARE	SPARE
GREEN/BLACK	SPARE	SPARE	SPARE	SPARE
WHITE/BLACK	SPARE	SPARE	SPARE	SPARE
BLUE/BLACK	Ø 2 PED CALL	Ø 6 PED CALL	Ø 6 PED CALL	Ø 2 PED CALL
BLUE/WHITE	SH 6 Ø 2 W	SH 10 Ø 6 W	SH 16 Ø 6 W	SH 20 Ø 2 W
BLACK/WHITE	SH 6 Ø 2 DW	SH 10 Ø 6 DW	SH 16 Ø 6 DW	SH 20 Ø 2 DW
BLACK	SH 1 Ø5 Y LT ARROW	SH 7 Ø3 Y LT ARROW	SH 11 Ø1 Y LT ARROW	SH 17 Ø7 Y LT ARROW
GREEN/WHITE	SH 5 Ø 8 W	SH 9 Ø 8 W	SH 15 Ø 4 W	SH 19 Ø 4 W
RED/WHITE	SH 5 Ø 8 DW	SH 9 Ø 8 DW	SH 15 Ø 4 DW	SH 19 Ø 4 DW
BLUE	SH 1 Ø5 G LT ARROW	SH 7 Ø8 G LT ARROW	SH 11 Ø1 G LT ARROW	SH 17 Ø7 G LT ARROW
WHITE	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON
BLACK/RED	Ø 8 PED CALL	Ø 8 PED CALL	Ø 4 PED CALL	Ø 4 PED CALL
WHITE/RED	SPARE	SPARE	SPARE	SPARE
ORANGE/RED	SPARE	SPARE	SPARE	SPARE
BLUE/RED	SPARE	SPARE	SPARE	SPARE
RED/GREEN	SPARE	SPARE	SPARE	SPARE

CONDUIT SUMMARY

RUN NO.	CONDUIT 2"	CONDUIT 3"	CONDUIT 4"	RUN LENGTH (FT)	INSTALL TYPE	ELECTRICAL CONDUCTORS XHHW #6	GROUND BARE #6	GROUND BARE #8	SIGNAL CABLES #14 AWG 20 CNDR TYP A	5 CNDR TYP A	7 CNDR TYP A	VIVDS CABLE	OPTICOM CABLE	ILSN CABLE 3/C #12
1	1			7	T	2	1							
2			2	7	T			2	4			4	4	4
3	1	1		7	T			2	1			1	1	1
4			2	19	T			2	3			3	3	3
5			1	70	B			1	2			2	2	2
6			1	107	B			1	1			1	1	1
7	1	1		7	T			2	1			1	1	1
8			1	77	B			1						
9	1	1		15	T			2	1			1	1	1
10			1	100	B			1	1			1	1	1
11	1	1		7	T			2	1			1	1	1
CABLE TOTALS						14	7	478	468	0	0	468	468	468

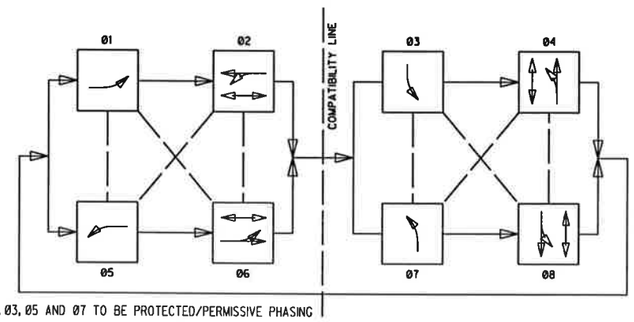
CONDUIT TOTALS			
	2" TRENCH	43	T = TRENCH B = BORE
	2" BORE	0	
	3" TRENCH	36	
	3" BORE	0	
	4" TRENCH	52	
	4" BORE	354	

SIGNAL HEAD AND POLE PLACEMENT



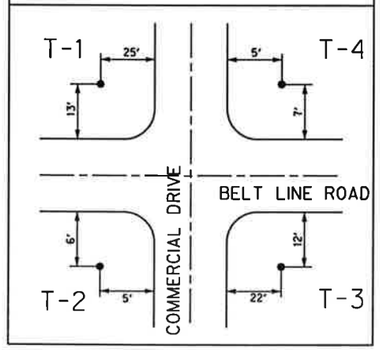
	T-1	T-2	T-3	T-4
A	13'	5'	12'	5'
B	18'	9'	17'	9'
C	11'	13'	11'	11'
D	11'	N/A	11'	N/A
E	13'	N/A	12'	N/A
F	55'	28'	55'	24'
G	20'	20'	20'	20'
H	N/A	N/A	N/A	N/A

PROPOSED SIGNAL PHASING



Ø1, Ø3, Ø5 AND Ø7 TO BE PROTECTED/PERMISSIVE PHASING

SIGNAL POLE LOCATIONS



DISTANCE TO CURB MEASURED ALONG PERPENDICULAR TO CL

DISTANCES ARE FOR GUIDANCE ONLY. EXACT LOCATION OF SIGNAL POLES SHALL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE TOWN ENGINEER PRIOR TO DRILLING

STATE OF TEXAS
S.P. BOOTH
94903
LICENSED
PROFESSIONAL ENGINEER

S.P. Booth ,P.E. 1/24/2014
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

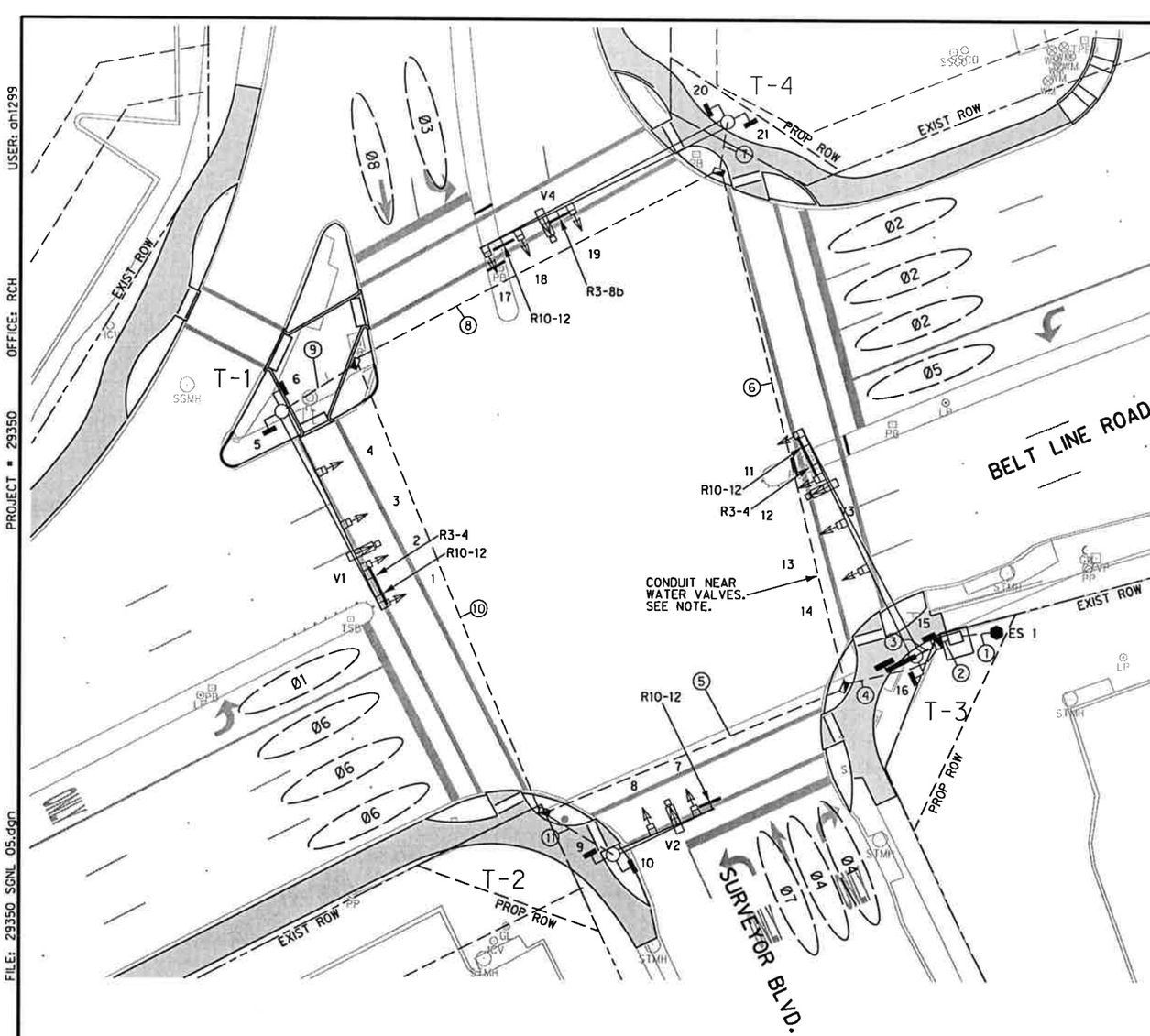
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

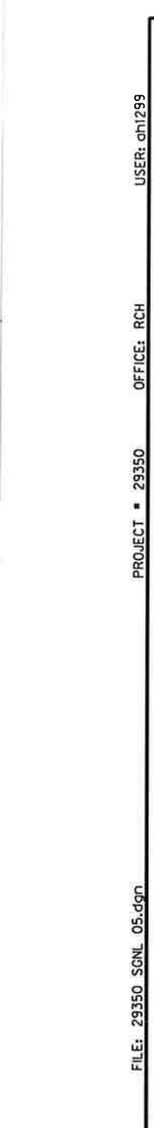
BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC SIGNAL DESIGN TABLES
BELT LINE RD AT COMMERCIAL DR

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 SGNL 04	TS-4

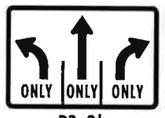




0 15 30 45
SCALE IN FEET

N

LEGEND OF SYMBOLS	
	VIDEO DETECTION ZONES
	SIGNAL POLE/MAST ARM SET UP
2	SIGNAL HEAD NUMBERS
	CONTROLLER CABINET
	GROUND BOX TYPE D (LG)
	GROUND BOX TYPE E (SM)
	LUMINAIRE
Ø2	PHASE NUMBERS
T-2	POLE NUMBERS
22	CONDUIT RUN NUMBERS
R.O.W.	RIGHT OF WAY LINES
	VIVDS CAMERA
	ELECTRICAL SERVICE
	OPTICOM
	MAST ARM MOUNTED SIGN
	WIRELESS ETHERNET SUBSCRIBER

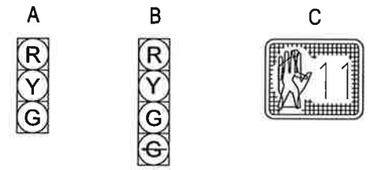


R3-8b
36" X 24"

R3-4
24" X 24"

R10-12
24" X 30"

SIGNAL HEAD TYPES



V3 V4LT* PED (WITH COUNTDOWN)

*WITH BI-MODAL YELLOW AND GREEN ARROWS.

ELECTRICAL SERVICE DATA

ELECTRICAL SERVICE DESCRIPTION SEE ED(4)	SERVICE CONDUIT SIZE (RMC)	SERVICE CONDUCTORS NO. / SIZE	MAIN CIRCUIT BREAKER, POLE / AMP	TWO-POLE CONTACTOR AMPS	PANELBD / LOADCENTER AMP RATING (MIN)	CIRCUIT NO.	BRANCH CKT. BRK. POLE / AMPS	KVA LOAD
TY D (120/240) 70 (NS) SS (E) PS (U)	2"	3 / #6	2P / 100	30	100	T.S. ILSN	1P / 50 2P / 20	< 7.1

NOTES:

1) SALVAGE EXISTING SIGNAL EQUIPMENT. RETURN TO TOWN OF ADDISON.
2) ALL POLES AND MAST ARMS TO BE POWDER COAT SILVER TO MATCH BELT LINE STREET LIGHTS.
3) ALL MAST ARM MOUNTED SIGNS SHALL HAVE HIGH INTENSITY PRISMATIC (HIP) SHEETING.
4) RELOCATE EXISTING STREET NAME SIGNS TO NEW POLES/MAST ARMS.
5) FURNISH AND INSTALL A 10' POLE EXTENSION ON T-1 SIGNAL ARM. CONTRACTOR TO INSTALL TOWN SUPPLIED WIRELESS ETHERNET SUBSCRIBER ON THE POLE EXTENSION. CONTRACTOR SHALL AIM THE ETHERNET SUBSCRIBER UNIT AS DIRECTED BY THE TOWN ENGINEER. WIRELESS RADIO TO BE MOUNTED BY OPTICOM HEAD ON T-1.
6) CONTRACTOR SHALL FURNISH AND INSTALL THE VIDEO SERVER AND HARDENED ETHERNET SWITCH INSIDE THE TRAFFIC SIGNAL CONTROLLER CABINET.
7) THE VIDEO SERVER SHALL BE INSTALLED BETWEEN THE VIVDS PROCESSOR AND HARDENED ETHERNET SWITCH (POLE T-1).
8) REMOVE ALL EXISTING FIELD WIRING AFTER NEW SIGNALS ARE PUT INTO SERVICE.
9) ALL EXISTING PULL BOXES TO TO BE REMOVED AND ABANDONED CONDUIT TO BE CUT AND CAPPED. SALVAGED PULL BOXES TO BE RETURNED TO TOWN OF ADDISON.
10) COORDINATE SEQUENCING OF INSTALL OF SIGNAL CONDUITS WITH INSTALL OF WATER VALVES.

SIGNAL POLE CHART

POLE NUMBER	T-1						T-2				T-3						T-4				
MAST ARM LENGTH	48'						24'				55'						60'				
FOUNDATION TYPE	36-A						30-A				48-A						48-A				
WITH LUMINAIRES	NO						NO				NO						NO				
MAST ARM SIGNS	R10-12, R3-4						R10-12				R10-12, R3-4						R10-12, R3-8b				
SIZE OF LENS	12"																				
SIGNAL TYPE	B	A	A	A	C	C	B	A	C	C	B	A	A	A	C	C	B	A	A	C	C
SIGNAL FACE NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
LED SIGNAL INDICATIONS	R	R	R	R	DW	DW	R	R	DW	DW	R	R	R	R	DW	DW	R	R	R	DW	DW
	Y	Y	Y	Y	W	W	Y	Y	W	W	Y	Y	Y	Y	W	W	Y	Y	Y	W	W
	G	G	G	G			G	G			G	G	G	G			G	G	G		
	~~GY~~						~~GY~~				~~GY~~						~~GY~~				

ALL SIGNAL HEADS SHALL HAVE BLACK PLASTIC BACK PLATES.
LEFT-TURN INDICATIONS WILL CONSIST OF 4 SECTION HEADS WITH BI-MODAL YELLOW AND GREEN ARROWS.
ALL MAST ARMS WILL HAVE LED ILLUMINATED STREET NAME SIGNS.

STATE OF TEXAS
S.P. BOOTH
94903
LICENSED
PROFESSIONAL ENGINEER

S. P. Booth, P.E. 1/24/2014
Signature of Registrant Date

NO.	REVISION	BY	DATE

Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

PROPOSED TRAFFIC SIGNAL LAYOUT
BELT LINE RD AT SURVEYOR BLVD

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 SGNL 05	TS-5

CABLE TERMINATION CHART

CONDUCTOR COLOR	CABLE 1 20 CNDR FROM CNTRL TO T-1 TERMINAL BLOCK	CABLE 2 10 CNDR FROM CNTRL TO T-2 TERMINAL BLOCK	CABLE 3 20 CNDR FROM CNTRL TO T-3 TERMINAL BLOCK	CABLE 4 20 CNDR FROM CNTRL TO T-4 TERMINAL BLOCK
RED	SH 1, 2, 3, 4 Ø 2 R	SH 7, 8 Ø 8 R	SH 11, 12, 13, 14 Ø 6 R	SH 17, 18, 19 Ø 4 R
ORANGE	SH 1, 2, 3, 4 Ø 2 Y	SH 7, 8 Ø 8 Y	SH 11, 12, 13, 14 Ø 6 Y	SH 17, 18, 19 Ø 4 Y
GREEN	SH 1, 2, 3, 4 Ø 2 G	SH 7, 8 Ø 8 G	SH 11, 12, 13, 14 Ø 6 G	SH 17, 18, 19 Ø 4 G
RED/BLACK	SPARE	SPARE	SPARE	SPARE
ORANGE/BLACK	SPARE	SPARE	SPARE	SPARE
GREEN/BLACK	SPARE	SPARE	SPARE	SPARE
WHITE/BLACK	SPARE	SPARE	SPARE	SPARE
BLUE/BLACK	Ø 2 PED CALL	Ø 6 PED CALL	Ø 6 PED CALL	Ø 2 PED CALL
BLUE/WHITE	SH 6 Ø 2 W	SH 10 Ø 6 W	SH 16 Ø 6 W	SH 20 Ø 2 W
BLACK/WHITE	SH 6 Ø 2 DW	SH 10 Ø 6 DW	SH 16 Ø 6 DW	SH 20 Ø 2 DW
BLACK	SH 1 Ø5 Y LT ARROW	SH 7 Ø3 Y LT ARROW	SH 11 Ø1 Y LT ARROW	SH 17 Ø7 Y LT ARROW
GREEN/WHITE	SH 5 Ø 8 W	SH 9 Ø 8 W	SH 15 Ø 4 W	SH 21 Ø 4 W
RED/WHITE	SH 5 Ø 8 DW	SH 9 Ø 8 DW	SH 15 Ø 4 DW	SH 21 Ø 4 DW
BLUE	SH 1 Ø5 G LT ARROW	SH 7 Ø8 G LT ARROW	SH 11 Ø1 G LT ARROW	SH 17 Ø7 G LT ARROW
WHITE	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON
BLACK/RED	Ø 8 PED CALL	Ø 8 PED CALL	Ø 4 PED CALL	Ø 4 PED CALL
WHITE/RED	SPARE	SPARE	SPARE	SPARE
ORANGE/RED	SPARE	SPARE	SPARE	SPARE
BLUE/RED	SPARE	SPARE	SPARE	SPARE
RED/GREEN	SPARE	SPARE	SPARE	SPARE

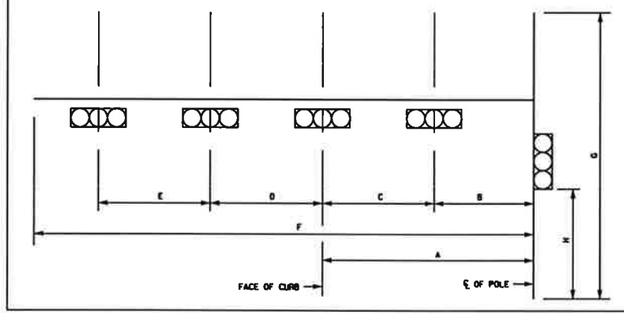
CONDUIT SUMMARY

RUN NO.	CONDUIT 2"	CONDUIT 3"	CONDUIT 4"	RUN LENGTH (FT)	INSTALL TYPE	ELECTRICAL CONDUCTORS XHHW #6	GROUND BARE #6	GROUND BARE #8	SIGNAL CABLES #14 AWG 20 CNDR TYP A	5 CNDR TYP A	7 CNDR TYP A	VIVDS CABLE	OPTICOM CABLE	ILSN CABLE 3/C #12
1	1			7	T	2	1							
2			2	7	T			2	4			4	4	4
3	1	1		25	T			2	1			1	1	1
4			2	12	T			2	3			3	3	3
5			1	72	B			1	2			2	2	2
6			1	118	B			1	1			1	1	1
7	1	1		12	T			2	1			1	1	1
8			1	92	B			1						
9	1	1		23	T			2	1			1	1	1
10			1	107	B			1	1			1	1	1
11	1	1		12	T			2	1			1	1	1
CABLE TOTALS						14	7	571	505	0	0	505	505	505

CONDUIT TOTALS		
	2" TRENCH	79
	2" BORE	0
	3" TRENCH	72
	3" BORE	0
	4" TRENCH	38
	4" BORE	389

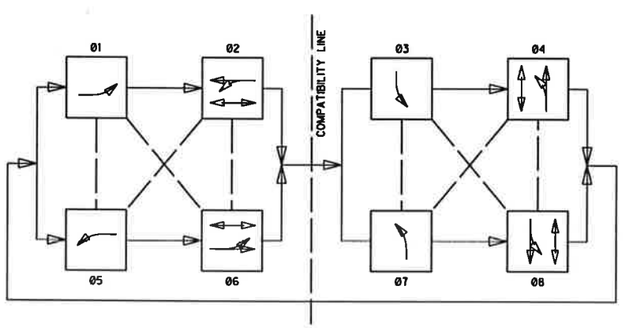
T = TRENCH
B = BORE

SIGNAL HEAD AND POLE PLACEMENT



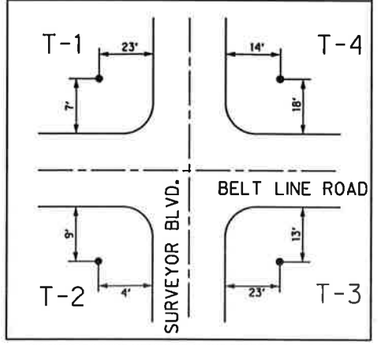
	T-1	T-2	T-3	T-4
A	7'	4'	13'	14'
B	15'	10'	22'	38'
C	11'	10'	11'	11'
D	11'	N/A	11'	9'
E	10'	N/A	11'	N/A
F	48'	24'	55'	60'
G	20'	20'	20'	20'
H	N/A	N/A	N/A	N/A

PROPOSED SIGNAL PHASING



Ø1, Ø3, Ø5 AND Ø7 TO BE PROTECTED/PERMISSIVE PHASING

SIGNAL POLE LOCATIONS



DISTANCE TO CURB MEASURED ALONG PERPENDICULAR TO CL

DISTANCES ARE FOR GUIDANCE ONLY.
EXACT LOCATION OF SIGNAL POLES SHALL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE TOWN ENGINEER PRIOR TO DRILLING

STATE OF TEXAS
S.P. BOOTH
94903
LICENSED PROFESSIONAL ENGINEER

S. P. Booth ,P.E. 1/24/2014
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

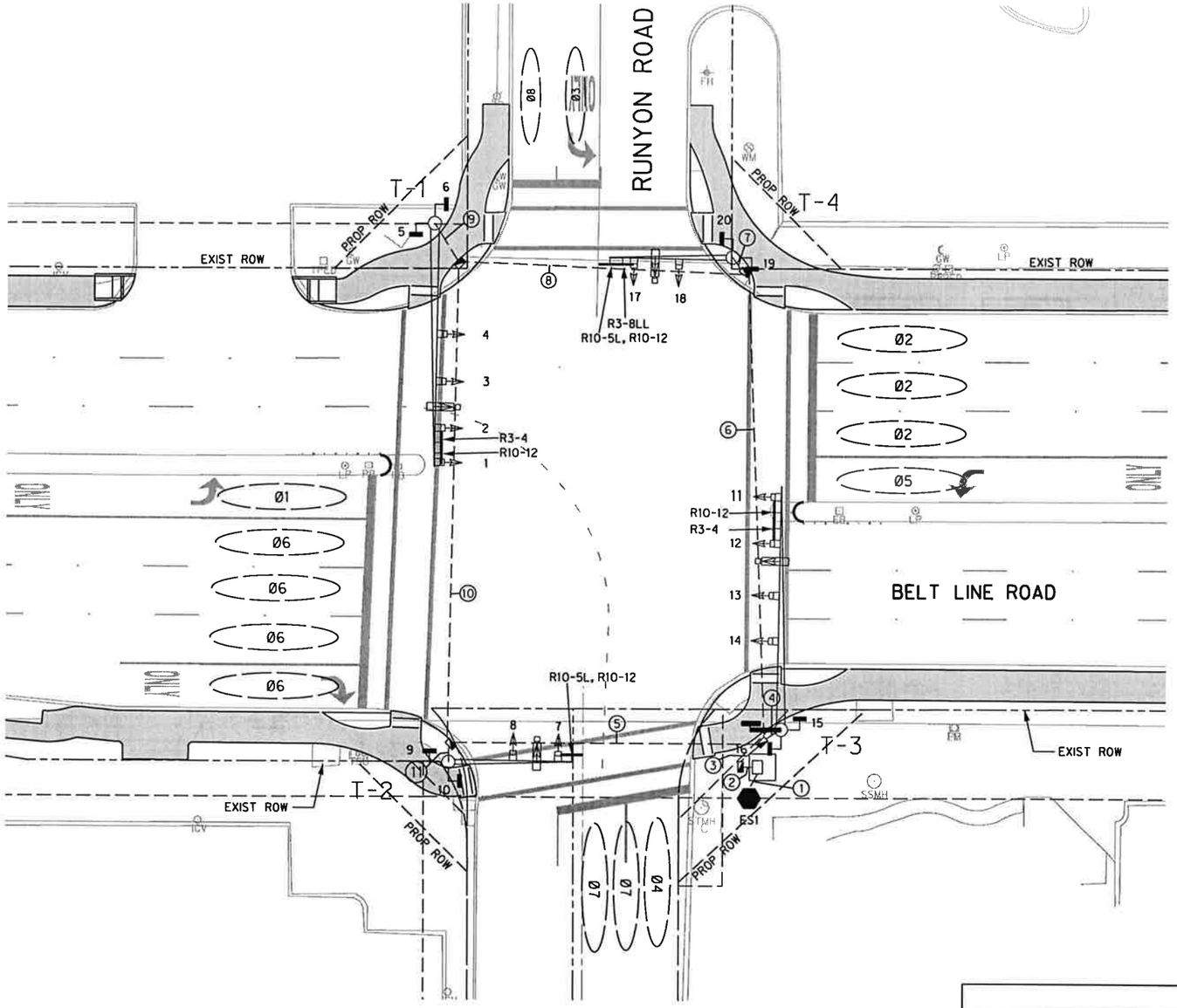
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC SIGNAL DESIGN TABLES
BELT LINE RD AT SURVEYOR BLVD

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 738-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 SGNL 06	TS-6



0 15 30 45
SCALE IN FEET

N

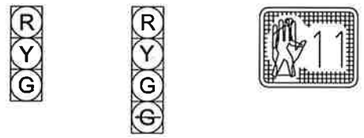
LEGEND OF SYMBOLS	
	VIDEO DETECTION ZONES
	SIGNAL POLE/MAST ARM SET UP
2	SIGNAL HEAD NUMBERS
	CONTROLLER CABINET
	GROUND BOX TYPE D (LG)
	GROUND BOX TYPE E (SM)
	LUMINAIRE
Ø2	PHASE NUMBERS
T-2	POLE NUMBERS
(22)	CONDUIT RUN NUMBERS
R.O.W.	RIGHT OF WAY LINES
	VIVDS CAMERA
	ELECTRICAL SERVICE
	OPTICOM
	MAST ARM MOUNTED SIGN
	WIRELESS ETHERNET SUBSCRIBER

R3-8LL
24" X 24"

R3-4
24" X 24"

R10-12
24" X 30"

SIGNAL HEAD TYPES



PED
V3 V4LT* (WITH COUNTDOWN)

*WITH BI-MODAL YELLOW AND GREEN ARROWS.

ELECTRICAL SERVICE DATA

ELECTRICAL SERVICE DESCRIPTION SEE ED(4)	SERVICE CONDUIT SIZE (RMC)	SERVICE CONDUCTORS NO. / SIZE	MAIN CIRCUIT BREAKER POLE / AMP	TWO-POLE CONTACTOR AMPS	PANELBD./ LOADCENTER AMP RATING (MIN)	CIRCUIT NO.	BRANCH CKT. BRK. POLE / AMPS	KVA LOAD
TY D (120/240) 70 (NS) SS (E) PS (U)	2"	3 / #8	2P / 100	30	100	T.S. ILSN	1P / 50 2P / 20	< 7.1

NOTES:

1) SALVAGE EXISTING SIGNAL EQUIPMENT. RETURN TO TOWN OF ADDISON.
2) ALL POLES AND MAST ARMS TO BE POWDER COAT SILVER TO MATCH BELT LINE STREET LIGHTS.
3) ALL MAST ARM MOUNTED SIGNS SHALL HAVE HIGH INTENSITY PRISMATIC (HIP) SHEETING.
4) RELOCATE EXISTING STREET NAME SIGNS TO NEW POLES/MAST ARMS.
5) FURNISH AND INSTALL A 10' POLE EXTENSION ON T-1 SIGNAL ARM. CONTRACTOR TO INSTALL TOWN SUPPLIED WIRELESS ETHERNET SUBSCRIBER ON THE POLE EXTENSION. CONTRACTOR SHALL AIM THE ETHERNET SUBSCRIBER UNIT AS DIRECTED BY THE TOWN ENGINEER. WIRELESS RADIO TO BE MOUNTED BY OPTICOM HEAD ON T-1.
6) CONTRACTOR SHALL FURNISH AND INSTALL THE VIDEO SERVER AND HARDENED ETHERNET SWITCH INSIDE THE TRAFFIC SIGNAL CONTROLLER CABINET.
7) THE VIDEO SERVER SHALL BE INSTALLED BETWEEN THE VIVDS PROCESSOR AND HARDENED ETHERNET SWITCH (POLE T-1).
8) REMOVE ALL EXISTING FIELD WIRING AFTER NEW SIGNALS ARE PUT INTO SERVICE.
9) ALL EXISTING PULL BOXES TO TO BE REMOVED AND ABANDONED CONDUIT TO BE CUT AND CAPPED. SALVAGED PULL BOXES TO BE RETURNED TO TOWN OF ADDISON.

SIGNAL POLE CHART

POLE NUMBER	T-1						T-2				T-3						T-4			
MAST ARM LENGTH	55'						28'				55'						28'			
FOUNDATION TYPE	48-A						30-A				48-A						30-A			
WITH LUMINAIRES	NO						NO				NO						NO			
MAST ARM SIGNS	R10-12, R3-4						R10-5L				R10-12, R3-4						R3-8LL, R10-5L			
SIZE OF LENS	12"																			
SIGNAL TYPE	B	A	A	A	C	C	B	A	C	C	B	A	A	A	C	C	B	A	C	C
SIGNAL FACE NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
LED SIGNAL INDICATIONS	R	R	R	R	DW	DW	R	R	DW	DW	R	R	R	R	DW	DW	R	R	DW	DW
	Y	Y	Y	Y	W	W	Y	Y	W	W	Y	Y	Y	Y	W	W	Y	Y	W	W
	G	G	G	G			G	G			G	G	G	G			G	G		
	~~GY~~						~~GY~~				~~GY~~						~~GY~~			

ALL SIGNAL HEADS SHALL HAVE BLACK PLASTIC BACK PLATES.
LEFT-TURN INDICATIONS WILL CONSIST OF 4 SECTION HEADS WITH BI-MODAL YELLOW AND GREEN ARROWS.
ALL MAST ARMS WILL HAVE LED ILLUMINATED STREET NAME SIGNS.

STATE OF TEXAS
S.P. BOOTH
94903
LICENSED
PROFESSIONAL ENGINEER

S.P. Booth, P.E. 1/24/2014
Signature of Registrant Date

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

PROPOSED TRAFFIC SIGNAL LAYOUT
BELT LINE RD AT RUNYON RD

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 SGNL 07	TS-7

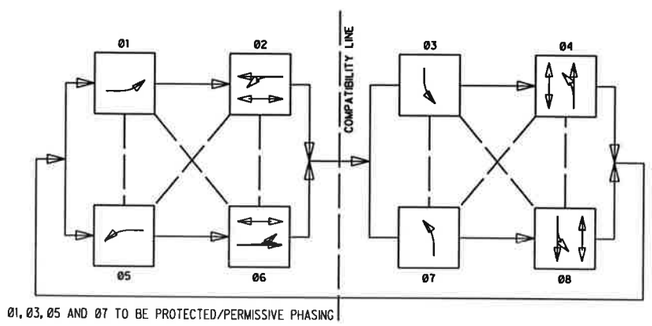
SHEET 120 OF 235

USER: dh1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 SGNL 07.dgn
TIME: 4:26:21 PM
DATE: 1/23/2014

CABLE TERMINATION CHART

CONDUCTOR COLOR	CABLE 1 20 CNDR FROM CNTRL TO T-1 TERMINAL BLOCK	CABLE 2 10 CNDR FROM CNTRL TO T-2 TERMINAL BLOCK	CABLE 3 20 CNDR FROM CNTRL TO T-3 TERMINAL BLOCK	CABLE 4 20 CNDR FROM CNTRL TO T-4 TERMINAL BLOCK
RED	SH 1, 2, 3, 4 Ø 2 R	SH 7, 8 Ø 8 R	SH 11, 12, 13, 14 Ø 6 R	SH 17, 18 Ø 4 R
ORANGE	SH 1, 2, 3, 4 Ø 2 Y	SH 7, 8 Ø 8 Y	SH 11, 12, 13, 14 Ø 6 Y	SH 17, 18 Ø 4 Y
GREEN	SH 1, 2, 3, 4 Ø 2 G	SH 7, 8 Ø 8 G	SH 11, 12, 13, 14 Ø 6 G	SH 17, 18 Ø 4 G
RED/BLACK	SPARE	SPARE	SPARE	SPARE
ORANGE/BLACK	SPARE	SPARE	SPARE	SPARE
GREEN/BLACK	SPARE	SPARE	SPARE	SPARE
WHITE/BLACK	SPARE	SPARE	SPARE	SPARE
BLUE/BLACK	Ø 2 PED CALL	Ø 6 PED CALL	Ø 6 PED CALL	Ø 2 PED CALL
BLUE/WHITE	SH 6 Ø 2 W	SH 10 Ø 6 W	SH 16 Ø 6 W	SH 20 Ø 2 W
BLACK/WHITE	SH 6 Ø 2 DW	SH 10 Ø 6 DW	SH 16 Ø 6 DW	SH 20 Ø 2 DW
BLACK	SH 1 Ø5 Y LT ARROW	SH 7 Ø3 Y LT ARROW	SH 11 Ø1 Y LT ARROW	SH 17 Ø7 Y LT ARROW
GREEN/WHITE	SH 5 Ø 8 W	SH 9 Ø 8 W	SH 15 Ø 4 W	SH 19 Ø 4 W
RED/WHITE	SH 5 Ø 8 DW	SH 9 Ø 8 DW	SH 15 Ø 4 DW	SH 19 Ø 4 DW
BLUE	SH 1 Ø5 G LT ARROW	SH 7 Ø8 G LT ARROW	SH 11 Ø1 G LT ARROW	SH 17 Ø7 G LT ARROW
WHITE	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON
BLACK/RED	Ø 8 PED CALL	Ø 8 PED CALL	Ø 4 PED CALL	Ø 4 PED CALL
WHITE/RED	SPARE	SPARE	SPARE	SPARE
ORANGE/RED	SPARE	SPARE	SPARE	SPARE
BLUE/RED	SPARE	SPARE	SPARE	SPARE
RED/GREEN	SPARE	SPARE	SPARE	SPARE

PROPOSED SIGNAL PHASING



Ø1, Ø3, Ø5 AND Ø7 TO BE PROTECTED/PERMISSIVE PHASING

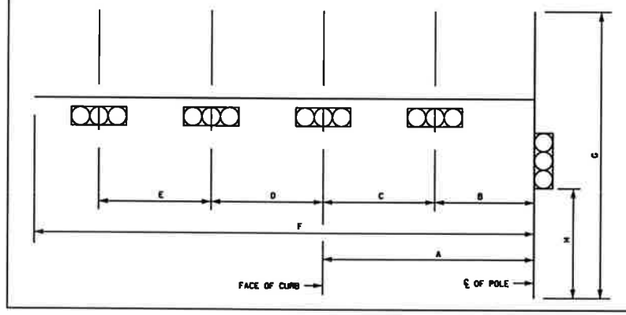
CONDUIT SUMMARY

RUN NO.	CONDUIT 2"	CONDUIT 3"	CONDUIT 4"	RUN LENGTH (FT)	INSTALL TYPE	ELECTRICAL CONDUCTORS XHHW #6	GROUND BARE #6	GROUND BARE #8	SIGNAL CABLES #14 AWG 20 CNDR TYP A	5 CNDR TYP A	7 CNDR TYP A	VIVDS CABLE	OPTICOM CABLE	ILSN CABLE 3/C #12
1	1			5	T	2	1							
2			2	5	T			2	4			4	4	4
3			2	7	T			2	4			4	4	4
4	1	1		7	T			2	1			1	1	1
5			1	70	B			1	2			2	2	2
6			1	107	B			1	1			1	1	1
7	1	1		7	T			2	1			1	1	1
8			1	77	B			1						
9	1	1		15	T			2	1			1	1	1
10			1	100	B			1	1			1	1	1
11	1	1		7	T			2	1			1	1	1
CABLE TOTALS						10	5	450	431	0	0	431	431	431

CONDUIT TOTALS		
	2" TRENCH	41
	2" BORE	0
	3" TRENCH	36
	3" BORE	0
	4" TRENCH	24
	4" BORE	354

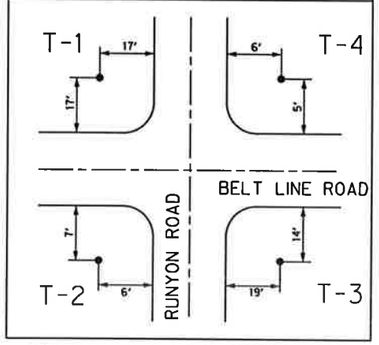
T = TRENCH
B = BORE

SIGNAL HEAD AND POLE PLACEMENT



	T-1	T-2	T-3	T-4
A	17'	6'	14'	6'
B	24'	15'	19'	21'
C	11'	11'	11'	12'
D	11'	N/A	11'	N/A
E	8'	N/A	12'	N/A
F	55'	28'	55'	28'
G	20'	20'	20'	20'
H	N/A	N/A	N/A	N/A

SIGNAL POLE LOCATIONS



DISTANCE TO CURB MEASURED ALONG PERPENDICULAR TO CL

DISTANCES ARE FOR GUIDANCE ONLY.
EXACT LOCATION OF SIGNAL POLES SHALL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE TOWN ENGINEER PRIOR TO DRILLING

STATE OF TEXAS
S.P. BOOTH
94903
LICENSED
PROFESSIONAL ENGINEER

S.P. Booth, P.E. 1/24/2014
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

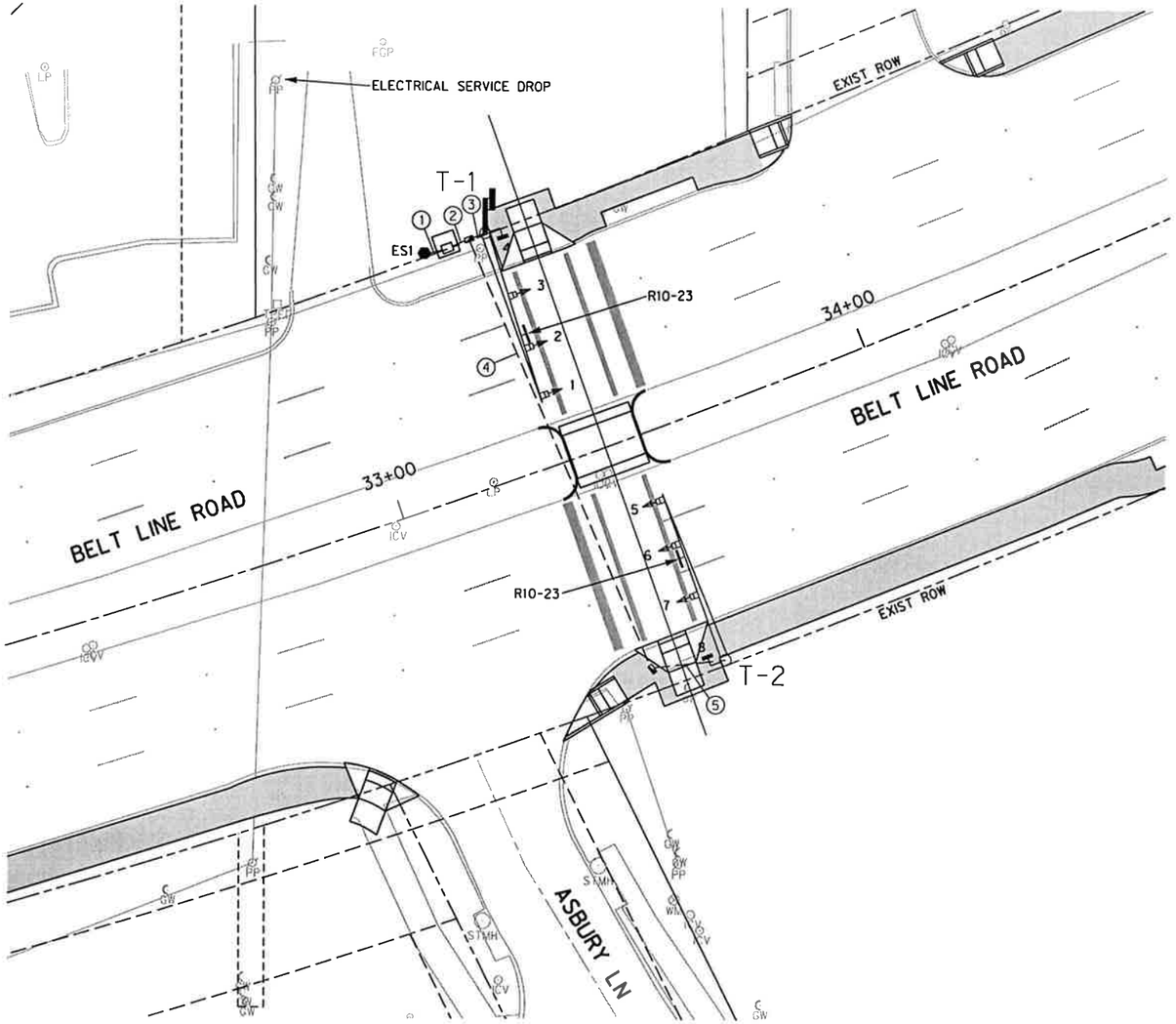
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC SIGNAL DESIGN TABLES
BELT LINE RD AT RUNYON RD

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 SGNL 08	TS-8



0 15 30 45
SCALE IN FEET

N

CROSSWALK
STOP ON RED
R10-23
24" X 30"

LEGEND OF SYMBOLS	
	VIDEO DETECTION ZONES
	SIGNAL POLE/MAST ARM SET UP
2	SIGNAL HEAD NUMBERS
	CONTROLLER CABINET
	GROUND BOX TYPE D (LG)
	GROUND BOX TYPE E (SM)
	LUMINAIRE
Ø2	PHASE NUMBERS
T-2	POLE NUMBERS
(22)	CONDUIT RUN NUMBERS
R.O.W.	RIGHT OF WAY LINES
	VIVDS CAMERA
	ELECTRICAL SERVICE
	OPTICOM
	MAST ARM MOUNTED SIGN
	WIRELESS ETHERNET SUBSCRIBER

SIGNAL HEAD TYPES

D — HAWK ASSEMBLY

B — PED (WITH COUNTDOWN)

NOTES:

1) ALL POLES AND MAST ARMS TO BE POWDER COAT SILVER TO MATCH BELT LINE STREET LIGHTS.
2) ALL MAST ARM MOUNTED SIGNS SHALL HAVE HIGH INTENSITY PRISMATIC (HIP) SHEETING.
3) FURNISH AND INSTALL A 10' POLE EXTENSION ON T-1 SIGNAL ARM. CONTRACTOR TO INSTALL TOWN SUPPLIED WIRELESS ETHERNET SUBSCRIBER ON THE POLE EXTENSION. CONTRACTOR SHALL AIM THE ETHERNET SUBSCRIBER UNIT AS DIRECTED BY THE TOWN ENGINEER.
4) CONTRACTOR TO FURNISH HARDENED ETHERNET SWITCH INSIDE THE TRAFFIC CONTRACTOR CABINET (INSTALL).

SIGNAL POLE CHART								
POLE NUMBER	T-1				T-2			
MAST ARM LENGTH	36'				36'			
FOUNDATION TYPE	36-A				36-A			
WITH LUMINAIRES	NO				NO			
MAST ARM SIGNS	R10-23				R10-23			
SIZE OF LENS								
SIGNAL TYPE	D	D	D	B	D	D	D	B
SIGNAL FACE NO.	1	2	3	4	5	6	7	8
LED SIGNAL INDICATIONS	R	R	R	DW	R	R	R	DW
	R	R	R	W	R	R	R	W
	Y	Y	Y		Y	Y	Y	

ALL SIGNAL HEADS SHALL HAVE BLACK PLASTIC BACK PLATES.

ELECTRICAL SERVICE DATA								
ELECTRICAL SERVICE DESCRIPTION SEE ED(4)	SERVICE CONDUIT SIZE (RMC)	SERVICE CONDUCTORS NO. / SIZE	MAIN CIRCUIT BREAKER POLE / AMP	TWO-POLE CONTACTOR AMPS	PANELBD / LOADCENTER AMP RATING (MIN)	CIRCUIT NO.	BRANCH CKT. BRK. POLE / AMPS	KVA LOAD
TY D (120/240) 70 (NS) SS (E) PS (U)	2"	3 / #6	2P / 100	30	100	T.S.	1P / 50	< 7.1

STATE OF TEXAS
S.P. BOOTH
94903
LICENSED
PROFESSIONAL ENGINEER

S.P. Booth, P.E. 1/24/2014
Signature of Registrant Date

NO.	REVISION	BY	DATE

Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

PROPOSED TRAFFIC SIGNAL LAYOUT
BELT LINE RD AT HAWK SIGNAL

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 SGNL 09	TS-9

CABLE TERMINATION CHART

CONDUCTOR COLOR	CABLE 1 20 CNDR FROM CNTRL TO T-1 TERMINAL BLOCK	CABLE 2 20 CNDR FROM CNTRL TO T-2 TERMINAL BLOCK
RED	SH 1, 2, 3 R (RH)	SH 5, 6, 7 R (RH)
ORANGE	SH 1, 2, 3 Y	SH 5, 6, 7 Y
GREEN	SPARE	SPARE
RED/BLACK	SH 1, 2, 3 R (LH)	SH 5, 6, 7 R (LH)
ORANGE/BLACK	SPARE	SPARE
GREEN/BLACK	SPARE	SPARE
WHITE/BLACK	SPARE	SPARE
BLUE/BLACK	SPARE	SPARE
BLUE/WHITE	SPARE	SPARE
BLACK/WHITE	SPARE	SPARE
BLACK	SPARE	SPARE
GREEN/WHITE	SH 4 Ø4 + Ø8 PED W	SH 8 Ø4 + Ø8 PED W
RED/WHITE	SH 4 Ø4 + Ø8 PED DW	SH 4 Ø4 + Ø8 PED DW
BLUE	SPARE	SPARE
WHITE	SIGNAL COMMON	SIGNAL COMMON
BLACK/RED	PED CALL Ø4 + Ø8	PED CALL Ø4 + Ø8
WHITE/RED	SPARE	SPARE
ORANGE/RED	SPARE	SPARE
BLUE/RED	SPARE	SPARE
RED/GREEN	SPARE	SPARE

NOTE:

RED INDICATIONS AT EACH SIGNAL HEAD TO BE WIRED SEPARATELY FOR FLASHING CLEARANCE PHASE

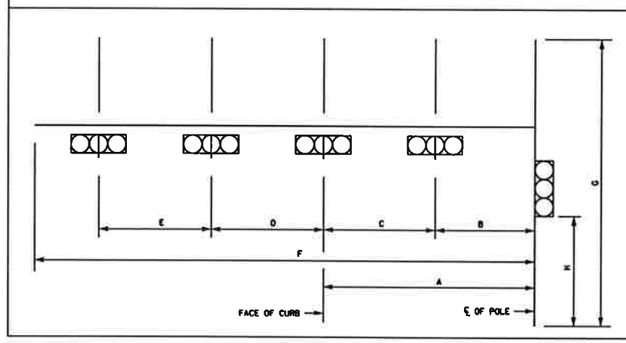
CONDUIT SUMMARY

RUN NO.	CONDUIT 2"	CONDUIT 3"	CONDUIT 4"	RUN LENGTH (FT)	INSTALL TYPE	ELECTRICAL CONDUCTORS XHHW #6	GROUND BARE #6	GROUND BARE #8	SIGNAL CABLES #14 AWG 20 CNDR TYP A	5 CNDR TYP A	7 CNDR TYP A	VIVDS CABLE	OPTICOM CABLE	I.S.N CABLE 3/C #12
1	1			5	T	2	1							
2			1	5	T			1	2					
3			1	5	T			1	1					
4			1	95	B			1	1					
5			1	17	T			1	1					
CABLE TOTALS						10	5	122	127	0	0	0	0	0

CONDUIT TOTALS		
	2" TRENCH	5
	2" BORE	0
	3" TRENCH	0
	3" BORE	0
	4" TRENCH	27
	4" BORE	95

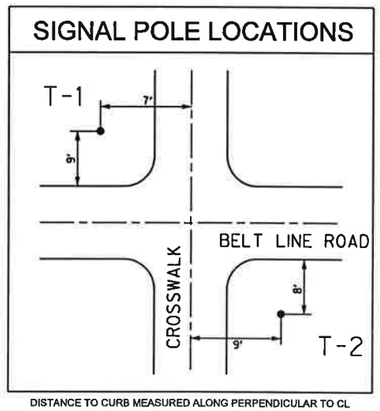
T = TRENCH
B = BORE

SIGNAL HEAD AND POLE PLACEMENT



	T-1	T-2
A	9'	8'
B	14'	15'
C	11'	11'
D	11'	11'
E	N/A	N/A
F	36'	36'
G	20'	20'
H	N/A	N/A

SIGNAL POLE LOCATIONS



DISTANCE TO CURB MEASURED ALONG PERPENDICULAR TO CL

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STATE OF TEXAS
S.P. BOOTH
94903
LICENSED PROFESSIONAL ENGINEER

S. P. Booth P.E. 1/24/2014
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC SIGNAL DESIGN TABLES
BELT LINE RD AT HAWK SIGNAL

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 SGNL 10	TS-10

Traffic Control Narrative:

Duct Bank Construction:

1. Follow proposed sequence of construction.
2. Restripe 10' lanes Marsh to Midway.
3. For each section,
   a. Shift traffic to 10' wide lanes with the right lane adjacent to outside curb. Use Type 1 low profile concrete barrier with Type 2 low profile concrete barrier at ends to protect primary work zone. See typical sections in Traffic Control Plan sheets.
   b. Primary work zone with three open through lanes in each direction shall be in place at all times during peak hours from:
      6:30 am - 9:30 am Monday through Saturday
      3:30 pm - 7:30 pm Monday through Saturday
   c. Secondary work zone will include the primary work zone in addition to a coned off lane on one or both sides. It will be used for material removal, delivery of new material and manhole installation and shall be in place during off-peak hours only.
   d. Once traffic is shifted and barriers in place, excavate and load dirt to dump truck.
   e. Install concrete duct bank by open cut unless otherwise noted.
   f. After cure, backfill and pave
   g. Move on to next section
4. A section must be completed and restored before proceeding to the next adjacent section.

Utility Crossing by Tunnel:

1. Bore pit to be approximately 10' from back of curb or as otherwise indicated on the plans.
2. Can be done at any time.

Utility Crossing by Open Cut:

1. Construction to be done at night during off-peak hours.
2. Shift eastbound traffic to southern westbound lane and construct utility south of median.
3. Once completed, flip traffic to other side of median with eastbound traffic in two southern eastbound lanes and westbound traffic in northern eastbound lane.
4. Construct remaining utility crossing. If construction cannot be completed during the allowed off-peak hours, provide steel plates with an asphalt edge transition until the next available work period.

Water line 20" Valves and 8" Water line B Construction

1. Construction to be done at night during off-peak hours.
2. For 8" water line, repeat steps 2, 3 and 4 for "Utility Crossing by Open Cut."
3. For 20" valves, outside lane closure at night during off-peak hours.
4. If construction cannot be completed during the allowed off-peak hours, provide steel plates with an asphalt edge transition and wait until next available work period.

Short Term Outside Lane Closure for Parkway, Sidewalk & Signal Work:

1. Outside lane closure for parkway and sidewalk construction shall only be allowed between 9 am and 3:30 pm.
2. Maintain access to businesses at all times.
3. Maintain a continuous pedestrian path on either side of the road at all times through the entire project limits.

Overlay and Permanent Striping Construction:

1. To be done during off-peak hours one lane at a time.
2. Use work vehicle with a trail vehicle and a shadow vehicle.
3. Open to traffic behind shadow vehicle once overlay can be driven on.
4. Maintain access at all times to businesses during their operating hours.

TRAFFIC CONTROL PARAMETERS *

1. 3 lanes each direction available for peak hour traffic, 6:30 AM to 9:30 AM, 3:30 PM to 7:30 PM, weekdays.
2. 2 lanes each direction available for traffic, 9:30 AM to 3:30 PM, 7:30 PM to 11 PM, weekdays.
3. 1 lane each direction available for traffic, 11 PM to 6:30 AM, weekdays.
4. Weekend work - 2 lanes each direction available for traffic 9:30 AM to 3:30 PM, Saturday. 1 lane each direction available for traffic, 7:30 PM Saturday through midnight Sunday.
5. Contractor shall not perform any work during the following Town events and dates: Taste of Addison (May 16-18, 2014), Addison Kaboom Town (July 3-4, 2014), Addison Oktoberfest (September 18-21, 2014).
6. Close 1 successive median opening at a time for duct bank construction as shown in the plans. Proceed to the next closure once pavement is restored.
7. Maintain access to adjacent properties at all times, only one driveway closed to each property at any one time.
8. Duct bank crossings are shown to be constructed by open cut and must satisfy the above traffic control parameters.
9. All detours shall conform to Texas MUTCD and standard sheets provided in the plans.
10. Provide 6 changeable message signs, at the locations shown in the plans for advance warning.
11. Only one consecutive median opening can be closed at a time.

GENERAL CONSTRUCTION SEQUENCE

1. Electrical duct bank
2. Telecom duct bank
3. Oncor, Fiberlight, Time Warner, AT&T facility relocations
4. Pole removal
5. Traffic signals, sidewalks, water and storm sewer are concurrent
6. Overlay and striping

* Contractor may propose a different sequence of work as long as traffic control parameters are met and duct bank circuit 1 (ONCOR) Phase 1, Steps 1-5 in detailed TCP is the first work completed.

M.E. ROMANOWSKI 96306 LICENSED PROFESSIONAL ENGINEER

P.E. 10/25/13

Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

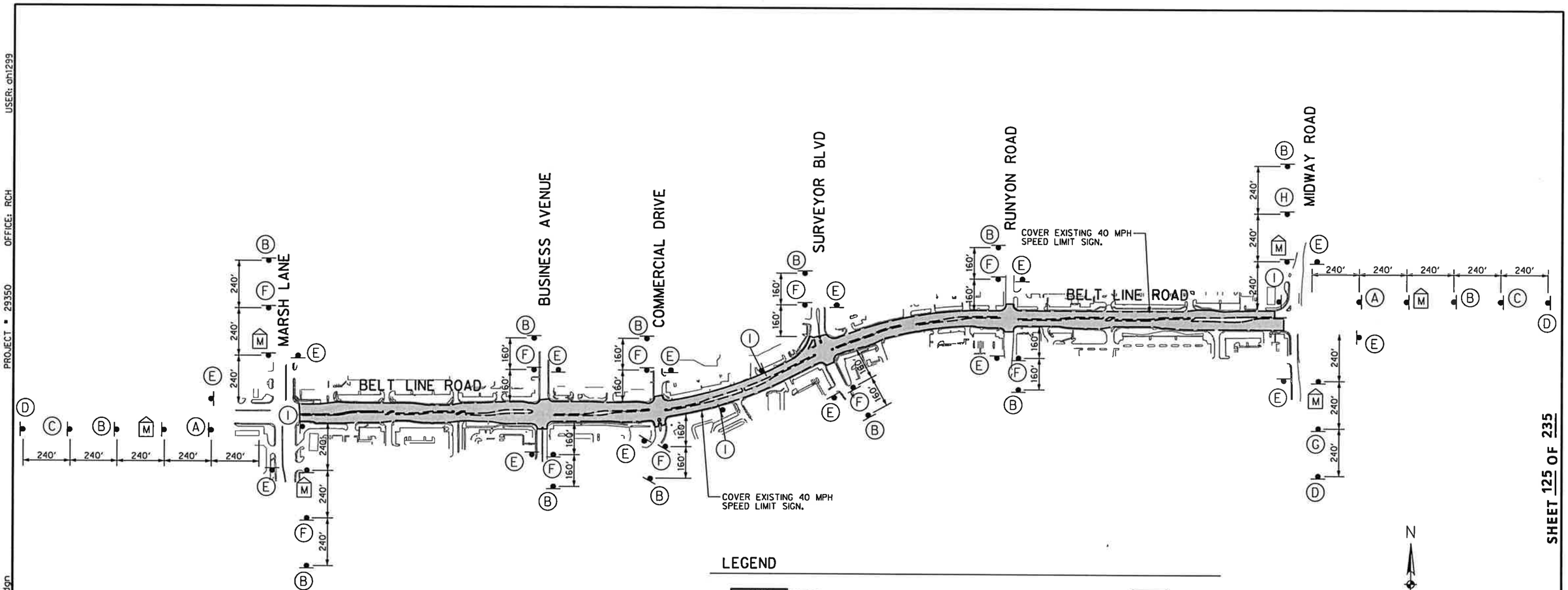
BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL NARRATIVE & GENERAL NOTES

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275 TEL (214) 346-6200 FAX (214) 738-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 TCPN 01	TCP-00

PROJECT # 29350 OFFICE: RCH USER: ah1299
DATE: 10/24/2013 TIME: 3:14:02 PM FILE: 29350 TCP 01.dgn



LEGEND

(A)	BEGIN ROAD WORK NEXT X MILES — G20-5T 48x24 NAME ADDRESS CITY STATE CONTRACTOR — G20-6 48x30	(E) END ROAD WORK — G20-2a 48x24
(B)	ROAD WORK AHEAD — CW20-1D 48x48	(F) ROAD WORK ← NEXT X MILES NEXT X MILES → — G20-1a 72x36
(C)	WORK ZONE — G20-9 36x24 TRAFFIC FINES DOUBLE — R20-5 36x30 WHEN WORKERS ARE PRESENT — PLAQUE 36x18	(G) ROAD WORK ← NEXT X MILES — G20-1BL 72x24
(D)	OBEY WARNING SIGNS STATE LAW — R20-3	(H) ROAD WORK NEXT X MILES → — G20-1BR 72x24
		(I) WORK ZONE / SPEED LIMIT 30 — G20-5aP 24x18; R2-1 24x30

(M) PORTABLE CHANGEABLE MESSAGE SIGN

N

0 125 250 375 500 750
SCALE IN FEET

STATE OF TEXAS
M.E. ROMANOWSKI
54306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. Date 10/25/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

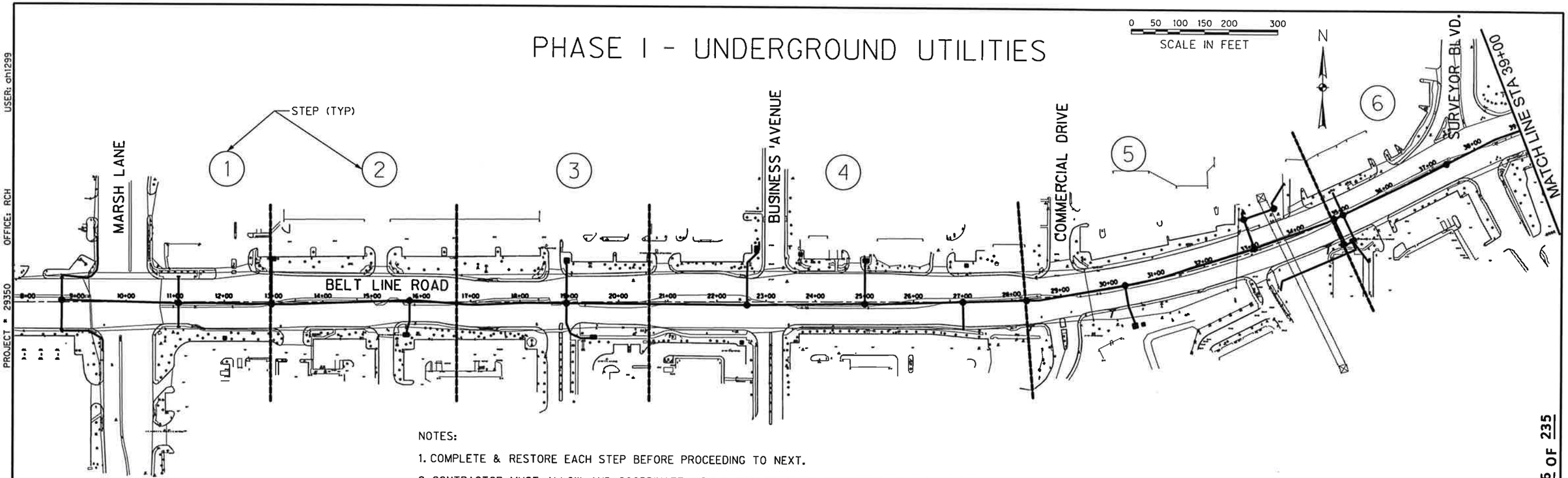
BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN
ADVANCED WARNING SIGN LAYOUT

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

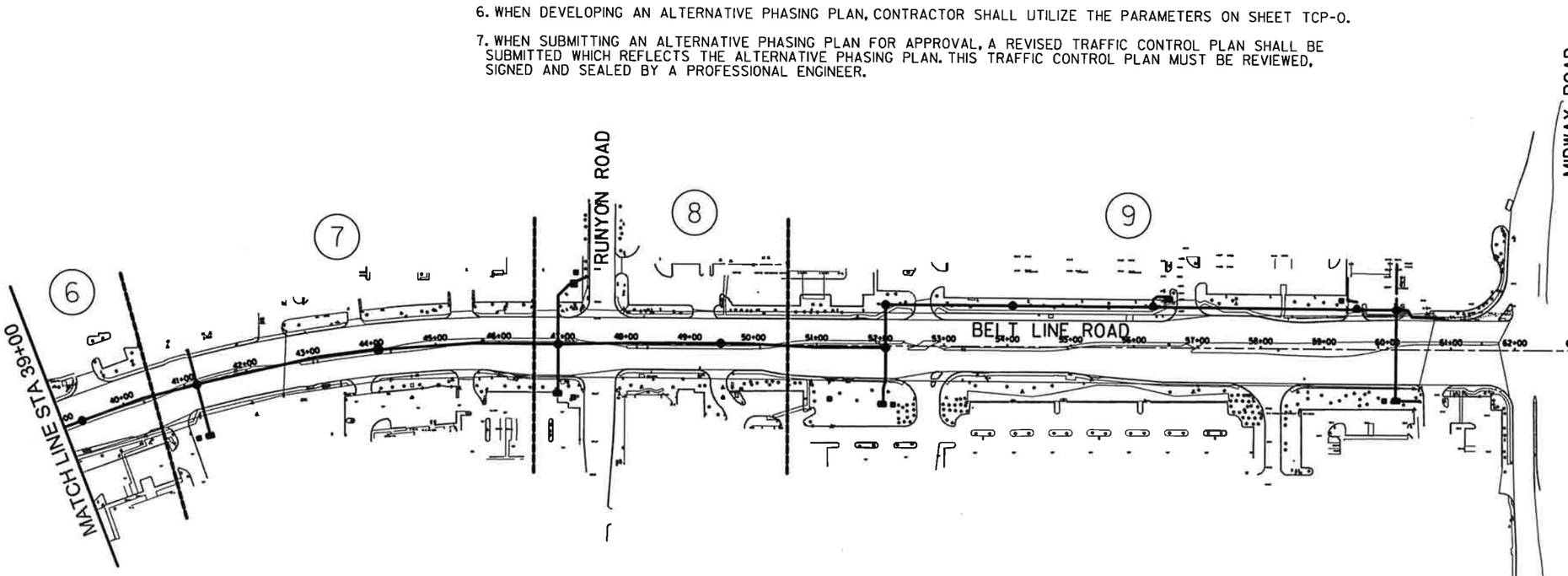
PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 TCP 01	TCP-0

PHASE I - UNDERGROUND UTILITIES



NOTES:

1. COMPLETE & RESTORE EACH STEP BEFORE PROCEEDING TO NEXT.
2. CONTRACTOR MUST ALLOW AND COORDINATE WITH ONCOR PRIOR TO PROCEEDING TO STEPS 6-9.
3. ADDITIONAL CLOSURES OF LANES WILL BE REQUIRED FOR PULLING & SPLICING CONDUCTORS.
4. THE PHASING PLAN IS A SUGGESTED SEQUENCE OF CONSTRUCTION.
5. THE CONTRACTOR MAY SUBMIT AN ALTERNATIVE PHASING PLAN FOR APPROVAL BY THE OWNER AND ENGINEER.
6. WHEN DEVELOPING AN ALTERNATIVE PHASING PLAN, CONTRACTOR SHALL UTILIZE THE PARAMETERS ON SHEET TCP-0.
7. WHEN SUBMITTING AN ALTERNATIVE PHASING PLAN FOR APPROVAL, A REVISED TRAFFIC CONTROL PLAN SHALL BE SUBMITTED WHICH REFLECTS THE ALTERNATIVE PHASING PLAN. THIS TRAFFIC CONTROL PLAN MUST BE REVIEWED, SIGNED AND SEALED BY A PROFESSIONAL ENGINEER.



STATE OF TEXAS
M.E. ROMANOWSKI
94306
LICENSED
PROFESSIONAL ENGINEER

P.E. 10/25/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

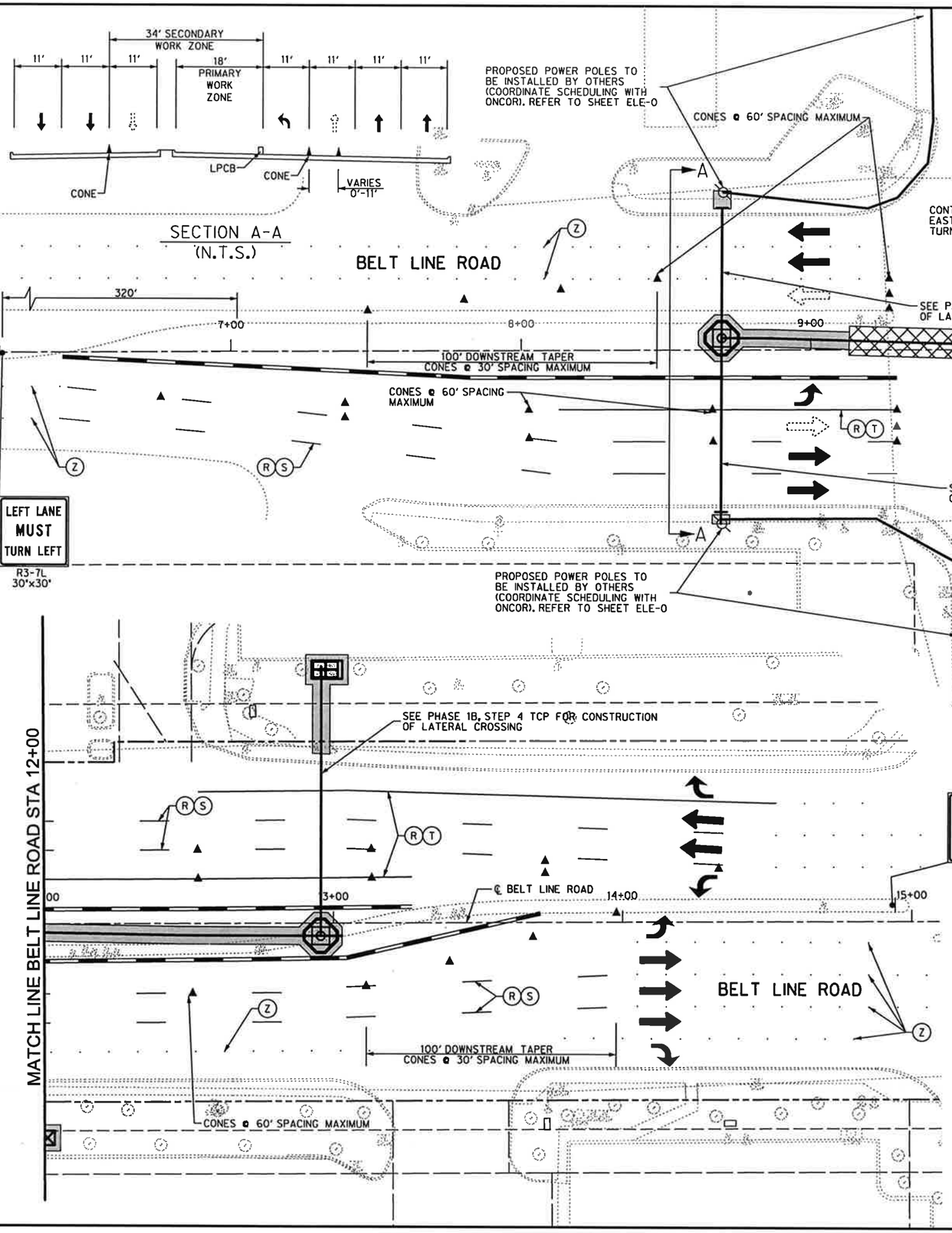
BELT LINE ROAD
UNDERGROUND ELECTRICAL

SUGGESTED SEQUENCE OF CONSTRUCTION
PHASE 1 - UNDERGROUND UTILITIES

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 738-0095

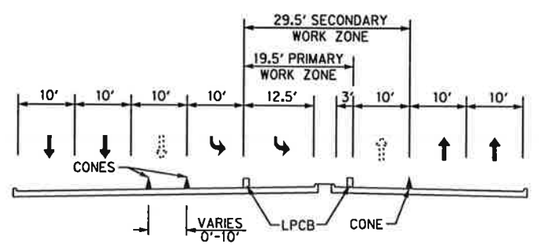
PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 DUCT BANK 01	SOC-1

USER: ah1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 SOC 01.dgn
TIME: 3:14:03 PM
DATE: 10/24/2013



LEGEND

- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS



SECTION B-B
(N.T.S.)

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.
2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.
3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

STATE OF TEXAS
M.E. ROMANOWSKI
96306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. Date 10/25/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

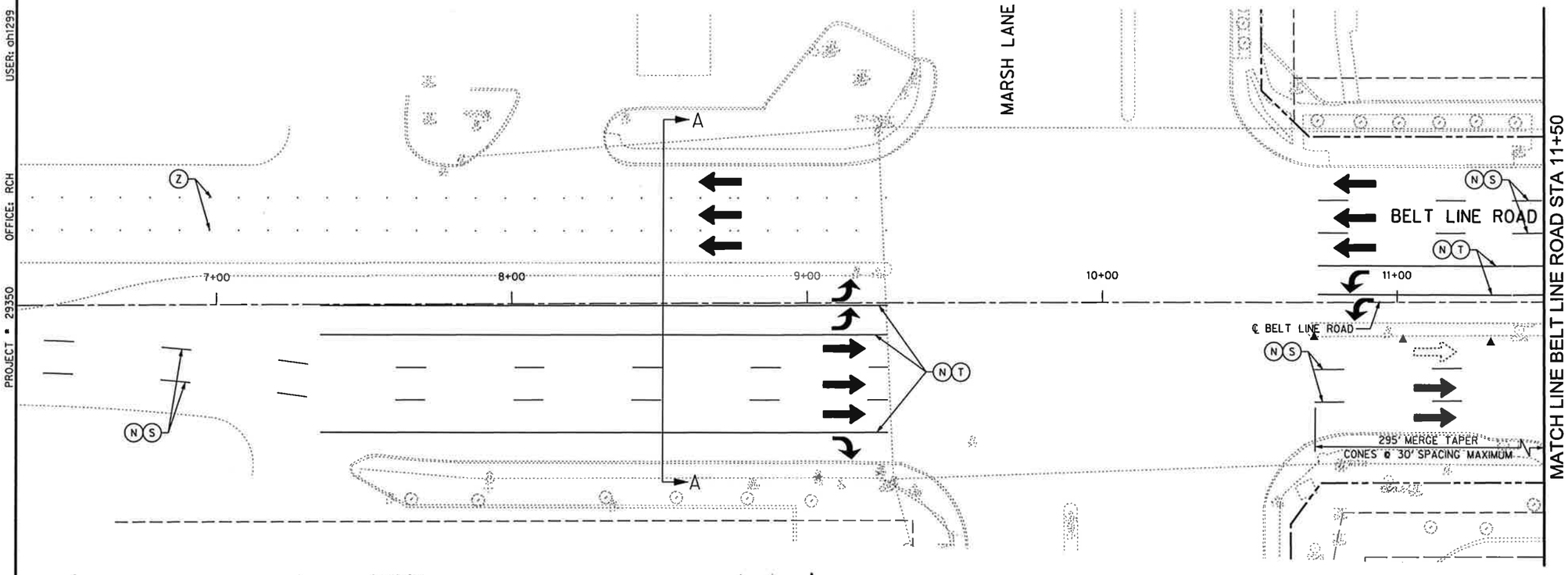
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

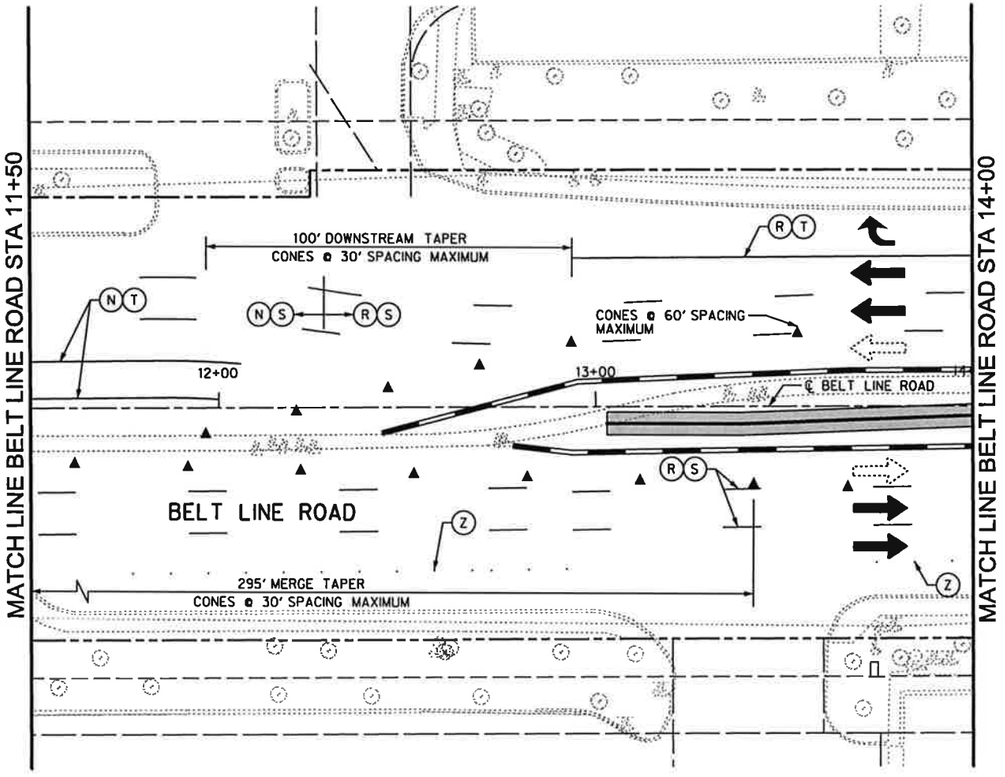
BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN - DUCT BANK PHASE 1, STEP 1

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 TCP1-01-01	TCP-1





0 10 20 30 40 60
SCALE IN FEET

N

LEGEND

- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

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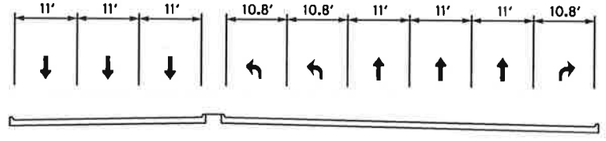
2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.
3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.



SECTION A-A
(N.T.S.)

STATE OF TEXAS
M.E. ROMANOWSKI
94306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. Date 10/25/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

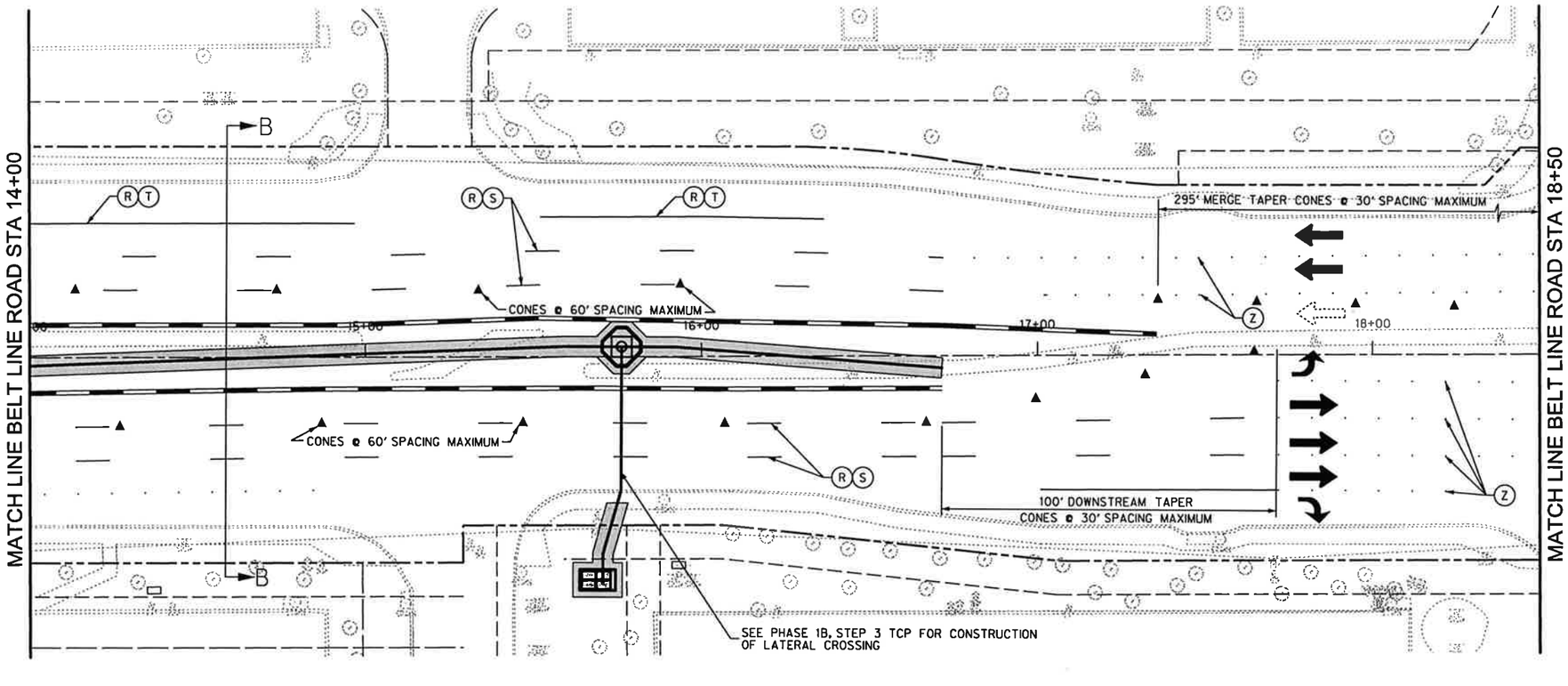
TRAFFIC CONTROL PLAN - DUCT BANK PHASE 1, STEP 2

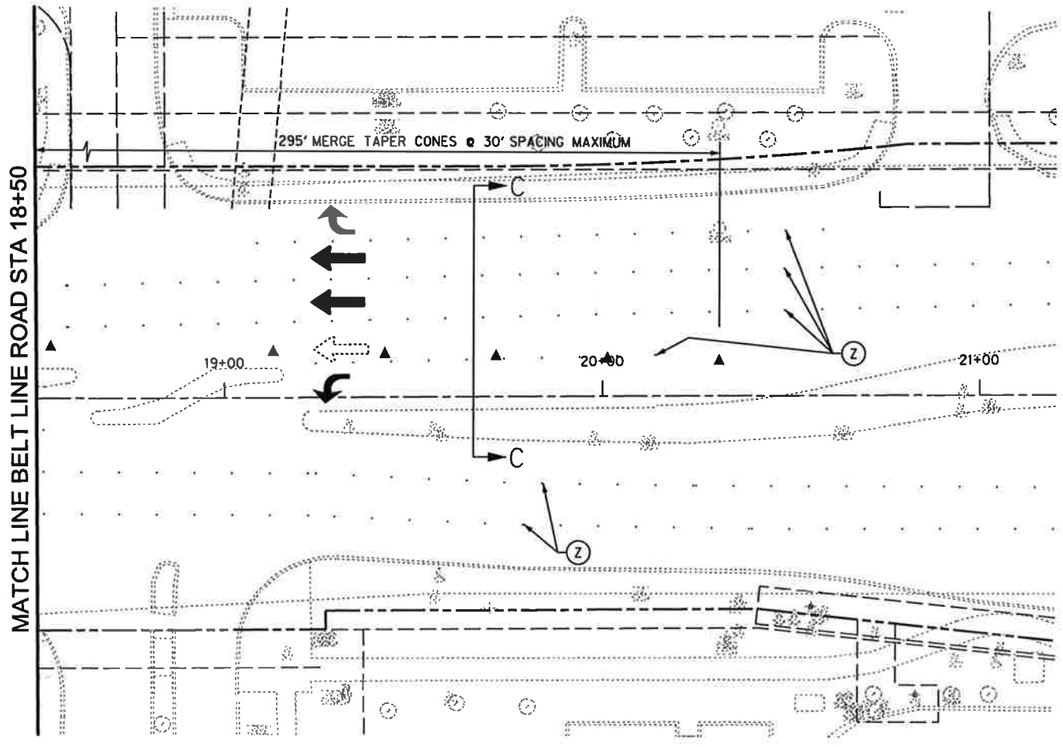
HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

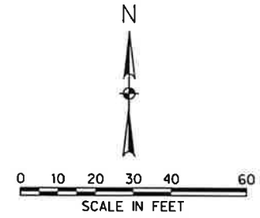
PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP01-02-01	TCP-2

SHEET 128 OF 235

USER: ah1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 TCP01-02-02.dgn
TIME: 3:14:18 PM
DATE: 10/24/2013







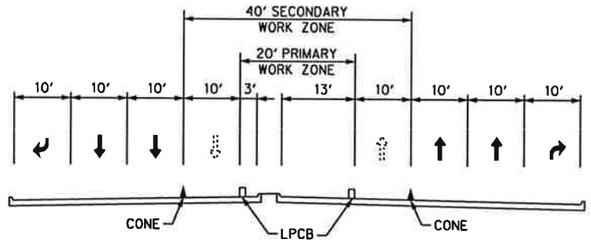
LEGEND

- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

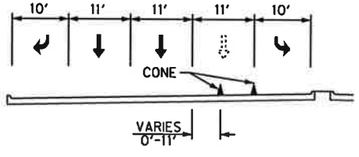
NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.



SECTION B-B
(N.T.S.)



SECTION C-C
(N.T.S.)

STATE OF TEXAS
M.E. ROMANOWSKI
94306
LICENSED
PROFESSIONAL ENGINEER

P.E. 10/25/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

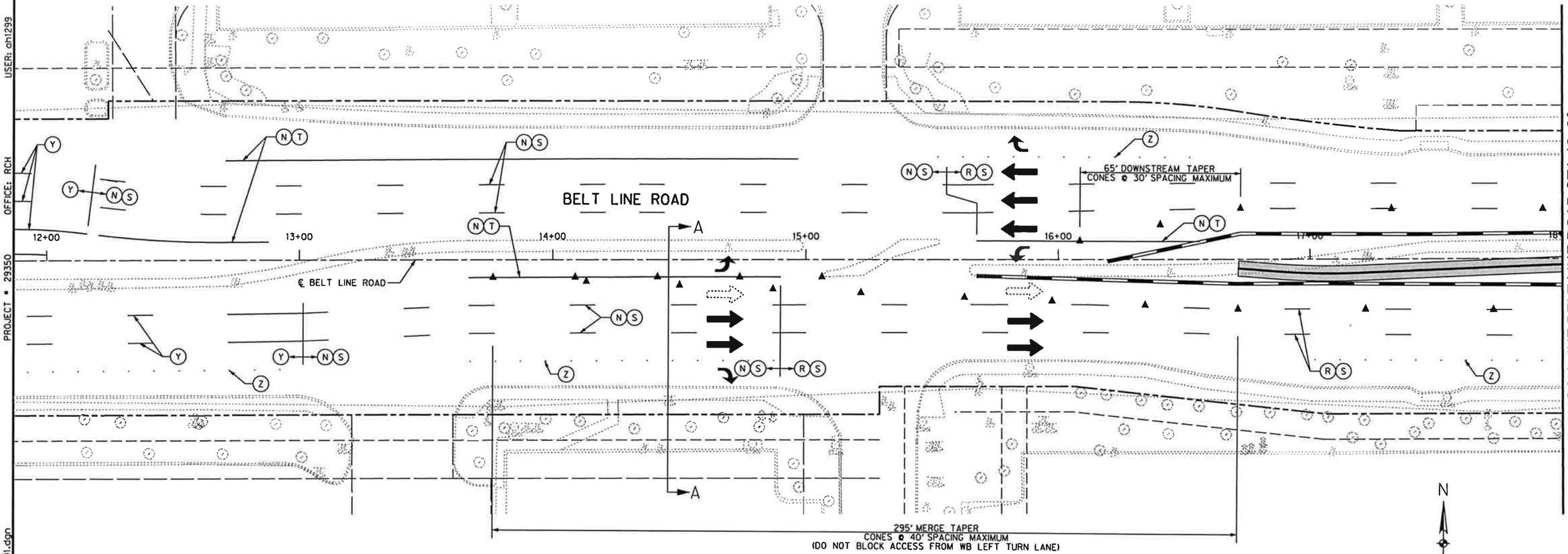
BELT LINE ROAD
UNDERGROUND ELECTRICAL

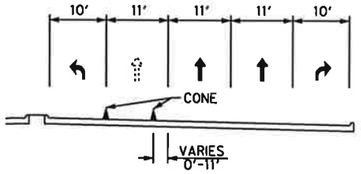
TRAFFIC CONTROL PLAN - DUCT BANK
PHASE 1, STEP 2

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP01-02-02	TCP-3

SHEET 129 OF 235





SECTION A-A
(N.T.S.)

LEGEND

- ▲ CONES
- ■ OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- ● DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

N

0 10 20 30 40 60
SCALE IN FEET

STATE OF TEXAS
M.E. ROMANOWSKI
84306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10/25/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

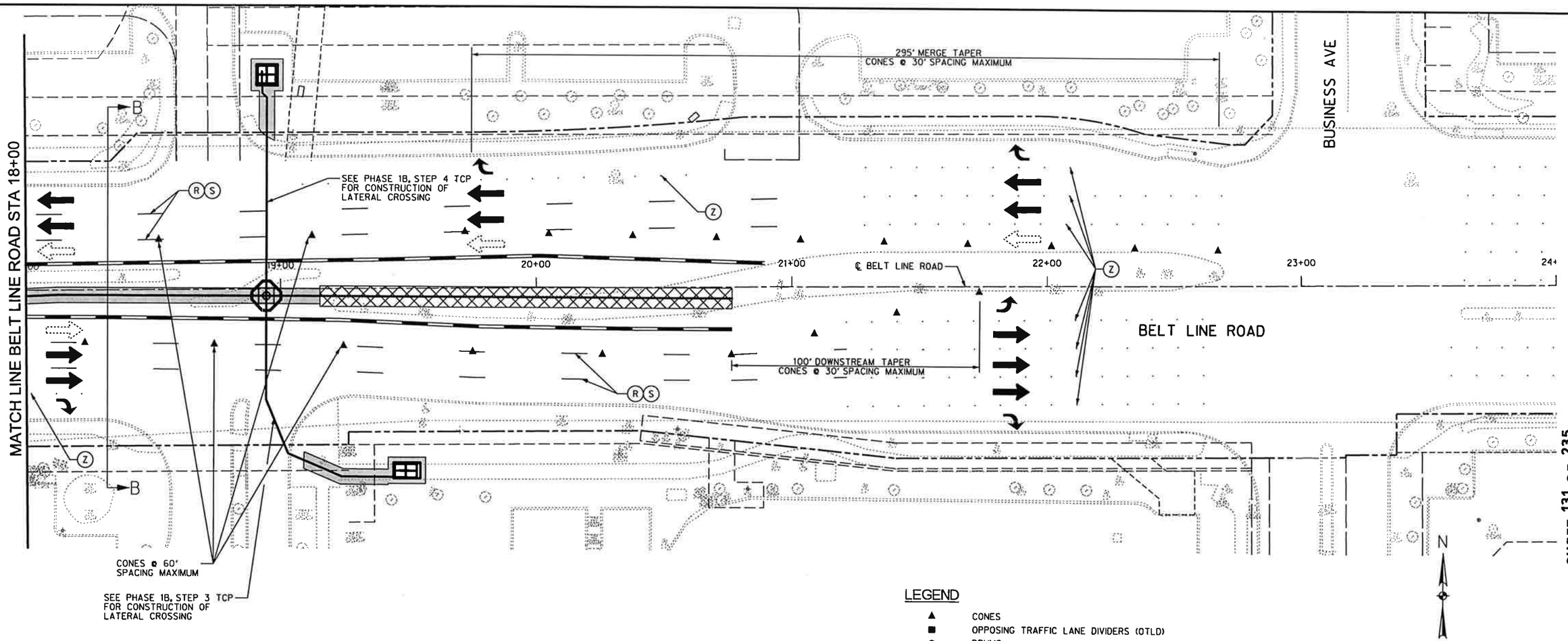
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

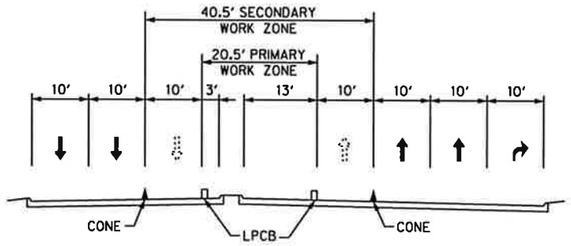
BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN - DUCT BANK
PHASE 1, STEP 3

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP01-03-01	TCP-4





SECTION B-B
(N.T.S.)

LEGEND

- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
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- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
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- DUCT BANK BORING
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NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

M.E. ROMANOWSKI 86306 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Signature of Registrant P.E. 10/25/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN - DUCT BANK
PHASE 1, STEP 3

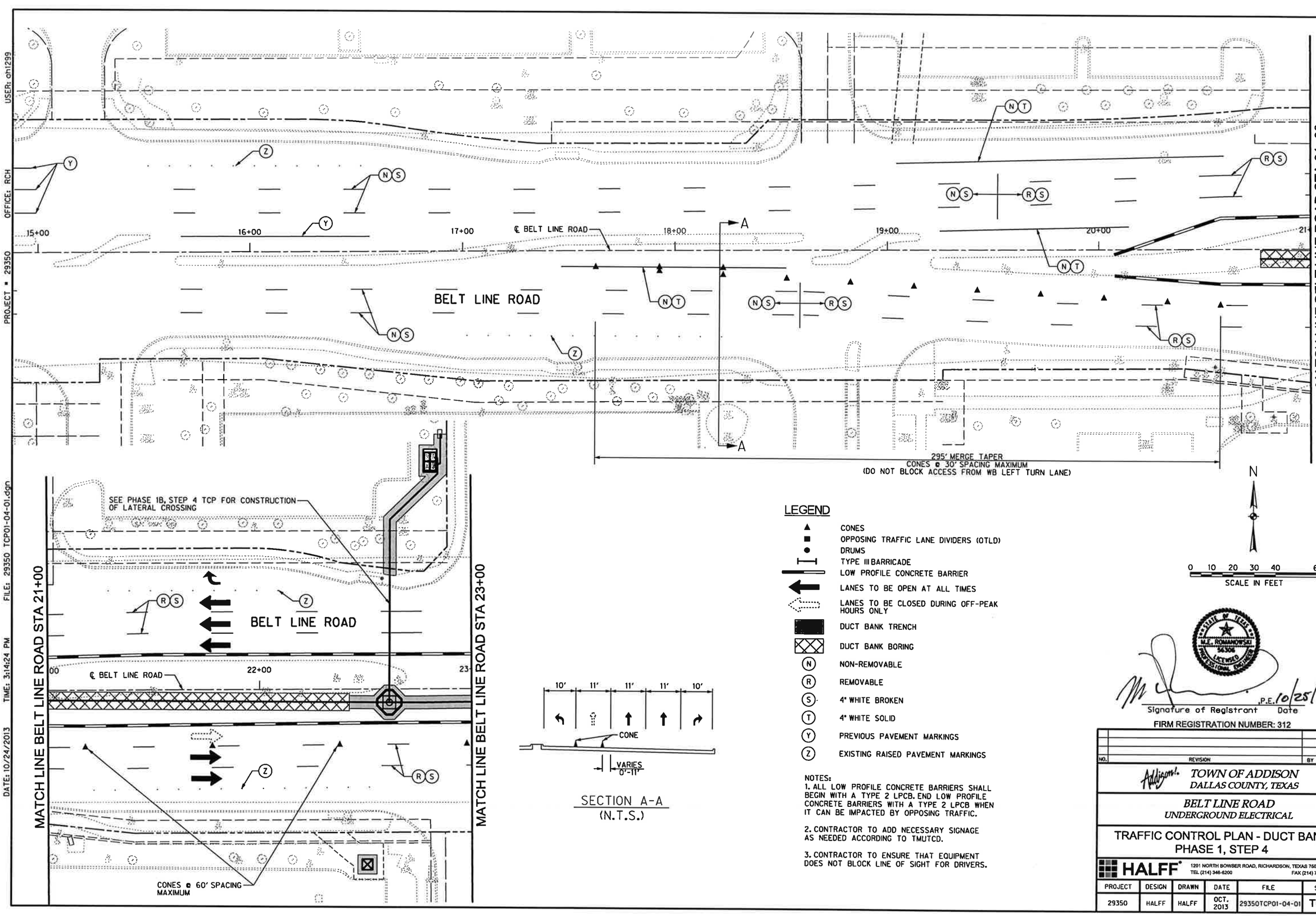
HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 738-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP01-03-02	TCP-5

SHEET 131 OF 235

DATE: 10/24/2013 TIME: 3:14:22 PM FILE: 29350 TCP01-03-02.dgn PROJECT # 29350 OFFICE: RCH USER: ah1299

USER: ah1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 TCP01-04-01.dgn
TIME: 3:14:24 PM
DATE: 10/24/2013



SECTION A-A
(N.T.S.)

LEGEND

- ▲ CONES
- ■ OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- ● DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
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- DUCT BANK BORING
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- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

M.E. ROMANOWSKI 94306 LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

Signature of Registrant P.E. 10/25/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

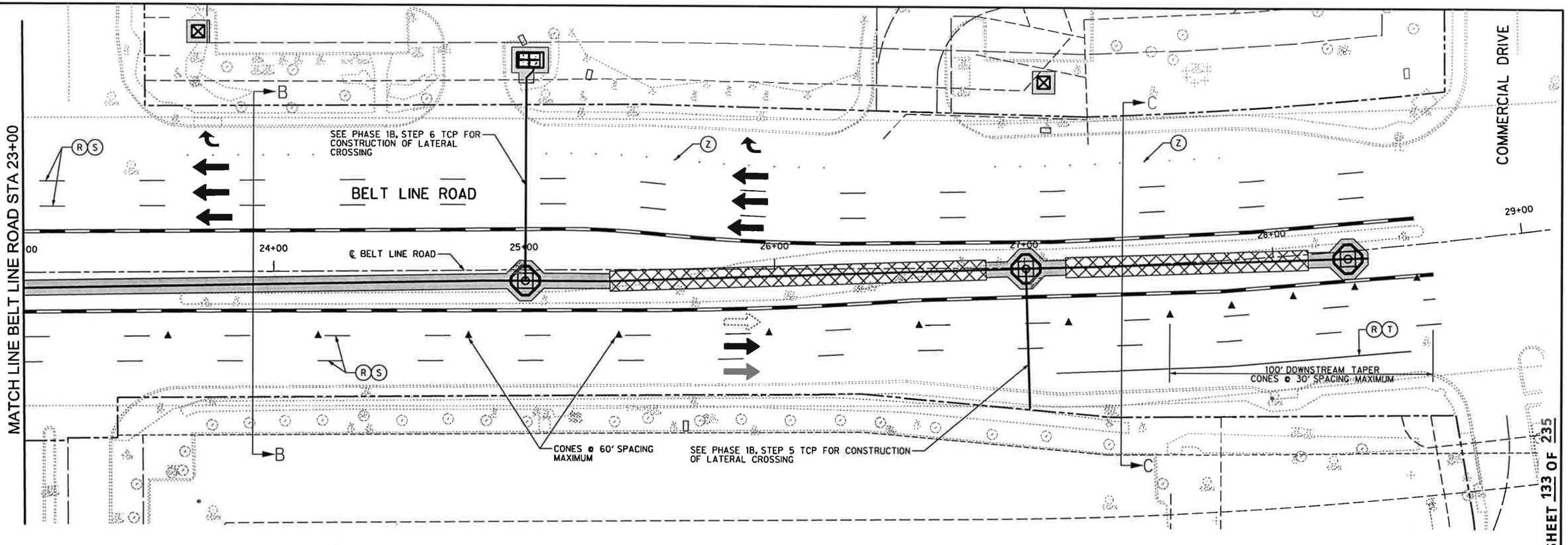
TRAFFIC CONTROL PLAN - DUCT BANK PHASE 1, STEP 4

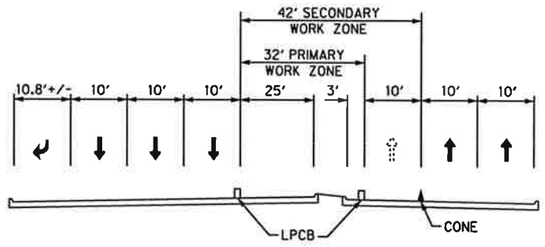
HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 738-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP01-04-01	TCP-6

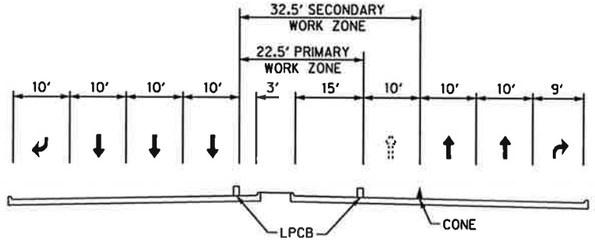
MATCH LINE BELT LINE ROAD STA 21+00

SHEET 132 OF 235





SECTION B-B
(N.T.S.)



SECTION C-C
(N.T.S.)

LEGEND

- ▲ CONES
- ■ OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- ● DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

N

0 10 20 30 40 60
SCALE IN FEET

M.E. ROMANOWSKI 56306 LAKEWOOD PROFESSIONAL ENGINEER

Signature of Registrant, P.E. Date 10/25/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

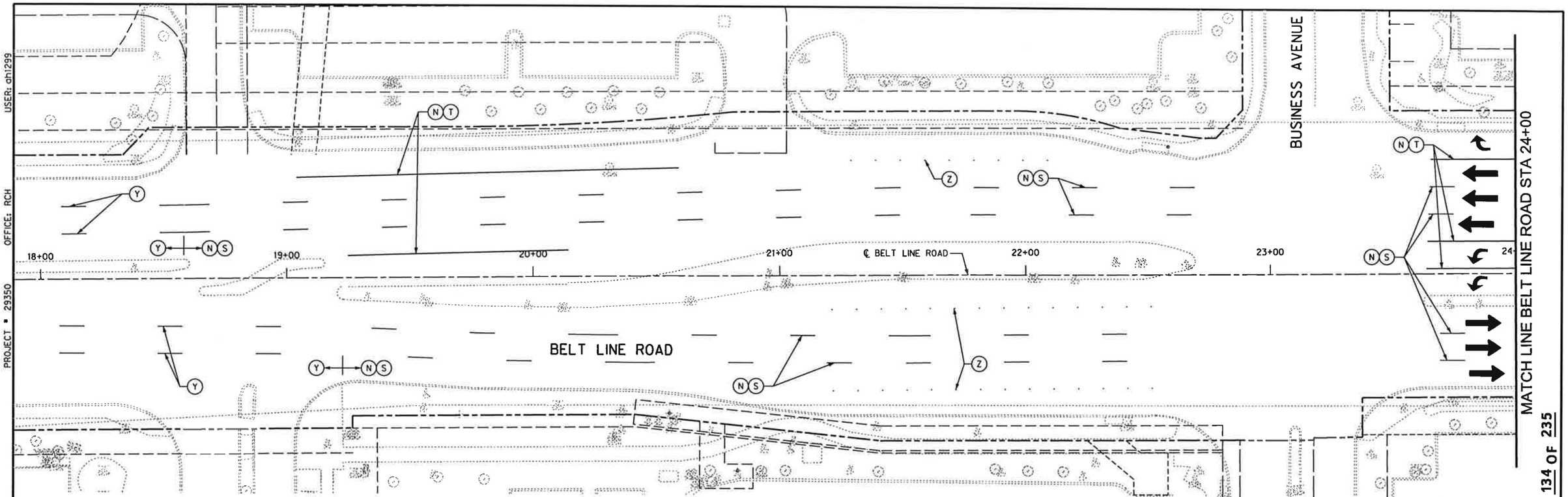
TRAFFIC CONTROL PLAN - DUCT BANK PHASE 1, STEP 4

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP01-04-02	TCP-7

SHEET 133 OF 235

USER: ah1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 TCP01-04-02.dgn
TIME: 3:14:26 PM
DATE: 10/24/2013



N

0 10 20 30 40 60

SCALE IN FEET

LEGEND

- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
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- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

STATE OF TEXAS
M.E. ROMANOWSKI
94306
LICENSED
PROFESSIONAL ENGINEER

P.E. 10/25/13

Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

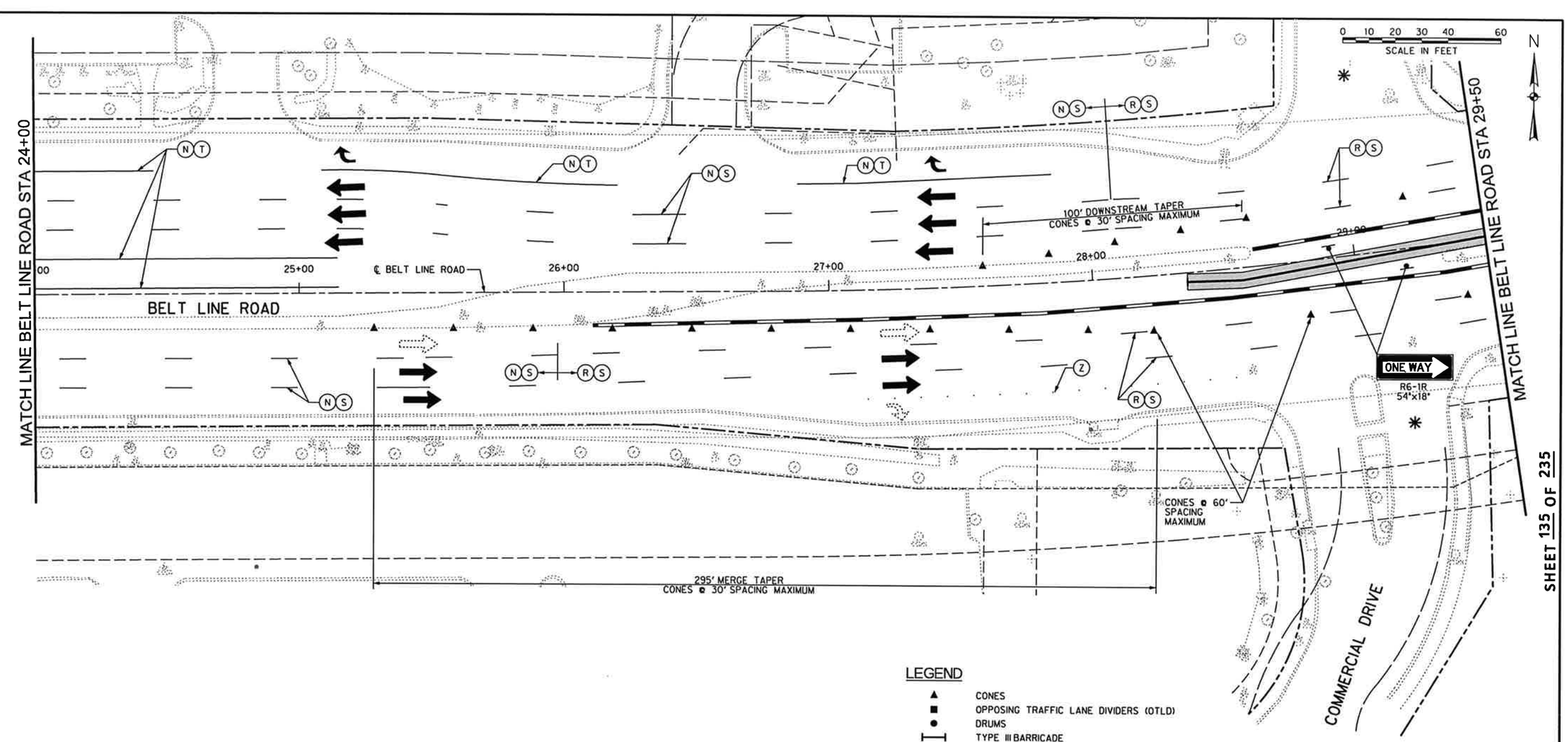
TRAFFIC CONTROL PLAN - DUCT BANK
PHASE 1, STEP 5

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL. (214) 346-6200 FAX (214) 738-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP01-05-01	TCP-8

SHEET 134 OF 235

USER: ah1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 TCP01-05-01.dgn
TIME: 3:14:27 PM
DATE: 10/24/2013



✱ CONTRACTOR SHALL ADD TRAFFIC CONTROL TO COMMERCIAL DRIVE TO NOTIFY DRIVERS THAT THE BELT LINE ROAD CROSSING IS CLOSED.

CONTRACTOR SHALL ALSO NOTIFY SIGNAL TECHNICIAN 48 HOURS PRIOR TO THE NEED FOR SIGNAL ADJUSTMENT.

LEGEND

- ▲ CONES
- ■ OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- ● DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
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- DUCT BANK BORING
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- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
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STATE OF TEXAS
M.E. ROMANOWSKI
56306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant, P.E. Date 10/25/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN - DUCT BANK PHASE 1, STEP 5

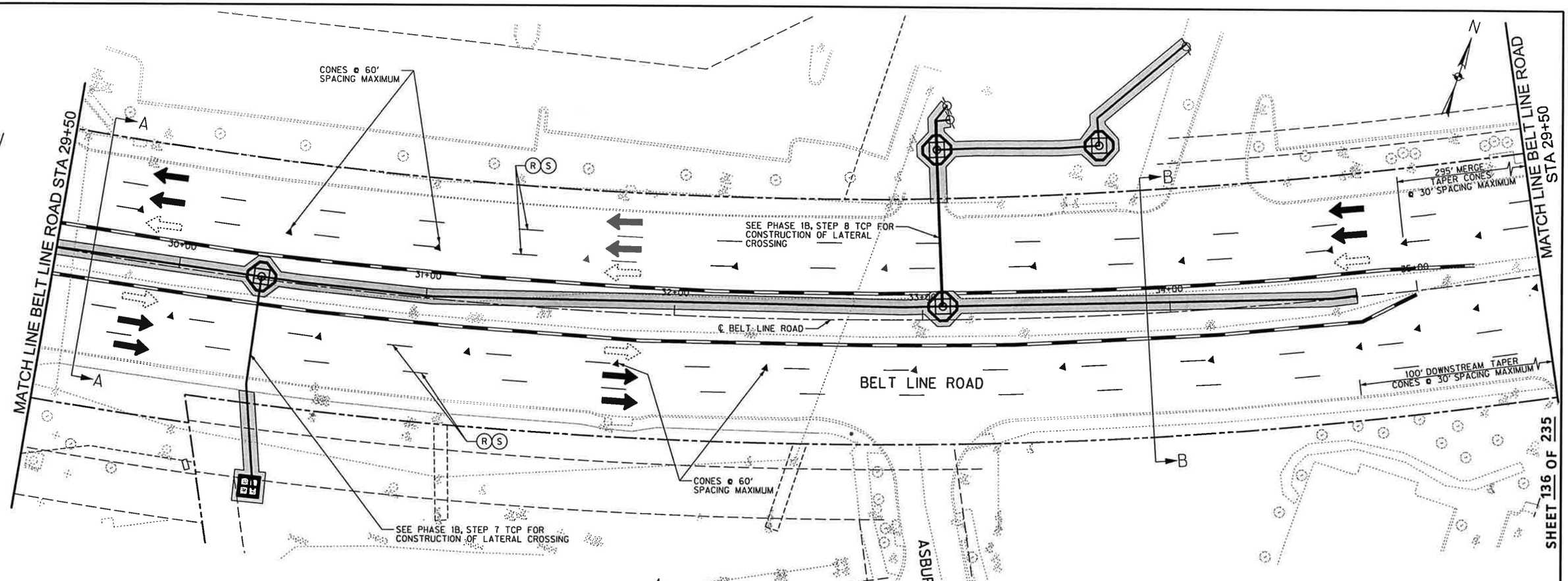
HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-8200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP01-05-02	TCP-9

SHEET 135 OF 235

DATE: 10/24/2013 TIME: 3:14:29 PM FILE: 29350 TCP01-05-02.dgn PROJECT # 29350 OFFICE: RCH USER: an1299

USER: ah1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 TCP01-05-03.dgn
TIME: 3:14:31 PM
DATE: 10/24/2013



LEGEND

- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
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- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

0 10 20 30 40 60
SCALE IN FEET

STATE OF TEXAS
M.E. ROMANOWSKI
94306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. Date 10/25/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

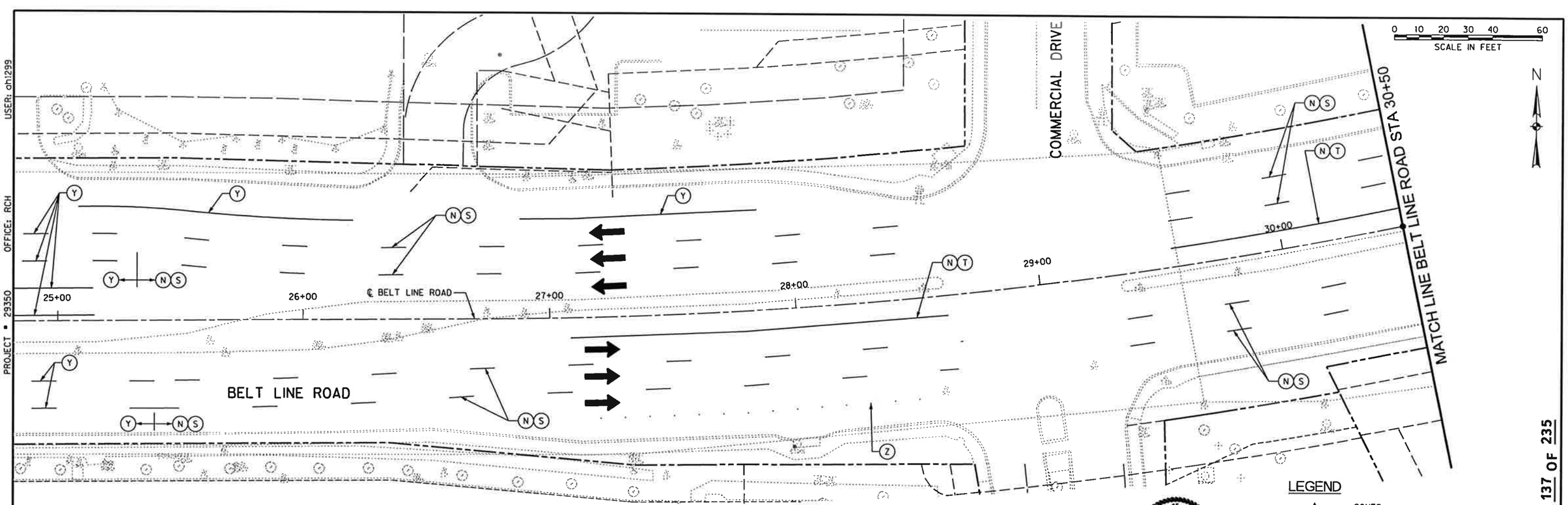
BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN - DUCT BANK PHASE 1, STEP 5

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP01-05-03	TCP-10

USER: ah1299
OFFICE: RCH
PROJECT • 29350
FILE: 29350 TCP01-06-01.dgn
TIME: 3:14:32 PM
DATE: 10/24/2013



NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

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STATE OF TEXAS
M.E. ROMANOWSKI
94306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10/25/13 Date

LEGEND

- ▲ CONES
- ■ OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- ● DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN - DUCT BANK PHASE 1, STEP 6

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP01-06-01	TCP-11

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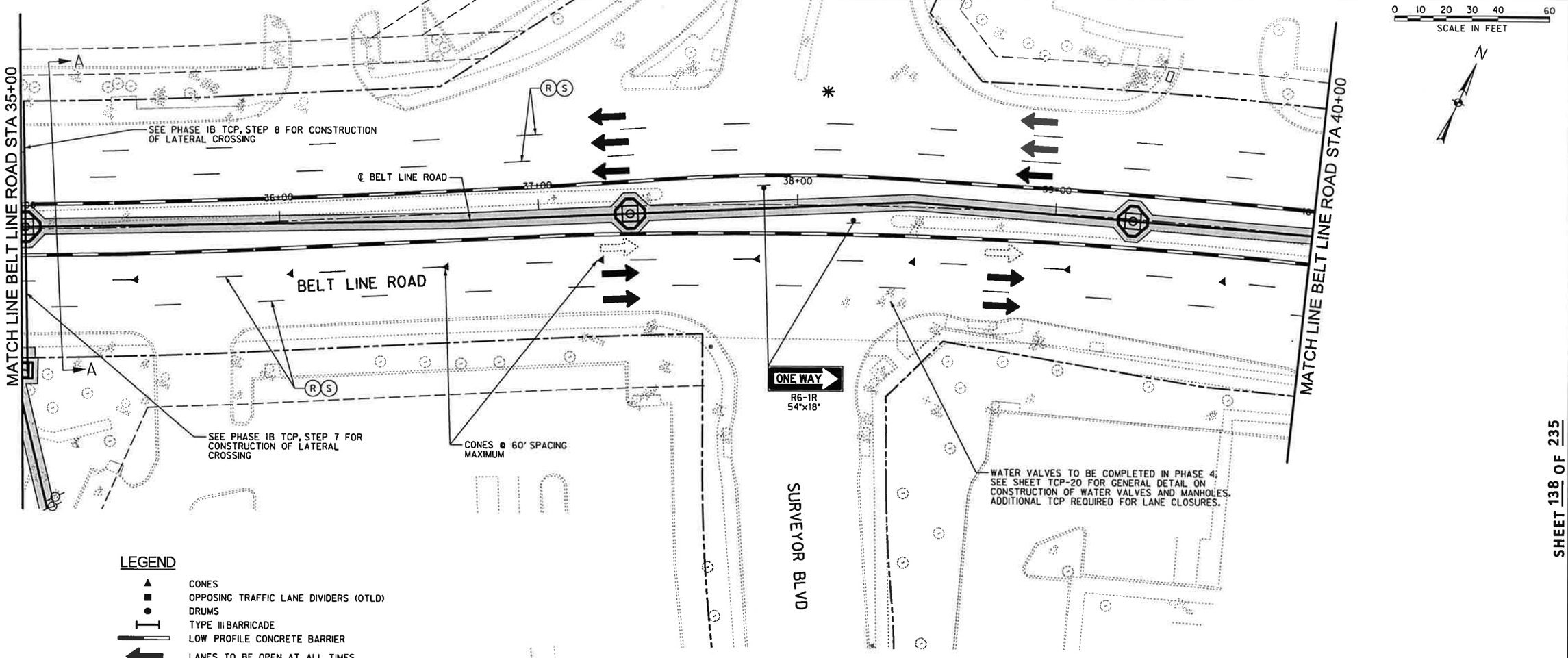
PROJECT # 29350 OFFICE: RCH USER: ah1299



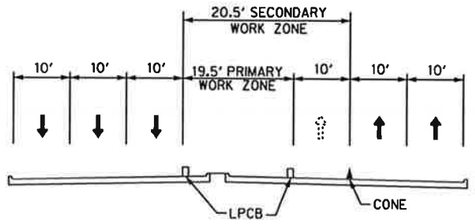
LEGEND

- ▲ CONES
- ■ OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- ● DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.



SECTION A-A
(N.T.S.)

✱ CONTRACTOR SHALL ADD TRAFFIC CONTROL TO SURVEYOR BLVD TO NOTIFY DRIVERS THAT THE BELT LINE ROAD CROSSING IS CLOSED.

CONTRACTOR SHALL ALSO NOTIFY SIGNAL TECHNICIAN 48 HOURS PRIOR TO THE NEED FOR SIGNAL ADJUSTMENT.

STATE OF TEXAS
M.E. ROMANOWSKI
54306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. Date 10/25/13

SHEET 138 OF 235

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN - DUCT BANK PHASE 1, STEP 6

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 738-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
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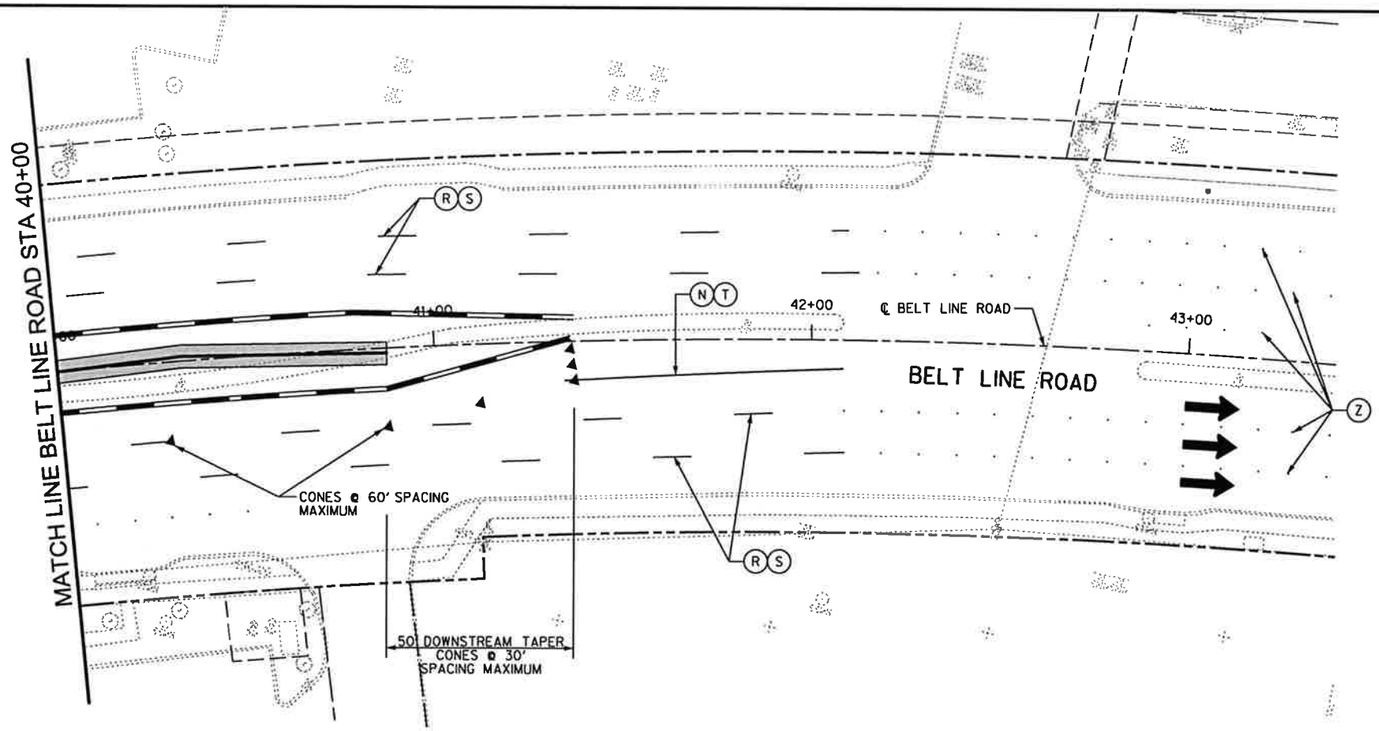

0 10 20 30 40 60
SCALE IN FEET

N

LEGEND

- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
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- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

M.E. ROMANOWSKI 96306 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

Signature of Registrant P.E. 10/25/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN - DUCT BANK PHASE 1, STEP 6

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275 TEL (214) 346-8200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
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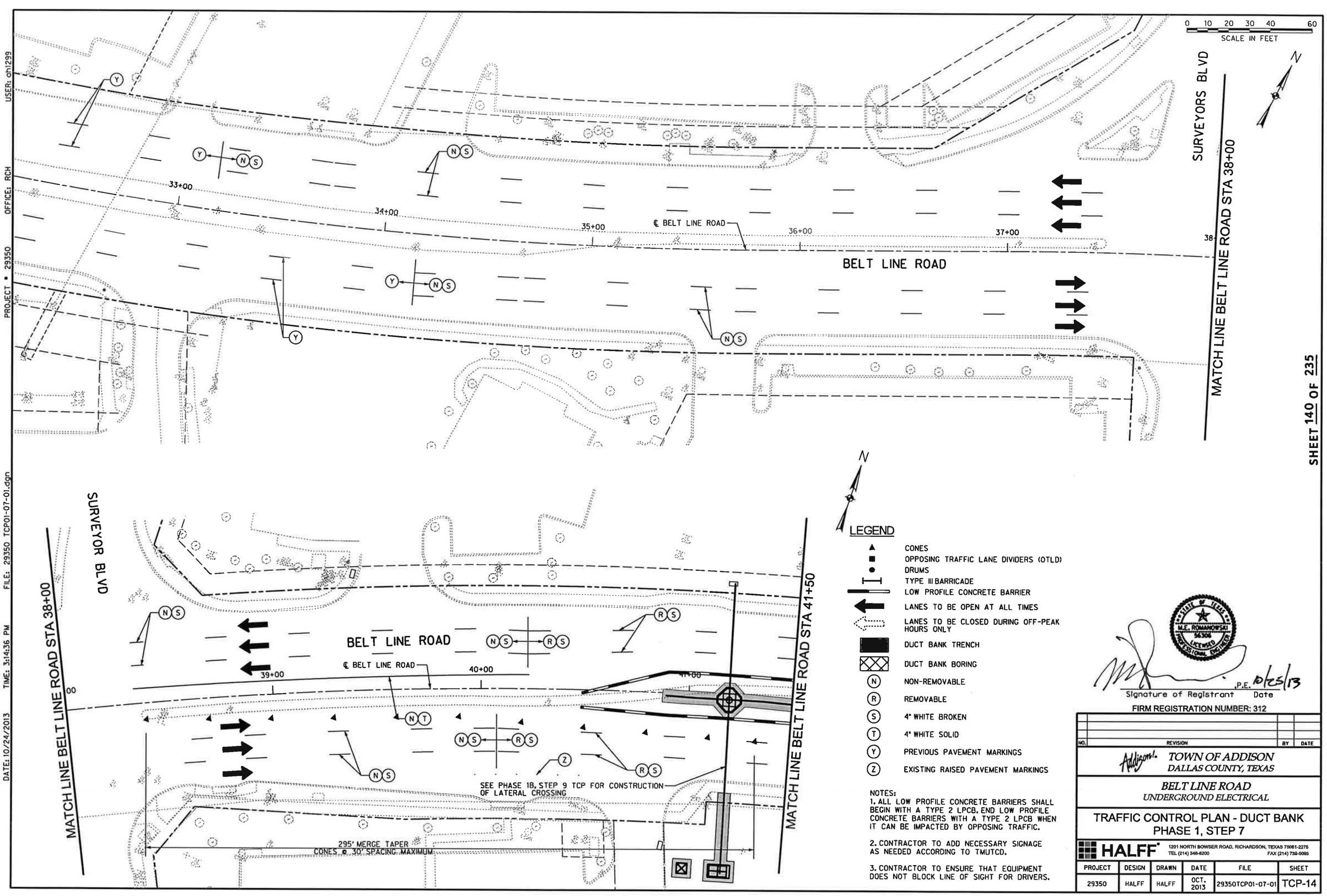

LEGEND

- ▲ CONES
- ■ OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- ● DRUMS
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STATE OF TEXAS
M.E. ROMANOWSKI
94306
LICENSED
PROFESSIONAL ENGINEER

P.E. 10/25/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

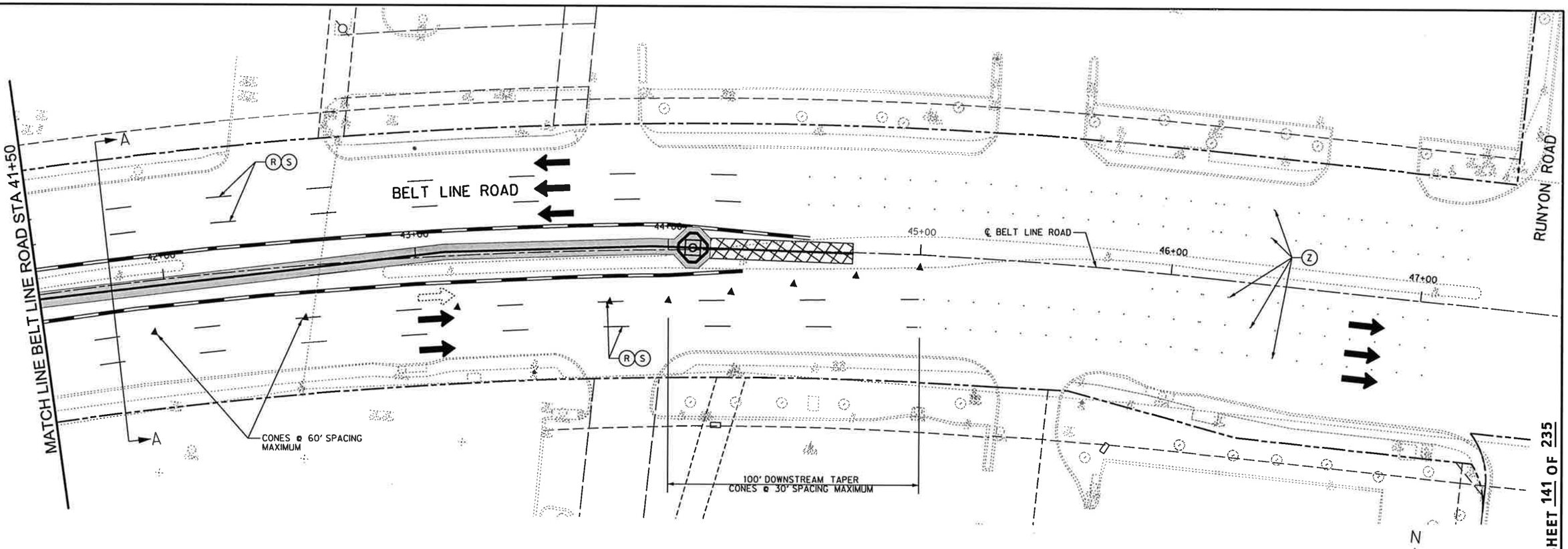
TRAFFIC CONTROL PLAN - DUCT BANK
PHASE 1, STEP 7

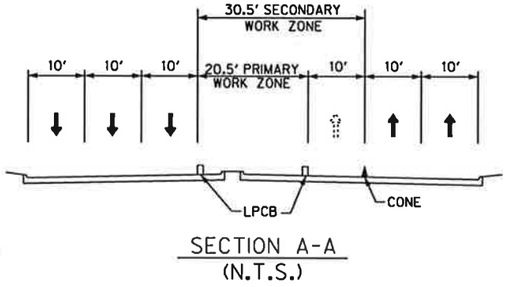
HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP01-07-01	TCP-14

SHEET 140 OF 235

USER: ah1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 TCP01-07-01.dgn
TIME: 3:14:36 PM
DATE: 10/24/2013





SECTION A-A
(N.T.S.)

LEGEND

- ▲ CONES
- ■ OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- ● DRUMS
- TYPE III BARRICADE
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STATE OF TEXAS
M.E. ROMANOWSKI
94306
LICENSED
PROFESSIONAL ENGINEER

P.E. 10/25/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN - DUCT BANK PHASE 1, STEP 7

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 738-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP01-07-02	TCP-15

USER: ah1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 TCP01-08-01.dgn
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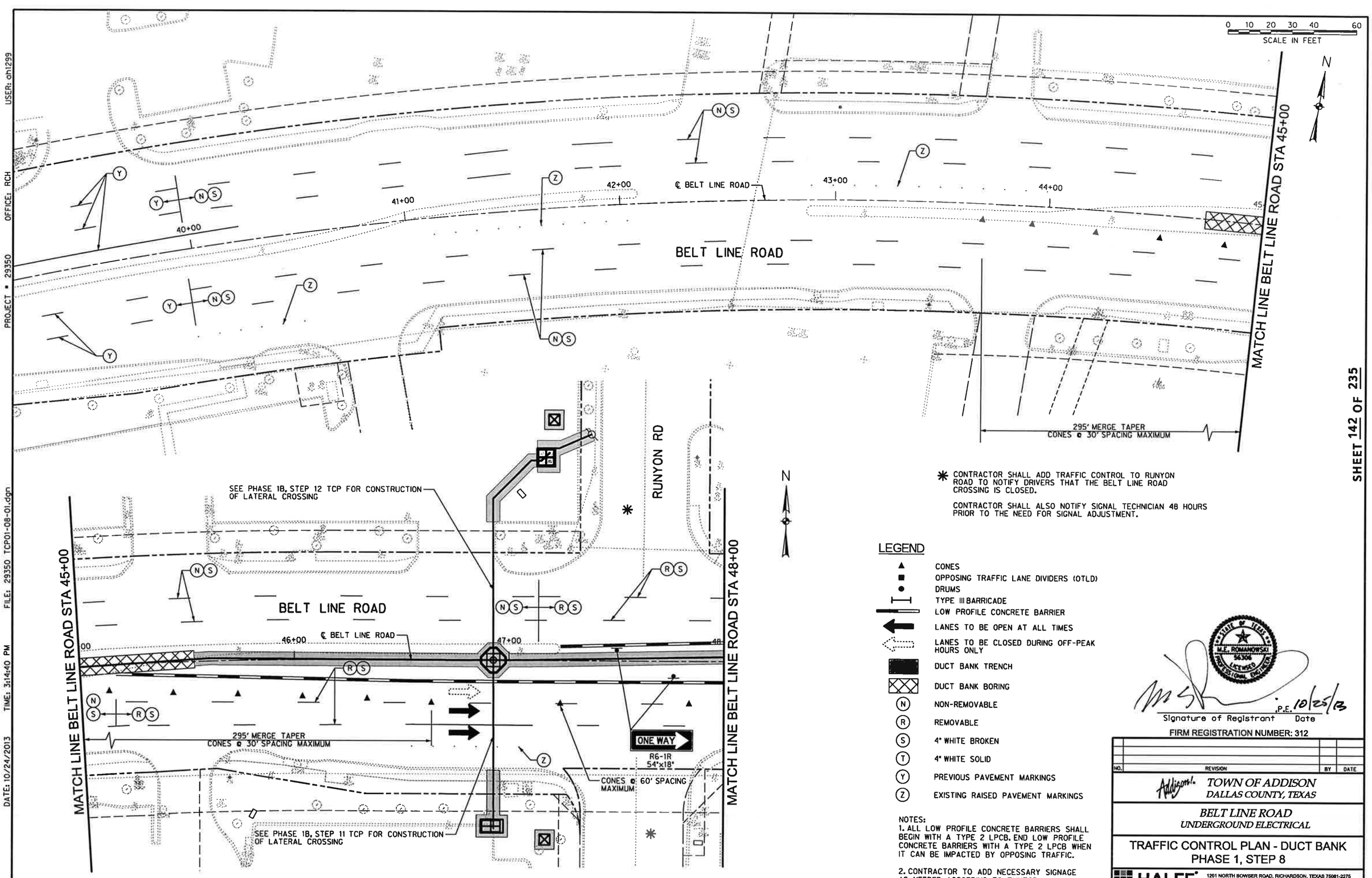
DATE: 10/24/2013



* CONTRACTOR SHALL ADD TRAFFIC CONTROL TO RUNYON ROAD TO NOTIFY DRIVERS THAT THE BELT LINE ROAD CROSSING IS CLOSED.

CONTRACTOR SHALL ALSO NOTIFY SIGNAL TECHNICIAN 48 HOURS PRIOR TO THE NEED FOR SIGNAL ADJUSTMENT.

LEGEND

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STATE OF TEXAS
M.E. ROMANOWSKI
84306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10/25/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN - DUCT BANK PHASE 1, STEP 8

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP01-08-01	TCP-16

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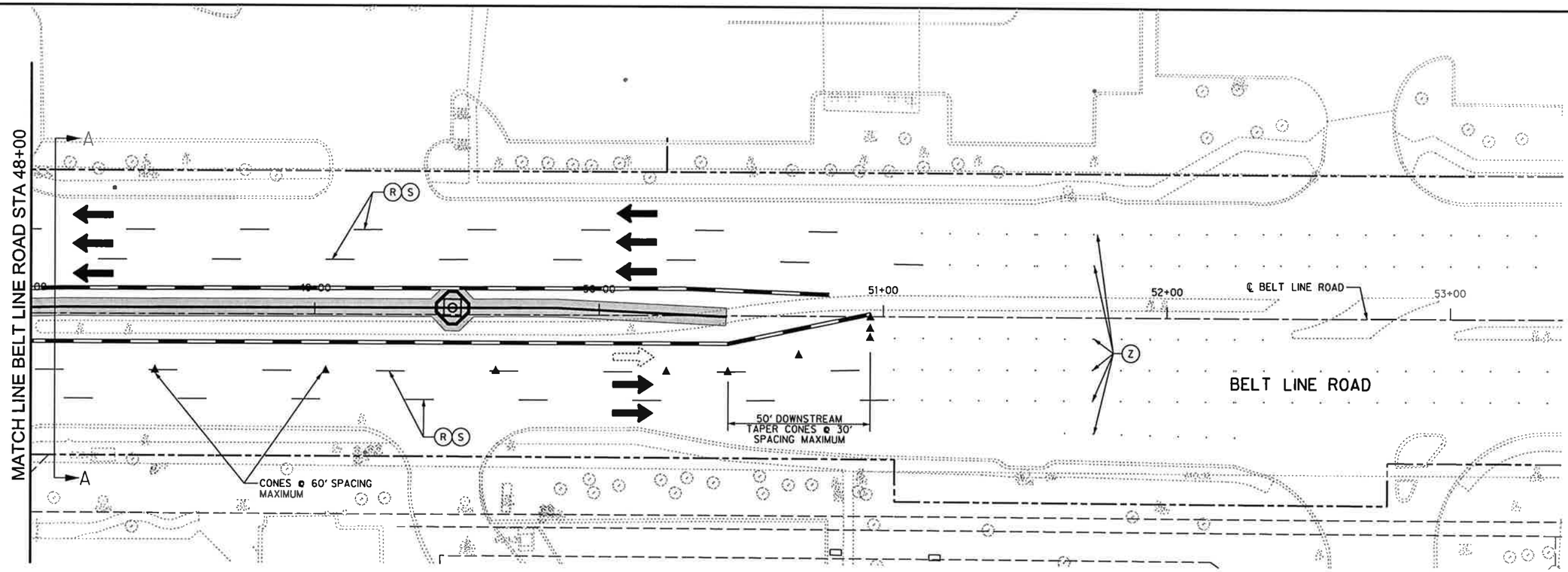

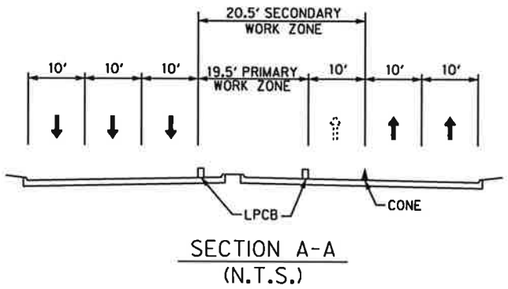

SECTION A-A
(N.T.S.)

LEGEND

- ▲ CONES
- ■ OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- ● DRUMS
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3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

N

0 10 20 30 40 60
SCALE IN FEET

STATE OF TEXAS
M.E. ROMANOWSKI
96306
LICENSED
PROFESSIONAL ENGINEER

P.E. 10/25/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN - DUCT BANK
PHASE 1, STEP 8

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP01-08-02	TCP-17

RUNYON ROAD

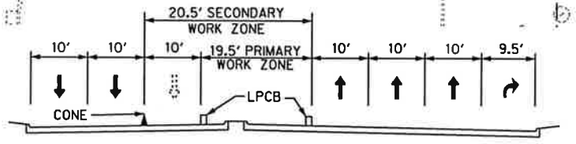
75' DOWNSTREAM TAPER
CONES @ 30' SPACING MAXIMUM

45+00 46+00 47+00 ℄ BELT LINE ROAD 48+00 49+00 50+00 51

BELT LINE ROAD

MATCH LINE BELT LINE ROAD STA 51+00

MATCH LINE BELT LINE ROAD STA 54+00



SECTION A-A
(N.T.S.)

CONES @ 60' SPACING MAXIMUM

295' MERGE TAPER
CONES @ 30' SPACING MAXIMUM

SEE PHASE 1B, STEP 14 TCP FOR CONSTRUCTION OF LATERAL CROSSING

52+00 53+00 54

℄ BELT LINE ROAD

BELT LINE ROAD

SEE PHASE 1B, STEP 13 TCP FOR CONSTRUCTION OF LATERAL CROSSING

LEGEND

- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
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NOTES:
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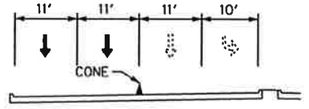

SECTION B-B
(N.T.S.)

N

0 10 20 30 40 60
SCALE IN FEET

STATE OF TEXAS
M.E. ROMANOWSKI
56306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. Date 10/25/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN - DUCT BANK
PHASE 1, STEP 9

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP01-09-01	TCP-18

USER: ah1299
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PROJECT # 29350
FILE: 29350 TCP01-09-01.dgn
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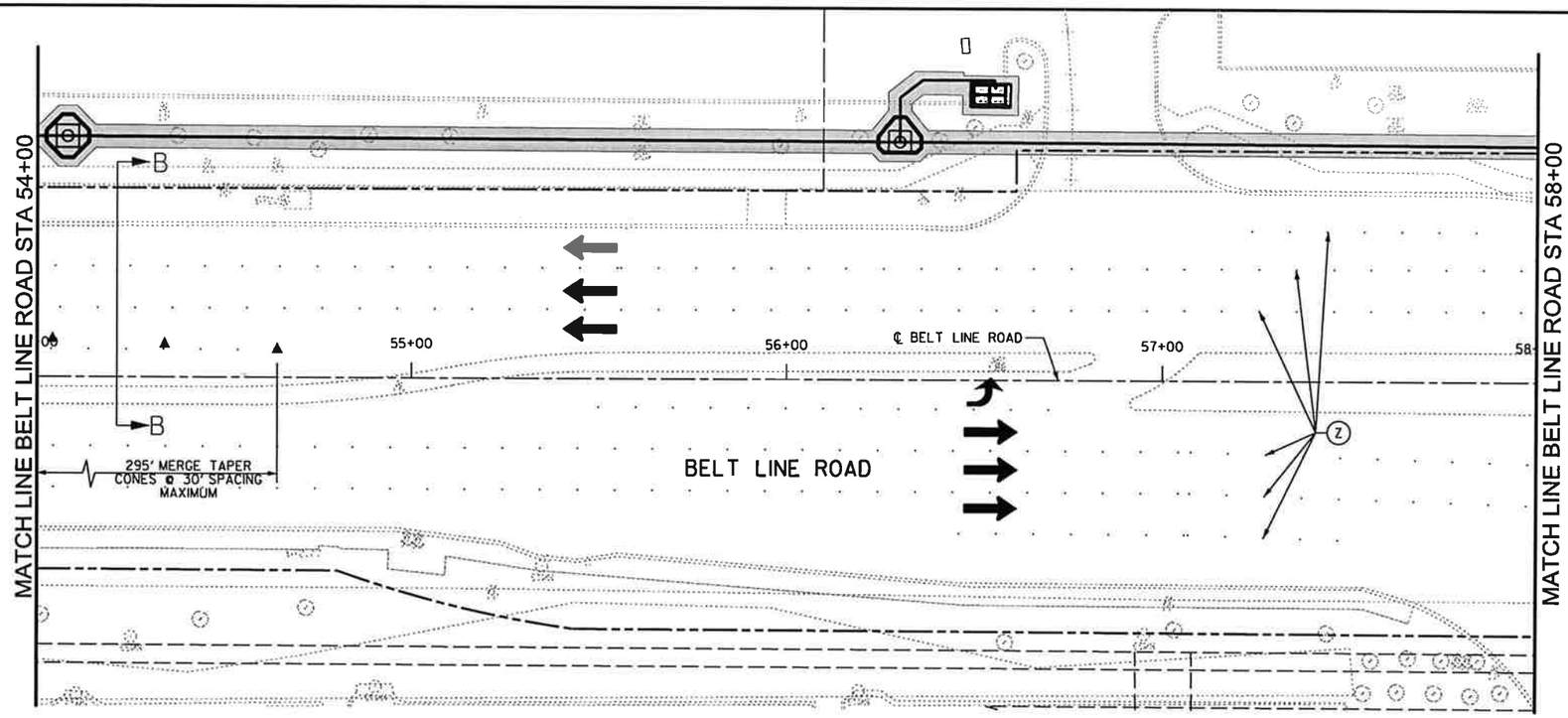
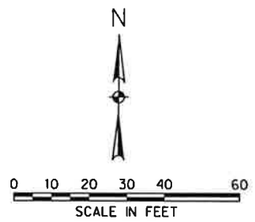
DATE: 10/24/2013





LEGEND

- ▲ CONES
- ■ OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- ● DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
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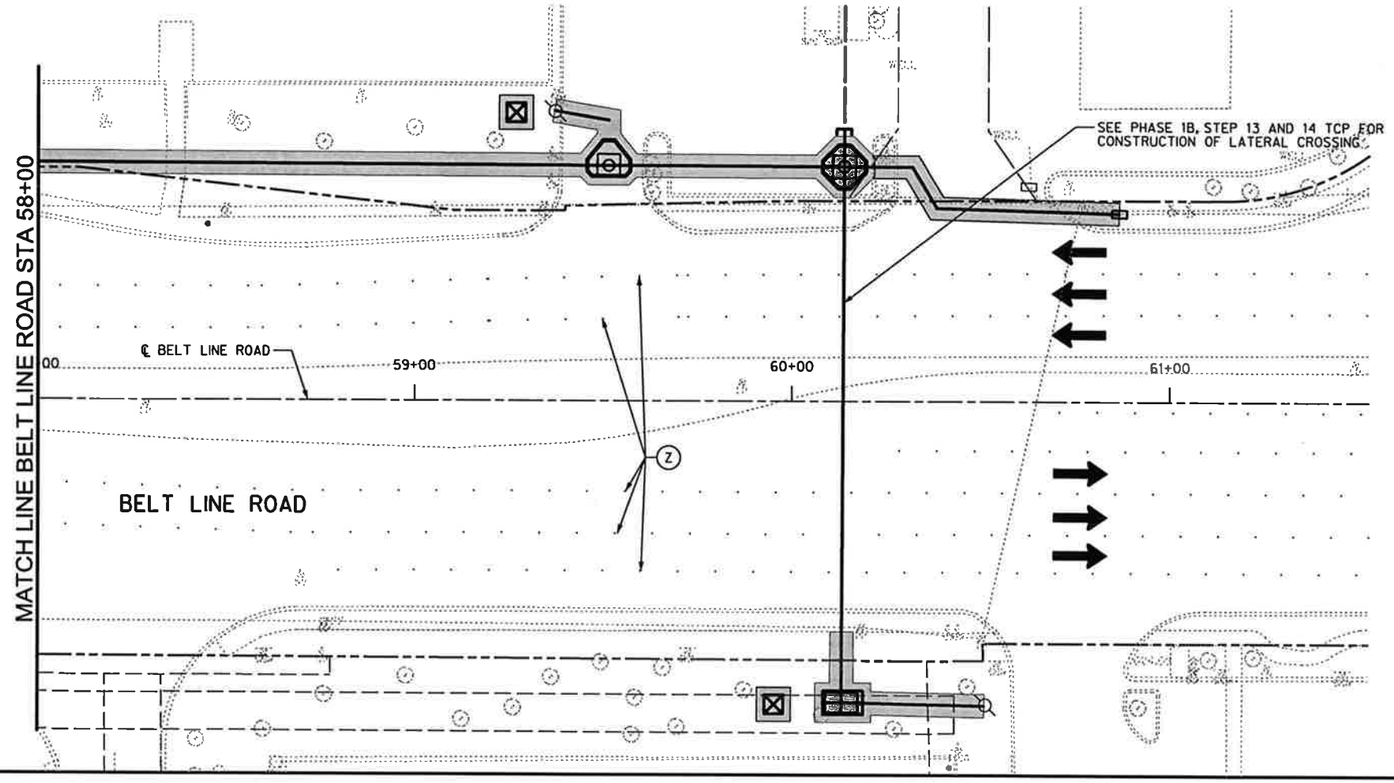
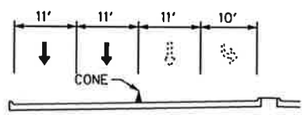
NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.





SECTION B-B
(N.T.S.)

M.E. ROMANOWSKI 94306 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

Signature of Registrant P.E. 10/25/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN - DUCT BANK
PHASE 1, STEP 9

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275 TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP01-09-02	TCP-19

DATE: 10/24/2013 TIME: 4:35:55 PM FILE: 29350 TCP01-09-02.dgn
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USER: dh1299
OFFICE: RCH
PROJECT # 29350
DATE: 10/24/2013 TIME: 3:14:49 PM FILE: 29350 TCP01-02-03.dgn

BELT LINE ROAD

16+00 17+00 18+00 19+00 20+00 ℄ BELT LINE ROAD 21+00

MATCH LINE BELT LINE ROAD STA 21+50

295' MERGE TAPER DRUMS @ 30' SPACING MAXIMUM
(MAINTAIN ACCESS TO RIGHT TURN LANES, DRIVEWAYS, AND CROSS-STREETS)

148' TANGENT DRUMS @ 60' SPACING MAXIMUM
(MAINTAIN ACCESS TO RIGHT TURN LANES, DRIVEWAYS, AND CROSS-STREETS)

148' MERGE TAPER @ 60' SPACING MAXIMUM
(MAINTAIN ACCESS TO RIGHT TURN LANES, DRIVEWAYS, AND CROSS-STREETS)

SHEET 146 OF 235

MATCH LINE BELT LINE ROAD STA 21+50

BELT LINE ROAD

22+00 23+00 24+00

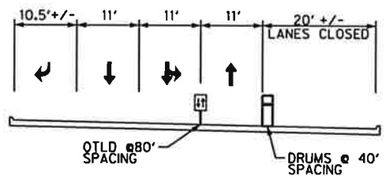
℄ BELT LINE ROAD

MATCH LINE BELT LINE ROAD STA 24+50

148' MERGE TAPER @ 60' SPACING MAXIMUM
(MAINTAIN ACCESS TO RIGHT TURN LANES, DRIVEWAYS, AND CROSS-STREETS)

BUSINESS AVE

✱ CONTRACTOR SHALL REQUEST SIGNAL TIMING TO BE ADJUSTED BY TOWN 48 HOURS PRIOR TO LANE CLOSURES. CONTRACTOR SHALL ALSO DIRECT CROSS-STREET TRAFFIC AS NEEDED.



SECTION A-A
(N.T.S.)

LEGEND

- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
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N

0 10 20 30 40 60
SCALE IN FEET

STATE OF TEXAS
M.E. ROMANOWSKI
83306
LICENSED
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P.E. 10/25/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

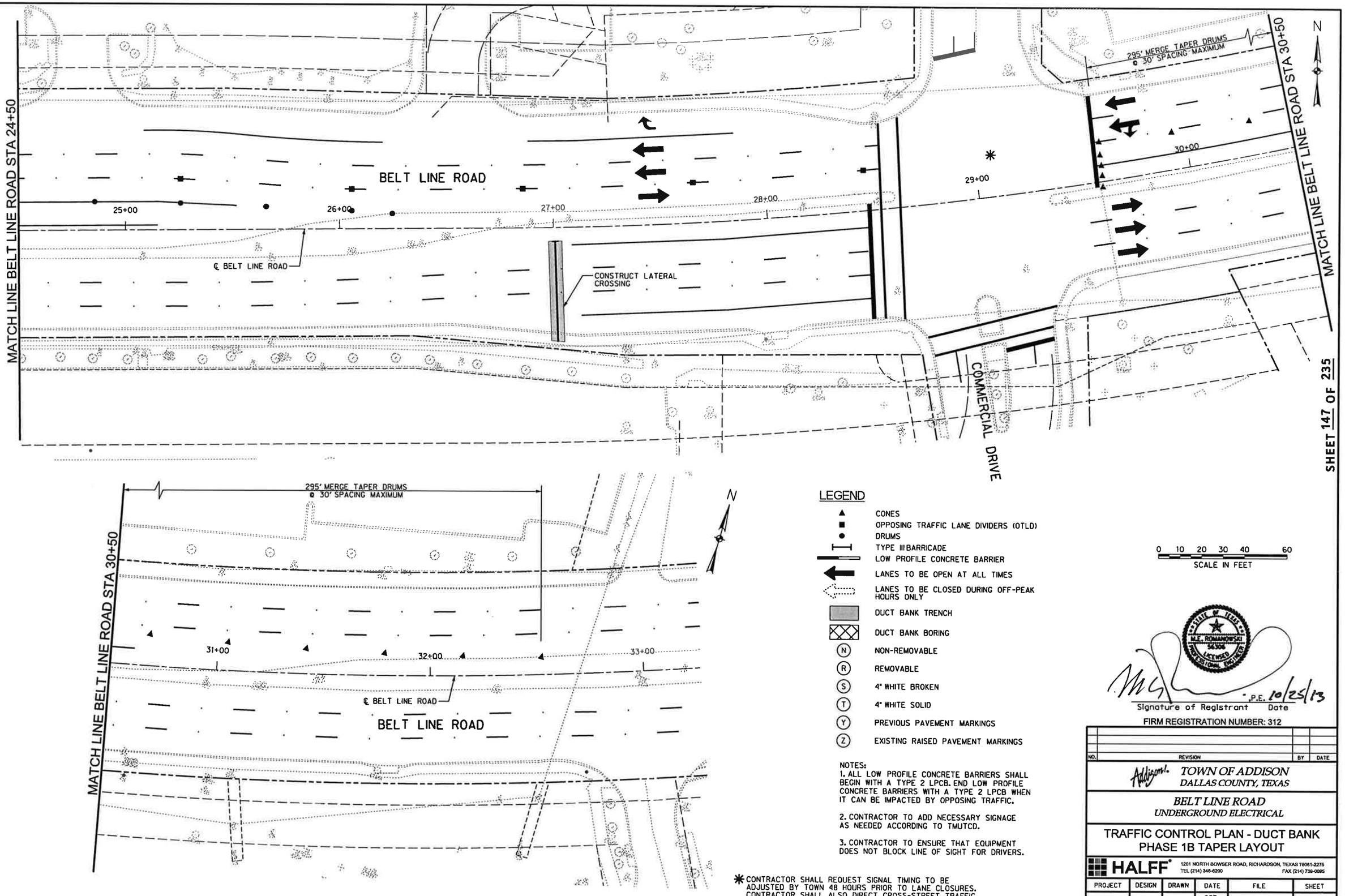
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN - DUCT BANK PHASE 1B TAPER LAYOUT

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP01-02-03	TCP-20



LEGEND

- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

✱ CONTRACTOR SHALL REQUEST SIGNAL TIMING TO BE ADJUSTED BY TOWN 48 HOURS PRIOR TO LANE CLOSURES. CONTRACTOR SHALL ALSO DIRECT CROSS-STREET TRAFFIC AS NEEDED.

0 10 20 30 40 60
SCALE IN FEET

STATE OF TEXAS
M.E. ROMANOWSKI
54306
LICENSED PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10/25/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

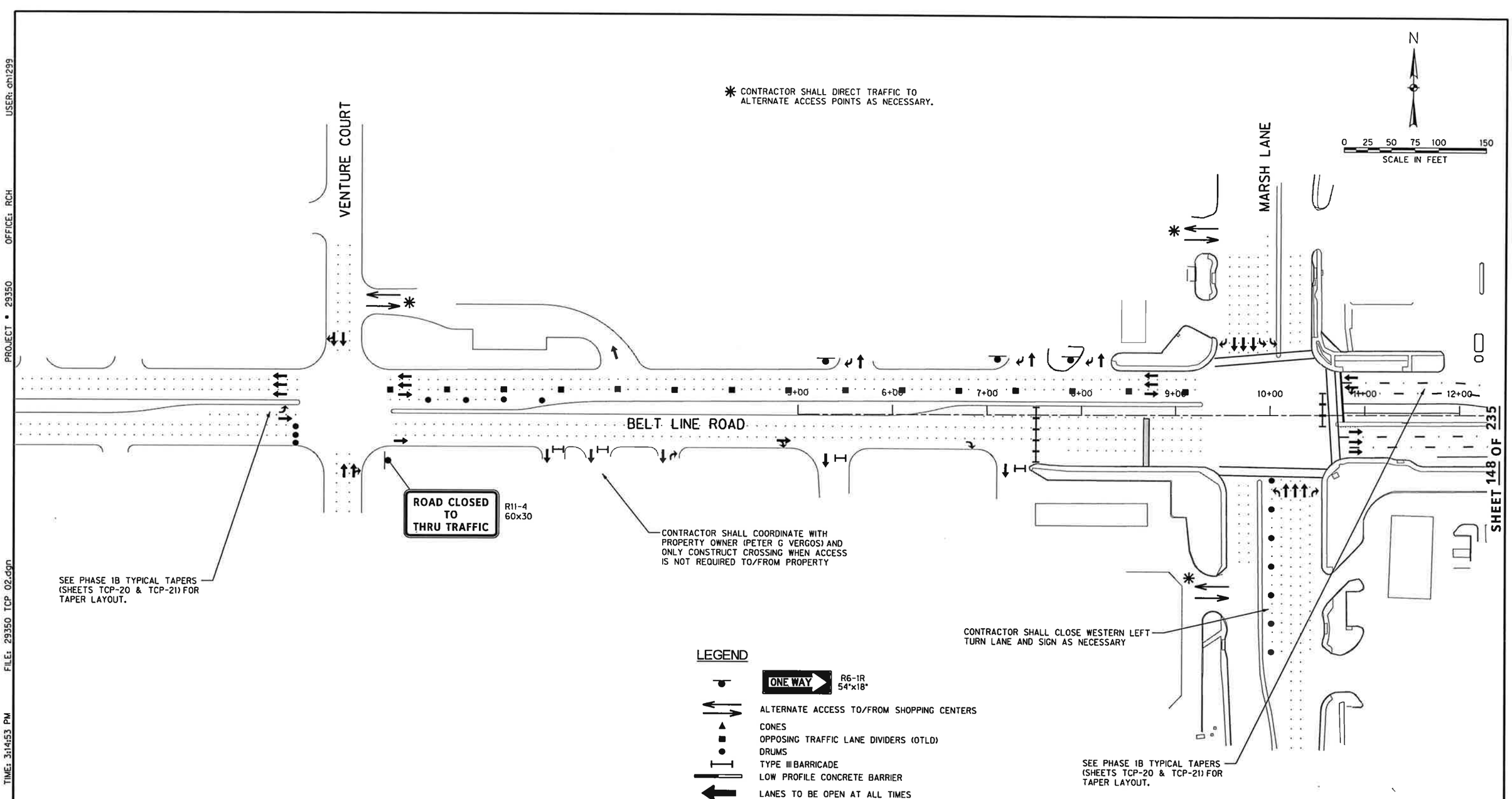
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN - DUCT BANK PHASE 1B TAPER LAYOUT

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP01-02-04	TCP-21



SHEET 148 OF 235

LEGEND

- ONE WAY — R6-1R 54"x18"
- ALTERNATE ACCESS TO/FROM SHOPPING CENTERS
- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

4. CONTRACTOR MAY WORK ON PHASE 1B, STEP 1 CONCURRENTLY WITH PHASE 1, STEPS 1.

M.E. ROMANOWSKI 56306 LICENSED PROFESSIONAL ENGINEER

P.E. 10/25/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

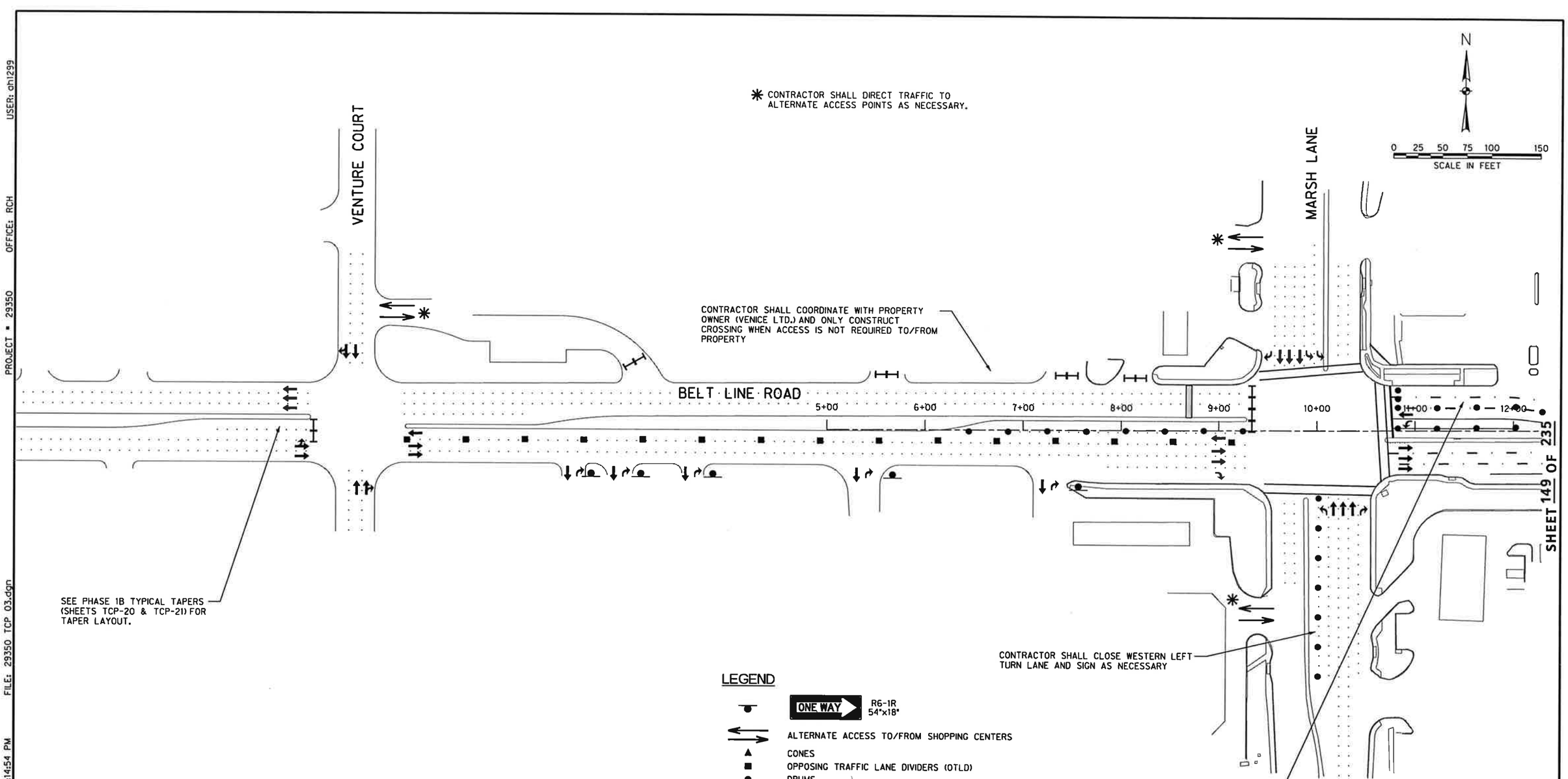
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN
PHASE 1B-STEP 1

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 TCP 02	TCP-22



SHEET 149 OF 235

LEGEND

- ONE WAY — R6-1R 54"x18"
- ALTERNATE ACCESS TO/FROM SHOPPING CENTERS
- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

4. CONTRACTOR MAY WORK ON PHASE 1B, STEP 2 CONCURRENTLY WITH PHASE 1, STEPS 1.

STATE OF TEXAS — M.E. ROMANOWSKI — 56306 — LICENSED PROFESSIONAL ENGINEER

Signature of Registrant P.E. Date 10/25/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

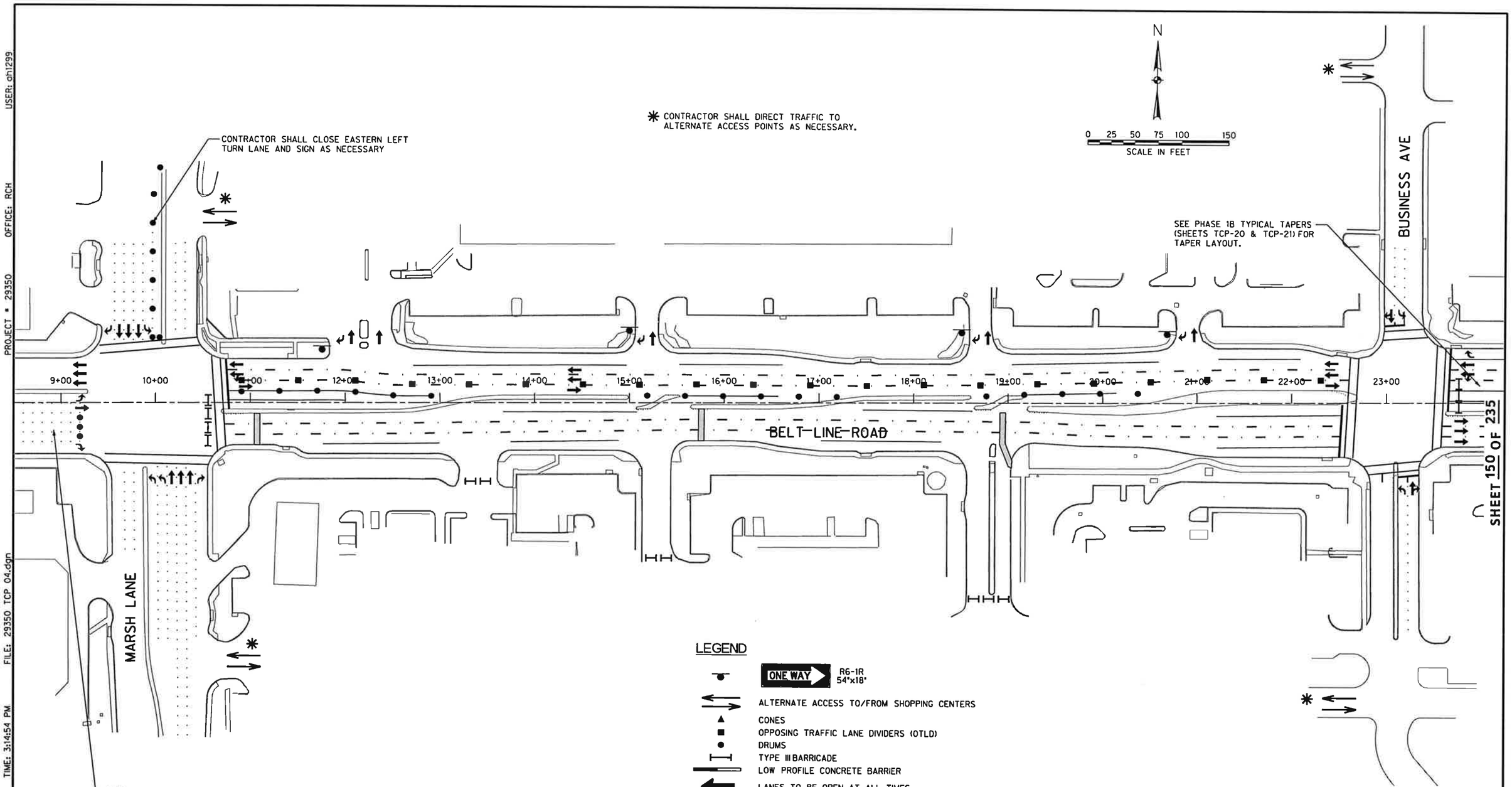
Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN
PHASE 1B-STEP 2

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275 TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 TCP 03	TCP-23



LEGEND

ONE WAY R6-1R 54"x18"	
	ALTERNATE ACCESS TO/FROM SHOPPING CENTERS
	CONES
	OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
	DRUMS
	TYPE III BARRICADE
	LOW PROFILE CONCRETE BARRIER
	LANES TO BE OPEN AT ALL TIMES
	LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
	DUCT BANK TRENCH
	DUCT BANK BORING
(N)	NON-REMOVABLE
(R)	REMOVABLE
(S)	4" WHITE BROKEN
(T)	4" WHITE SOLID
(Y)	PREVIOUS PAVEMENT MARKINGS
(Z)	EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

4. CONTRACTOR MAY WORK ON PHASE 1B, STEP 1 CONCURRENTLY WITH PHASE 1, STEPS 1, 2 AND 3.

STATE OF TEXAS
M.E. ROMANOWSKI
54306
LICENSED
PROFESSIONAL ENGINEER

M.E. Romanowski, P.E. 10/25/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

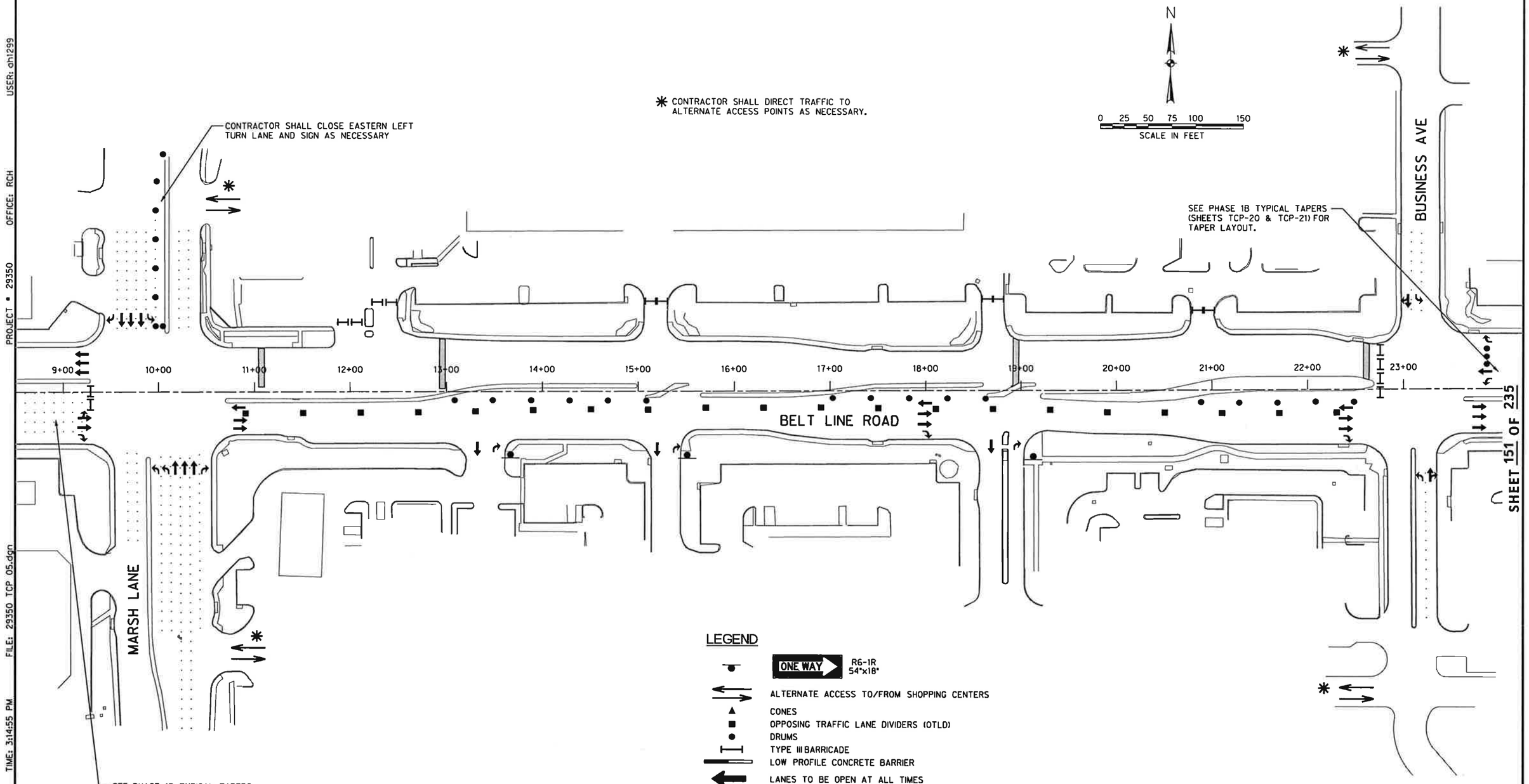
TRAFFIC CONTROL PLAN
PHASE 1B-STEP 3

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 TCP 04	TCP-24

SHEET 150 OF 235

USER: ah1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 TCP 04.dgn
TIME: 3:14:54 PM
DATE: 10/24/2013



LEGEND

ONE WAY R6-1R 54"x18"	
	ALTERNATE ACCESS TO/FROM SHOPPING CENTERS
	CONES
	OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
	DRUMS
	TYPE III BARRICADE
	LOW PROFILE CONCRETE BARRIER
	LANES TO BE OPEN AT ALL TIMES
	LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
	DUCT BANK TRENCH
	DUCT BANK BORING
(N)	NON-REMOVABLE
(R)	REMOVABLE
(S)	4" WHITE BROKEN
(T)	4" WHITE SOLID
(Y)	PREVIOUS PAVEMENT MARKINGS
(Z)	EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

4. CONTRACTOR MAY WORK ON PHASE 1B, STEP 2 CONCURRENTLY WITH PHASE 1, STEPS 1, 2, 3 AND 4.

STATE OF TEXAS
M.E. ROMANOWSKI
54306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10/25/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

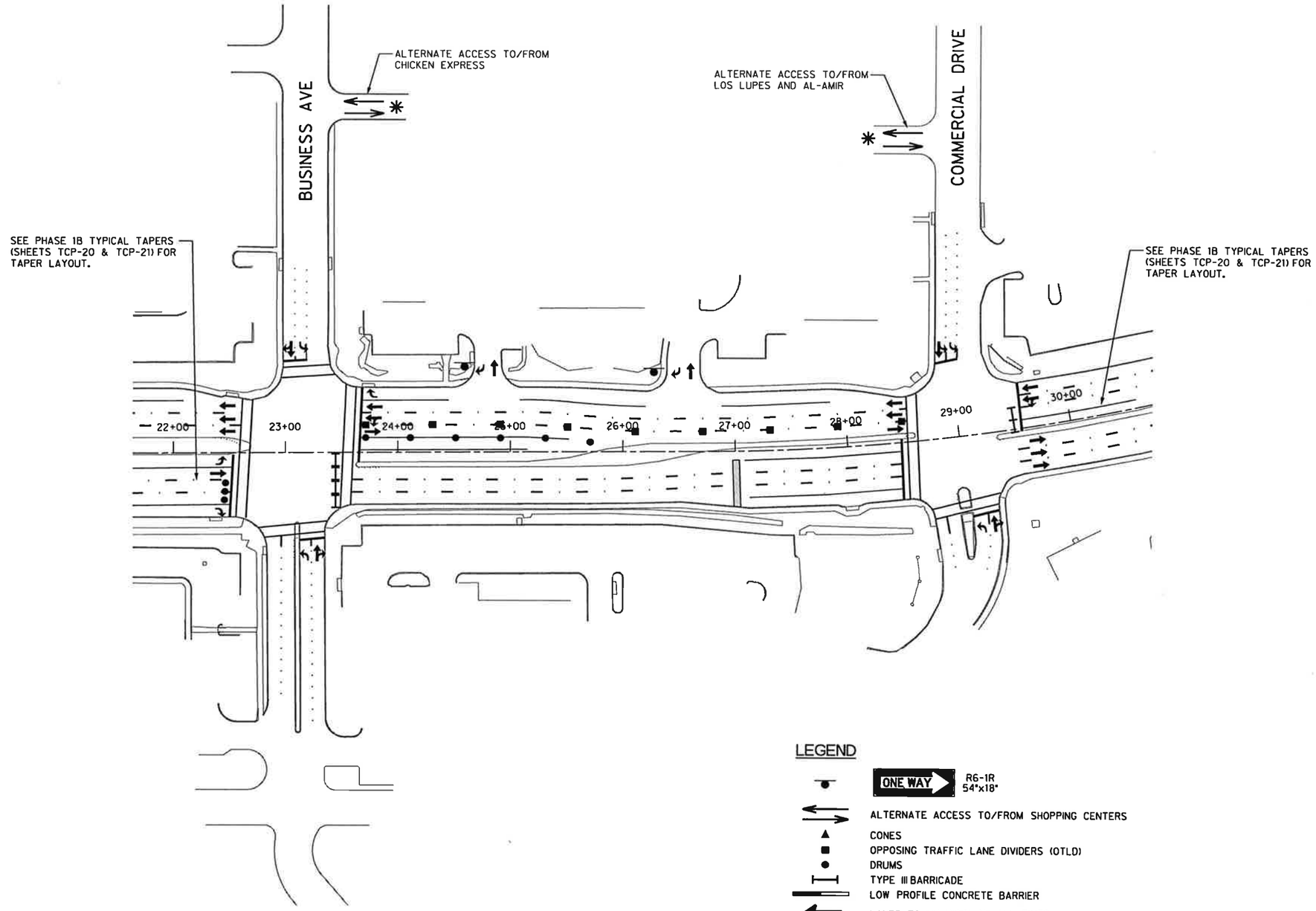
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN
PHASE 1B-STEP 4

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 TCP 05	TCP-25



N

0 25 50 75 100 150
SCALE IN FEET

LEGEND

- ONE WAY R6-1R 54"x18"
- ALTERNATE ACCESS TO/FROM SHOPPING CENTERS
- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

4. CONTRACTOR MAY WORK ON PHASE 1B, STEP 3 CONCURRENTLY WITH PHASE 1, STEPS 4.

STATE OF TEXAS
M.E. ROMANOWSKI
54306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10/25/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

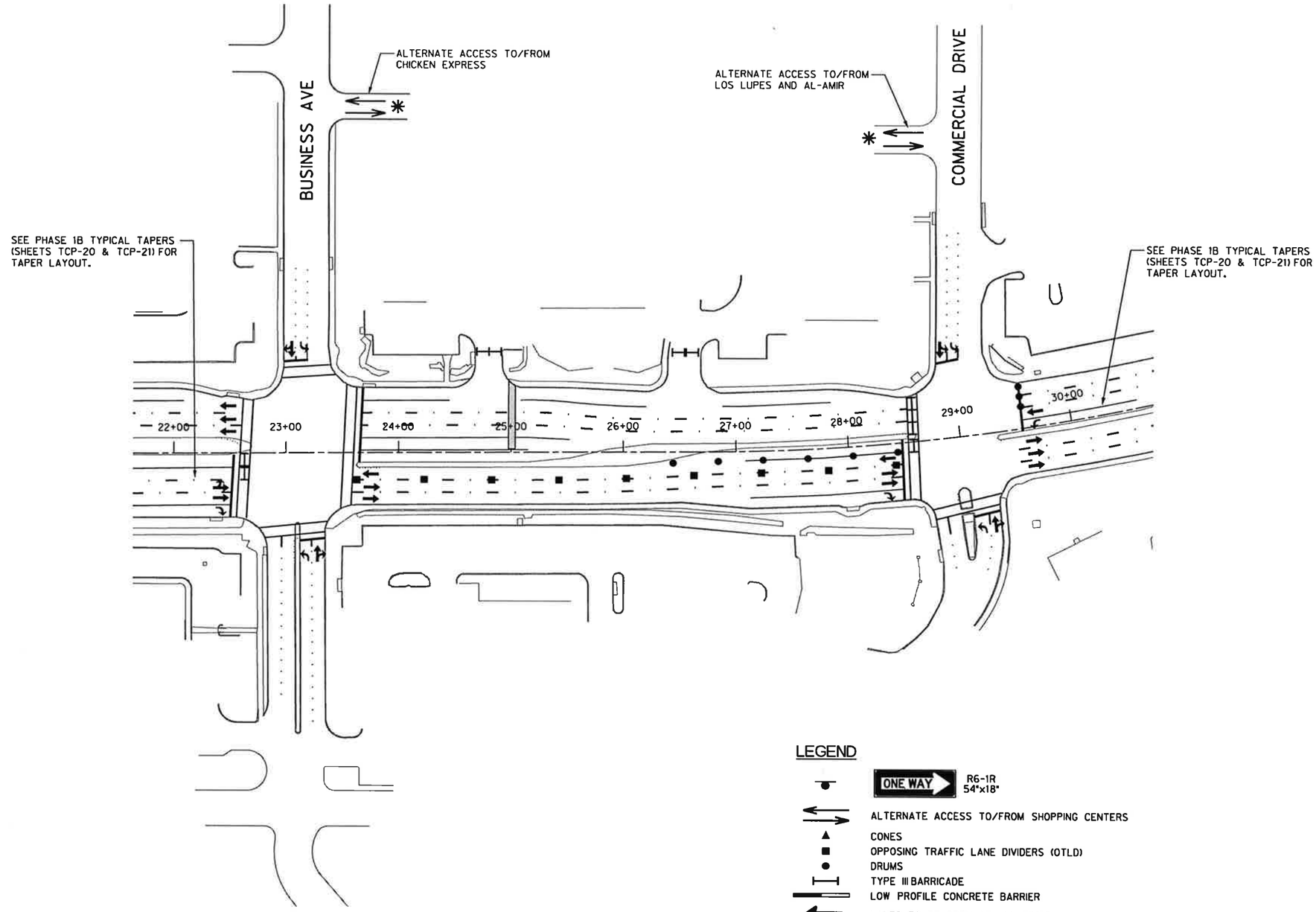
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN PHASE 1B-STEP 5

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275 TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 TCP 06	TCP-26



LEGEND

- ONE WAY R6-1R 54"x18"
- ALTERNATE ACCESS TO/FROM SHOPPING CENTERS
- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

4. CONTRACTOR MAY WORK ON PHASE 1B, STEP 4 CONCURRENTLY WITH PHASE 1, STEPS 4.

STATE OF TEXAS
M.E. ROMANOWSKI
54306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10/25/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

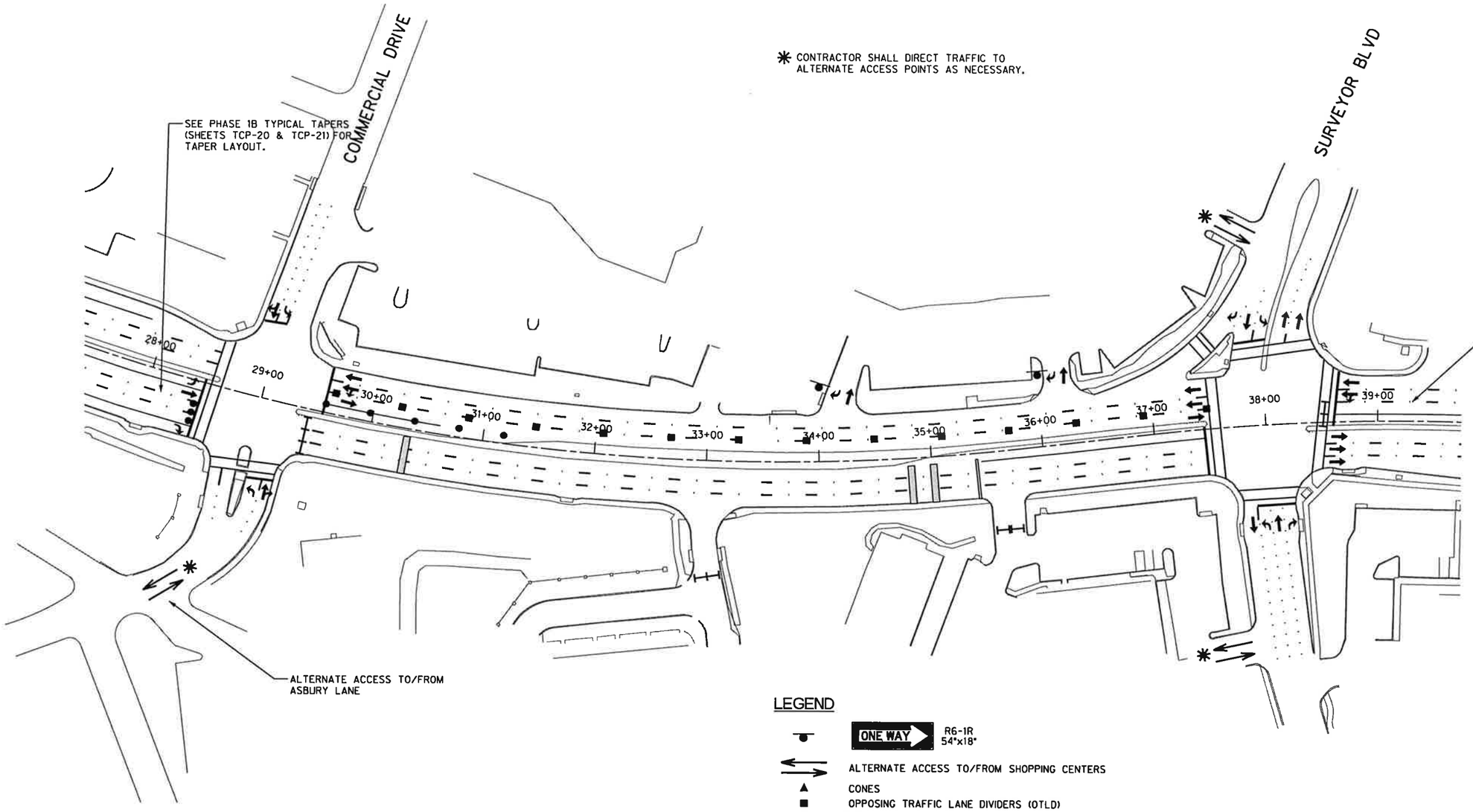
Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN
PHASE 1B-STEP 6

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6290 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 TCP 07	TCP-27



LEGEND

- ONE WAY R6-1R 54"x18"
- ALTERNATE ACCESS TO/FROM SHOPPING CENTERS
- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

4. CONTRACTOR MAY WORK ON PHASE 1B, STEP 5 CONCURRENTLY WITH PHASE 1, STEPS 5 AND 6.

STATE OF TEXAS
M.E. ROMANOWSKI
56306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. Date 10/25/13

SHEET 154 OF 235

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

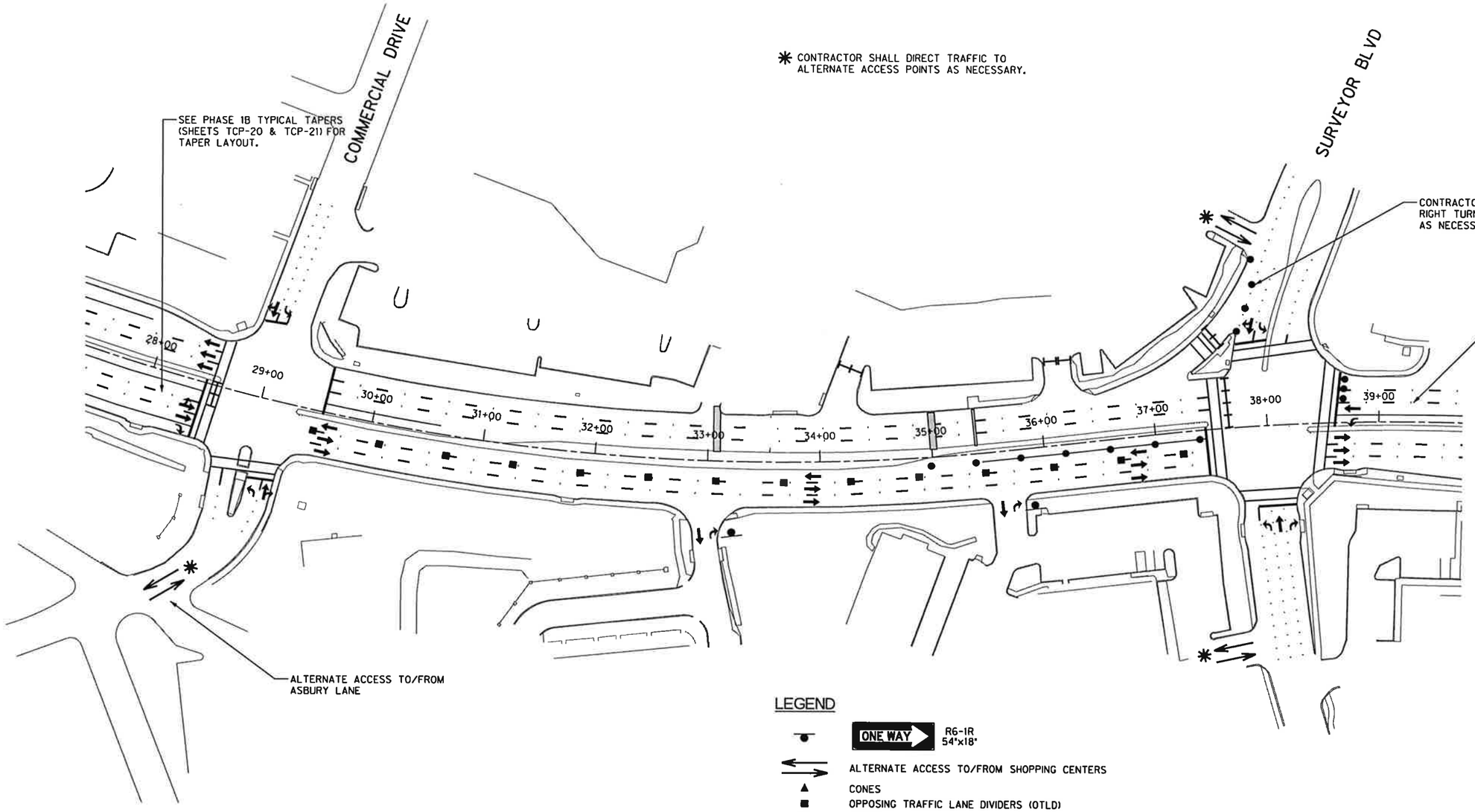
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN
PHASE 1B-STEP 7

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 738-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 TCP 08	TCP-28



LEGEND

- ONE WAY R6-1R 54"x18"
- ALTERNATE ACCESS TO/FROM SHOPPING CENTERS
- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

4. CONTRACTOR MAY WORK ON PHASE 1B, STEP 6 CONCURRENTLY WITH PHASE 1, STEPS 5 AND 6.

STATE OF TEXAS
M.E. ROMANOWSKI
56306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10/25/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

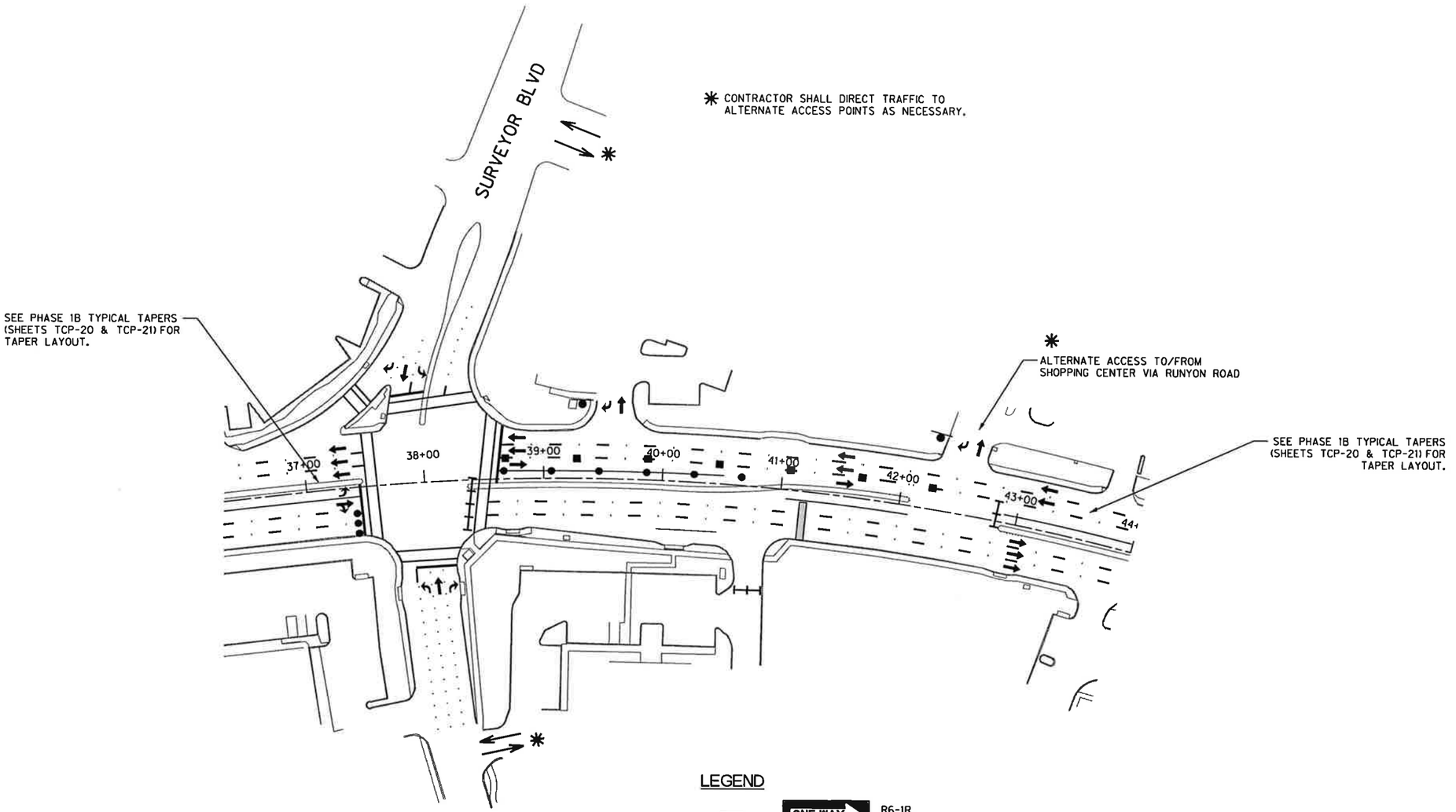
BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN
PHASE 1B-STEP 8

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 TCP 09	TCP-29

DATE: 10/24/2013 TIME: 3:14:57 PM FILE: 29350 TCP 09.dgn PROJECT • 29350 OFFICE: RCH USER: ahl299



LEGEND

- ONE WAY R6-1R 54"x18"
- ALTERNATE ACCESS TO/FROM SHOPPING CENTERS
- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

4. CONTRACTOR MAY WORK ON PHASE 1B, STEP 7 CONCURRENTLY WITH PHASE 1, STEPS 7.

STATE OF TEXAS
M.E. ROMANOWSKI
56306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10/25/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

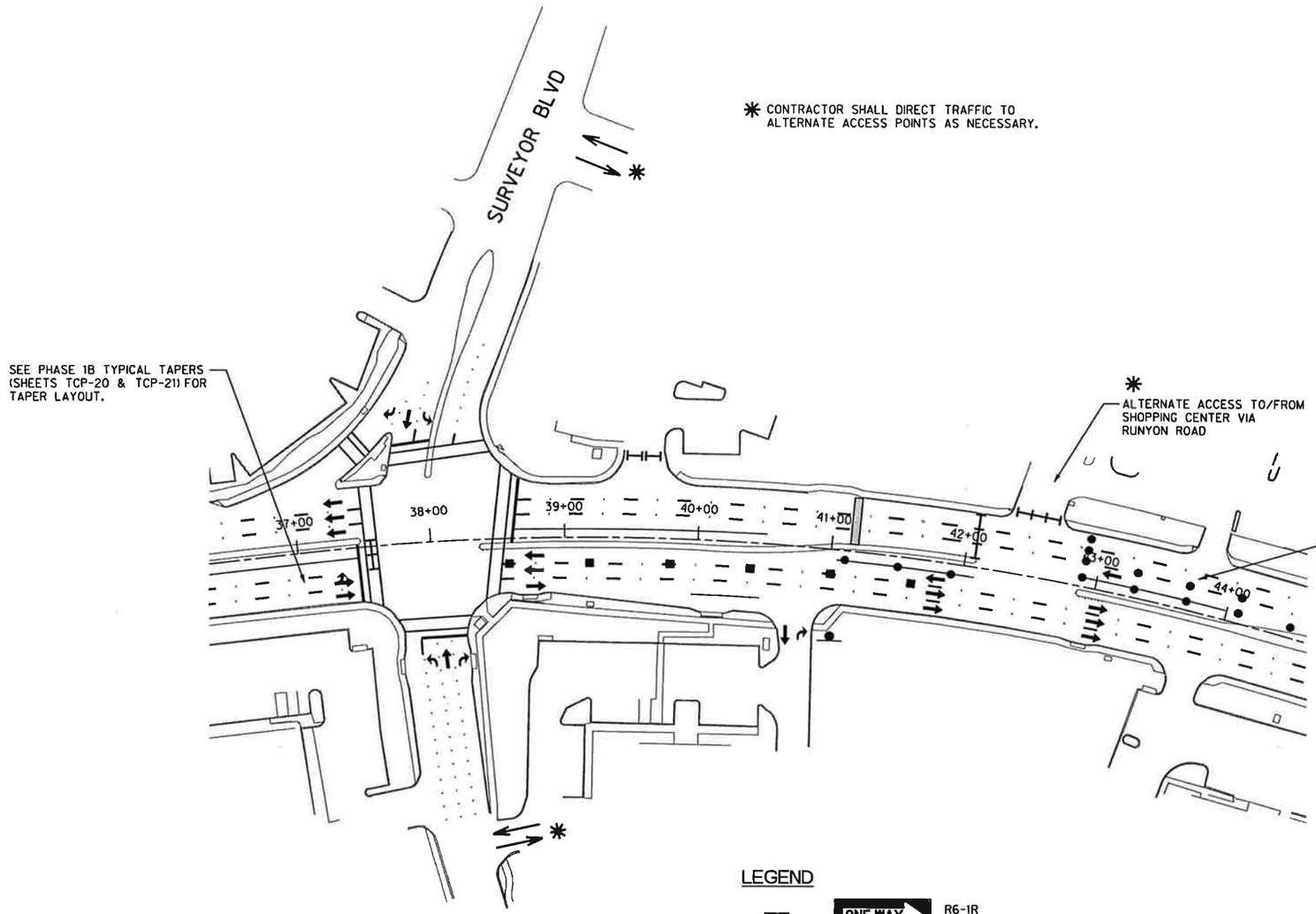
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN
PHASE 1B-STEP 9

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 TCP 10	TCP-30



LEGEND

- ONE WAY R6-1R 54"x18"
- ALTERNATE ACCESS TO/FROM SHOPPING CENTERS
- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

4. CONTRACTOR MAY WORK ON PHASE 1B, STEP 8 CONCURRENTLY WITH PHASE 1, STEPS 7.

STATE OF TEXAS
M.E. ROMANOWSKI
96306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10/25/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

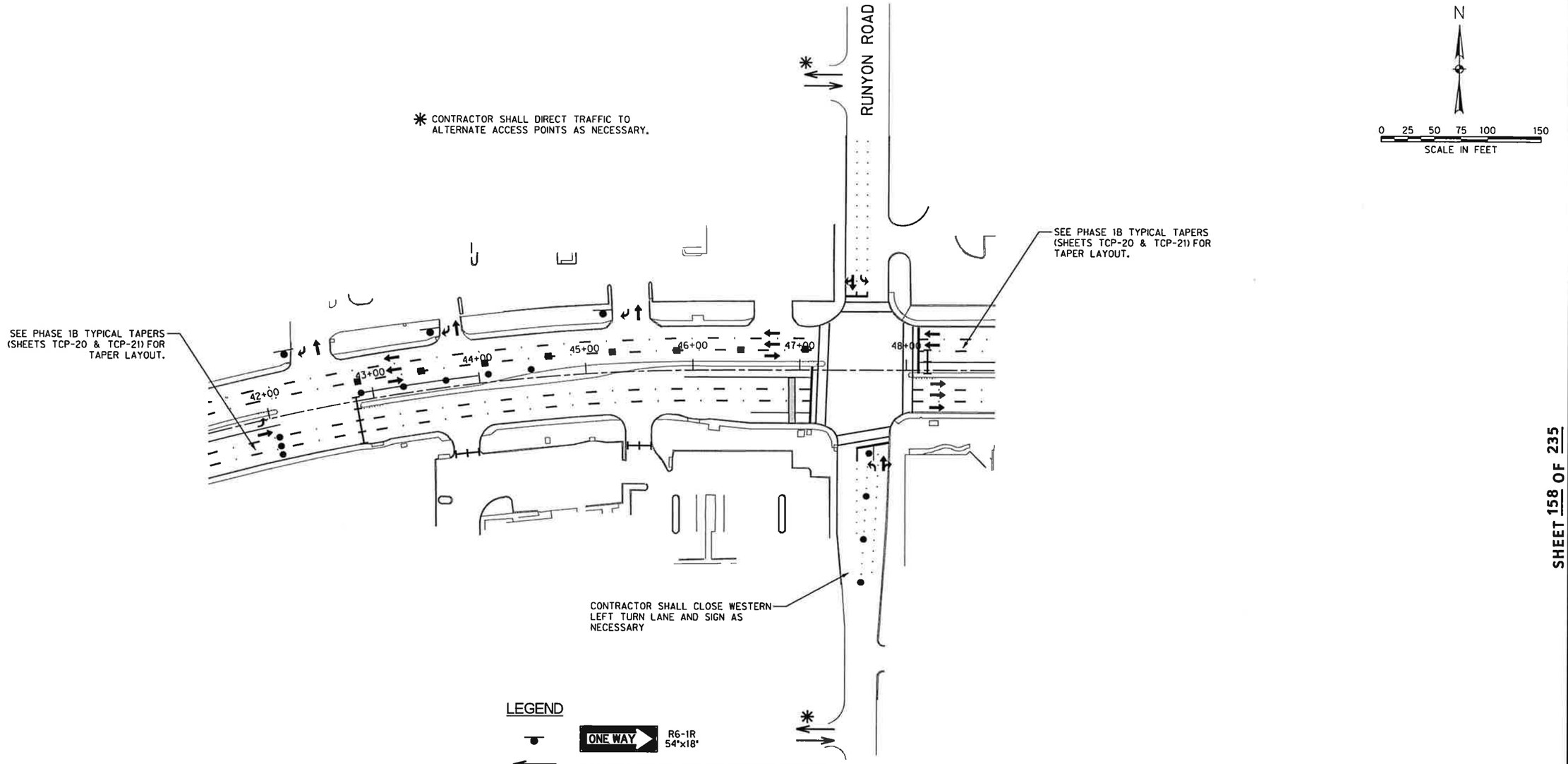
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN
PHASE 1B-STEP 10

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 TCP 11	TCP-31



LEGEND

- ONE WAY R6-1R 54"x18"
- ALTERNATE ACCESS TO/FROM SHOPPING CENTERS
- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

4. CONTRACTOR MAY WORK ON PHASE 1B, STEP 9 CONCURRENTLY WITH PHASE 1, STEPS 8.

M.E. ROMANOWSKI 96306 LICENSED PROFESSIONAL ENGINEER
P.E. 10/25/13
Signature of Registrant Date

SHEET 158 OF 235

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

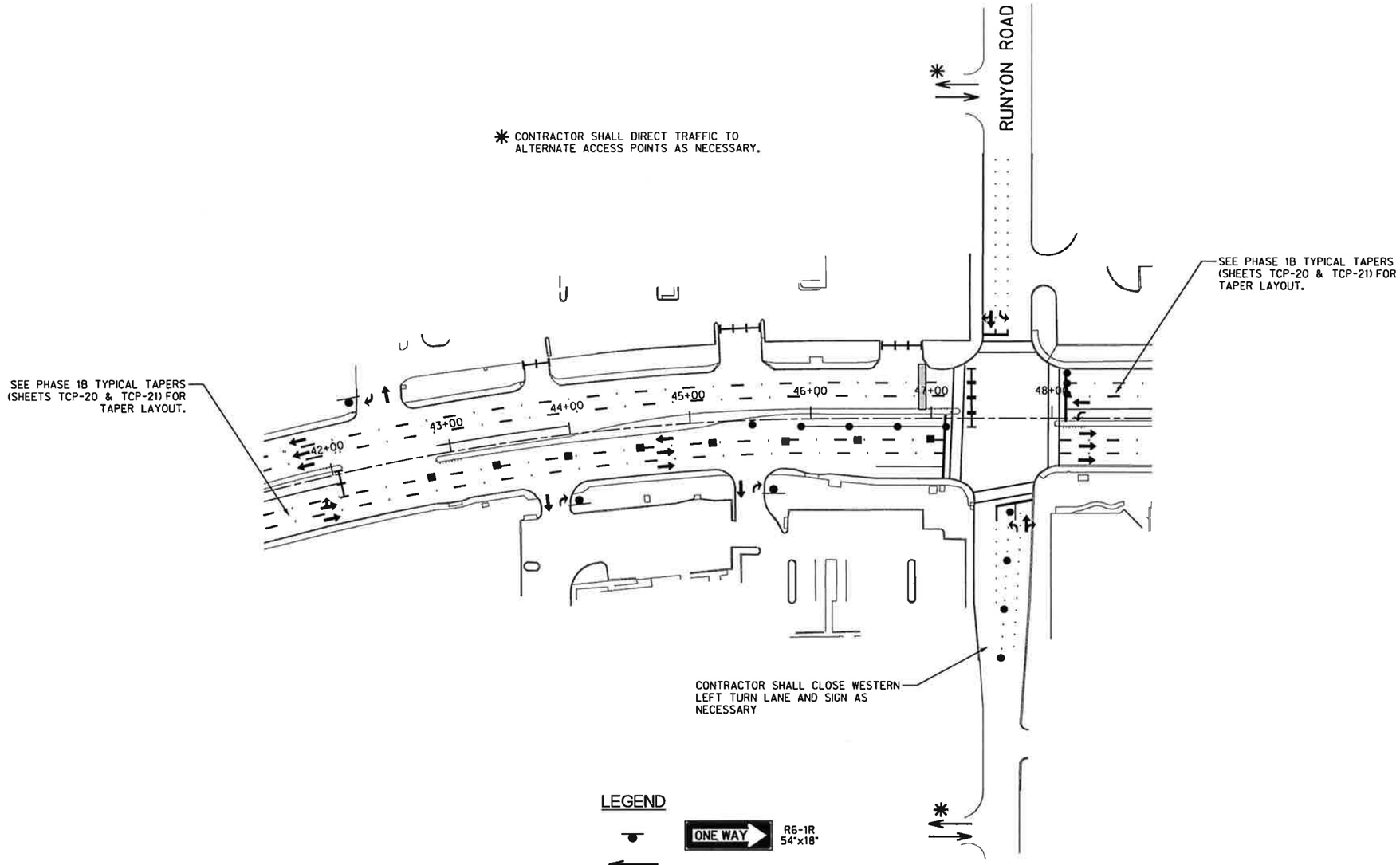
BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN
PHASE 1B-STEP 11

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 TCP 12	TCP-32

USER: ah1299
PROJECT # 29350 OFFICE: RCH FILE: 29350 TCP 13.dgn
DATE: 10/24/2013 TIME: 3:15:06 PM



N

0 25 50 75 100 150
SCALE IN FEET

LEGEND

- ONE WAY R6-1R 54"x18"
- ALTERNATE ACCESS TO/FROM SHOPPING CENTERS
- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

4. CONTRACTOR MAY WORK ON PHASE 1B, STEP 9 CONCURRENTLY WITH PHASE 1, STEPS 8.

STATE OF TEXAS
M.E. ROMANOWSKI
94306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10/25/13 Date

SHEET 159 OF 235

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN
PHASE 1B-STEP 12

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 TCP 13	TCP-33

CENTURION WAY

RUNYON ROAD

MIDWAY ROAD

* CONTRACTOR SHALL DIRECT TRAFFIC TO ALTERNATE ACCESS POINTS AS NECESSARY.

SEE PHASE 1B TYPICAL TAPERS (SHEETS TCP-20 & TCP-21) FOR TAPER LAYOUT.

SEE PHASE 1B TYPICAL TAPERS (SHEETS TCP-20 & TCP-21) FOR TAPER LAYOUT.

48+00 49+00 50+00 51+00 52+00 53+00 54+00 55+00 56+00 57+00 58+00 59+00 60+00 61+00 62+00

CONTRACTOR SHALL CLOSE WESTERN LEFT TURN LANE AND SIGN AS NECESSARY

LEGEND

ONE WAY R6-1R 54"x18"	
	ALTERNATE ACCESS TO/FROM SHOPPING CENTERS
	CONES
	OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
	DRUMS
	TYPE III BARRICADE
	LOW PROFILE CONCRETE BARRIER
	LANES TO BE OPEN AT ALL TIMES
	LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
	DUCT BANK TRENCH
	DUCT BANK BORING
(N)	NON-REMOVABLE
(R)	REMOVABLE
(S)	4" WHITE BROKEN
(T)	4" WHITE SOLID
(Y)	PREVIOUS PAVEMENT MARKINGS
(Z)	EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

4. CONTRACTOR MAY WORK ON PHASE 1B, STEP 11 CONCURRENTLY WITH PHASE 1, STEPS 9.

N

0 25 50 75 100 150
SCALE IN FEET

STATE OF TEXAS
M.E. ROMANOWSKI
56306
LICENSED PROFESSIONAL ENGINEER

Signature of Registrant P.E. 10/25/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN
PHASE 1B-STEP 13

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 TCP 14	TCP-34

USER: ah1299 OFFICE: RCH PROJECT # 29350 FILE: 29350 TCP 14.dgn TIME: 3:15:07 PM DATE: 10/24/2013

CENTURION WAY

RUNYON ROAD

MIDWAY ROAD

SEE PHASE 1B TYPICAL TAPERS (SHEETS TCP-20 & TCP-21) FOR TAPER LAYOUT.

* CONTRACTOR SHALL DIRECT TRAFFIC TO ALTERNATE ACCESS POINTS AS NECESSARY.

CONTRACTOR SHALL CLOSE RIGHT TURN LANE AND SIGN AS NECESSARY

SEE PHASE 1B TYPICAL TAPERS (SHEETS TCP-20 & TCP-21) FOR TAPER LAYOUT.

48+00 49+00 50+00 51+00 52+00 53+00 54+00 55+00 56+00 57+00 58+00 59+00 60+00 61+00 62+00

CONTRACTOR SHALL CLOSE WESTERN LEFT TURN LANE AND SIGN AS NECESSARY

LEGEND

ONE WAY R6-1R 54"x18"	
	ALTERNATE ACCESS TO/FROM SHOPPING CENTERS
	CONES
	OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
	DRUMS
	TYPE III BARRICADE
	LOW PROFILE CONCRETE BARRIER
	LANES TO BE OPEN AT ALL TIMES
	LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
	DUCT BANK TRENCH
	DUCT BANK BORING
(N)	NON-REMOVABLE
(R)	REMOVABLE
(S)	4" WHITE BROKEN
(T)	4" WHITE SOLID
(Y)	PREVIOUS PAVEMENT MARKINGS
(Z)	EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

4. CONTRACTOR MAY WORK ON PHASE 1B, STEP 12 CONCURRENTLY WITH PHASE 1, STEPS 9.

N

0 25 50 75 100 150
SCALE IN FEET

STATE OF TEXAS
M.E. ROMANOWSKI
54306
LICENSED
PROFESSIONAL ENGINEER

P.E. 10/25/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN
PHASE 1B-STEP 14

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL. (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 TCP 15	TCP-35

USER: ah1299 OFFICE: RCH PROJECT # 29350 FILE: 29350 TCP 15.dgn TIME: 3:15:07 PM DATE: 10/24/2013

USER: ah1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 TCP04-00-01.dgn
TIME: 3:15:08 PM
DATE: 10/24/2013

33+00
34+00
35+00
℄ BELT LINE ROAD
36+00
37+00
38+00
BELT LINE ROAD
295' MERGE TAPER
CONES @ 30' SPACING MAXIMUM
WORK ZONE
CONES @ 60' SPACING MAXIMUM
SHIFT TAPER
CONES @ 30' SPACING MAXIMUM
SURVEYOR BLVD

TYPICAL TREATMENT FOR
PARKWAY AREA CONSTRUCTION
200' TO 1000' IN LENGTH

N

0 10 20 30 40 60
SCALE IN FEET

LEGEND

- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
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NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

STATE OF TEXAS
M.F. ROMANOWSKI
94306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant ,P.E. 10/25/13 Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

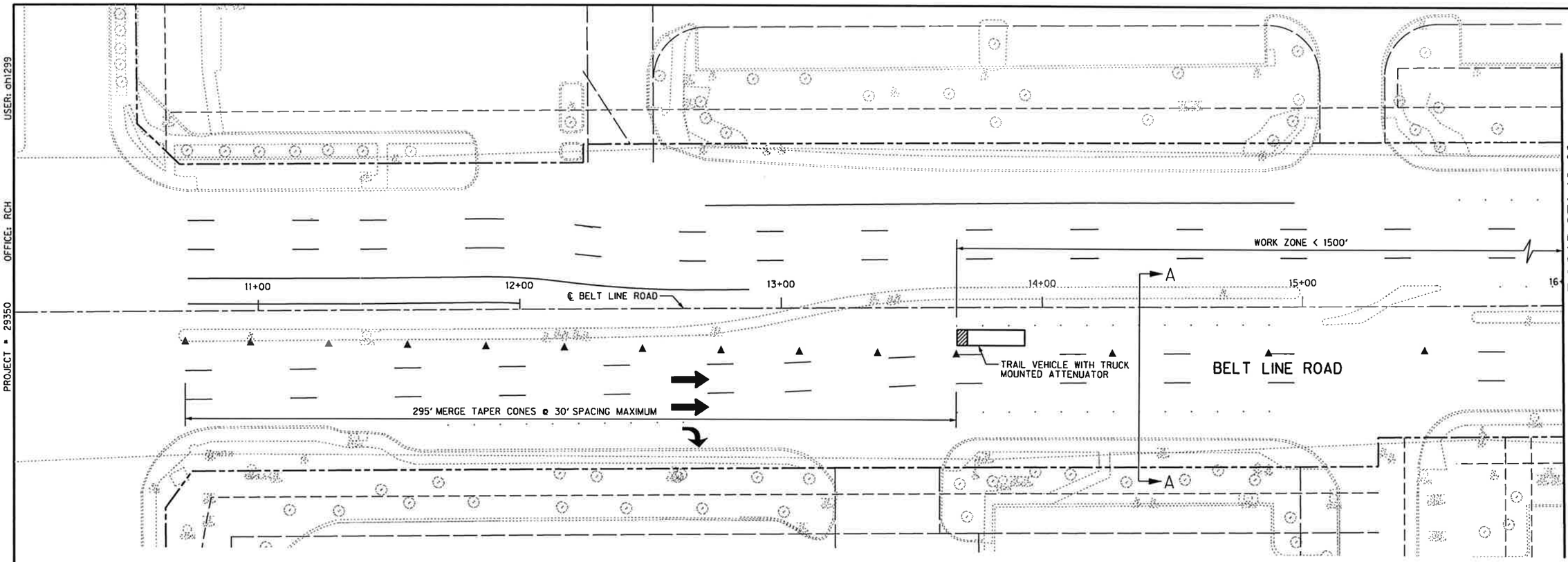
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

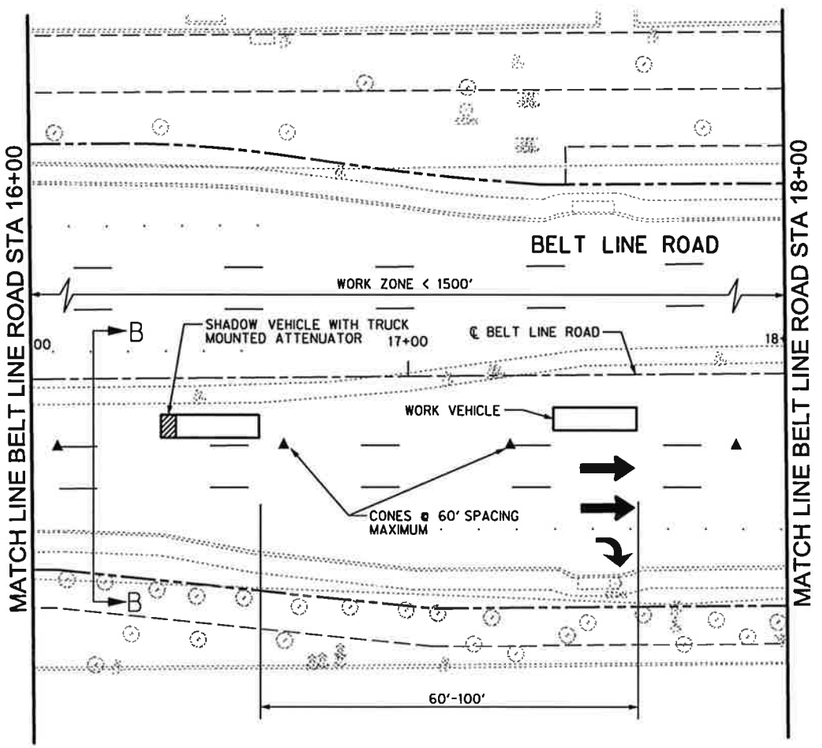
BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN - PARKWAY
PHASE 2, 3, 4 & 5

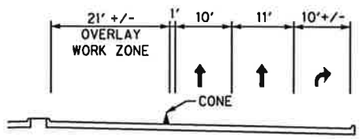
HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 76081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP04-00-01	TCP-36

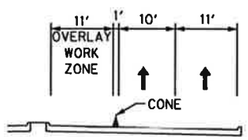




OVERLAY CONSTRUCTION TO BE DONE DURING OFF-PEAK HOURS - CONTRACTOR TO PROVIDE DETAILED TCP FOR OVERLAY WORK



SECTION A-A
(N.T.S.)



SECTION B-B
(N.T.S.)

LEGEND

- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
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NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

N

0 10 20 30 40 60
SCALE IN FEET

STATE OF TEXAS
M.E. ROMANOWSKI
56306
LICENSED
PROFESSIONAL ENGINEER

P.E. 10/25/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

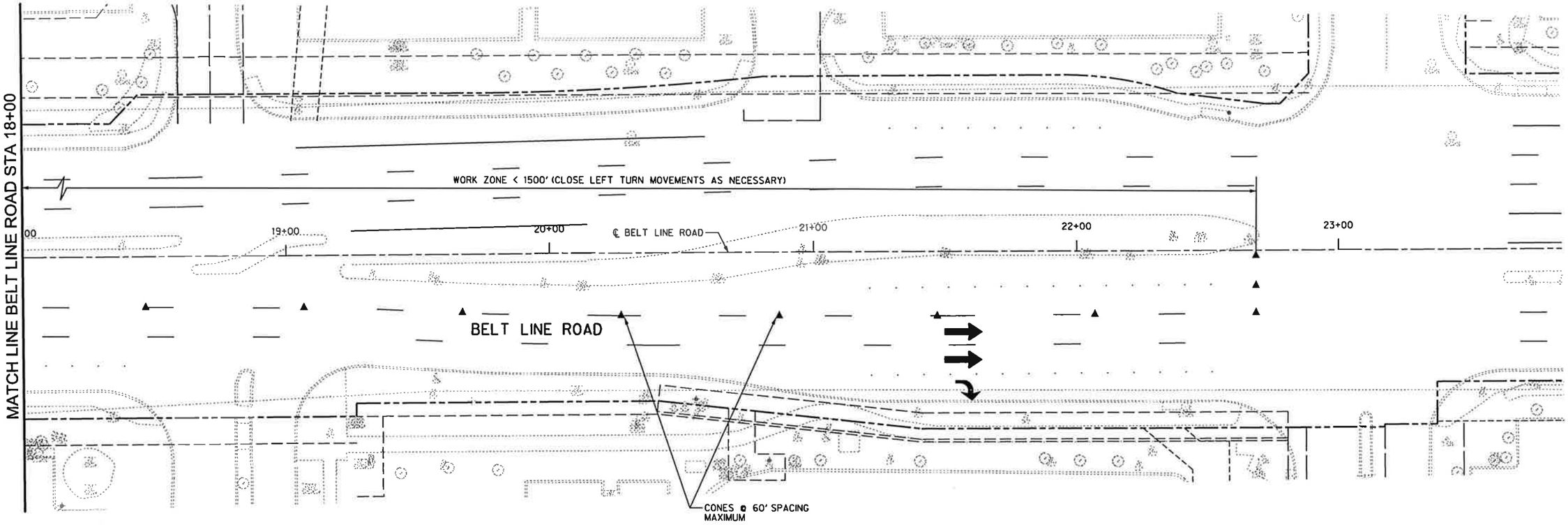
TRAFFIC CONTROL PLAN - OVERLAY PHASE 6, STEP 1

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP06-01-01	TCP-37

SHEET 163 OF 235

USER: dh1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 TCP06-01-01.dgn
TIME: 3:15:10 PM
DATE: 10/24/2013



N

0 10 20 30 40 60
SCALE IN FEET

LEGEND

- ▲ CONES
- ■ OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- ● DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
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- (Y) PREVIOUS PAVEMENT MARKINGS
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NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

STATE OF TEXAS
M.E. ROMANOWSKI
94508
LICENSED
PROFESSIONAL ENGINEER

P.E. 10/25/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

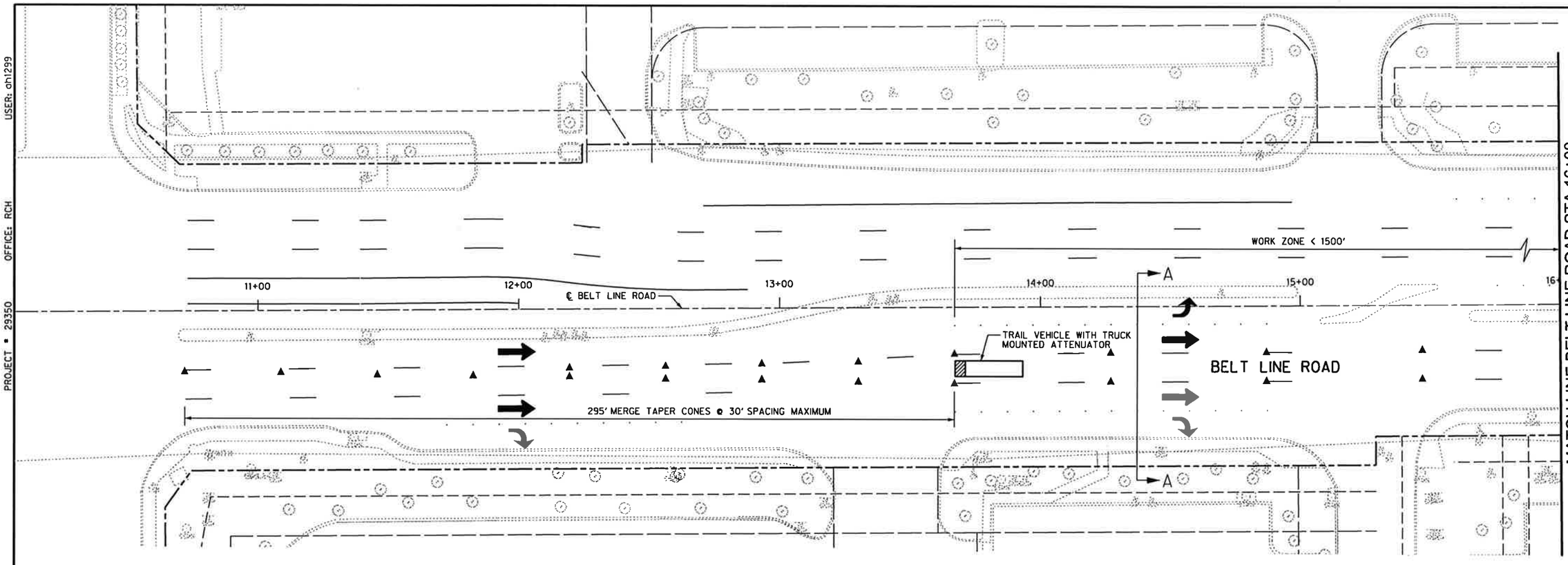
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

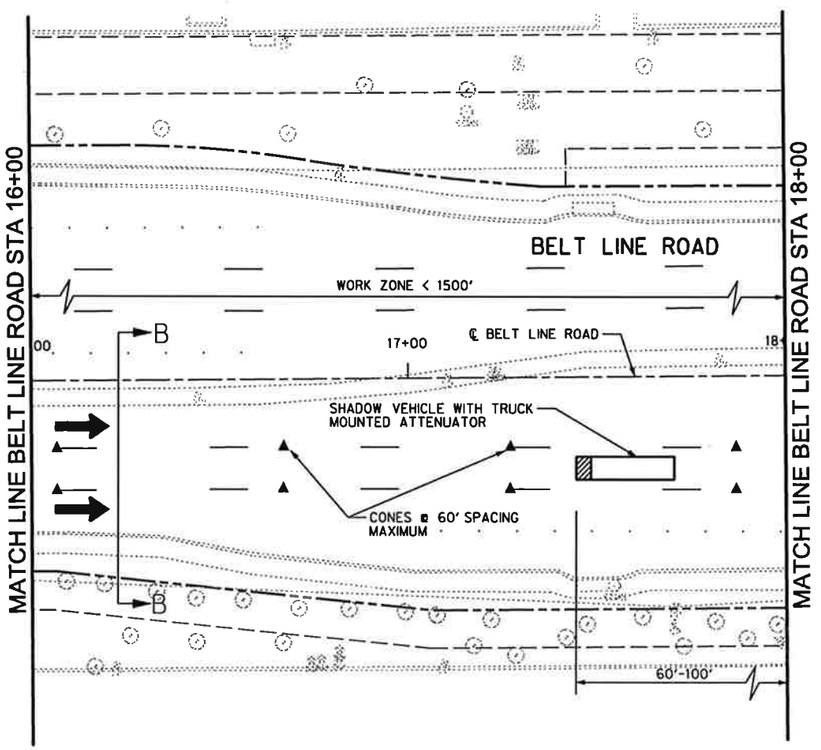
BELT LINE ROAD
UNDERGROUND ELECTRICAL

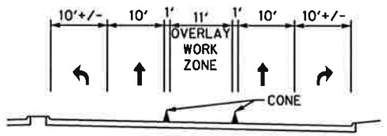
TRAFFIC CONTROL PLAN - OVERLAY
PHASE 6, STEP 1

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

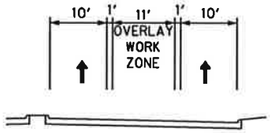
PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP06-01-02	TCP-38







SECTION A-A
(N.T.S.)



SECTION B-B
(N.T.S.)

LEGEND

- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

N

0 10 20 30 40 60
SCALE IN FEET

STATE OF TEXAS
M.E. ROMANOWSKI
96306
LICENSED
PROFESSIONAL ENGINEER

P.E. 10/25/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

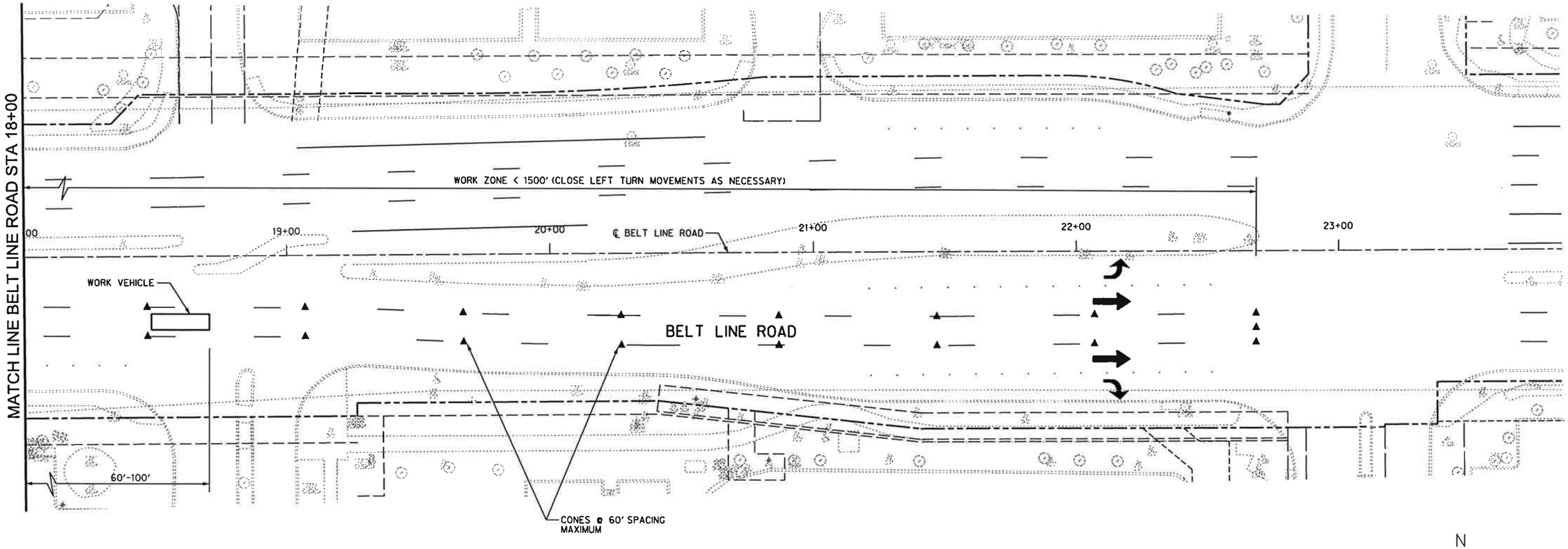
BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN - OVERLAY PHASE 6, STEP 2

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP06-02-01	TCP-39

USER: dh1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 TCP06-02-01.dgn
TIME: 3:15:13 PM
DATE: 10/24/2013



LEGEND

- CONES
- OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

N

0 10 20 30 40 60
SCALE IN FEET

STATE OF TEXAS
M.E. ROMANOWSKI
86308
LICENSED
PROFESSIONAL ENGINEER

P.E. 10/25/13
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN - OVERLAY PHASE 6, STEP 2

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
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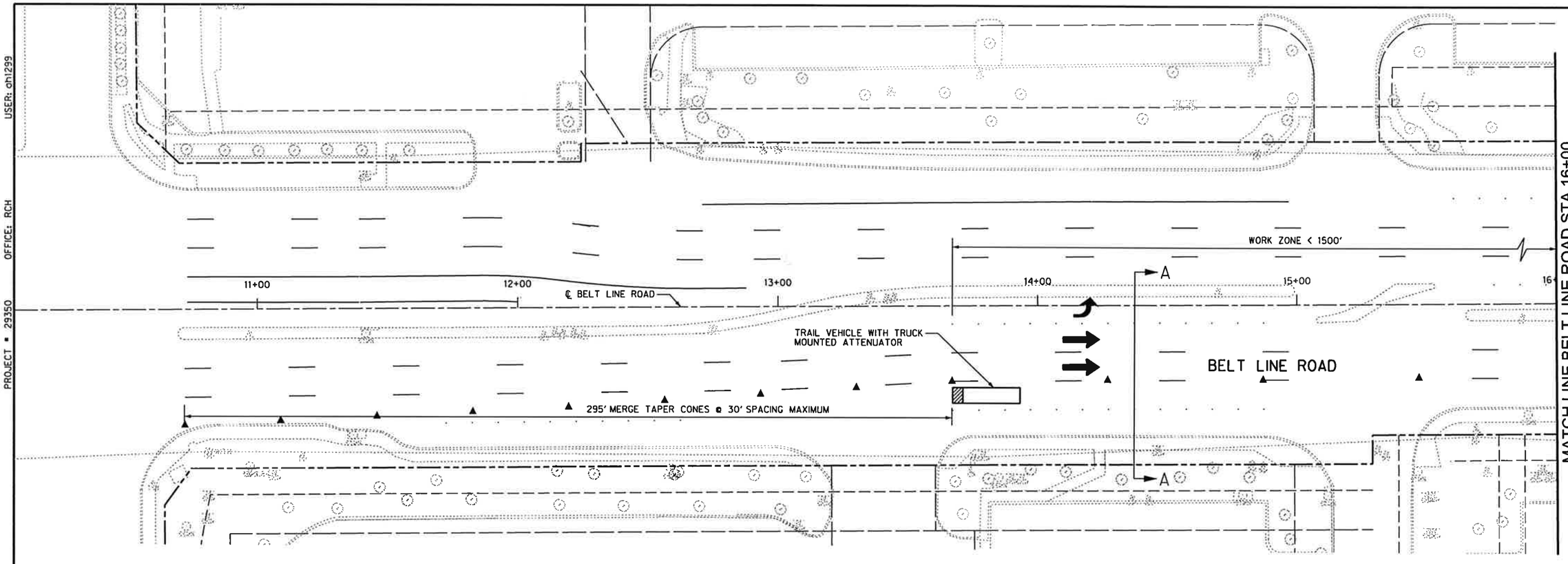
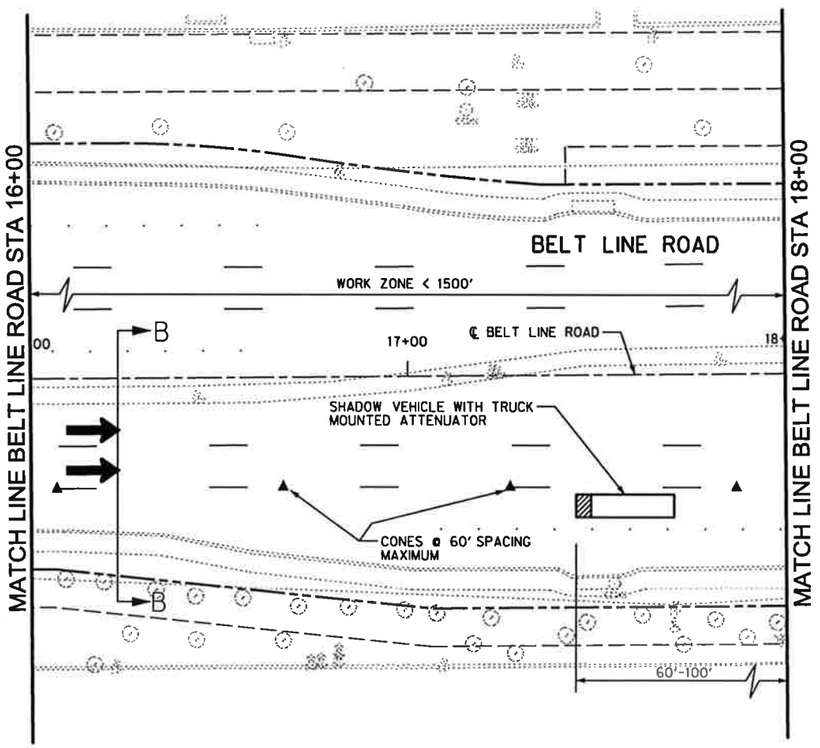
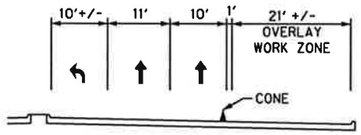
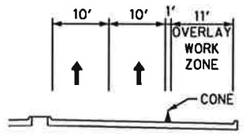






SECTION A-A
(N.T.S.)



SECTION B-B
(N.T.S.)

LEGEND

- ▲ CONES
- ■ OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- ● DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

N

0 10 20 30 40 60
SCALE IN FEET

STATE OF TEXAS
M.E. ROMANOWSKI
36306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. Date 10/25/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

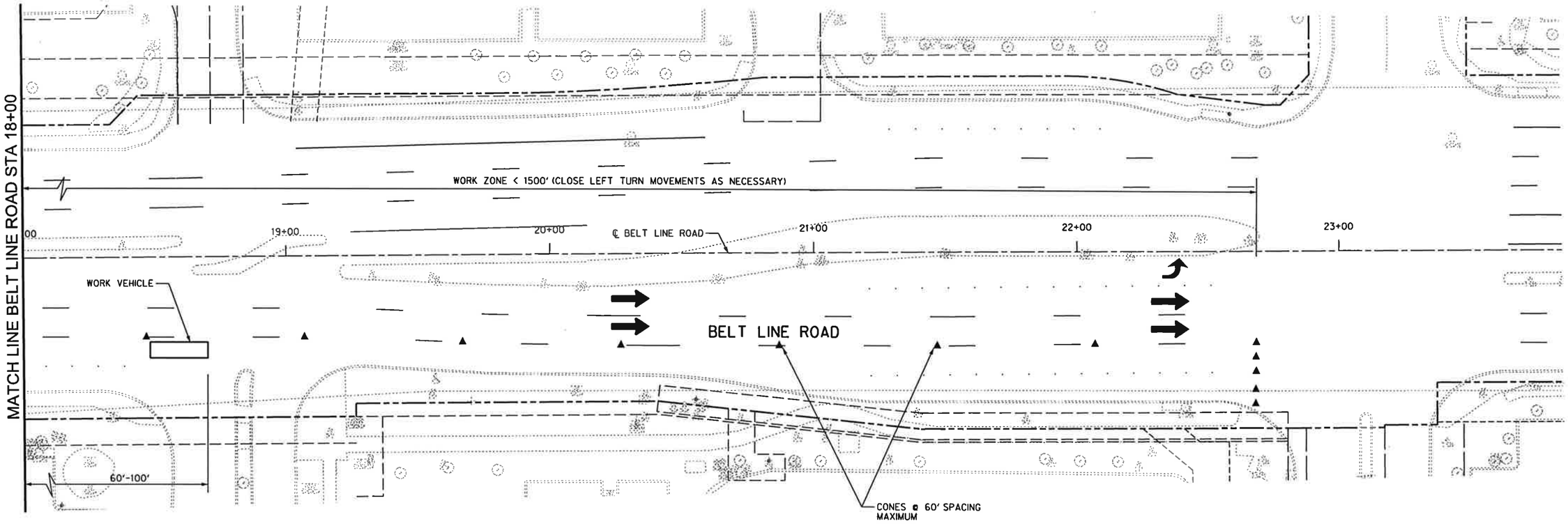
TRAFFIC CONTROL PLAN - OVERLAY PHASE 6, STEP 3

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP06-03-01	TCP-41

SHEET 167 OF 235

USER: ah1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 TCP06-03-01.dgn
TIME: 3:15:17 PM
DATE: 10/24/2013



N

0 10 20 30 40 60

SCALE IN FEET

LEGEND

- ▲ CONES
- ■ OPPOSING TRAFFIC LANE DIVIDERS (OTLD)
- ● DRUMS
- TYPE III BARRICADE
- LOW PROFILE CONCRETE BARRIER
- LANES TO BE OPEN AT ALL TIMES
- LANES TO BE CLOSED DURING OFF-PEAK HOURS ONLY
- DUCT BANK TRENCH
- DUCT BANK BORING
- (N) NON-REMOVABLE
- (R) REMOVABLE
- (S) 4" WHITE BROKEN
- (T) 4" WHITE SOLID
- (Y) PREVIOUS PAVEMENT MARKINGS
- (Z) EXISTING RAISED PAVEMENT MARKINGS

NOTES:
1. ALL LOW PROFILE CONCRETE BARRIERS SHALL BEGIN WITH A TYPE 2 LPCB. END LOW PROFILE CONCRETE BARRIERS WITH A TYPE 2 LPCB WHEN IT CAN BE IMPACTED BY OPPOSING TRAFFIC.

2. CONTRACTOR TO ADD NECESSARY SIGNAGE AS NEEDED ACCORDING TO TMUTCD.

3. CONTRACTOR TO ENSURE THAT EQUIPMENT DOES NOT BLOCK LINE OF SIGHT FOR DRIVERS.

STATE OF TEXAS
M.E. ROMANOWSKI
96306
LICENSED
PROFESSIONAL ENGINEER

Signature of Registrant P.E. Date 10/25/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

TRAFFIC CONTROL PLAN - OVERLAY PHASE 6, STEP 3

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL. (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350TCP06-03-02	TCP-42

USER: dh1299
OFFICE: RCH
PROJECT # 29350
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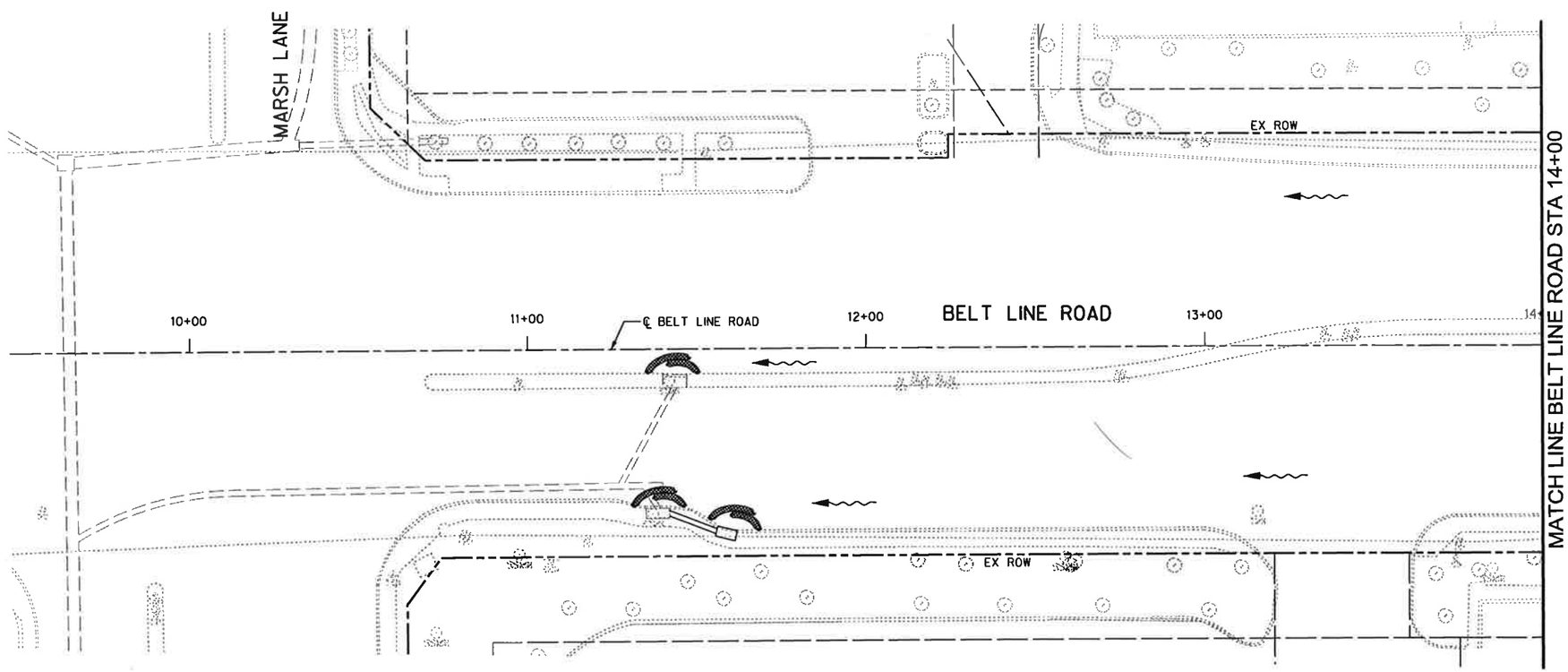
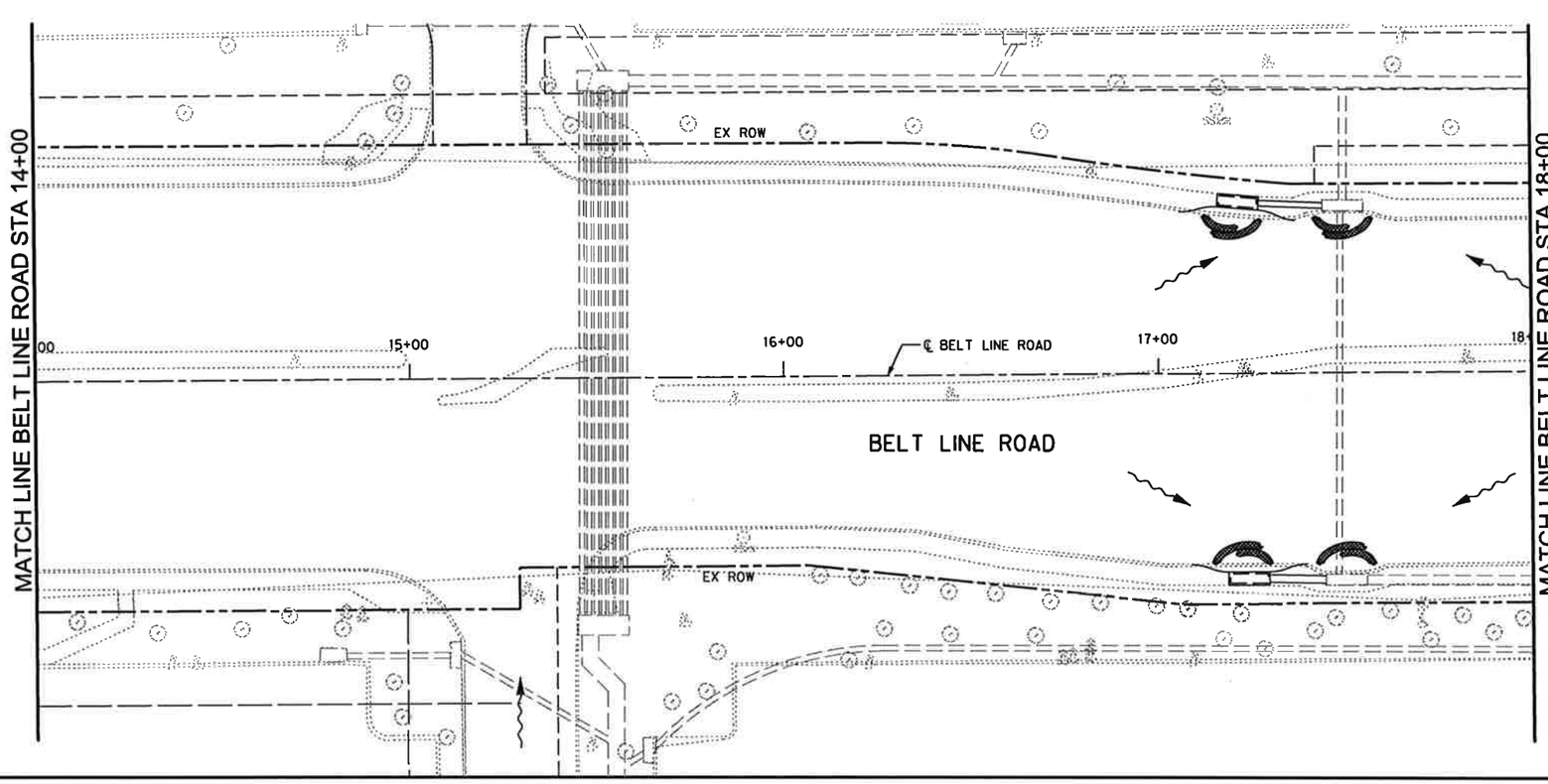




N

0 10 20 30 40 60
SCALE IN FEET

LEGEND

- DIRECTION OF DRAINAGE FLOW
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- INLET PROTECTION

SHEET 169 OF 235

STATE OF TEXAS
MANUS CHAMPRASERT
94638
LICENSED
PROFESSIONAL ENGINEER

Manus Champrasert, P.E. 10/25/2013
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

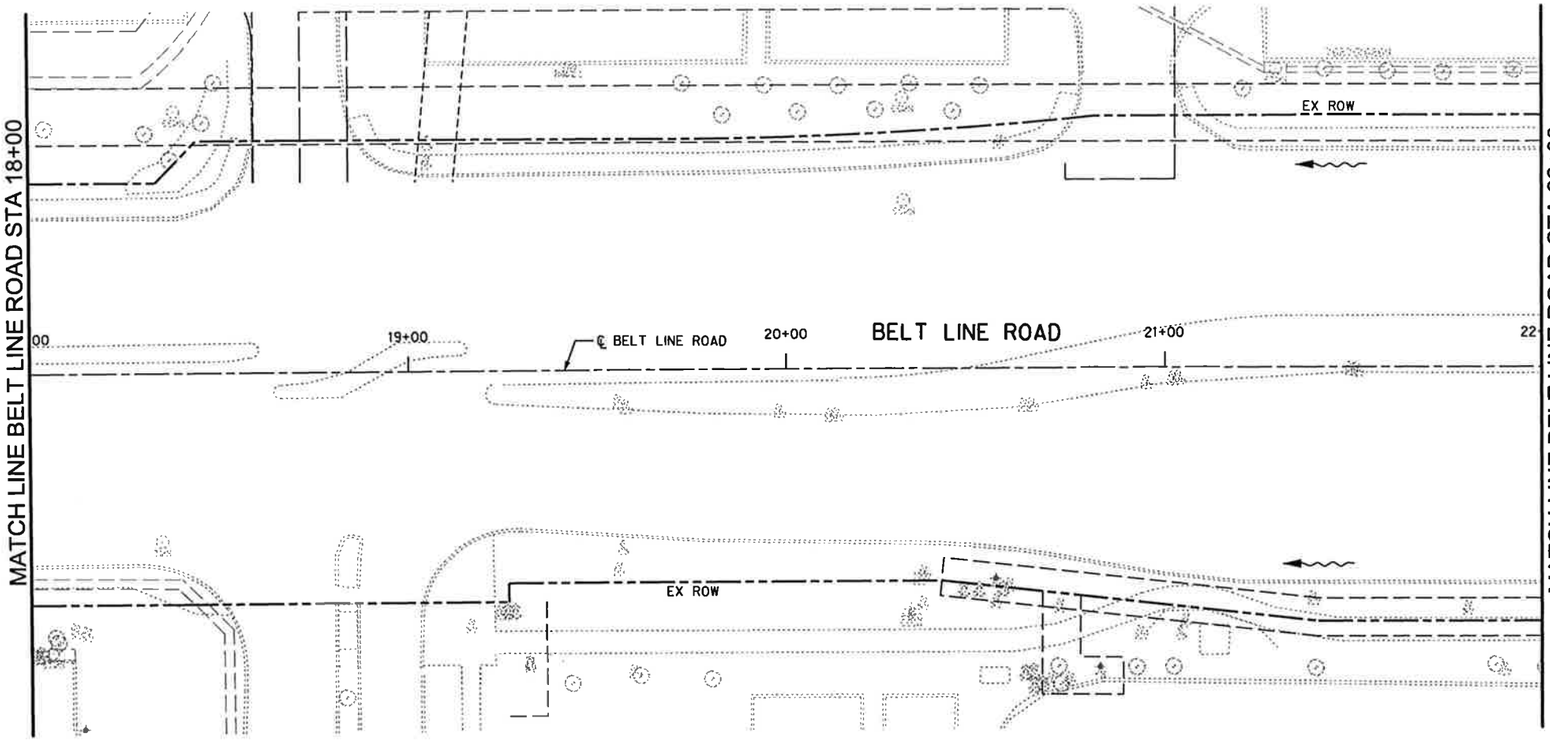
BELT LINE ROAD
UNDERGROUND ELECTRICAL

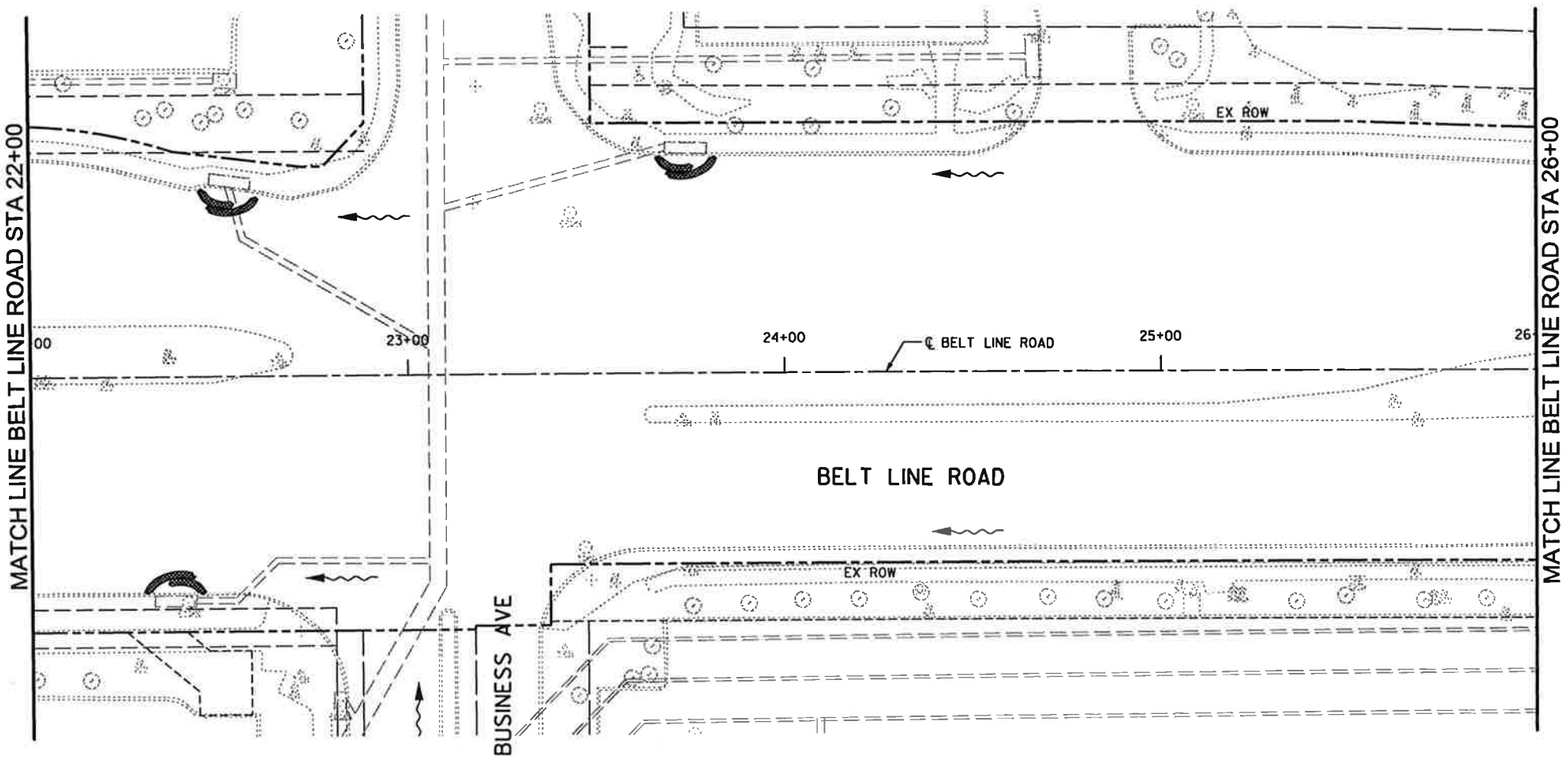
EROSION CONTROL PLAN
BELT LINE RD STA 10+00 TO STA 18+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 SWP3 01	EC-1

USER: dh1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 SWP3 01.dgn
TIME: 3:15:20 PM
DATE: 10/24/2013





0 10 20 30 40 60
SCALE IN FEET

LEGEND

- DIRECTION OF DRAINAGE FLOW
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- INLET PROTECTION

SHEET 170 OF 235

STATE OF TEXAS
MANUS CHAPRASERT
94658
LICENSED
PROFESSIONAL ENGINEER

Manu Chaiprasert P.E. 10/25/2013
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

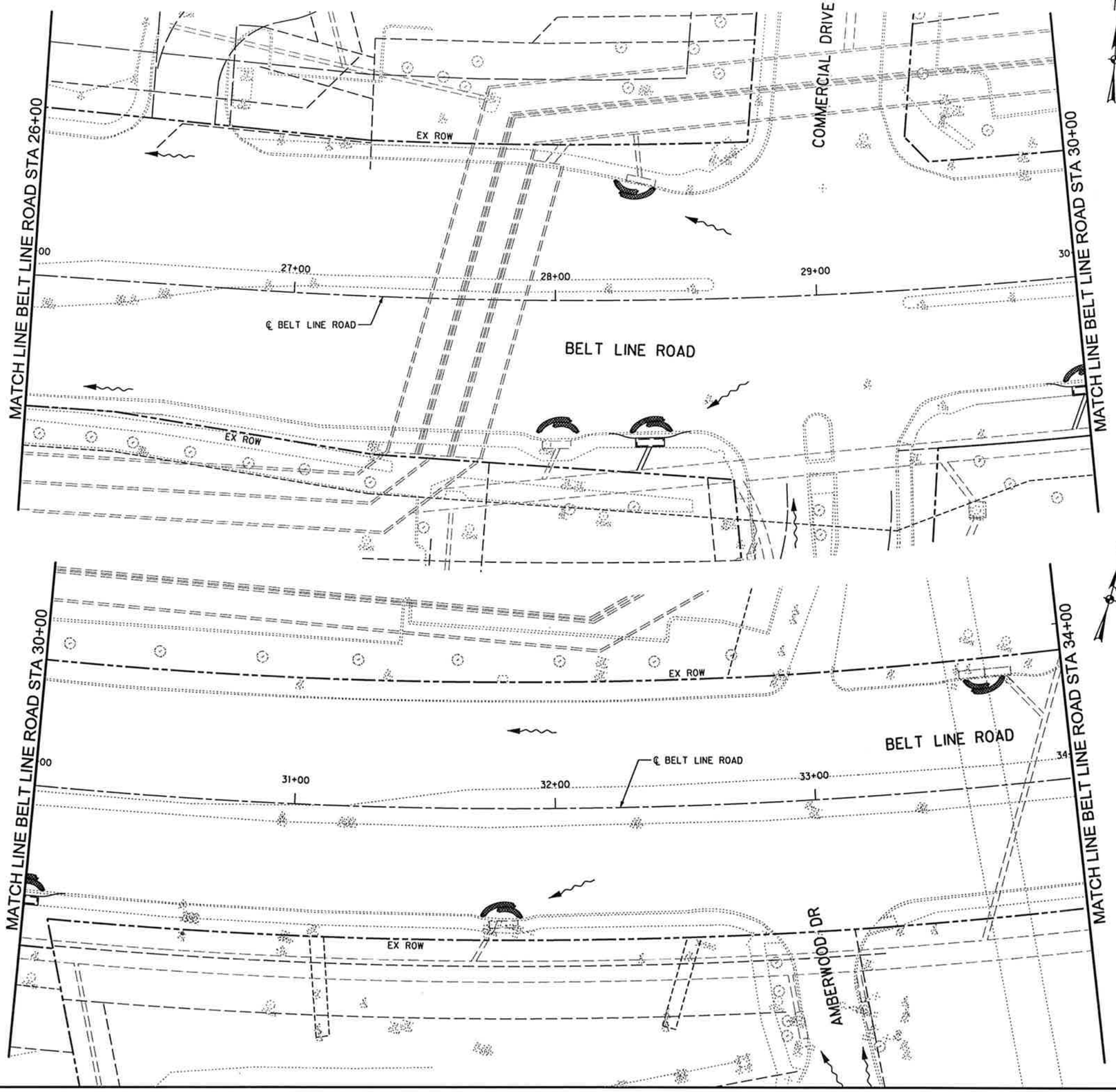
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

EROSION CONTROL PLAN
BELT LINE RD STA 18+00 TO STA 26+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 SWP3 02	EC-2



LEGEND

- DIRECTION OF DRAINAGE FLOW
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- INLET PROTECTION

SHEET 171 OF 235

MANUS CHAIPRASERT 94658 LICENSED PROFESSIONAL ENGINEER STATE OF TEXAS

Manus Chaiprasert P.E. 10/25/2013
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

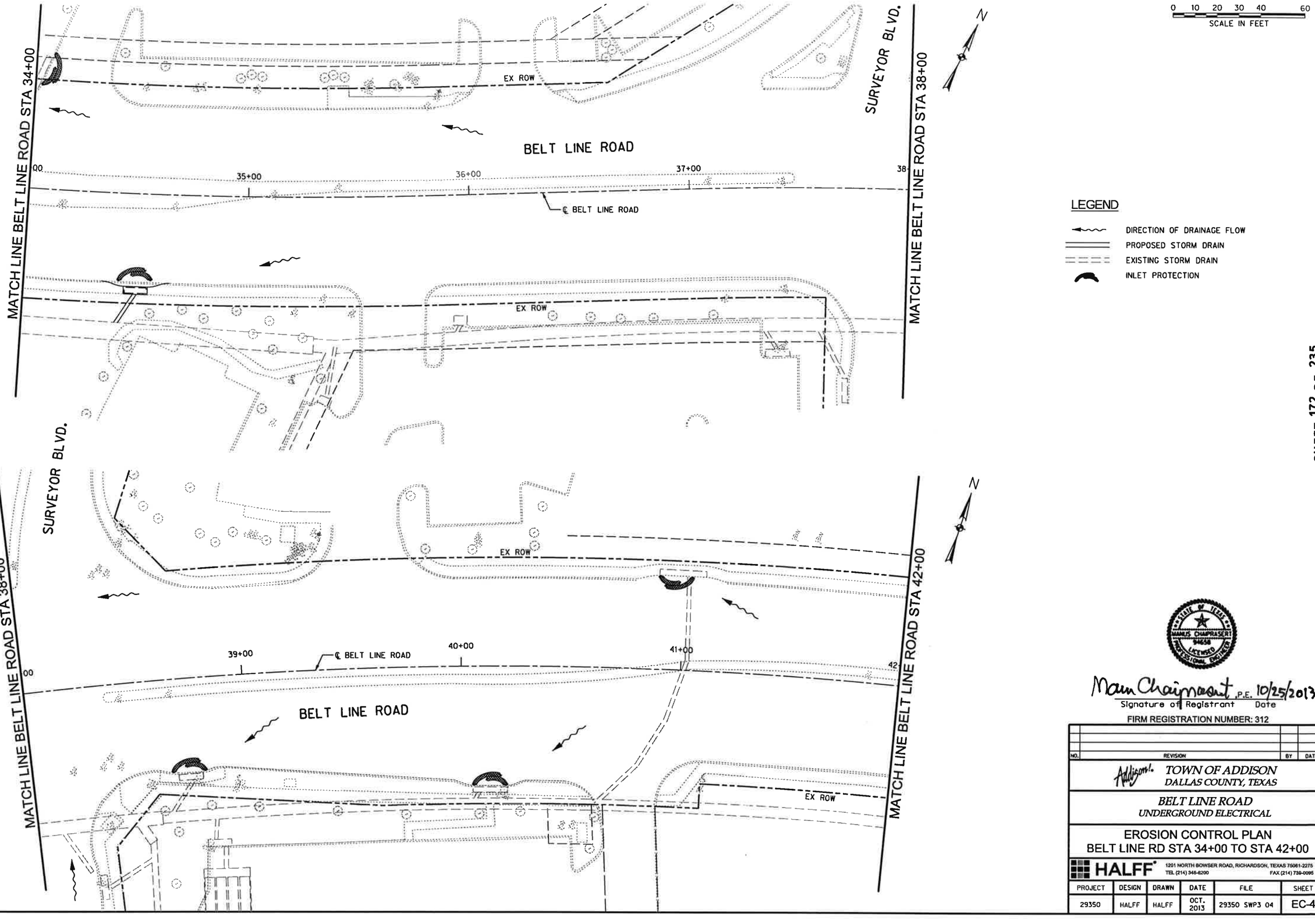
BELT LINE ROAD
UNDERGROUND ELECTRICAL

EROSION CONTROL PLAN
BELT LINE RD STA 26+00 TO STA 34+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 SWP3 03	EC-3

USER: dh1299
OFFICE: RCH
PROJECT # 29350
FILE: 29350 SWP3 04.dgn
TIME: 3:15:26 PM
DATE: 10/24/2013



LEGEND

- DIRECTION OF DRAINAGE FLOW
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- INLET PROTECTION

SHEET 172 OF 235

Manu Chaimsant, P.E. 10/25/2013
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

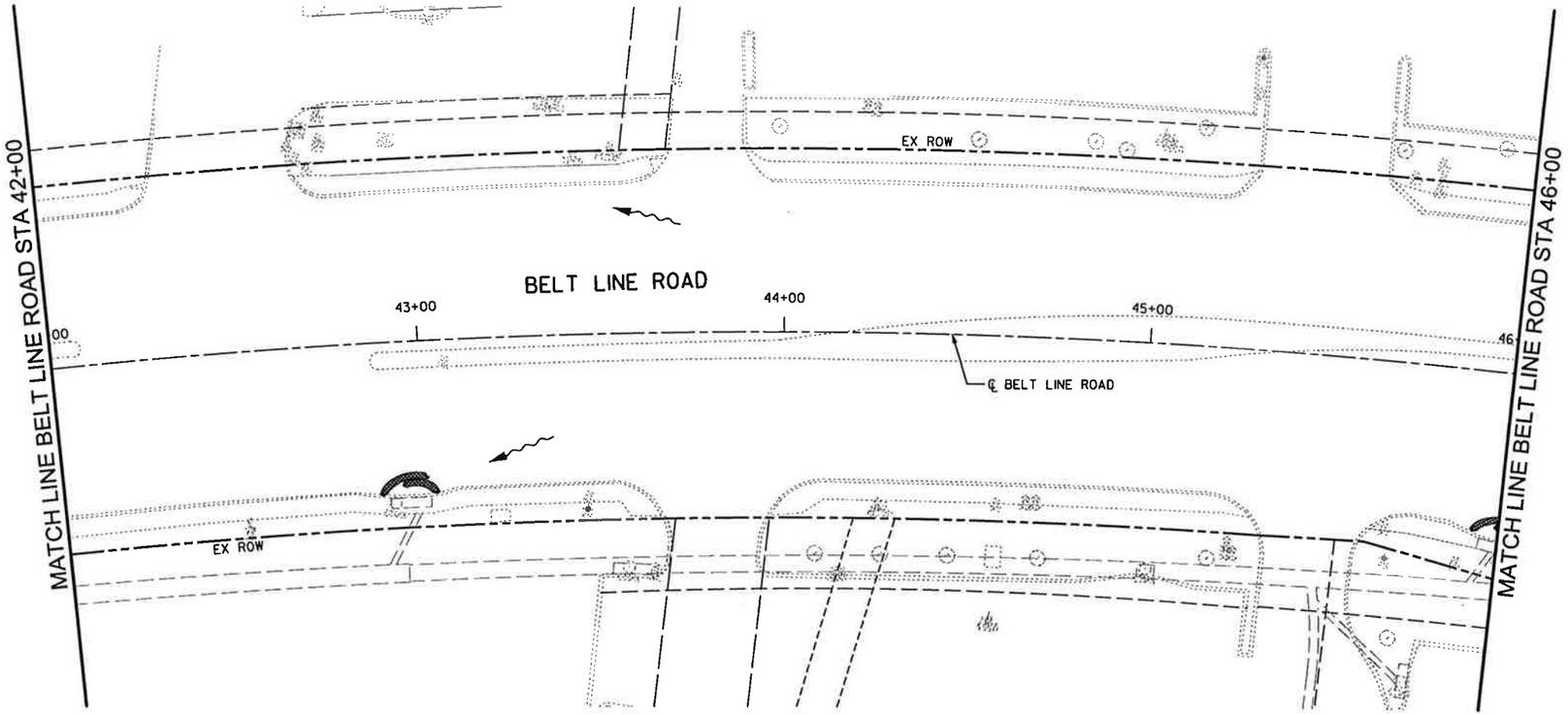
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

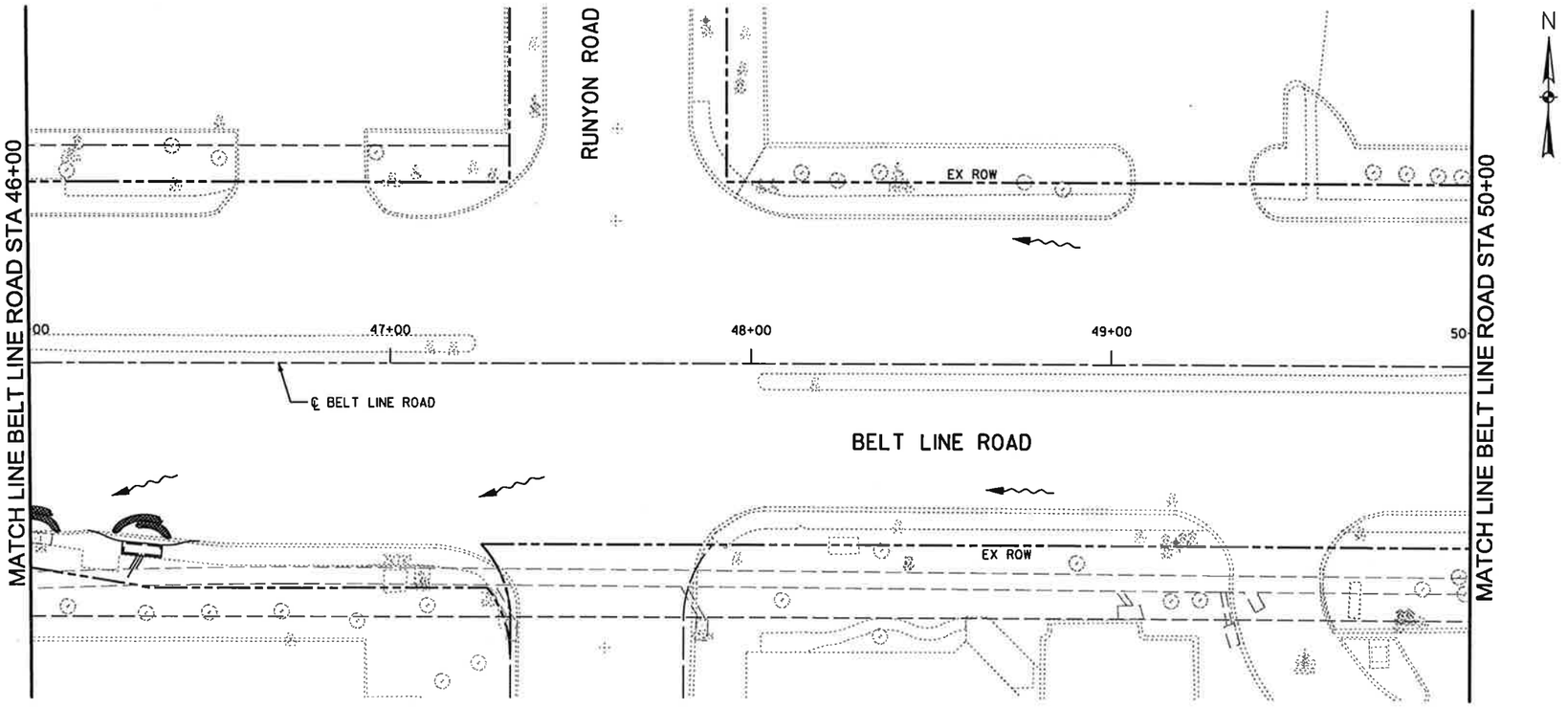
BELT LINE ROAD
UNDERGROUND ELECTRICAL

EROSION CONTROL PLAN
BELT LINE RD STA 34+00 TO STA 42+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 SWP3 04	EC-4





N

0 10 20 30 40 60
SCALE IN FEET

LEGEND

- DIRECTION OF DRAINAGE FLOW
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- INLET PROTECTION

STATE OF TEXAS
MANUS CHAIPRASERT
94638
LICENSED
PROFESSIONAL ENGINEER

Manus Chaiprasert P.E. 10/25/2013
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

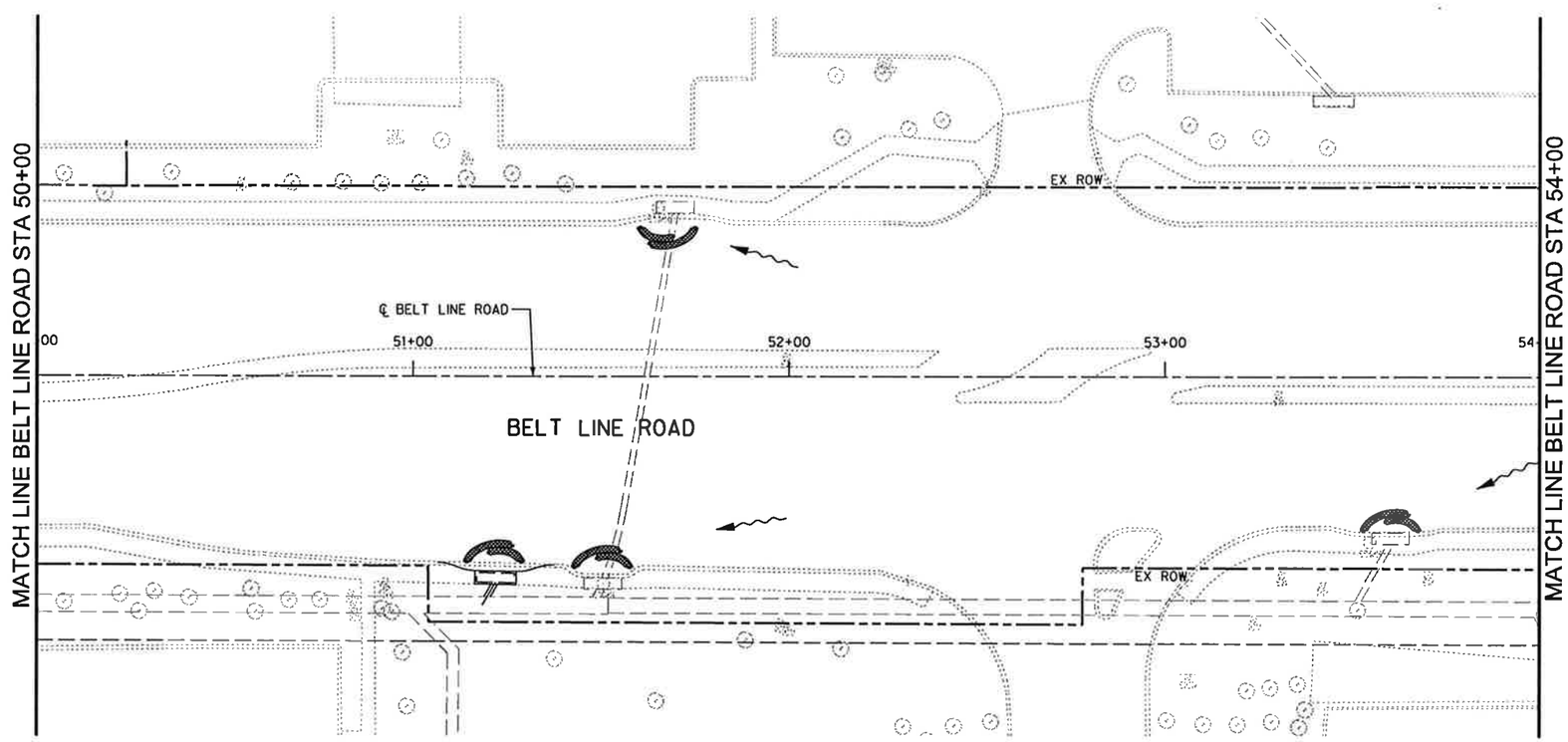
EROSION CONTROL PLAN
BELT LINE RD STA 42+00 TO STA 50+00

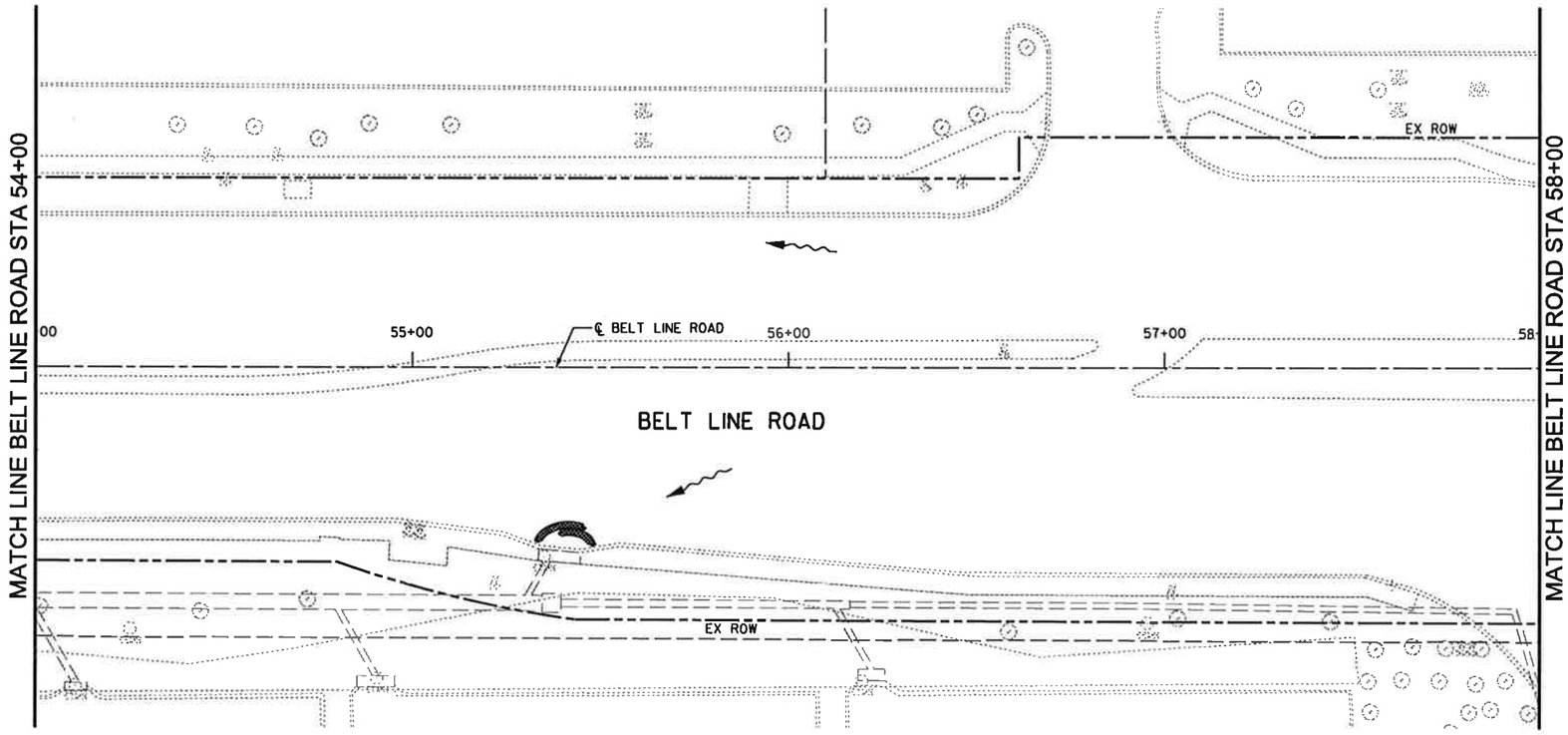
HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 SWP3 05	EC-5

SHEET 173 OF 235

PROJECT ▪ 29350 OFFICE: RCH USER: ah1299
DATE: 10/24/2013 TIME: 3:15:28 PM FILE: 29350 SWP3 05.dgn





0 10 20 30 40 60
SCALE IN FEET

LEGEND

- DIRECTION OF DRAINAGE FLOW
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- INLET PROTECTION

STATE OF TEXAS
MANUS CHAMPRASERT
94638
LICENSED
PROFESSIONAL ENGINEER

Manus Champrasert, P.E. 10/25/2013
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

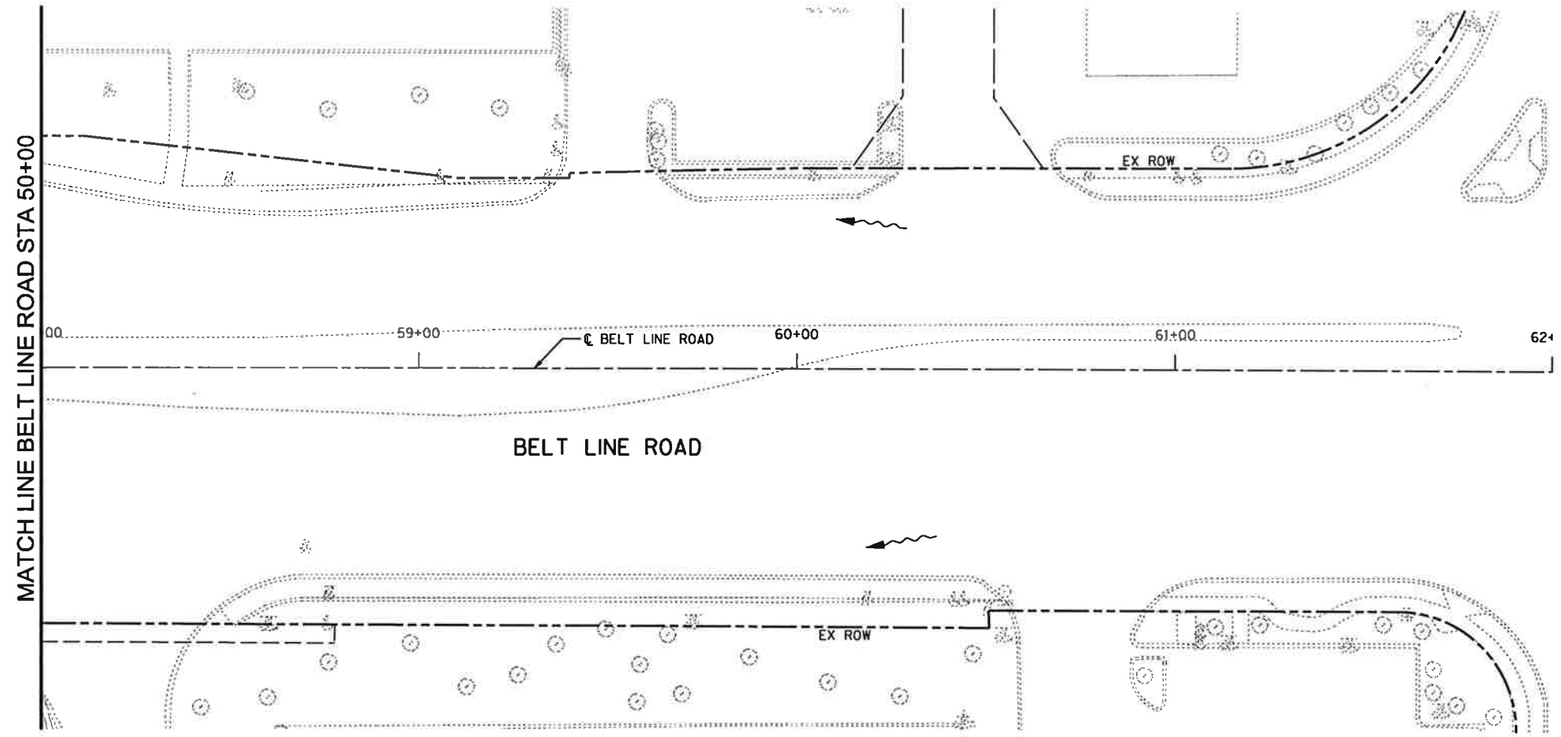
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

EROSION CONTROL PLAN
BELT LINE RD STA 50+00 TO STA 58+00

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 SWP3 06	EC-6



0 10 20 30 40 60
SCALE IN FEET

LEGEND

- DIRECTION OF DRAINAGE FLOW
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- INLET PROTECTION

SHEET 175 OF 235

STATE OF TEXAS
MANUS CHAIPRASERT
94258
LICENSED
PROFESSIONAL ENGINEER

Manus Chaiprasert P.E. 10/25/2013
Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

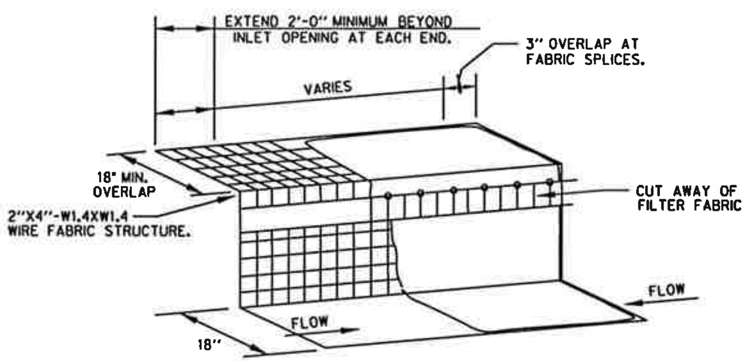
EROSION CONTROL PLAN
BELT LINE RD STA 58+00 TO STA 62+00

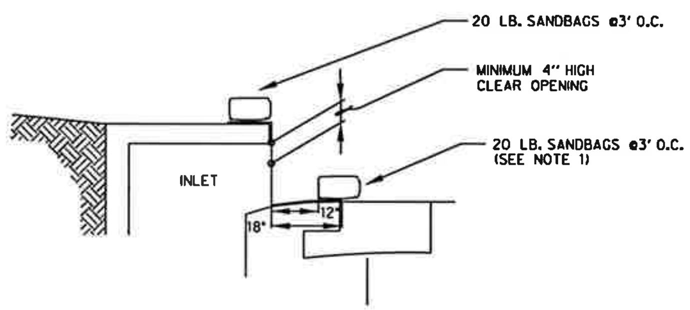
HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

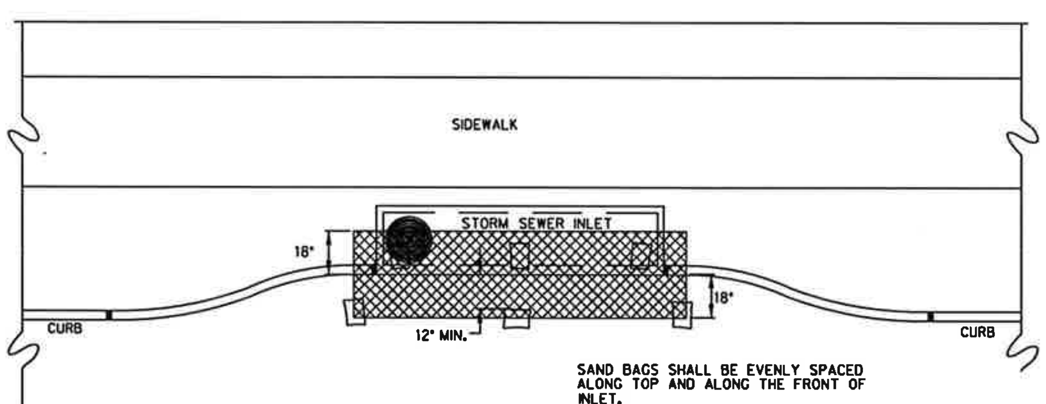
PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 SWP3 07	EC-7

DATE: 10/24/2013 TIME: 3:15:32 PM FILE: 29350 SWP3 07.dgn
PROJECT # 29350 OFFICE: RCH USER: gh1299

USER: ah1299 OFFICE: RCH PROJECT # 29350 FILE: 29350 DTEC 01.dgn TIME: 3:15:33 PM DATE: 10/24/2013







SAND BAGS SHALL BE EVENLY SPACED ALONG TOP AND ALONG THE FRONT OF INLET.

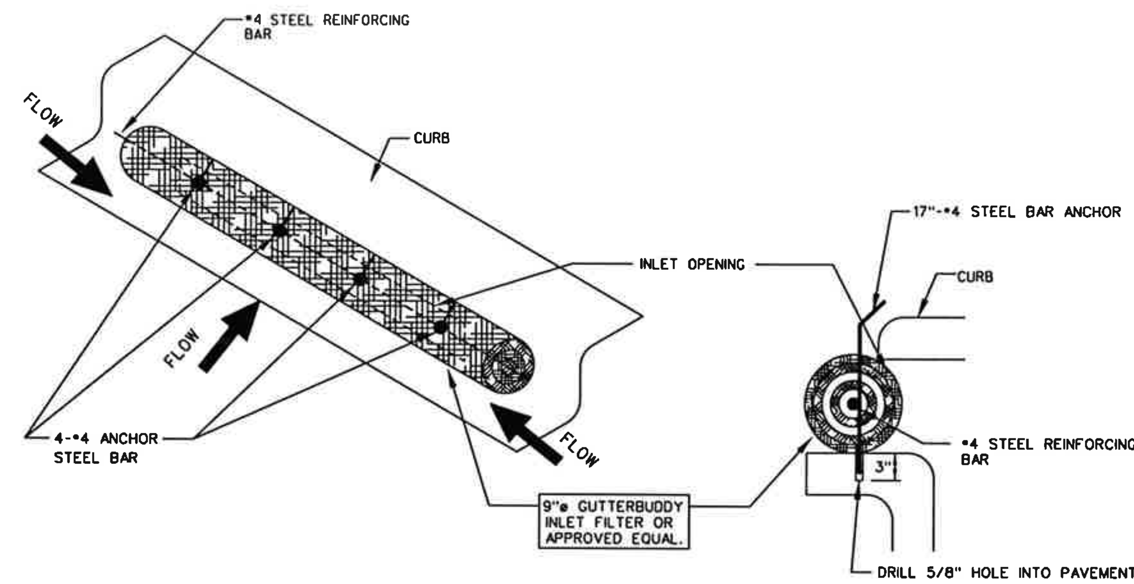
NOTES:

1. A SECTION OF FILTER FABRIC SHALL BE REMOVED AS SHOWN ON THIS DETAIL TO PROVIDE A 4" MINIMUM CLEAR OPENING. FABRIC MUST BE SECURED TO WIRE BACKING WITH CLIPS OR HOG RINGS AT THIS LOCATION.
2. INSPECTION SHALL BE MADE BY THE CONTRACTOR AND SILT ACCUMULATION MUST BE REMOVED WHEN DEPTH REACHES 2".
3. CONTRACTOR SHALL MONITOR THE PERFORMANCE OF INLET PROTECTION DURING EACH RAINFALL EVENT AND IMMEDIATELY REMOVE THE INLET PROTECTIONS IF THE STORM-WATER BEGINS TO OVERTOP THE CURB.
4. INLET PROTECTIONS SHALL BE REMOVED AS SOON AS THE SOURCE OF SEDIMENT IS STABILIZED.

INLET OPENING	MINIMUM NUMBER OF SAND BAGS	
	TOP	FRONT
5'	2	3
10'	3	3
15'	3	4
20'	4	4

RECESSED CURB INLET PROTECTION DETAIL

NOT TO SCALE



NOTES:

1. INLET FILTER SHALL BE ACF ENVIRONMENTAL "GUTTERBUDDY" OR APPROVED EQUAL.
2. INSTALL FIBER ROLL IN FRONT OF INLET OPENING. EACH END OF ROLL SHOULD OVERLAP OPENING BY APPROX. 1'.
3. FIBER ROLL SHALL HAVE A STEEL BAR THROUGH THE CENTER.
4. INSPECTION SHALL BE MADE BY THE CONTRACTOR AND SILT ACCUMULATION MUST BE REMOVED WHEN DEPTH REACHES 2".
5. CONTRACTOR SHALL MONITOR THE PERFORMANCE OF INLET PROTECTION DURING EACH RAINFALL EVENT AND IMMEDIATELY REMOVE THE INLET PROTECTIONS IF THE STORM-WATER BEGINS TO OVERTOP THE CURB.
6. INLET PROTECTIONS SHALL BE REMOVED AS SOON AS THE SOURCE OF SEDIMENT IS STABILIZED.

NON-RECESSED CURB INLET PROTECTION DETAIL

NOT TO SCALE

STATE OF TEXAS M.E. ROMANOWSKI 56306 LICENSED PROFESSIONAL ENGINEER

Marc Chaignaut P.E. 10/25/2013

Signature of Registrant Date

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

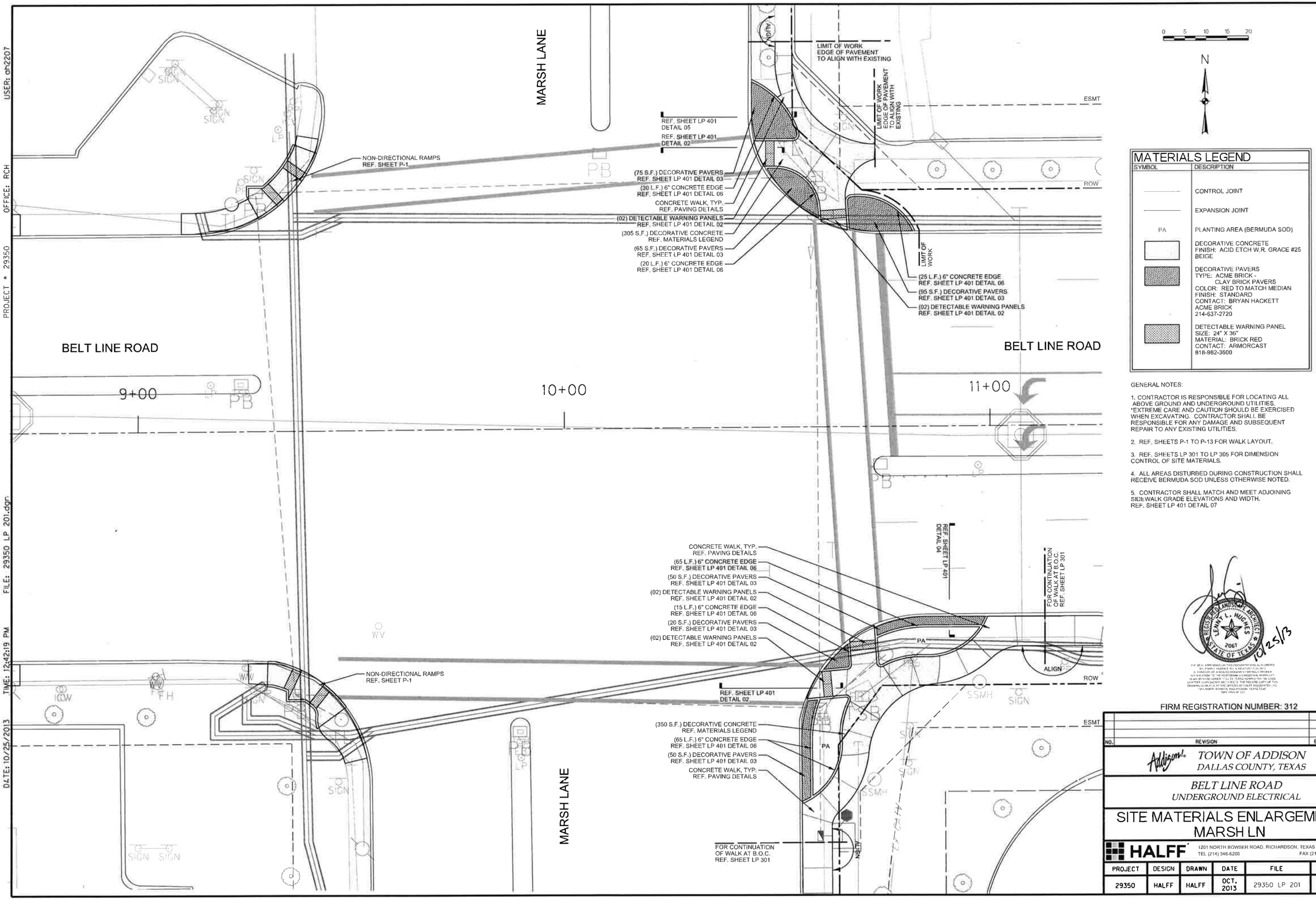
Addison! TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

EROSION CONTROL DETAILS

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275 TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29530 DTEC 01	DT-EC



MATERIALS LEGEND

SYMBOL	DESCRIPTION
	CONTROL JOINT
	EXPANSION JOINT
PA	PLANTING AREA (BERMUDA SOD)
	DECORATIVE CONCRETE FINISH: ACID ETCH W.R. GRACE #25 BEIGE
	DECORATIVE PAVERS TYPE: ACME BRICK - CLAY BRICK PAVERS COLOR: RED TO MATCH MEDIAN FINISH: STANDARD CONTACT: BRYAN HACKETT ACME BRICK 214-637-2720
	DETECTABLE WARNING PANEL SIZE: 24" X 36" MATERIAL: BRICK RED CONTACT: ARMORCAST 818-982-3600

GENERAL NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL ABOVE GROUND AND UNDERGROUND UTILITIES. *EXTREME CARE AND CAUTION SHOULD BE EXERCISED WHEN EXCAVATING. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE AND SUBSEQUENT REPAIR TO ANY EXISTING UTILITIES.

2. REF. SHEETS P-1 TO P-13 FOR WALK LAYOUT.

3. REF. SHEETS LP 301 TO LP 305 FOR DIMENSION CONTROL OF SITE MATERIALS.

4. ALL AREAS DISTURBED DURING CONSTRUCTION SHALL RECEIVE BERMUDA SOD UNLESS OTHERWISE NOTED.

5. CONTRACTOR SHALL MATCH AND MEET ADJOINING SIDEWALK GRADE ELEVATIONS AND WIDTH. REF. SHEET LP 401 DETAIL 07

LENNY L. HUGHES 2067 REGISTERED LANDSCAPE ARCHITECT STATE OF TEXAS

12/23/13

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY LENNY L. HUGHES R.L.A. 12/23/2013. A DUPLICATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION TO THE RESPONSIBLE LANDSCAPE ARCHITECT IS AN OFFENSE UNDER TITLE 22, TEXAS ADMINISTRATIVE CODE, CHAPTER 1 LANDSCAPE ARCHITECTS. THE RECORD COPY OF THIS DRAWING IS ON FILE AT THE OFFICES OF HALFF ASSOCIATES, INC. 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

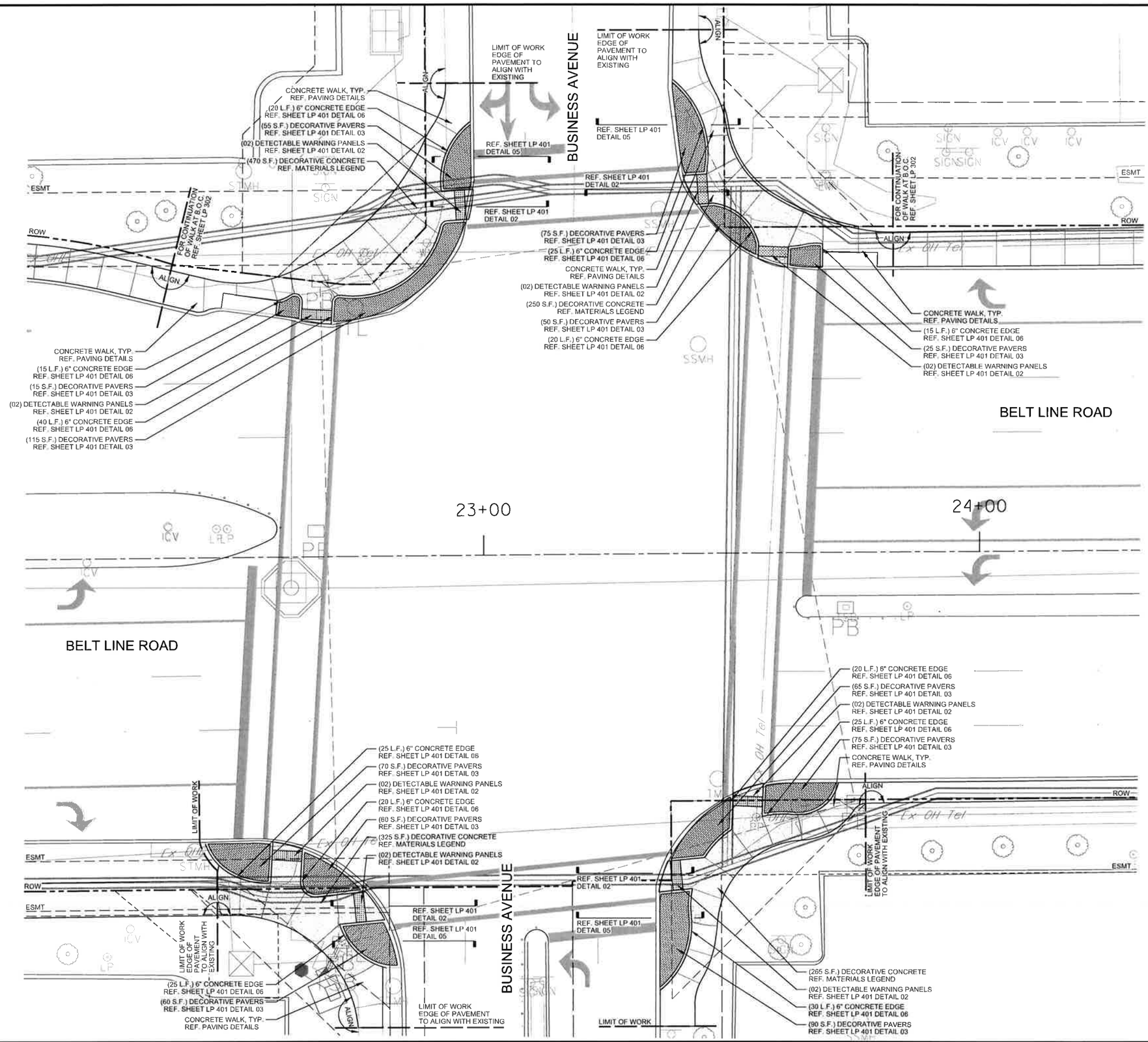
BELT LINE ROAD
UNDERGROUND ELECTRICAL

SITE MATERIALS ENLARGEMENT MARSH LN

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 LP 201	LP 201

USER: gh2207
OFFICE: RCH
PROJECT # 29350
FILE: 29350 LP 201.dgn
TIME: 12:42:19 PM
DATE: 10/25/2013



MATERIALS LEGEND

SYMBOL	DESCRIPTION
	CONTROL JOINT
	EXPANSION JOINT
PA	PLANTING AREA (BERMUDA SOD)
	DECORATIVE CONCRETE FINISH: ACID ETCH W.R. GRACE #25 BEIGE
	DECORATIVE PAVERS TYPE: ACME BRICK - CLAY BRICK PAVERS COLOR: RED TO MATCH MEDIAN FINISH: STANDARD CONTACT: BRYAN HACKETT ACME BRICK 214-637-2720
	DETECTABLE WARNING PANEL SIZE: 24" X 36" MATERIAL: BRICK RED CONTACT: ARMORCAST 818-982-3600

GENERAL NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL ABOVE GROUND AND UNDERGROUND UTILITIES. *EXTREME CARE AND CAUTION SHOULD BE EXERCISED WHEN EXCAVATING. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE AND SUBSEQUENT REPAIR TO ANY EXISTING UTILITIES.

2. REF. SHEETS P-1 TO P-13 FOR WALK LAYOUT.

3. REF. SHEETS LP 301 TO LP 305 FOR DIMENSION CONTROL OF SITE MATERIALS.

4. ALL AREAS DISTURBED DURING CONSTRUCTION SHALL RECEIVE BERMUDA SOD UNLESS OTHERWISE NOTED.

5. CONTRACTOR SHALL MATCH AND MEET ADJOINING SIDEWALK GRADE ELEVATIONS AND WIDTH. REF. SHEET LP 401 DETAIL 07

REGISTERED LANDSCAPE ARCHITECT LENNY L. HUGHES 2067 STATE OF TEXAS

10/25/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

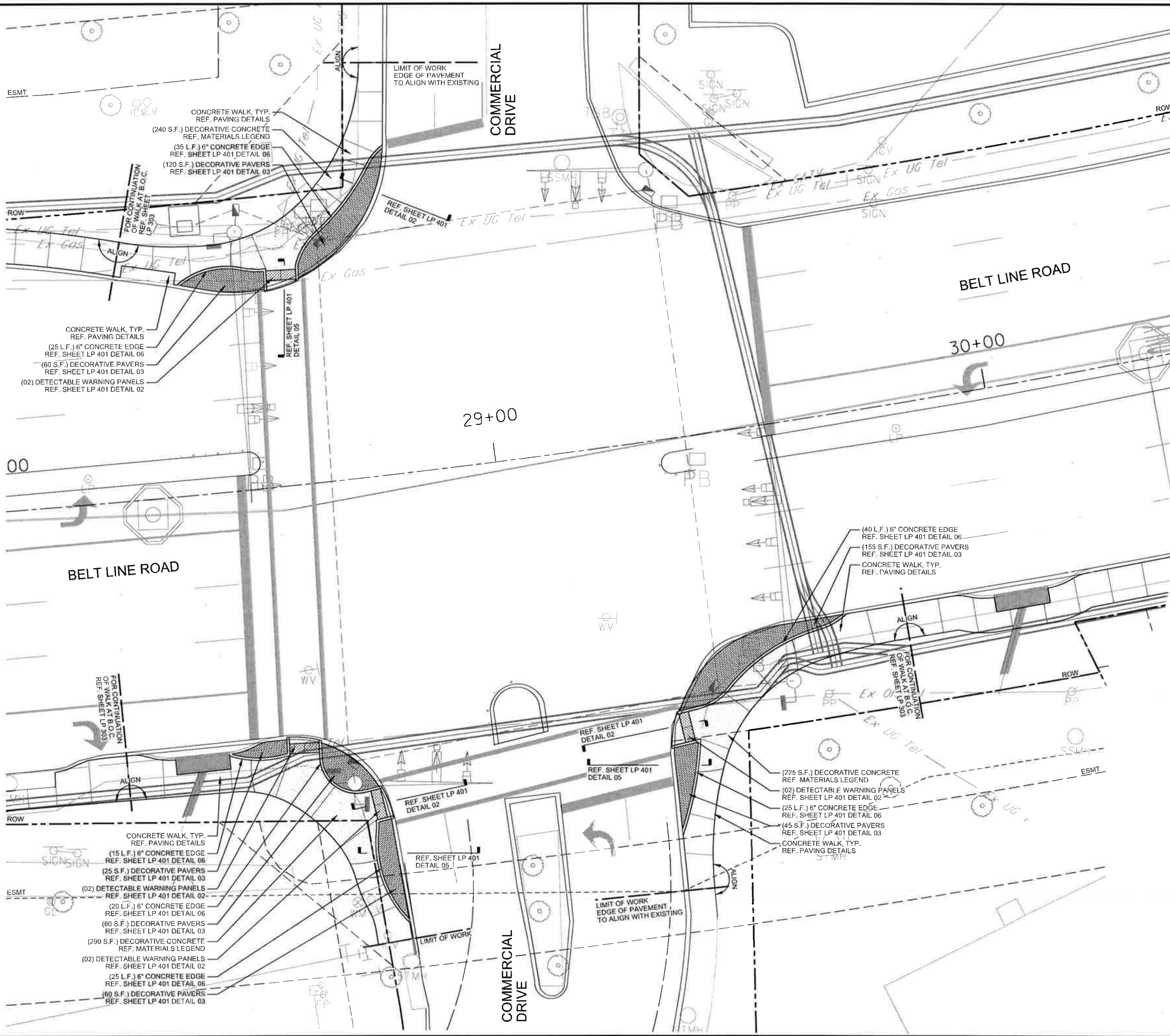
SITE MATERIALS ENLARGEMENT BUSINESS AVE

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 LP 202	LP 202

DATE: 10/25/2013 TIME: 12:43:07 PM FILE: 29350 LP 202.dgn
PROJECT # 29350 OFFICE: RCH USER: ah2207

USER: ah2207 OFFICE: RCH PROJECT # 29350 FILE: 29350 LP 203.dgr TIME: 12:43:53 PM DATE: 10/25/2013



MATERIALS LEGEND	
SYMBOL	DESCRIPTION
	CONTROL JOINT
	EXPANSION JOINT
PA	PLANTING AREA (BERMUDA SOD)
	DECORATIVE CONCRETE FINISH: ACID ETCH W.R. GRACE #25 BEIGE
	DECORATIVE PAVERS TYPE: ACME BRICK - CLAY BRICK PAVERS COLOR: RED TO MATCH MEDIAN FINISH: STANDARD CONTACT: BRYAN HACKETT ACME BRICK 214-637-2720
	DETECTABLE WARNING PANEL SIZE: 24" X 36" MATERIAL: BRICK RED CONTACT: ARMORCAST 818-982-3600

GENERAL NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL ABOVE GROUND AND UNDERGROUND UTILITIES. *EXTREME CARE AND CAUTION SHOULD BE EXERCISED WHEN EXCAVATING. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE AND SUBSEQUENT REPAIR TO ANY EXISTING UTILITIES.
2. REF. SHEETS P-1 TO P-13 FOR WALK LAYOUT.
3. REF. SHEETS LP 301 TO LP 305 FOR DIMENSION CONTROL OF SITE MATERIALS.
4. ALL AREAS DISTURBED DURING CONSTRUCTION SHALL RECEIVE BERMUDA SOD UNLESS OTHERWISE NOTED.
5. CONTRACTOR SHALL MATCH AND MEET ADJOINING SIDEWALK GRADE ELEVATIONS AND WIDTH, REF. SHEET LP 401 DETAIL 07

SHEET 179 OF 235

REGISTERED LANDSCAPE ARCHITECT LENNY L. HUGHES 2061 STATE OF TEXAS 10/25/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

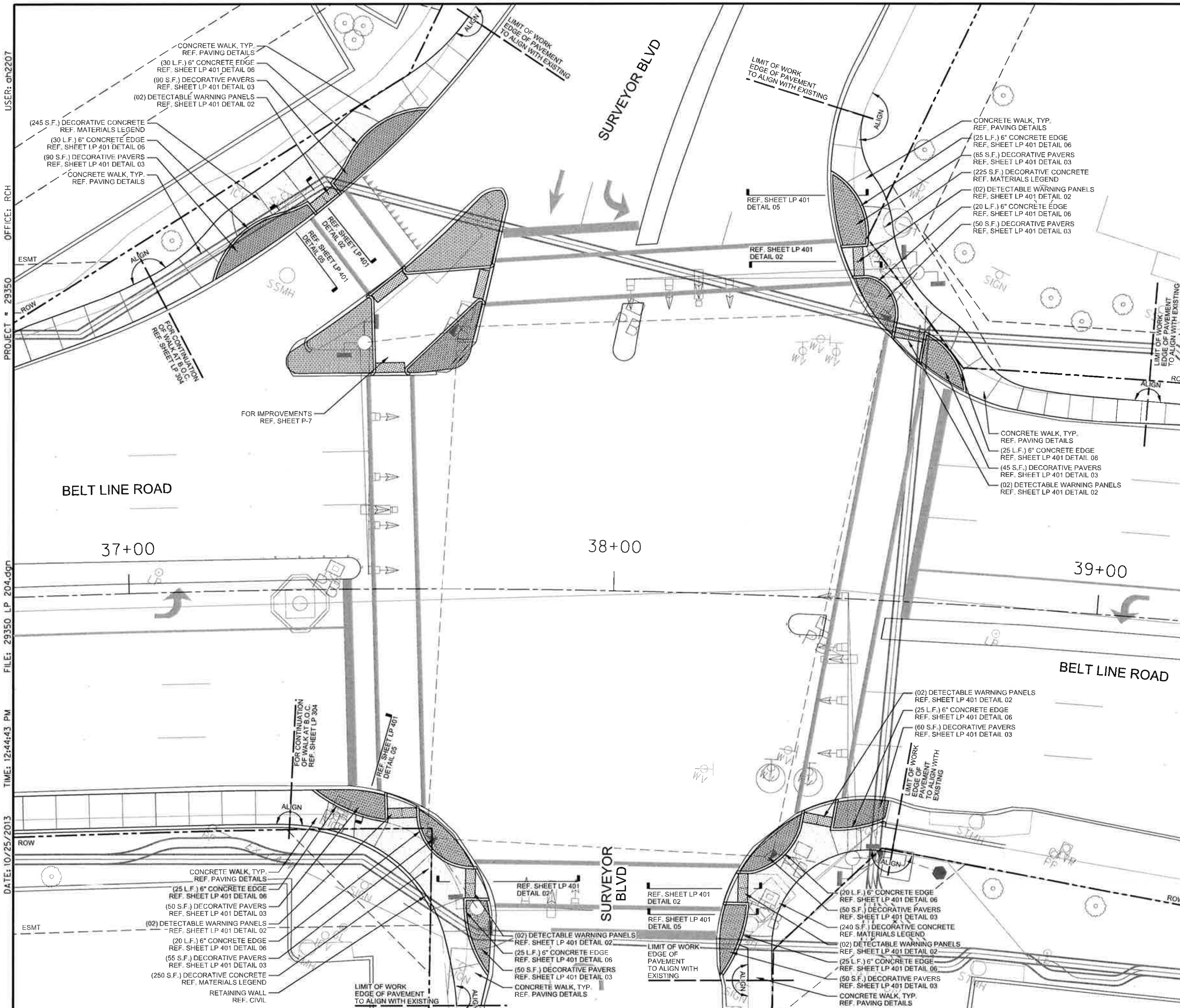
BELT LINE ROAD
UNDERGROUND ELECTRICAL

SITE MATERIALS ENLARGEMENT
COMMERCIAL AVE

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275 TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 LP 203	LP 203

USER: ah2207 OFFICE: RCH PROJECT # 29350 FILE: 29350 LP 204.dgn TIME: 12:44:43 PM DATE: 10/25/2013



SURVEYOR BLVD
BELT LINE ROAD
37+00
38+00
39+00
SURVEYOR BLVD
BELT LINE ROAD
CONCRETE WALK, TYP. REF. PAVING DETAILS
(30 L.F.) 6" CONCRETE EDGE REF. SHEET LP 401 DETAIL 06
(90 S.F.) DECORATIVE PAVERS REF. SHEET LP 401 DETAIL 03
(02) DETECTABLE WARNING PANELS REF. SHEET LP 401 DETAIL 02
(245 S.F.) DECORATIVE CONCRETE REF. MATERIALS LEGEND
LIMIT OF WORK EDGE OF PAVEMENT TO ALIGN WITH EXISTING
REF. SHEET LP 401 DETAIL 02
REF. SHEET LP 401 DETAIL 05
FOR CONTINUATION OF WALK AT B.O.C. REF. SHEET LP 304
FOR IMPROVEMENTS REF. SHEET P-7
(25 L.F.) 6" CONCRETE EDGE REF. SHEET LP 401 DETAIL 06
(65 S.F.) DECORATIVE PAVERS REF. SHEET LP 401 DETAIL 03
(225 S.F.) DECORATIVE CONCRETE REF. MATERIALS LEGEND
(20 L.F.) 6" CONCRETE EDGE REF. SHEET LP 401 DETAIL 06
(50 S.F.) DECORATIVE PAVERS REF. SHEET LP 401 DETAIL 03
(45 S.F.) DECORATIVE PAVERS REF. SHEET LP 401 DETAIL 03
(60 S.F.) DECORATIVE PAVERS REF. SHEET LP 401 DETAIL 03
(55 S.F.) DECORATIVE PAVERS REF. SHEET LP 401 DETAIL 03
(250 S.F.) DECORATIVE CONCRETE REF. MATERIALS LEGEND
(240 S.F.) DECORATIVE CONCRETE REF. MATERIALS LEGEND
RETAINING WALL REF. CIVIL
ROW
ESMT
ALIGN
SSMH
SIGN

0 5 10 15 20

N

MATERIALS LEGEND

SYMBOL	DESCRIPTION
(solid line)	CONTROL JOINT
(dashed line)	EXPANSION JOINT
PA	PLANTING AREA (BERMUDA SOD)
(blank box)	DECORATIVE CONCRETE FINISH: ACID ETCH W.R. GRACE #25 BEIGE
(hatched box)	DECORATIVE PAVERS TYPE: ACME BRICK - CLAY BRICK PAVERS COLOR: RED TO MATCH MEDIAN FINISH: STANDARD CONTACT: BRYAN HACKETT ACME BRICK 214-637-2720
(dotted box)	DETECTABLE WARNING PANEL SIZE: 24" X 36" MATERIAL: BRICK RED CONTACT: ARMORCAST 818-982-3600

GENERAL NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL ABOVE GROUND AND UNDERGROUND UTILITIES. *EXTREME CARE AND CAUTION SHOULD BE EXERCISED WHEN EXCAVATING. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE AND SUBSEQUENT REPAIR TO ANY EXISTING UTILITIES.

2. REF. SHEETS P-1 TO P-13 FOR WALK LAYOUT.

3. REF. SHEETS LP 301 TO LP 305 FOR DIMENSION CONTROL OF SITE MATERIALS.

4. ALL AREAS DISTURBED DURING CONSTRUCTION SHALL RECEIVE BERMUDA SOD UNLESS OTHERWISE NOTED.

5. CONTRACTOR SHALL MATCH AND MEET ADJOINING SIDEWALK GRADE ELEVATIONS AND WIDTH. REF. SHEET LP 401 DETAIL 07

REGISTERED LANDSCAPE ARCHITECT LENNY L. HUGHES 2061 STATE OF TEXAS 10/25/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

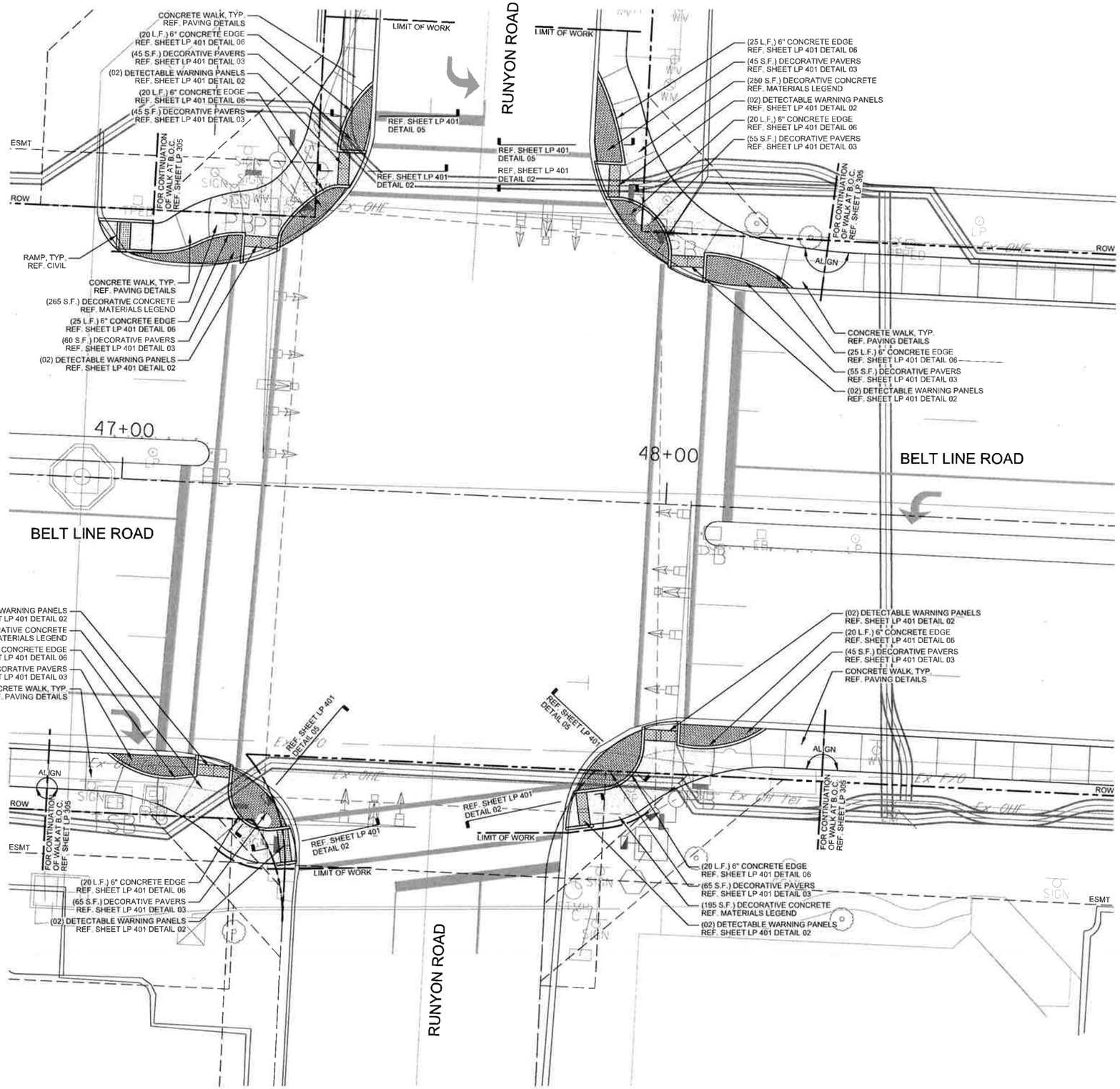
Addison! TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

SITE MATERIALS ENLARGEMENT
SURVEYOR BLVD

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275 TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 LP 204	LP 204



0 5 10 15 20

N

MATERIALS LEGEND

SYMBOL	DESCRIPTION
	CONTROL JOINT
	EXPANSION JOINT
PA	PLANTING AREA (BERMUDA SOD)
	DECORATIVE CONCRETE FINISH: ACID ETCH W.R. GRACE #25 BEIGE
	DECORATIVE PAVERS TYPE: ACME BRICK - CLAY BRICK PAVERS COLOR: RED TO MATCH MEDIAN FINISH: STANDARD CONTACT: BRYAN HACKETT ACME BRICK 214-637-2720
	DETECTABLE WARNING PANEL SIZE: 24" X 36" MATERIAL: BRICK RED CONTACT: ARMORCAST 818-982-3600

GENERAL NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL ABOVE GROUND AND UNDERGROUND UTILITIES. *EXTREME CARE AND CAUTION SHOULD BE EXERCISED WHEN EXCAVATING. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE AND SUBSEQUENT REPAIR TO ANY EXISTING UTILITIES.

2. REF. SHEETS P-1 TO P-13 FOR WALK LAYOUT.

3. REF. SHEETS LP 301 TO LP 305 FOR DIMENSION CONTROL OF SITE MATERIALS.

4. ALL AREAS DISTURBED DURING CONSTRUCTION SHALL RECEIVE BERMUDA SOD UNLESS OTHERWISE NOTED.

5. CONTRACTOR SHALL MATCH AND MEET ADJOINING SIDEWALK GRADE ELEVATIONS AND WIDTH. REF. SHEET LP 401 DETAIL 07

SHEET 181 OF 235

REGISTERED LANDSCAPE ARCHITECT · JENNY L. HUGHES · 2061 · STATE OF TEXAS

10/25/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

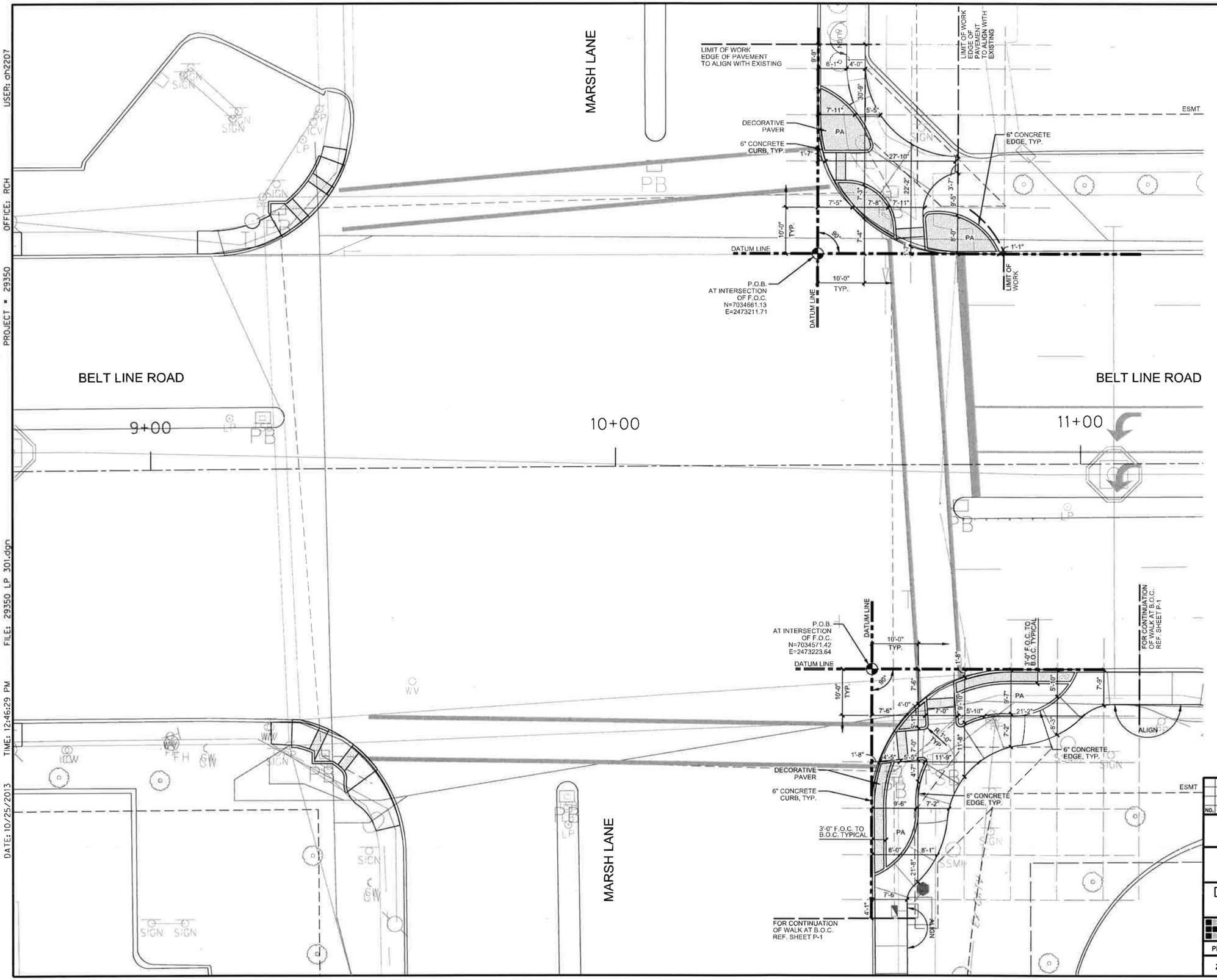
Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

SITE MATERIALS ENLARGEMENT RUNYON RD

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 LP 205	LP 205



0 5 10 15 20

N

MATERIALS LEGEND

SYMBOL	DESCRIPTION
	CONTROL JOINT
	EXPANSION JOINT
PA	PLANTING AREA (BERMUDA SOD)
	DECORATIVE CONCRETE REF. SHEETS LP 201 TO LP 205
	DECORATIVE PAVERS REF. SHEETS LP 201 TO LP 205
	DETECTABLE WARNING PANEL REF. SHEETS LP 201 TO LP 205

GENERAL NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL ABOVE GROUND AND UNDERGROUND UTILITIES. "EXTREME CARE AND CAUTION SHOULD BE EXERCISED WHEN EXCAVATING. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE AND SUBSEQUENT REPAIR TO ANY EXISTING UTILITIES.

2. ALL DIMENSIONS ARE FROM F.O.C. UNLESS OTHERWISE NOTED.

3. REF. SHEETS P-1 TO P-13 FOR WALK LAYOUT.

4. REF. SHEETS LP 201 TO LP 205 FOR SITE MATERIALS.

5. ALL AREAS DISTURBED DURING CONSTRUCTION SHALL RECEIVE BERMUDA SOD UNLESS OTHERWISE NOTED.

6. CONTRACTOR SHALL MATCH AND MEET ADJOINING SIDEWALK GRADE ELEVATIONS AND WIDTH. REF. SHEET LP 401 DETAIL 07

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

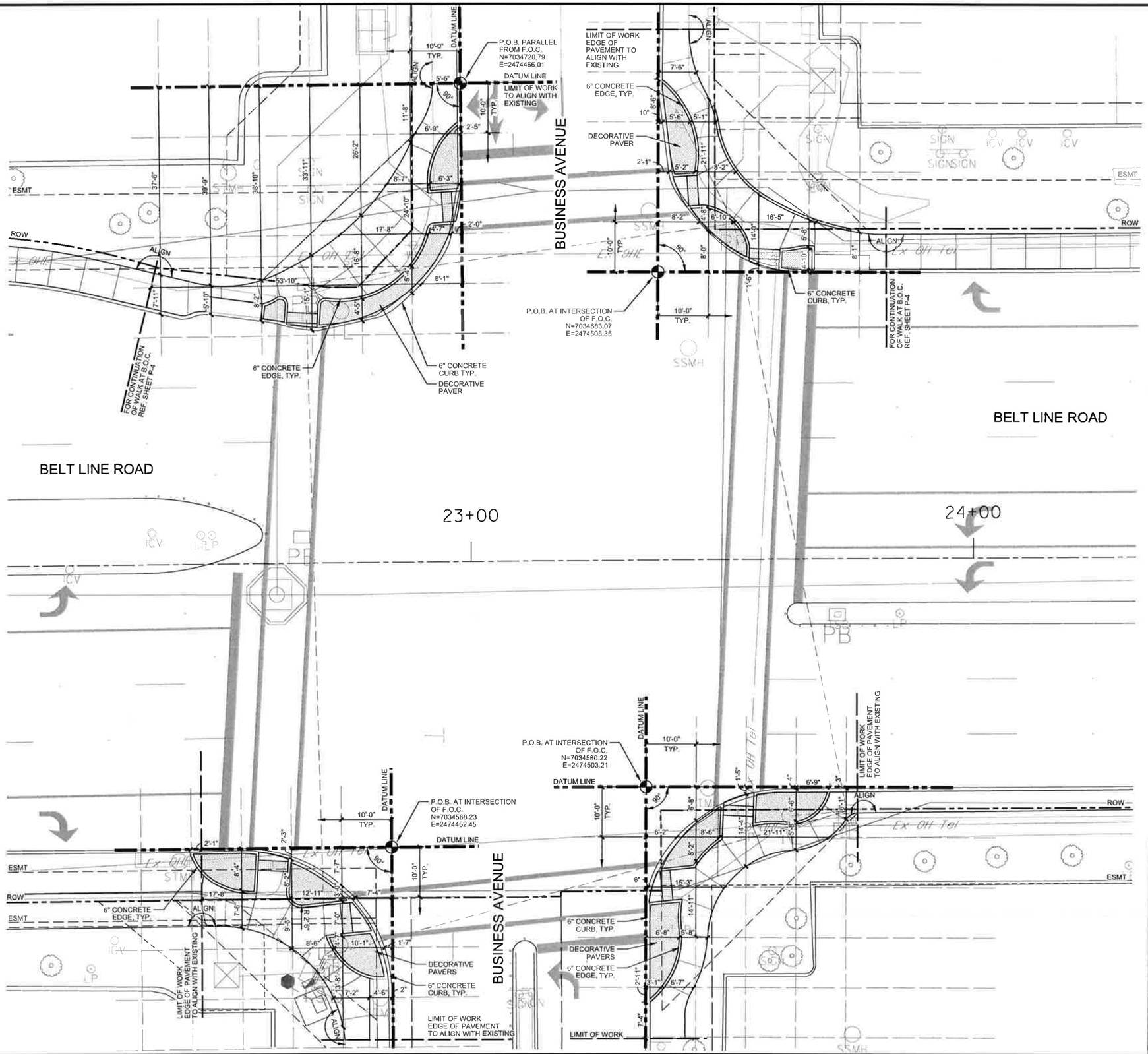
Addison TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

DIMENSION CONTROL ENLARGEMENT MARSH LN

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0085

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 LP 301	LP 301



0 5 10 15 20

N

LEGEND

SYMBOL	DESCRIPTION
	CONTROL JOINT
	EXPANSION JOINT
PA	PLANTING AREA (BERMUDA SOD)
	DECORATIVE CONCRETE REF. SHEETS LP 201 TO LP 205
	DECORATIVE PAVERS REF. SHEETS LP 201 TO LP 205
	DETECTABLE WARNING PANEL REF. SHEETS LP 201 TO LP 205

GENERAL NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL ABOVE GROUND AND UNDERGROUND UTILITIES. *EXTREME CARE AND CAUTION SHOULD BE EXERCISED WHEN EXCAVATING. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE AND SUBSEQUENT REPAIR TO ANY EXISTING UTILITIES.

2. ALL DIMENSIONS ARE FROM F.O.C. UNLESS OTHERWISE NOTED.

3. REF. SHEETS P-1 TO P-13 FOR WALK LAYOUT.

4. REF. SHEETS LP 201 TO LP 205 FOR SITE MATERIALS.

5. ALL AREAS DISTURBED DURING CONSTRUCTION SHALL RECEIVE BERMUDA SOD UNLESS OTHERWISE NOTED.

6. CONTRACTOR SHALL MATCH AND MEET ADJOINING SIDEWALK GRADE ELEVATIONS AND WIDTH. REF. SHEET LP 401 DETAIL 07

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

DIMENSION CONTROL ENLARGEMENT BUSINESS AVE

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT, 2013	29350 LP 302	LP 302

0 5 10 15 20

N

LEGEND

SYMBOL	DESCRIPTION
	CONTROL JOINT
	EXPANSION JOINT
PA	PLANTING AREA (BERMUDA SOD)
	DECORATIVE CONCRETE REF. SHEETS LP 201 TO LP 205
	DECORATIVE PAVERS REF. SHEETS LP 201 TO LP 205
	DETECTABLE WARNING PANEL REF. SHEETS LP 201 TO LP 205

GENERAL NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL ABOVE GROUND AND UNDERGROUND UTILITIES. *EXTREME CARE AND CAUTION SHOULD BE EXERCISED WHEN EXCAVATING. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE AND SUBSEQUENT REPAIR TO ANY EXISTING UTILITIES.

2. ALL DIMENSIONS ARE FROM F.O.C. UNLESS OTHERWISE NOTED.

3. REF. SHEETS P-1 TO P-13 FOR WALK LAYOUT.

4. REF. SHEETS LP 201 TO LP 205 FOR SITE MATERIALS.

5. ALL AREAS DISTURBED DURING CONSTRUCTION SHALL RECEIVE BERMUDA SOD UNLESS OTHERWISE NOTED.

6. CONTRACTOR SHALL MATCH AND MEET ADJOINING SIDEWALK GRADE ELEVATIONS AND WIDTH. REF. SHEET LP 401 DETAIL 07

REGISTERED LANDSCAPE ARCHITECT — LEANN L. HUGHES — 2067 — STATE OF TEXAS

10/25/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

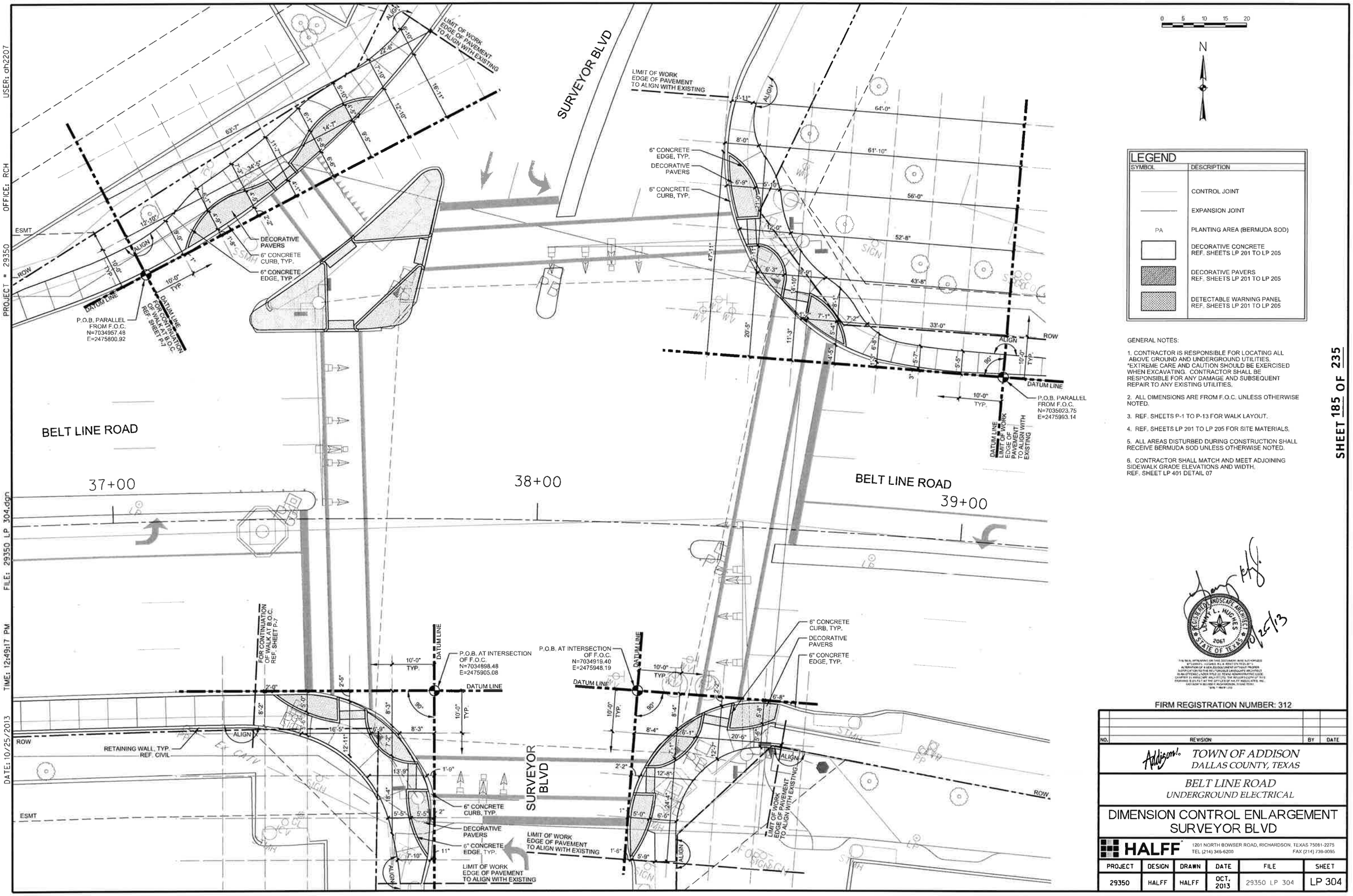
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

DIMENSION CONTROL ENLARGEMENT COMMERCIAL DR

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 LP 303	LP 303



0 5 10 15 20

N

LEGEND

SYMBOL	DESCRIPTION
	CONTROL JOINT
	EXPANSION JOINT
PA	PLANTING AREA (BERMUDA SOD)
	DECORATIVE CONCRETE REF. SHEETS LP 201 TO LP 205
	DECORATIVE PAVERS REF. SHEETS LP 201 TO LP 205
	DETECTABLE WARNING PANEL REF. SHEETS LP 201 TO LP 205

GENERAL NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL ABOVE GROUND AND UNDERGROUND UTILITIES. *EXTREME CARE AND CAUTION SHOULD BE EXERCISED WHEN EXCAVATING. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE AND SUBSEQUENT REPAIR TO ANY EXISTING UTILITIES.
2. ALL DIMENSIONS ARE FROM F.O.C. UNLESS OTHERWISE NOTED.
3. REF. SHEETS P-1 TO P-13 FOR WALK LAYOUT.
4. REF. SHEETS LP 201 TO LP 205 FOR SITE MATERIALS.
5. ALL AREAS DISTURBED DURING CONSTRUCTION SHALL RECEIVE BERMUDA SOD UNLESS OTHERWISE NOTED.
6. CONTRACTOR SHALL MATCH AND MEET ADJOINING SIDEWALK GRADE ELEVATIONS AND WIDTH. REF. SHEET LP 401 DETAIL 07

REGISTERED LANDSCAPE ARCHITECT
LARRY L. HUGHES
2061
STATE OF TEXAS
10/25/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

DIMENSION CONTROL ENLARGEMENT SURVEYOR BLVD

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 LP 304	LP 304

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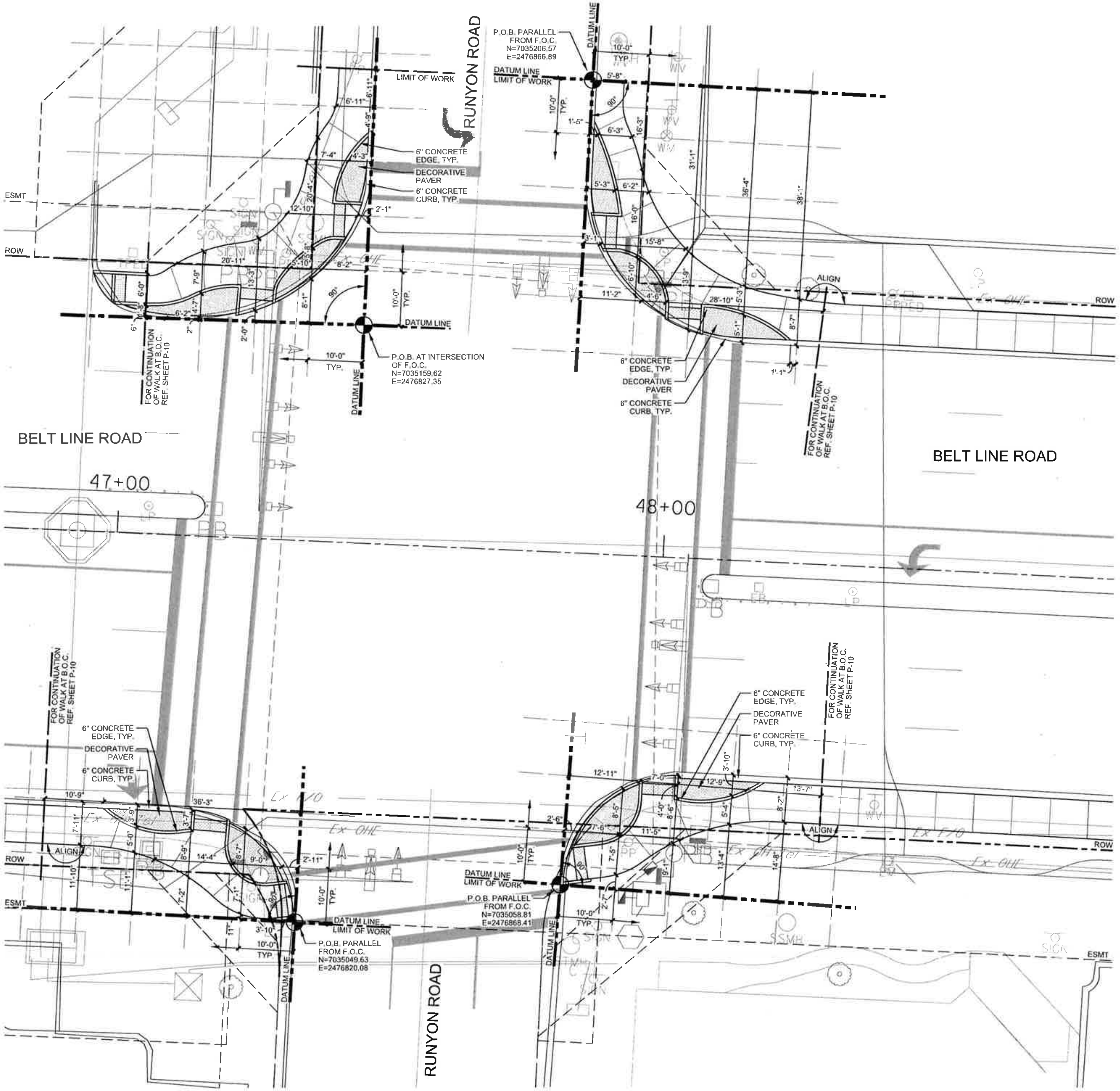
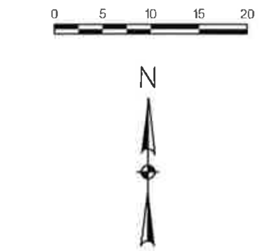
OFFICE: RCH
PROJECT # 29350
FILE: 29350 LP 304.dgn
TIME: 12:49:17 PM
DATE: 10/25/2013





LEGEND

SYMBOL	DESCRIPTION
	CONTROL JOINT
	EXPANSION JOINT
PA	PLANTING AREA (BERMUDA SOD)
	DECORATIVE CONCRETE REF. SHEETS LP 201 TO LP 205
	DECORATIVE PAVERS REF. SHEETS LP 201 TO LP 205
	DETECTABLE WARNING PANEL REF. SHEETS LP 201 TO LP 205

GENERAL NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL ABOVE GROUND AND UNDERGROUND UTILITIES. EXTREME CARE AND CAUTION SHOULD BE EXERCISED WHEN EXCAVATING. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE AND SUBSEQUENT REPAIR TO ANY EXISTING UTILITIES.
2. ALL DIMENSIONS ARE FROM F.O.C. UNLESS OTHERWISE NOTED.
3. REF. SHEETS P-1 TO P-13 FOR WALK LAYOUT.
4. REF. SHEETS LP 201 TO LP 205 FOR SITE MATERIALS.
5. ALL AREAS DISTURBED DURING CONSTRUCTION SHALL RECEIVE BERMUDA SOD UNLESS OTHERWISE NOTED.
6. CONTRACTOR SHALL MATCH AND MEET ADJOINING SIDEWALK GRADE ELEVATIONS AND WIDTH. REF. SHEET LP 401 DETAIL 07

REGISTERED LANDSCAPE ARCHITECT LENN L. HUGHES 2061 STATE OF TEXAS — 9/25/13

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

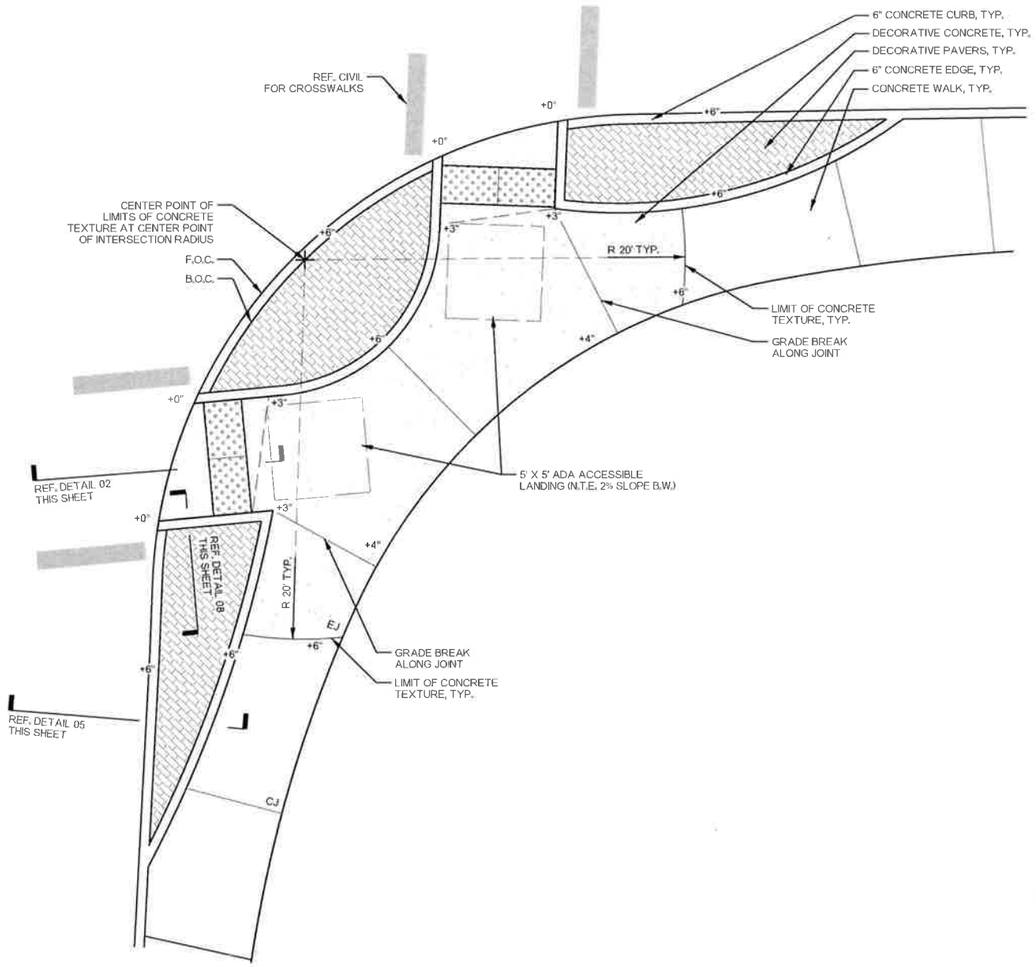
TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

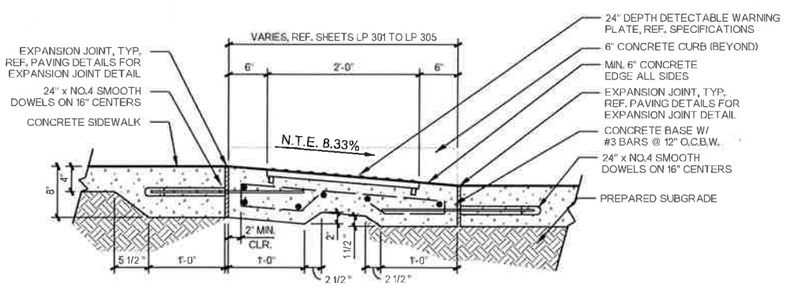
DIMENSION CONTROL ENLARGEMENT
RUNYON RD

HALFF 1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275 TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 LP 305	LP 305



01 TYPICAL INTERSECTION
SCALE: 1/4" = 1'-0" PLAN



02 ADA RAMP
SCALE: 1"=1'-0" SECTION

SPECIFICATIONS:

DETECTABLE WARNING PLATE

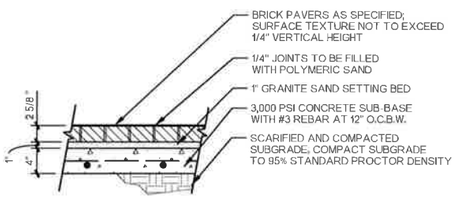
TYPE:	DESCRIPTION:
A6002436RADA	24"x36" RECTANGULAR PLATE
A6002448RADA	24"x48" RECTANGULAR PLATE
A6002460RADA	24"x60" RECTANGULAR PLATE

*LOCATION NOTED ON DRAWINGS

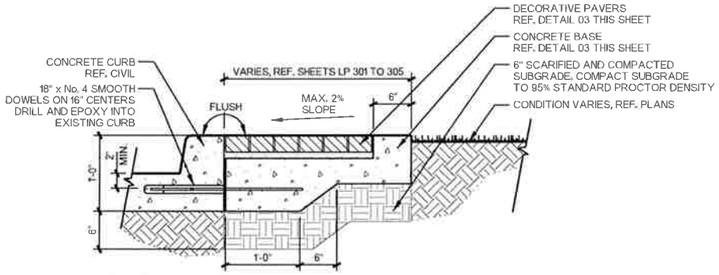
MANUFACTURER: ARMORCAST
-or approved equal-
COLOR: BRICK RED
INSTALL PER MANUFACTURER

SPECIFICATIONS:

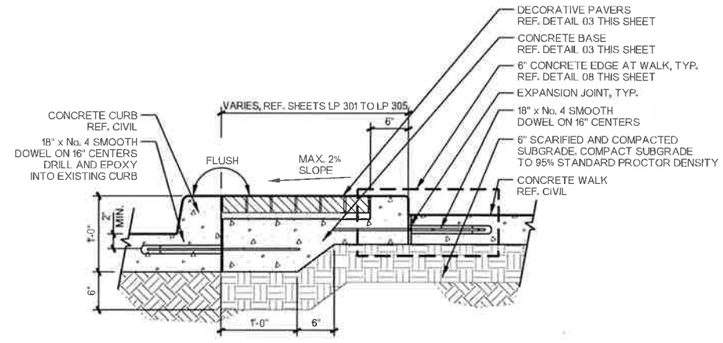
TYPE: ENDICOTT BRICK PAVER
PATTERN: RUNNING BOND
SIZE: 4" x 8" x 2 5/8"
COLOR: MEDIUM IRONSPOT
(TO MATCH TOWN STANDARD)
CONTACT: ENDICOTT CLAY PRODUCTS CO.
402-729-3315; www.endicott.com



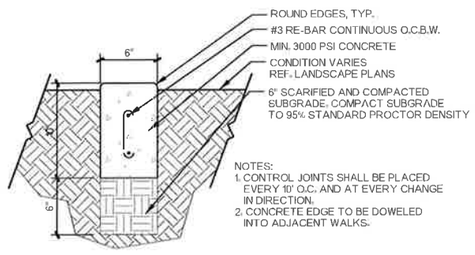
03 DECORATIVE PAVERS
SCALE: 1" = 1'-0" SECTION



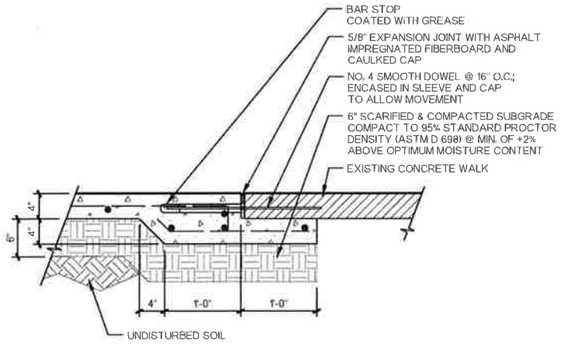
04 DECORATIVE PAVERS
SCALE: 1" = 1'-0" SECTION



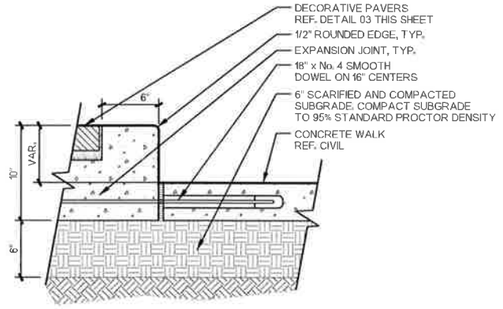
05 DECORATIVE PAVERS
SCALE: 1" = 1'-0" SECTION



06 6" CONCRETE EDGE
SCALE: 1 1/2"=1'-0" SECTION



07 NEW TO OLD CONCRETE CONNECTION
SCALE: 1"=1'-0" SECTION



08 6" CONCRETE EDGE AT WALK
SCALE: 1 1/2" = 1'-0" SECTION

THIS SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY LEWAYNE L. HUGHES, R.L.A. 2067 ON 10-25-2013. ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION TO THE RESPONSIBLE LANDSCAPE ARCHITECT IS AN OFFENSE UNDER TITLE 22 TEXAS ADMINISTRATIVE CODE, CHAPTER 3 LANDSCAPE ARCHITECTS. THE RECORD COPY OF THIS DRAWING IS ON FILE AT THE OFFICE OF HALFF ASSOCIATES, INC. 1201 NORTH BOWSER, RICHARDSON, TEXAS 75081

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

SITE DETAILS

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	OCT. 2013	29350 LP 401	LP 401

TREE REMOVAL AND REPLACEMENT SUMMARY

TAG	CALIPER	COMMON NAME	SCIENTIFIC NAME	REPLACEMENT (TREE SPECIES)	REPLACEMENT (SIZE)	LOCATION
31780	N/A	Yaupon Holly	Ilex vomitoria	Yaupon Holly (Ilex vomitoria)	10'-12' HT., 3-5 Cane Max.	T.B.D. by Town
31781	N/A	Yaupon Holly	Ilex vomitoria	Yaupon Holly (Ilex vomitoria)	10'-12' HT., 3-5 Cane Max.	T.B.D. by Town
31782	N/A	Yaupon Holly	Ilex vomitoria	Yaupon Holly (Ilex vomitoria)	10'-12' HT., 3-5 Cane Max.	T.B.D. by Town
31783	N/A	Yaupon Holly	Ilex vomitoria	Yaupon Holly (Ilex vomitoria)	10'-12' HT., 3-5 Cane Max.	T.B.D. by Town
32078	10	Cypress	Taxodium	Red Oak (Quercus shumardii)	4" Cal.	T.B.D. by Town
32079	10	Cypress	Taxodium	Red Oak (Quercus shumardii)	4" Cal.	T.B.D. by Town
42298	18	Ash	Fraxinus	Red Oak (Quercus shumardii)	4" Cal.	T.B.D. by Town
50272	8	Oak	Quercus	Red Oak (Quercus shumardii)	4" Cal.	T.B.D. by Town
50333	8	Oak	Quercus	Live Oak (Quercus virginiana)	4" Cal.	T.B.D. by Town
60082	6	Oak	Quercus	Red Oak (Quercus shumardii)	4" Cal.	T.B.D. by Town
60083	12	Oak	Quercus	Red Oak (Quercus shumardii)	4" Cal.	T.B.D. by Town
76077	8	Oak	Quercus	Live Oak (Quercus virginiana)	4" Cal.	T.B.D. by Town
76079	8	Oak	Quercus	Live Oak (Quercus virginiana)	4" Cal.	T.B.D. by Town
76160	24	Elm	Ulmus	Red Oak (Quercus shumardii)	4" Cal.	T.B.D. by Town
76161	16	Elm	Ulmus	Red Oak (Quercus shumardii)	4" Cal.	T.B.D. by Town
76163	24	Elm	Ulmus	Red Oak (Quercus shumardii)	4" Cal.	T.B.D. by Town
76194	4	Red Oak	Quercus shumardii	Red Oak (Quercus shumardii)	4" Cal.	T.B.D. by Town
76462	24	Oak	Quercus	Red Oak (Quercus shumardii)	8" Cal.	T.B.D. by Town
76914	24	Oak	Quercus	Red Oak (Quercus shumardii)	8" Cal.	T.B.D. by Town
76972	12	Cypress	Taxodium	Bald Cypress (Taxodium distichum)	4" Cal.	T.B.D. by Town
90107	12	Oak	Quercus	Red Oak (Quercus shumardii)	4" Cal.	T.B.D. by Town
90111	12	Oak	Quercus	Red Oak (Quercus shumardii)	4" Cal.	T.B.D. by Town
90130	8	Oak	Quercus	Red Oak (Quercus shumardii)	4" Cal.	T.B.D. by Town

TREE REMOVAL SUMMARY

TAG	CALIPER	COMMON NAME	SCIENTIFIC NAME
30491	N/A	Crape Myrtle	Lagerstroemia indica
30639	N/A	Crape Myrtle	Lagerstroemia indica
31807	N/A	Crape Myrtle	Lagerstroemia indica
31808	N/A	Crape Myrtle	Lagerstroemia indica
32744	N/A	Crape Myrtle	Lagerstroemia indica
40365	N/A	Crape Myrtle	Lagerstroemia indica
40469	N/A	Crape Myrtle	Lagerstroemia indica
40470	N/A	Crape Myrtle	Lagerstroemia indica
40471	N/A	Crape Myrtle	Lagerstroemia indica
40540	N/A	Crape Myrtle	Lagerstroemia indica
40795	N/A	Crape Myrtle	Lagerstroemia indica
40797	N/A	Crape Myrtle	Lagerstroemia indica
40911	N/A	Crape Myrtle	Lagerstroemia indica
40912	N/A	Crape Myrtle	Lagerstroemia indica
41065	N/A	Crape Myrtle	Lagerstroemia indica
41066	N/A	Crape Myrtle	Lagerstroemia indica
41067	N/A	Crape Myrtle	Lagerstroemia indica
42402	N/A	Crape Myrtle	Lagerstroemia indica
42582	12	Hickory	Carya
44237	N/A	Crape Myrtle	Lagerstroemia indica
50038	12	Oak	Quercus
60104	N/A	Crape Myrtle	Lagerstroemia indica
60107	N/A	Crape Myrtle	Lagerstroemia indica
60157	N/A	Holly	Ilex
75341	6	Elm	Ulmus
75342	N/A	Crape Myrtle	Lagerstroemia indica
75344	6	Elm	Ulmus
75358	N/A	Crape Myrtle	Lagerstroemia indica
75362	N/A	Crape Myrtle	Lagerstroemia indica
75366	6	Elm	Ulmus
75773	8	Elm	Ulmus
75779	N/A	Crape Myrtle	Lagerstroemia indica
75784	18	Oak	Quercus
75842	6	Oak	Quercus
75843	N/A	Crape Myrtle	Lagerstroemia indica
75844	N/A	Crape Myrtle	Lagerstroemia indica
75845	N/A	Crape Myrtle	Lagerstroemia indica
75869	8	Oak	Quercus
75870	12	Oak	Quercus
75875	12	Oak	Quercus
75924	N/A	Crape Myrtle	Lagerstroemia indica

TREE REMOVAL SUMMARY

TAG	CALIPER	COMMON NAME	SCIENTIFIC NAME
75925	N/A	Crape Myrtle	Lagerstroemia indica
75926	N/A	Crape Myrtle	Lagerstroemia indica
75929	N/A	Crape Myrtle	Lagerstroemia indica
75930	N/A	Crape Myrtle	Lagerstroemia indica
76068	N/A	Crape Myrtle	Lagerstroemia indica
76069	N/A	Crape Myrtle	Lagerstroemia indica
76070	N/A	Crape Myrtle	Lagerstroemia indica
76075	N/A	Crape Myrtle	Lagerstroemia indica
76089	N/A	Crape Myrtle	Lagerstroemia indica
76093	8	Oak	Quercus
76099	N/A	Crape Myrtle	Lagerstroemia indica
76118	N/A	Crape Myrtle	Lagerstroemia indica
76119	N/A	Crape Myrtle	Lagerstroemia indica
76260	N/A	Crape Myrtle	Lagerstroemia indica
76261	N/A	Crape Myrtle	Lagerstroemia indica
76288	N/A	Crape Myrtle	Lagerstroemia indica
76291	N/A	Crape Myrtle	Lagerstroemia indica
76292	N/A	Crape Myrtle	Lagerstroemia indica
76293	N/A	Crape Myrtle	Lagerstroemia indica
76294	N/A	Crape Myrtle	Lagerstroemia indica
76302	24	Elm	Ulmus
76483	N/A	Crape Myrtle	Lagerstroemia indica
76603	N/A	Crape Myrtle	Lagerstroemia indica
76604	N/A	Crape Myrtle	Lagerstroemia indica
76609	N/A	Crape Myrtle	Lagerstroemia indica
76896	24	Elm	Ulmus
76897	24	Oak	Quercus
76917	24	Oak	Quercus
76918	24	Oak	Quercus
76929	24	Oak	Quercus
76949	28	Oak	Quercus
76957	N/A	Crape Myrtle	Lagerstroemia indica
90077	N/A	Crape Myrtle	Lagerstroemia indica
90078	N/A	Crape Myrtle	Lagerstroemia indica
90079	N/A	Crape Myrtle	Lagerstroemia indica
90116	N/A	Crape Myrtle	Lagerstroemia indica
90118	N/A	Crape Myrtle	Lagerstroemia indica
90119	N/A	Crape Myrtle	Lagerstroemia indica
90121	N/A	Crape Myrtle	Lagerstroemia indica

TREE TRANSPLANT SUMMARY

TAG	CALIPER	COMMON NAME	SCIENTIFIC NAME	LOCATION
41669	N/A	Crape Myrtle	Lagerstroemia indica	T.B.D. by Town

NOTES:

1. THE LOCATION OF REPLACEMENT TREES TO BE DETERMINED BY TOWN STAFF.

2. THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE IRRIGATION TO NEWLY PLANTED AND TRANSPLANT TREES, TWO BUBBLERS PER TREE, INCLUDING INSTALLATION OF ALL NECESSARY COMPONENTS (SLEEVING, ALL ELECTRICAL EQUIPMENT, CONTROLLERS, ETC.) NEEDED TO PROVIDE A FULLY OPERATIONAL IRRIGATION SYSTEM. IT IS ALSO THE CONTRACTORS REPONSIBILITY TO CONFIRM AN EXISTING IRRIGATION SYSTEM IS IN PLACE, IS OPERATIONAL AND ABLE TO ACCOMMODATE THE ADDITIONAL TREES. SHOULD IT BE DETERMINED THAT THE EXISTING SYSTEM IS NOT ADEQUATE TO SUPPORT THE ADDITIONAL TREES THE CONTRACTOR WILL BE REQUIRED TO HIRE A TEXAS LICENSED IRRIGATOR TO DESIGN AND INSTALL A NEW SYSTEM IN ACCORDANCE WITH TCEQ AND TAC STANDARDS.

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO PLANT MATERIAL DUE TO SYSTEM FAILURE, INFERIOR WORKMANSHIP, OR LACK OF IRRIGATION DURING THE INSTALLATION OF PLANTS AND MAINTENANCE PERIOD.

GENERAL LEGEND

SIM.	SIMILAR
P.O.B.	POINT OF BEGINNING
P.O.T.	POINT OF TANGENCY
TYP.	TYPICAL
UNO	UNLESS NOTED OTHERWISE
PA	PLANTING AREA
B.O.C.	BACK OF CURB
F.O.C.	FACE OF CURB
℄	CENTERLINE CALLOUT
R.O.W.	RIGHT OF WAY
ESMT	EASEMENT
	ALIGN ELEMENTS
C	EXISTING TREE
	POINT OF BEGINNING
	SHEET MATCHLINE
	PROPERTY LINE
	LIMIT OF CONSTRUCTION
	CENTERLINE
	EASEMENT

GRADING LEGEND

EL XXX.XX	SPOT ELEVATION
T.W.	TOP OF WALL
B.W.	BOTTOM OF WALL
TYP.	TYPICAL
H.P.	HIGH POINT
L.P.	LOW POINT
T.C.	TOP OF CURB
B.C.	BOTTOM OF CURB
2%	PERCENT AND DIRECTION OF SLOPE
F.L.	FLOWLINE CALLOUT
	EXISTING MINOR CONTOUR
	EXISTING MAJOR CONTOUR
XXX	PROPOSED MINOR CONTOUR
XXX	PROPOSED MAJOR CONTOUR
	GRADE BREAK LINE

REGISTERED LANDSCAPE ARCHITECT
LENNY L. HUGHES
2067
STATE OF TEXAS

11/11/13

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY LENNY L. HUGHES, R.L.A. #2067 ON 11-11-2013. ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION TO THE RESPONSIBLE LANDSCAPE ARCHITECT IS AN OFFENSE UNDER TITLE 22, TEXAS ADMINISTRATIVE CODE, CHAPTER 3 LANDSCAPE ARCHITECTS. THE RECORD COPY OF THIS DRAWING IS ON FILE AT THE OFFICES OF HALFF ASSOCIATES, INC., 1201 NORTH BOWSER, RICHARDSON, TEXAS 75081. TBPE FIRM #F-312

FIRM REGISTRATION NUMBER: 312

NO.	REVISION	BY	DATE

TOWN OF ADDISON
DALLAS COUNTY, TEXAS

BELT LINE ROAD
UNDERGROUND ELECTRICAL

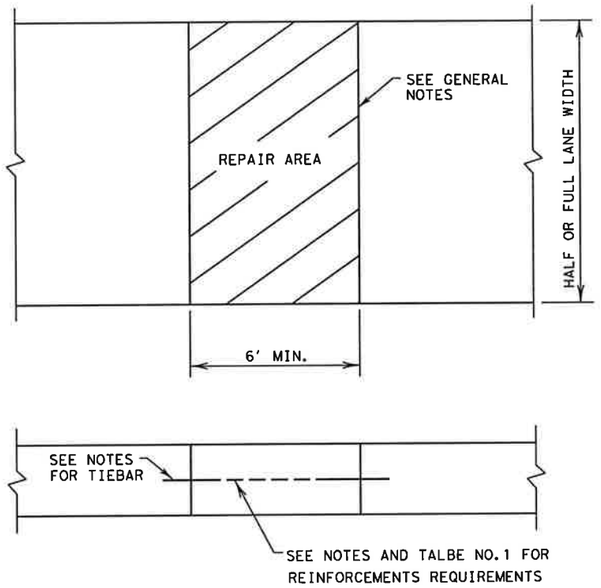
SUMMARY AND LEGEND

HALFF
1201 NORTH BOWSER ROAD, RICHARDSON, TEXAS 75081-2275
TEL (214) 346-6200 FAX (214) 739-0095

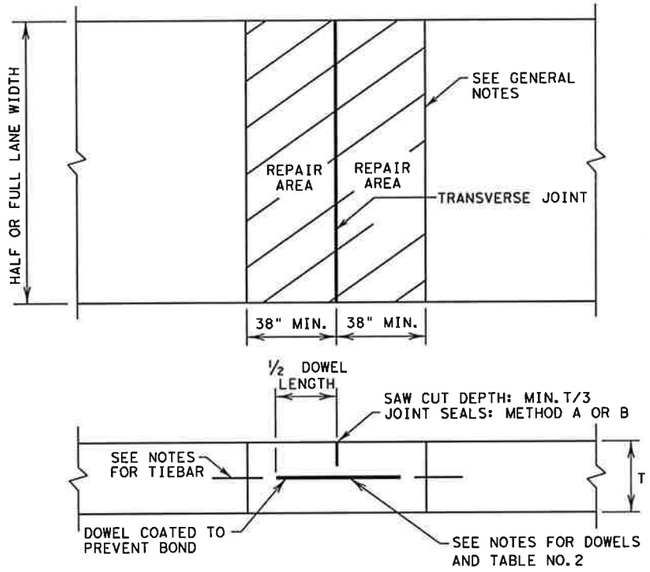
PROJECT	DESIGN	DRAWN	DATE	FILE	SHEET
29350	HALFF	HALFF	NOV. 2013	29350 LP 001	LP 001

DATE:
FILE:

FULL DEPTH REPAIR



FULL DEPTH TRANSVERSE JOINT REPAIR



TRANSVERSE CONTRACTION JOINT

GENERAL NOTES:

1. ITEM 361, "FULL-DEPTH REPAIR OF CONCRETE PAVEMENT," SHALL GOVERN FOR THIS WORK. THE FOLLOWING SPECIFICATIONS ARE REFERENCED IN ITEM 361.
   - * ITEM 360, " CONCRETE PAVEMENT "
   - * ITEM 421, " HYDRAULIC CEMENT CONCRETE "
   - * ITEM 438, " CLEANING AND SEALING JOINTS AND CRACKS (RIGID PAVEMENT AND BRIDGE DECKS) "
   - * ITEM 440, " REINFORCING STEEL"
   - * DMS-4650, " HYDRAULIC CEMENT CONCRETE CURING MATERIALS AND EVAPORATION RETARDANTS"
   - * DMS-6100, " EPOXIES AND ADHESIVES "
   - * DMS-6310, " JOINT SEALANTS AND FILLERS"
2. FULL DEPTH SAW CUTS SHALL BE MADE AROUND THE PERIMETER OF THE AREA TO BE REPAIRED. THE CUT SHALL BE MADE AT A RIGHT ANGLE TO THE PAVEMENT EDGE AND TO THE CENTER LINE OF THE PAVEMENT.
3. LONGITUDINAL FULL DEPTH SAW CUTS SHALL BE AT EXISTING LONGITUDINAL JOINTS.
4. ADDITIONAL SAW CUTS MAY BE REQUIRED WITHIN THE AREA OF THE REPAIR TO FACILITATE REMOVAL OF THE CONCRETE OR TO ALLEVIATE BINDING OF THE FULL DEPTH SAW CUT AT THE REPAIR EDGE.
5. THE SAW CUTS WHICH EXTEND OUTSIDE THE AREA OF THE REPAIR WILL BE CLEANED AND FILLED WITH A GROUT APPROVED BY THE ENGINEER.
6. EXISTING LONGITUDINAL AND TRANSVERSE JOINTS REMOVED DUE TO REPAIR OPERATION SHOULD BE RESTORED IN ACCORDANCE WITH STANDARD SHEET "CONCRETE PAVING DETAILS, JOINT SEALS."

REINFORCEMENTS REQUIREMENTS

REINFORCING STEEL SHALL BE #6 DEFORMED STEEL BARS CONFORMING TO ASTM A 615 (GRADE 60) OR ASTM A 996 (GRADE 60).

R1. THE STEEL SPACING FOR CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (CRCP) AND JOINTED REINFORCED CONCRETE PAVEMENT (JRCP) SHALL BE REINFORCED AS SHOWN IN TABLE NO. 1.

R2 REINFORCING BARS SHALL BE PLACED IN ONE LAYER AND SHALL BE TIED TO THE TIEBARS.

R3. THE LENGTH OF THE REINFORCING BAR SHALL BE THE LENGTH OR WIDTH OF THE REPAIR AREA MINUS 2 INCHES. THE END OF THE BAR SHALL BE PLACED WITHIN 1 INCH FROM THE REPAIR EDGE.

TIEBARS FOR REPAIR AREAS

T1. TIEBARS SHALL BE PLACED AT APPROXIMATELY THE MID-DEPTH OF SLAB. THE BOTTOM OF THE HOLE DRILLED FOR THE LONGITUDINAL BARS SHALL BE AT MID-DEPTH AND THE TOP OF THE HOLES DRILLED FOR THE TRANSVERSE BARS SHALL BE AT MID-DEPTH. MID-DEPTH WILL BE ESTABLISHED BY MEASURING FROM THE TOP OF THE SLAB DOWN. THE THICKNESS OF THE CONCRETE SLAB WILL BE DEFINED BY THE PLANS OR THE ENGINEER.

T2. THE BAR SIZE AND SPACING OF TIEBARS ARE SHOWN IN TABLE NO. 1.

T3. THE MINIMUM LENGTH OF TIEBARS EXTENDED INTO THE REPAIR AREA SHOULD BE 25 INCHES FOR A #6 BAR.

T4. THE TIEBAR SHALL BE GROUTED INTO THE EXISTING CONCRETE A MINIMUM OF 12 INCHES. BEFORE REPAIR WORK, DEMONSTRATE THAT THE BOND STRENGTH OF THE EPOXY-GROUTED TIEBARS MEETS THE REQUIREMENTS OF PULL-OUT TEST SPECIFIED IN ITEM 361.

T5. MULTIPLE PIECE TIEBARS SHALL BE USED WHEN THE REPAIR AREA MUST BE PLACED IN TWO STAGES DUE TO SEQUENCE OF CONSTRUCTION.

DOWELS FOR TRANSVERSE JOINT REPAIRS

D1. SMOOTH DOWEL BARS SHALL BE DELIVERED TO THE JOBS SITE IN PREFABRICATED DOWEL ASSEMBLIES. THE ENTIRE DOWEL BAR SHALL BE COATED WITH A MATERIAL WHICH WILL PREVENT BONDING TO THE CONCRETE.

D2. THE SIZE AND SPACING OF DOWEL BARS SHALL BE AS SHOWN IN TABLE NO. 2.

D3. PLACEMENT OF TIEBARS AND OTHER REINFORCING STEEL SHALL BE STOPPED APPROXIMATELY 4" FROM THE DOWEL BAR ASSEMBLY.

D4. DOWEL BAR PLACEMENT SHALL MEET THE REQUIREMENTS OF ITEM 360, "CONCRETE PAVEMENT."

TABLE NO. 2 DOWELS (SMOOTH BARS)

PAVEMENT THICKNESS (INCHES)	SIZE AND DIA.	LENGTH (INCHES)	SPACING (INCHES)
8	#8 (1 IN.)	18	12
9	#9 (1⅛ IN.)		
≥10	#10 (1¼ IN.)		

TABLE NO. 1 STEEL BARS SIZE AND SPACING

TYPE OF REINFORCEMENTS	TYPE PAVEMENT	PAVEMENT THICKNESS (INCHES)	TIEBARS		REGULAR REBARS		ALL BARS
			SIZE BAR (BAR NO.)	BAR SPACING (INCHES)	SIZE BAR (BAR NO.)	SPACING (INCHES)	FIRST & LAST SPACING AT END OR SIDE (INCHES)
TRANSVERSE BARS	CRCP JRCP	ALL	#6	24	#6	24	12
	JCP (CPCD)	ALL	#6	24	NONE	NONE	12
LONGITUDINAL BARS	CRCP	8	#6	9	#6	9	12
		9	#6	8	#6	8	12
		10	#6	7	#6	7	12
		11	#6	6.5	#6	6.5	12
		≥ 12	#6	6	#6	6	12
	JRCP	ALL	#6	12	#6	24	12
	JCP (CPCD)	ALL	#6	12	NONE	NONE	12

Texas Department of Transportation

Design Division Standard

FULL DEPTH REPAIR
FOR
CONCRETE PAVEMENT

FDR(CP)-05

FILE: fdrcp05.dgn	DN: TxDOT	CK: LL	DW: HC	CK:
© TxDOT September 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO.

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

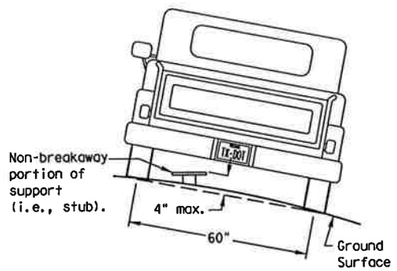
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-3))

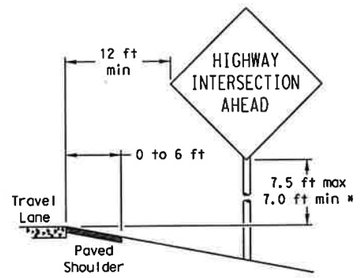
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

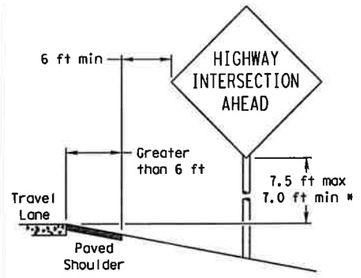
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

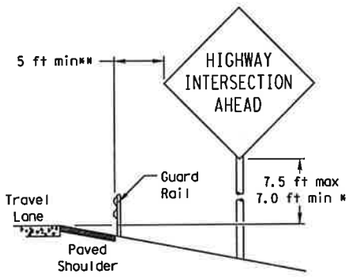
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



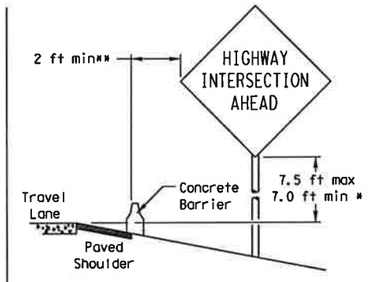
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

BEHIND BARRIER



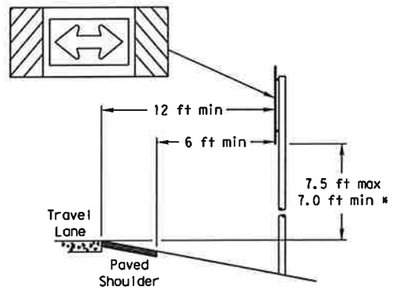
BEHIND GUARDRAIL



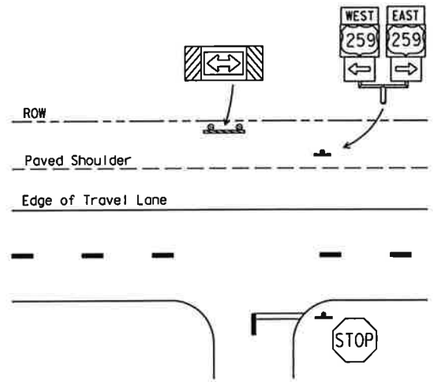
BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

T-INTERSECTION



When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

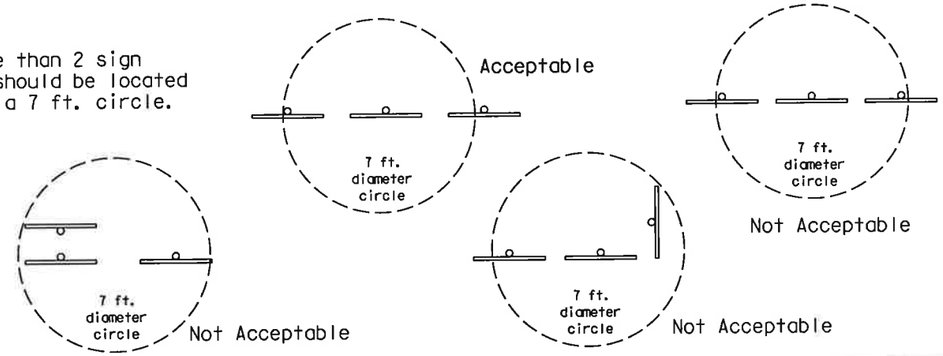
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

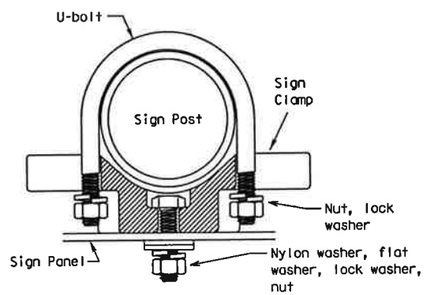
The website address is:
http://www.txdot.gov/publications/traffic.htm

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

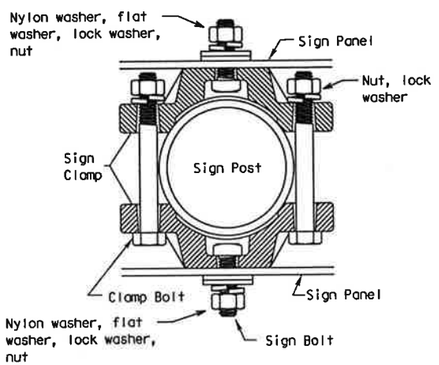


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

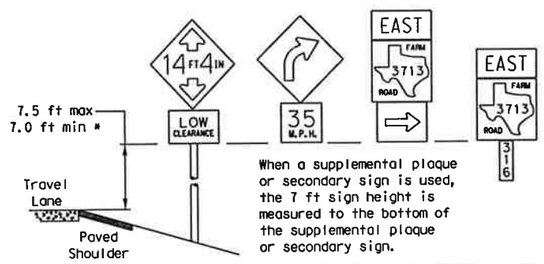
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



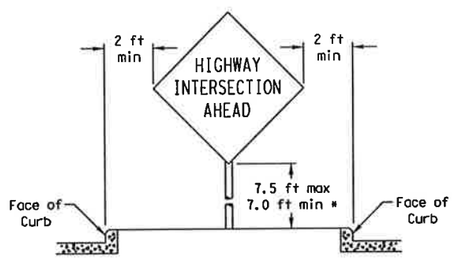
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



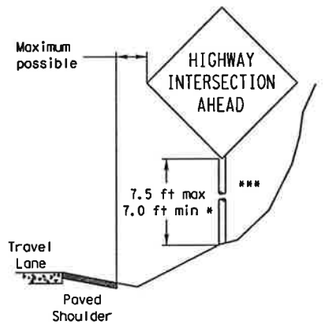
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

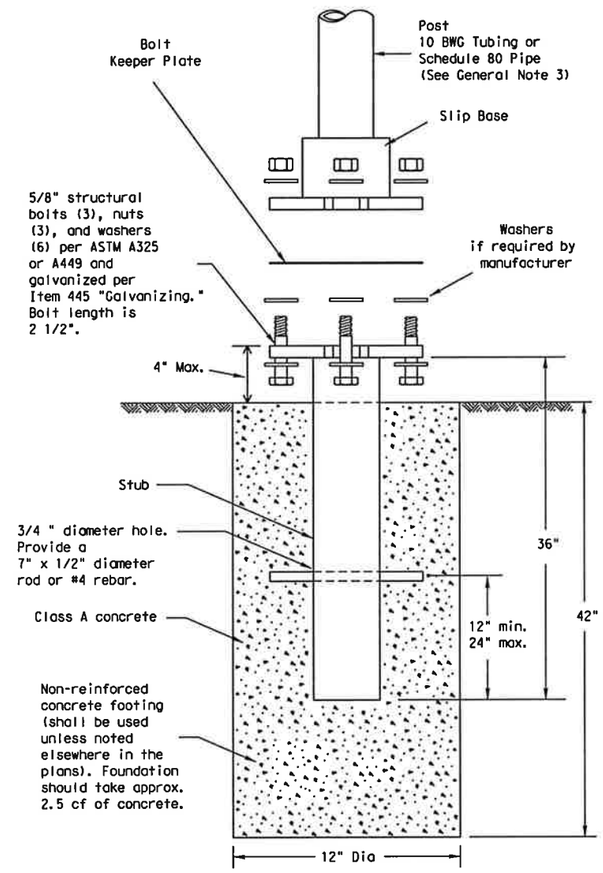
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.

DATE:
FILE:

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

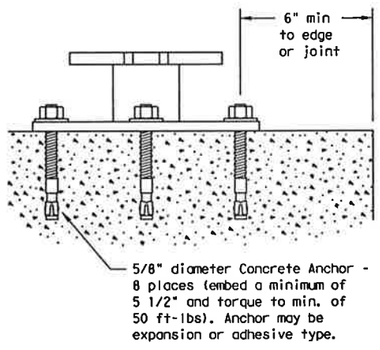
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

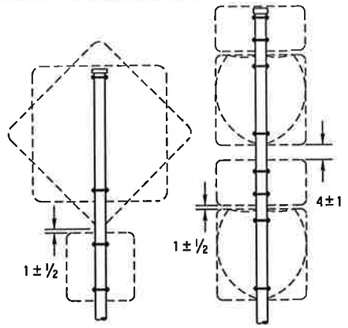
© TxDOT July 2002	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
9-08				
	DIST	COUNTY		SHEET NO.

26B

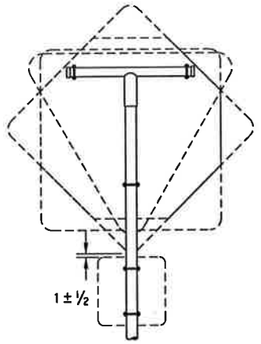
SHEET 191 OF 235

DATE:
FILE:

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



SM RD SGN ASSM TY XXXXX(1)XX(P)



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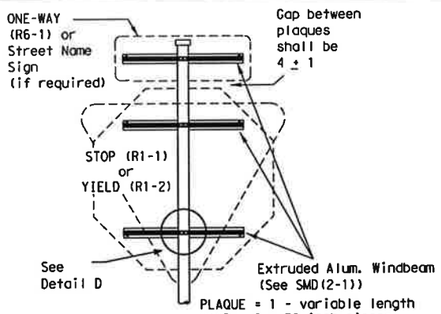

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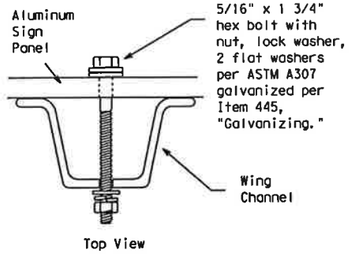
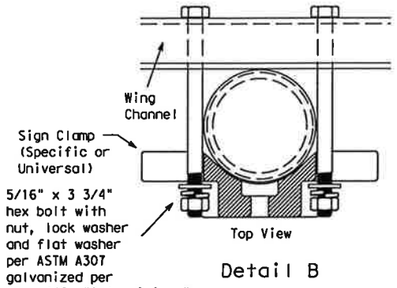


Top View

Detail A



Top View

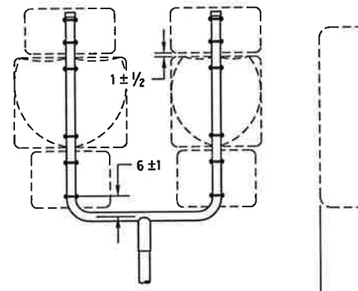
Detail B

GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.



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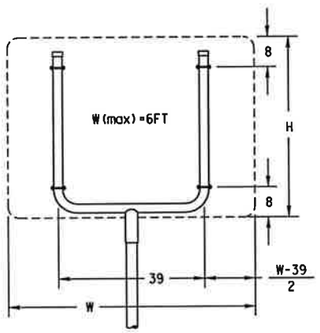

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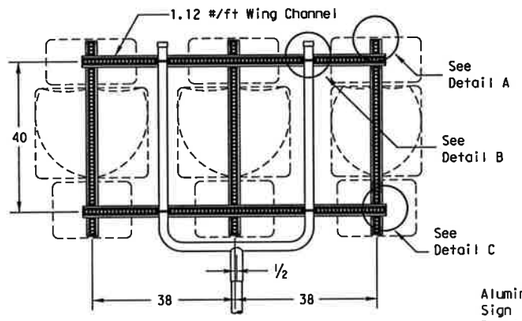
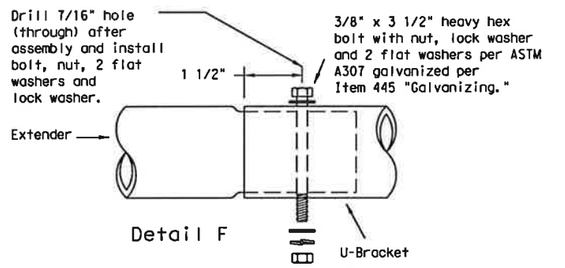
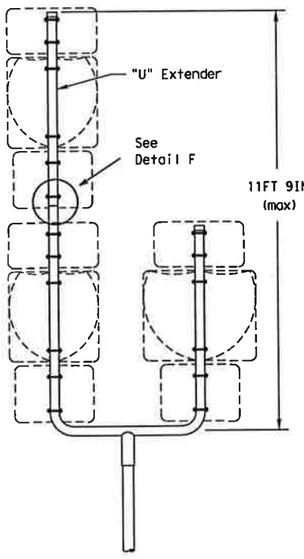


SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

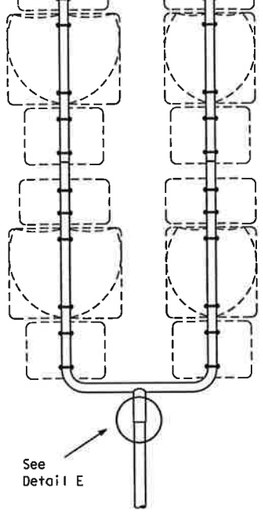


Detail F

Splices shall only be allowed behind the sign substrate.



SM RD SGN ASSM TY S80(1)XX(U-1EXT)



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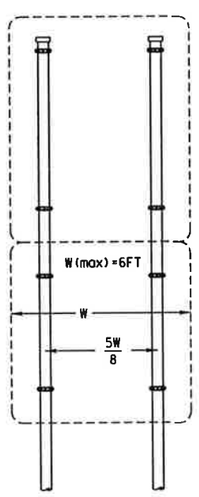
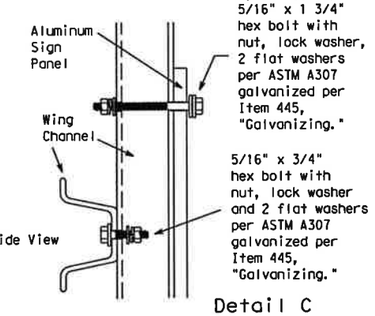
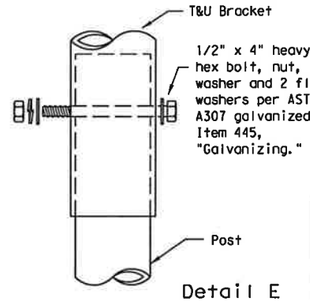


SM RD SGN ASSYM TY XXXXX(2)XX(P)

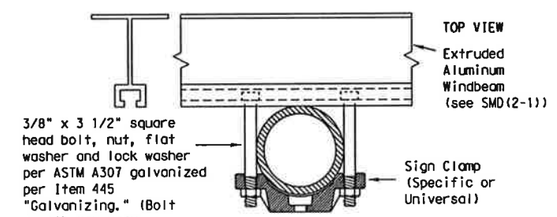


SIDE VIEW

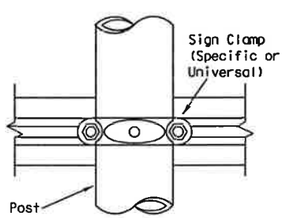
Detail C



Detail E

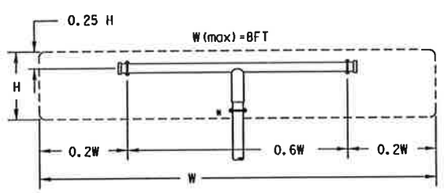


Detail D



REQUIRED SUPPORT

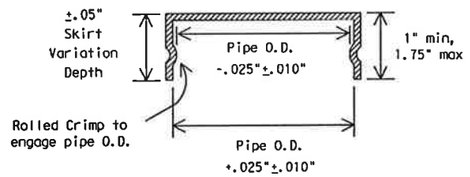
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



All dimensions are in english unless detailed otherwise.

SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

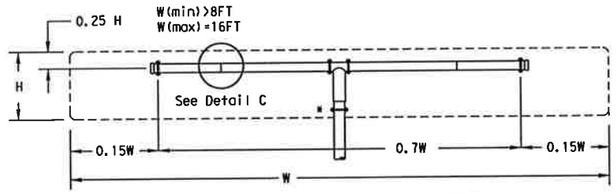
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.

9-08 REVISIONS

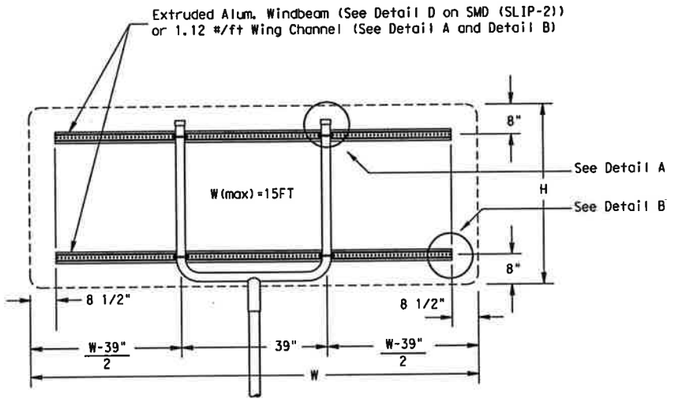
26C

SHEET 192 OF 235

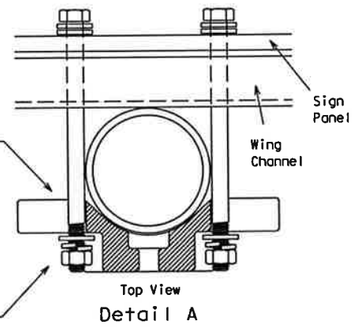
DATE:
FILE:



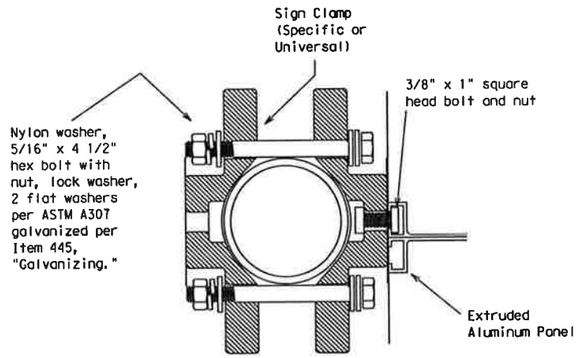
SM RD SGN ASSM TY XXXXX(1)XX(T-2EXT)
(* - See Note 12)



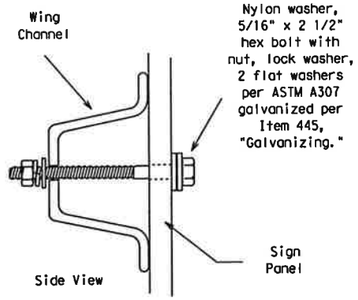
SM RD SGN ASSM TY XXXXX(1)XX(U-XX)



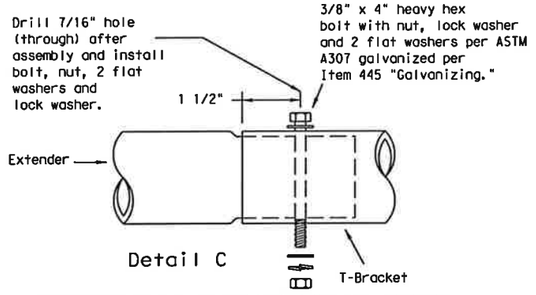
Detail A



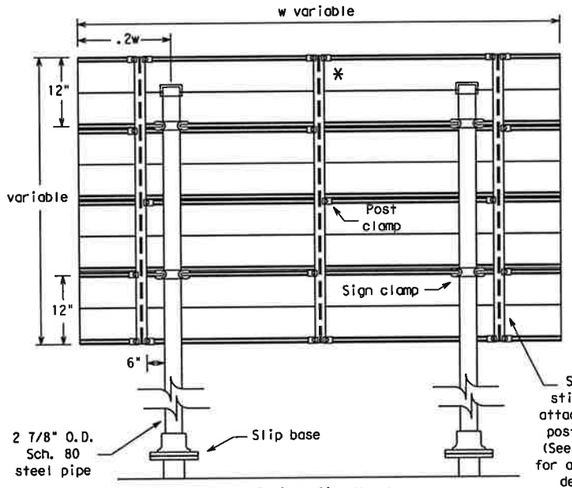
Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET



Detail B

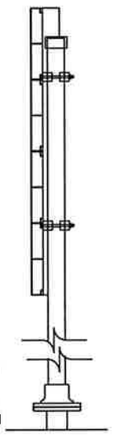


Splices shall only be allowed behind the sign substrate.



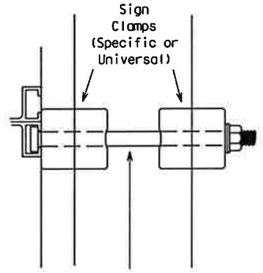
Typical Sign Mount
SM RD SGN ASSM TY S80(2)XX(P-EXAL)

* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

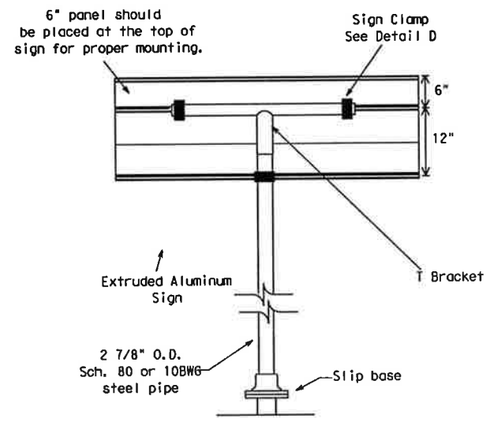


stiffeners attached with post clamps (See SMD(2-1) for additional details)

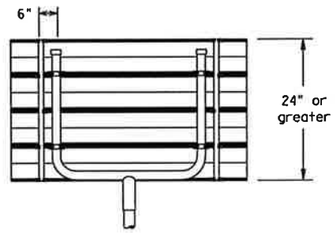
See Detail E
for clamp installation



Detail E



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Sign blanks shall be the sizes and shapes shown on the plans.
11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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DIST	COUNTY		SHEET NO.

9-08 REVISIONS

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).

2. The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.

3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.

4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.

5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets", the TxDOT "Roadway Design Manual" or engineering judgment.

6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.

7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.

8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.

10. As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.

11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.

12. The Engineer has the final decision on the location of all traffic control devices.

13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY APPAREL NOTES:

1. Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel" labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.

Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found on-line at the web address given below or by contacting:

Texas Department of Transportation
Traffic Operations Division - TE
Phone (512) 416-3118

THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)
TRAFFIC ENGINEERING STANDARD SHEETS

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-13

FILE: bc-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS 4-03 5-10 9-07 7-13	DIST	COUNTY		SHEET NO.

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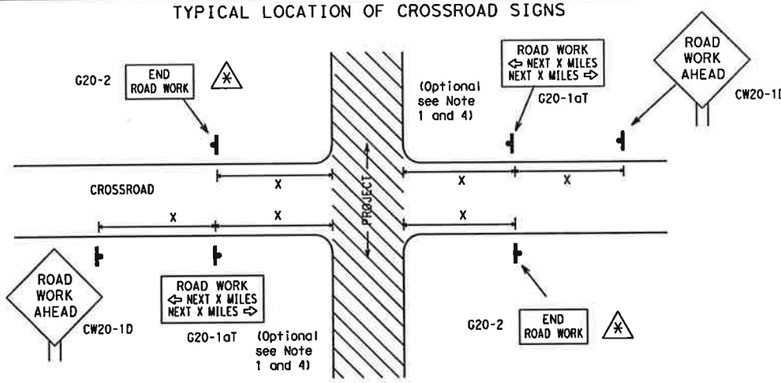
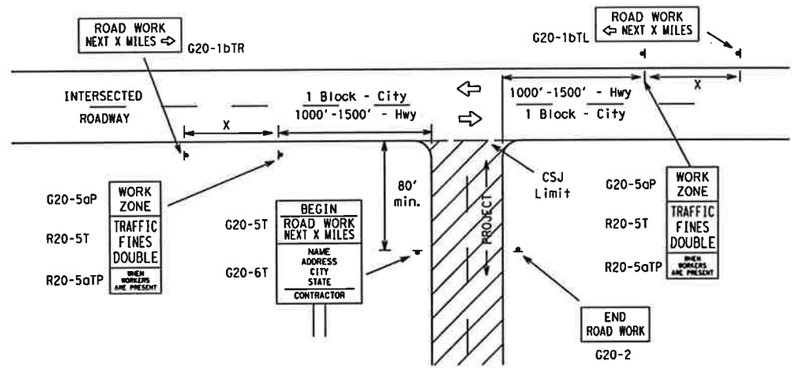
TYPICAL LOCATION OF CROSSROAD SIGNS



⚹ May be mounted on back of "ROAD WORK AHEAD"(CW20-1D) sign with approval of engineer. (See note 2 below)

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D)sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK"(G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume. This information shall be shown in the plans.
3. Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
4. The "ROAD WORK NEXT X MILES"(G20-1aT)sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

1. The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
2. If construction closes the road at a T-intersection the Contractor shall place the "CONTRACTOR NAME"(G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow(G20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1bTR)" signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING [1,5,6]

SIZE			SPACING	
Sign Number or Series	Conventional Road	Expressway/ Freeway	Posted Speed	Sign Spacing "X" △
			MPH	Feet (Apprx.)
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"	30	120
			35	160
			40	240
			45	320
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	50	400
			55	500[2]
			60	600[2]
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	65	700[2]
			70	800[2]
			75	900[2]
			80	1000[2]
			*	* [3]

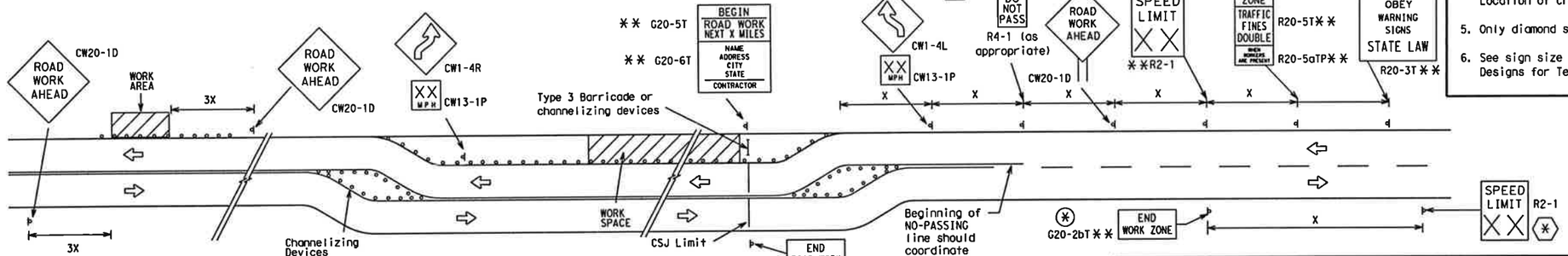
⚹ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

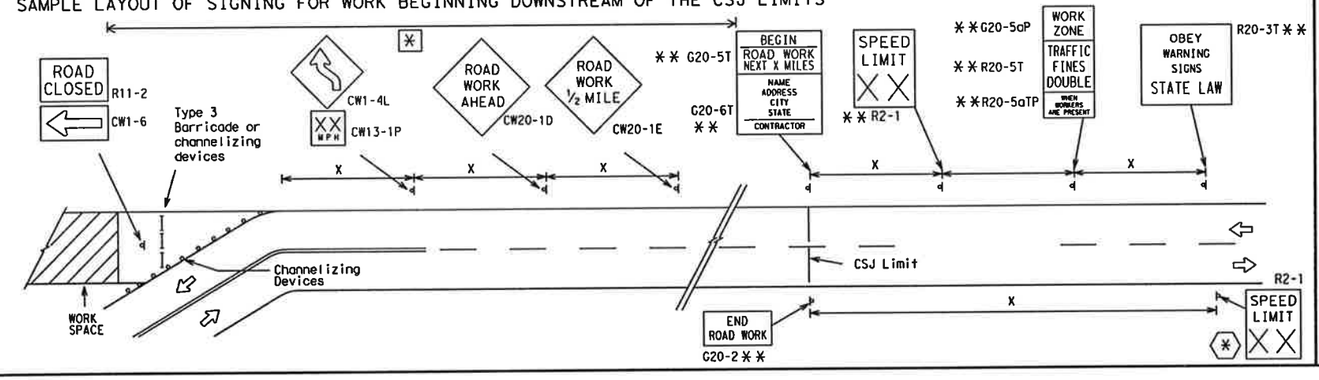
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizing devices.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS



NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES"(G20-5T)sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

⚹ The "BEGIN WORK ZONE"(G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

** Required CSJ Limit signing. See Note 10 on BC(1). TRAFFIC FINES DOUBLE signs will not be required on projects consisting solely of mobile operations work.

▣ Area for placement of "ROAD WORK AHEAD" (CW20-1D)sign and other signs or devices as called for on the Traffic Control Plan.

⚹ Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND	
⟼⟻	Type 3 Barricade
○○○	Channelizing Devices
▬	Sign
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

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Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-13

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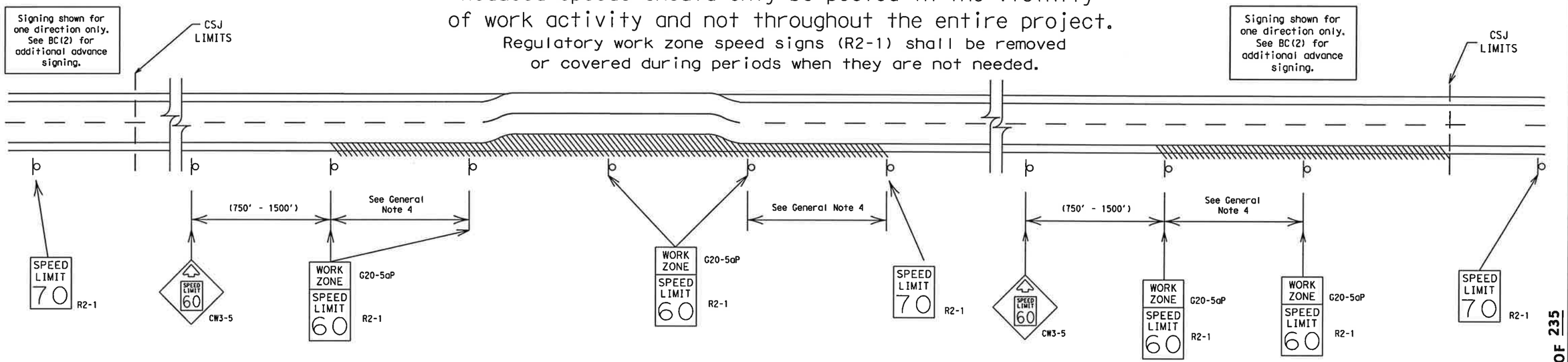
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

Work zone speed limits shall be regulatory, established in accordance with the "Procedures for Establishing Speed Zones," and approved by the Texas Transportation Commission, or by City Ordinance when within Incorporated City Limits.

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.

Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) width
f) other conditions readily apparent to the driver

As long as any of these conditions exist, the work zone speed limit signs should remain in place.

SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the travelled way.

Short Term Work Zone Speed Limit signs should be posted and visible to the motorists only when work activity is present. When work activity is not present, signs shall be removed or covered.
(See Removing or Covering on BC(4)).

GENERAL NOTES

1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. Frequency of work zone speed limit signs should be:
   40 mph and greater 0.2 to 2 miles
   35 mph and less 0.2 to 1 mile
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. Fabrication, erection and maintenance of the "ADVANCE SPEED LIMIT" (CW3-5) sign, "WORK ZONE" (G20-5aP) plaque and the "SPEED LIMIT" (R2-1) signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
   A. Law enforcement.
   B. Flagger stationed next to sign.
   C. Portable changeable message sign (PCMS).
   D. Low-power (drone) radar transmitter.
   E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-13

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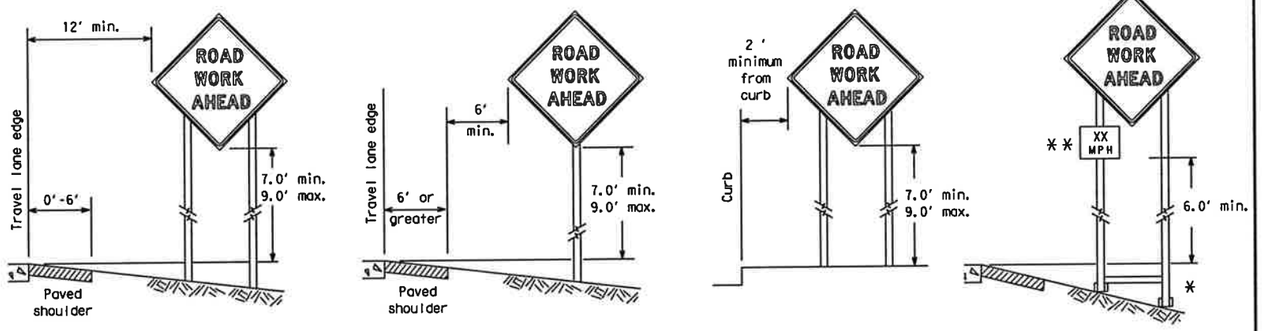
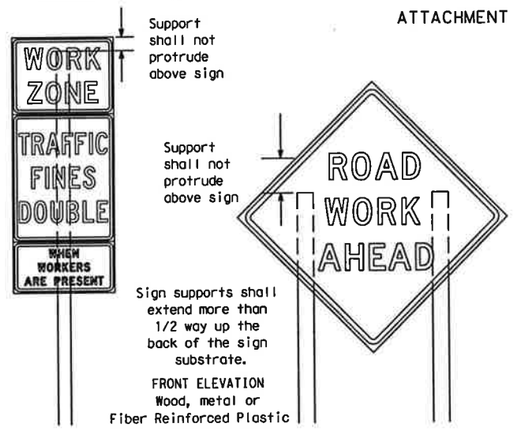
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



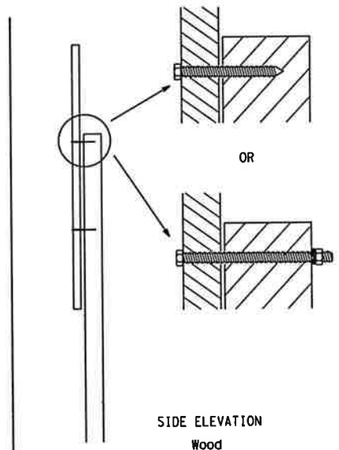
* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS



Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the spice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

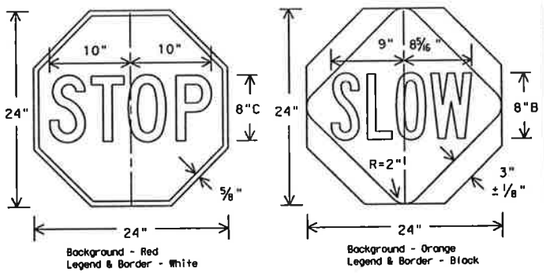


Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Nails shall NOT be allowed. Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

STOP/SLOW PADDLES

1. STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24" as detailed below.
2. When used at night, the STOP/SLOW paddle shall be retroreflectorized.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
4. Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

1. Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
2. When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
5. If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC sheets or the CWZTCD. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
6. Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
5. The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
6. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD). The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
7. The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
8. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

1. The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
   a. Long-term stationary - work that occupies a location more than 3 days.
   b. Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
   c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
   d. Short, duration - work that occupies a location up to 1 hour.
   e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

1. The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
2. The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
5. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

1. The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

SIGN SUBSTRATES

1. The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
2. White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
3. Orange sheeting, meeting the requirements of DMS-8300 Type B_{FL} or Type C_{FL}, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

1. All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
3. Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
4. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
6. Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
7. Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

1. Flags may be used to draw attention to warning signs. When used the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-13

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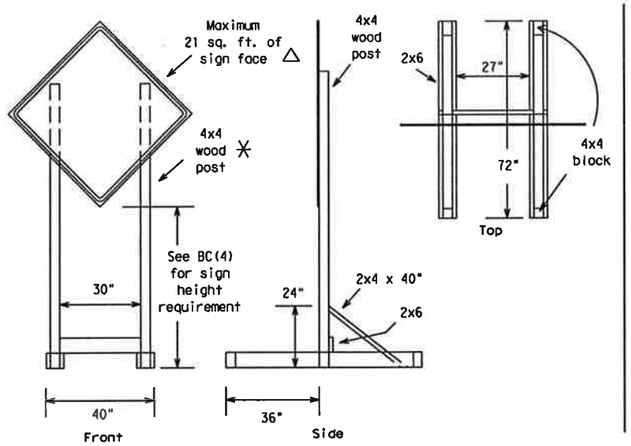
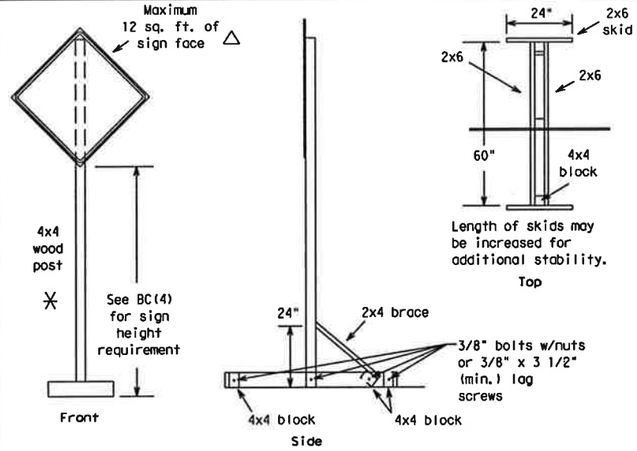
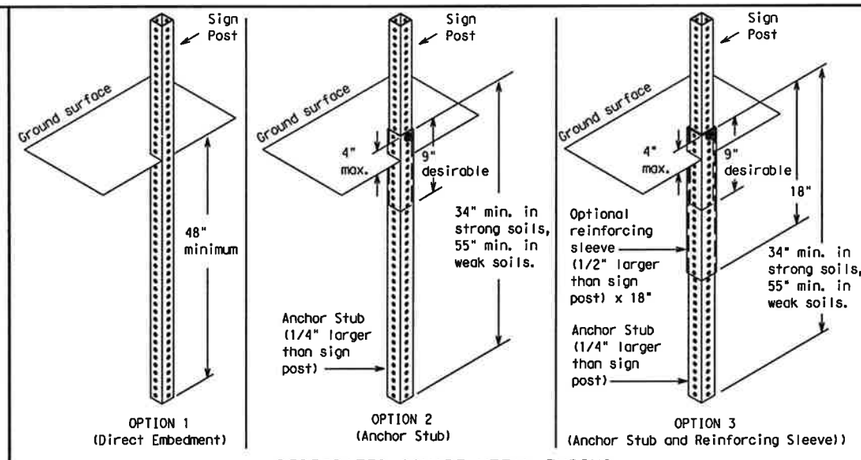


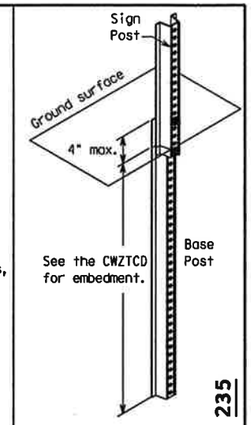


SKID MOUNTED WOOD SIGN SUPPORTS

LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □



PERFORATED SQUARE METAL TUBING



WING CHANNEL
Lap-splice/base bolted anchor

GROUND MOUNTED SIGN SUPPORTS

Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support.
The maximum sign square footage shall adhere to the manufacturer's recommendation.
Two post installations can be used for larger signs.

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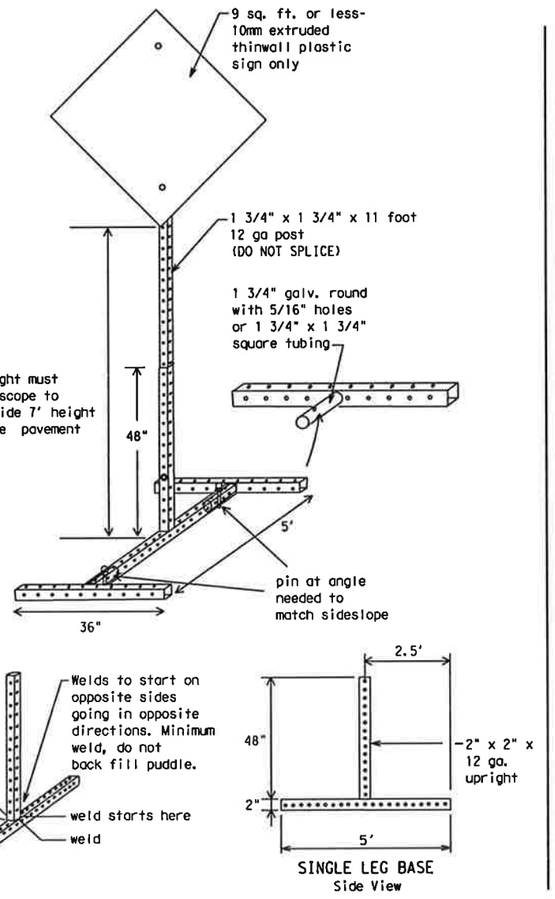
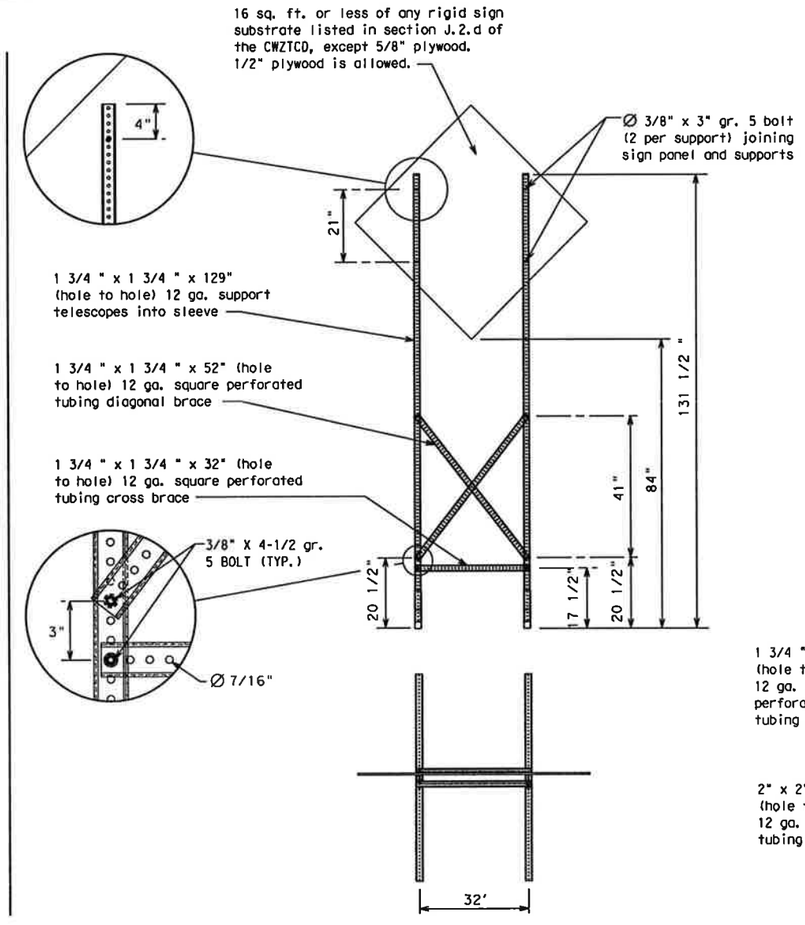
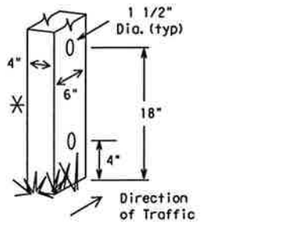
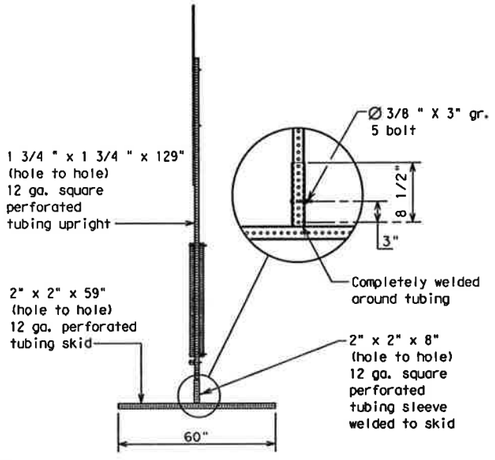






Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS



WEDGE ANCHORS

Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

OTHER DESIGNS

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

GENERAL NOTES

1. Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
3. When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

□ See BC(4) for definition of "Work Duration."

✳ Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

△ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

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Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

BC(5)-13

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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
3. Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
4. Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
6. When in use the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
7. The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
8. The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
9. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
10. Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
11. Do not use the word "Danger" in message.
12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
15. PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
16. Each line of text should be centered on the message board rather than left or right justified.
17. If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy	HOV
Vehicle Highway	HWY
Hour(s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT

WORD OR PHRASE	ABBREVIATION
Major	MAJ
Miles	MI
Miles Per Hour	MPH
Minor	MNR
Monday	MON
Normal	NORM
North	N
Northbound	(route) N
Parking	PKING
Road	RD
Right Lane	RT LN
Saturday	SAT
Service Road	SERV RD
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	(route) S
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Thursday	THURS
To Downtown	TO DWNTN
Traffic	TRAF
Travelers	TRVLRS
Tuesday	TUES
Time Minutes	TIME MIN
Upper Level	UPR LEVEL
Vehicles (s)	VEH, VEHS
Warning	WARN
Wednesday	WED
Weight Limit	WT LIMIT
West	W
Westbound	(route) W
Wet Pavement	WET PVMT
Will Not	WONT

Roadway designation # IH-number, US-number, SH-number, FM-number

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

(The Engineer may approve other messages not specifically covered here.)

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

- FREEWAY CLOSED X MILE
- FRONTAGE ROAD CLOSED
- ROAD CLOSED AT SH XXX
- SHOULDER CLOSED XXX FT
- ROAD CLSD AT FM XXXX
- RIGHT LN CLOSED XXX FT
- RIGHT X LANES CLOSED
- RIGHT X LANES OPEN
- CENTER LANE CLOSED
- DAYTIME LANE CLOSURES
- NIGHT LANE CLOSURES
- I-XX SOUTH EXIT CLOSED
- VARIOUS LANES CLOSED
- EXIT XXX CLOSED X MILE
- EXIT CLOSED
- RIGHT LN TO BE CLOSED
- MALL DRIVEWAY CLOSED
- X LANES CLOSED TUE - FRI
- XXXXXXXX BLVD CLOSED

Other Condition List

- ROADWORK XXX FT
- ROAD REPAIRS XXXX FT
- FLAGGER XXXX FT
- LANE NARROWS XXXX FT
- RIGHT LN NARROWS XXXX FT
- TWO-WAY TRAFFIC XX MILE
- MERGING TRAFFIC XXXX FT
- CONST TRAFFIC XXX FT
- LOOSE GRAVEL XXXX FT
- UNEVEN LANES XXXX FT
- DETOUR X MILE
- ROUGH ROAD XXXX FT
- ROADWORK PAST SH XXXX
- ROADWORK NEXT FRI-SUN
- BUMP XXXX FT
- US XXX EXIT X MILES
- TRAFFIC SIGNAL XXXX FT
- LANES SHIFT *

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

- MERGE RIGHT
- FORM X LINES RIGHT
- DETOUR NEXT X EXITS
- USE XXXXX RD EXIT
- USE EXIT XXX
- USE EXIT I-XX NORTH
- STAY ON US XXX SOUTH
- USE I-XX E TO I-XX N
- TRUCKS USE US XXX N
- WATCH FOR TRUCKS
- WATCH FOR TRUCKS
- EXPECT DELAYS
- EXPECT DELAYS
- PREPARE TO STOP
- REDUCE SPEED XXX FT
- END SHOULDER USE
- USE OTHER ROUTES
- WATCH FOR WORKERS
- STAY IN LANE *

Location List

- AT FM XXXX
- BEFORE RAILROAD CROSSING
- NEXT X MILES
- PAST US XXX EXIT
- XXXXXXX TO XXXXXXX
- US XXX TO FM XXXX

Warning List

- SPEED LIMIT XX MPH
- MAXIMUM SPEED XX MPH
- MINIMUM SPEED XX MPH
- ADVISORY SPEED XX MPH
- RIGHT LANE EXIT
- USE CAUTION
- DRIVE SAFELY
- DRIVE WITH CARE

** Advance Notice List

- TUE-FRI XX AM- X PM
- APR XX-XX X PM-X AM
- BEGINS MONDAY
- BEGINS MAY XX
- MAY X-X XX PM - XX AM
- NEXT FRI-SUN
- XX AM TO XX PM
- NEXT TUE AUG XX
- TONIGHT XX PM- XX AM

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

1. Only 1 or 2 phases are to be used on a PCMS.
2. The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
3. A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
4. A Location Phase is necessary only if a distance or location is not included in the first phase selected.
5. If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
6. For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

WORDING ALTERNATIVES

1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.
2. Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
4. Highway names and numbers replaced as appropriate.
5. ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
6. AHEAD may be used instead of distances if necessary.
7. FT and MI, MILE and MILES interchanged as appropriate.
8. AT, BEFORE and PAST interchanged as needed.
9. Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

1. When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
2. When symbol signs, such as the "Flagger Symbol"(CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
3. When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
4. A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-13

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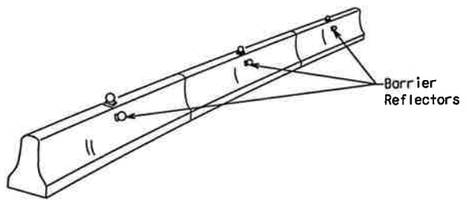
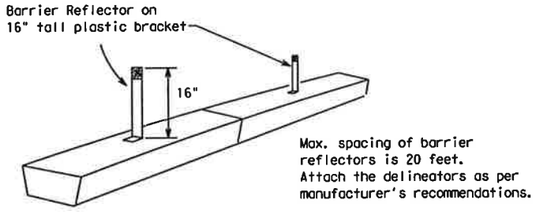
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.

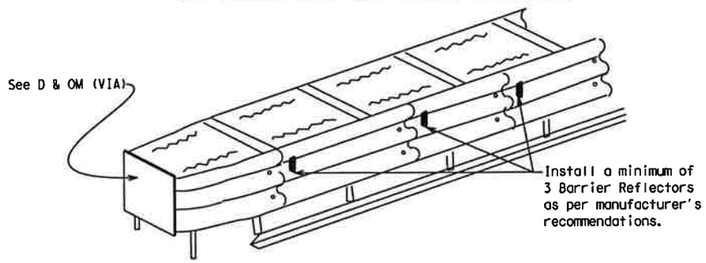


CONCRETE TRAFFIC BARRIER (CTB)

3. Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
4. Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional)while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
5. When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
6. Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
7. Maximum spacing of Barrier Reflectors is forty (40) feet.
8. Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
9. Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
10. Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
11. Single slope barriers shall be delineated as shown on the above detail.



LOW PROFILE CONCRETE BARRIER (LPCB)

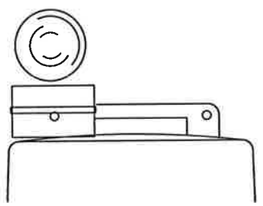


DELINEATION OF END TREATMENTS

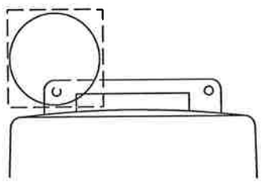
END TREATMENTS FOR
CTB'S USED
IN WORK ZONES

End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

WARNING LIGHTS

1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B_{FL} or C_{FL} Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
4. Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
5. The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
6. When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
7. When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
8. The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

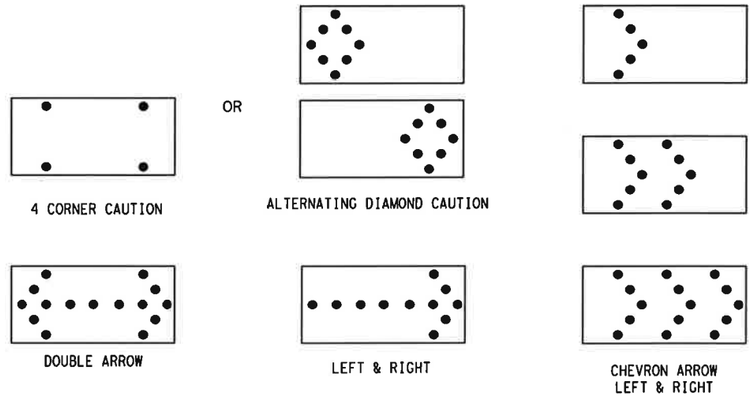
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
4. Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
5. Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
6. Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
7. The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

1. A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
2. The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
3. The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
4. Round reflectors shall be fully reflectorized, including the area where attached to the drum.
5. Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
6. The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
7. When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
8. The warning reflector should be mounted on the side of the handle nearest approaching traffic.
9. The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

1. The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
2. Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
3. The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
4. The Flashing Arrow Board should be able to display the following symbols:



5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
6. The straight line caution display is NOT ALLOWED.
7. The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
8. Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
9. The sequential arrow display is NOT ALLOWED.
10. The flashing arrow display is the TxDOT standard; however, the sequential Chevron display may be used during daylight operations.
11. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
12. A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
13. A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
14. Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION
Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

FLASHING ARROW BOARDS

SHEET 7 OF 12

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the National Cooperative Highway Research Report No. 350 (NCHRP 350) or the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

BC(7)-13

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GENERAL NOTES

1. For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
2. For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
3. For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
4. Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
5. Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
6. The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

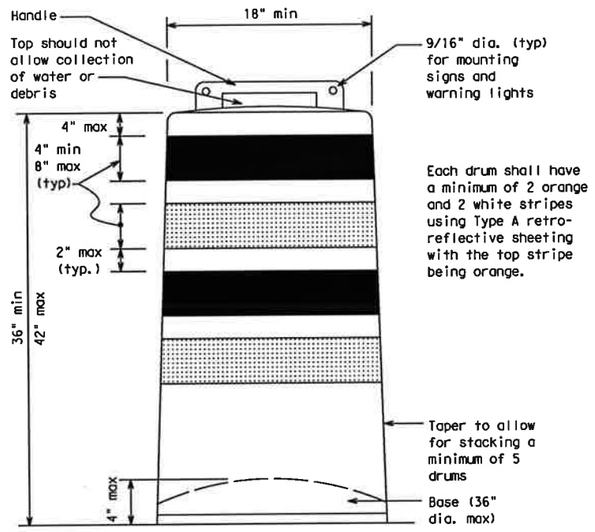
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
3. Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
4. Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
5. The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
6. The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectorized space between any two adjacent stripes shall not exceed 2 inches in width.
7. Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
9. Drum body shall have a maximum unballasted weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

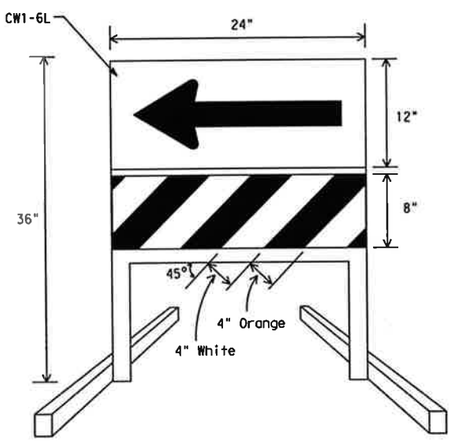
RETROREFLECTIVE SHEETING

1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
2. Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
3. Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
4. The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
5. When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
6. Ballast shall not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.

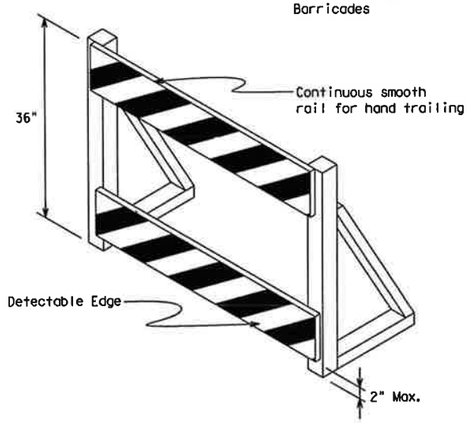




DIRECTION INDICATOR BARRICADE

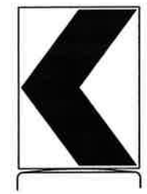
1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the size shown with a black arrow on a background of Type B_{FL} or Type C_{FL} Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
4. Double arrows on the Direction Indicator Barricade will not be allowed.
5. Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.

This detail is not intended for fabrication. See note 3 and the CWZTCD list for providers of approved Detectable Pedestrian Barricades



DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a device that is detectable by a person with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades may use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



18" x 24" Sign (Maximum Sign Dimension) Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer

12" x 24" Vertical Panel mount with diagonals sloping down towards travel way

Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_{FL} Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
3. Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
4. Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
5. Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
6. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
7. Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
8. R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

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Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-13

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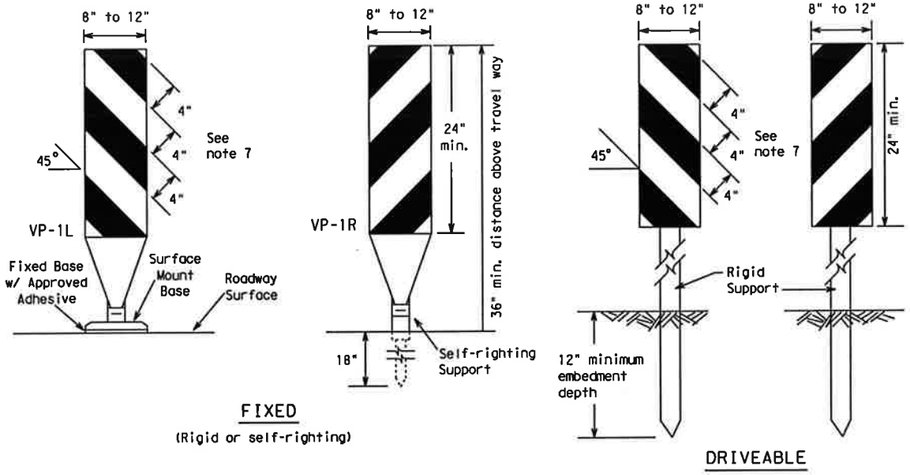
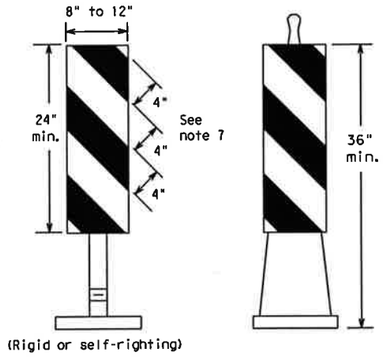


FIXED
(Rigid or self-righting)

DRIVEABLE

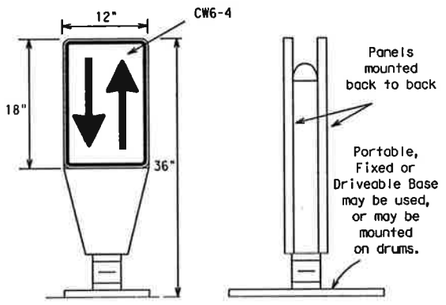


(Rigid or self-righting)

PORTABLE

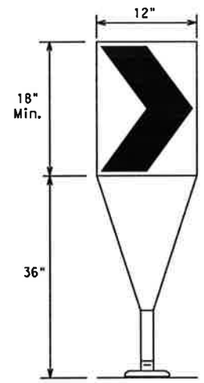
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual Appendix B "Treatment of Pavement Drop-offs in Work Zones" for additional guidelines on the use of VP's for drop-offs.
3. VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
4. VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
5. Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
6. Sheeting for the VP's shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

VERTICAL PANELS (VPs)



1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
2. The OTLD may be used in combination with 42" cones or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



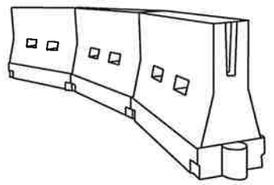
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
3. Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
4. To be effective, the chevron should be visible for at least 500 feet.
5. Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
6. For Long Term Stationary use on tapers or transitions on freeways and divided highways self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS

GENERAL NOTES

1. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10) placed near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	L=WS	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

** Taper lengths have been rounded off.
L=Length of Taper (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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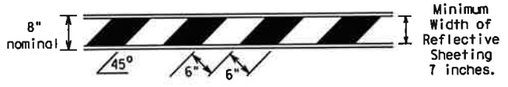
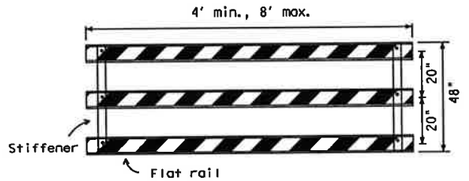
TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



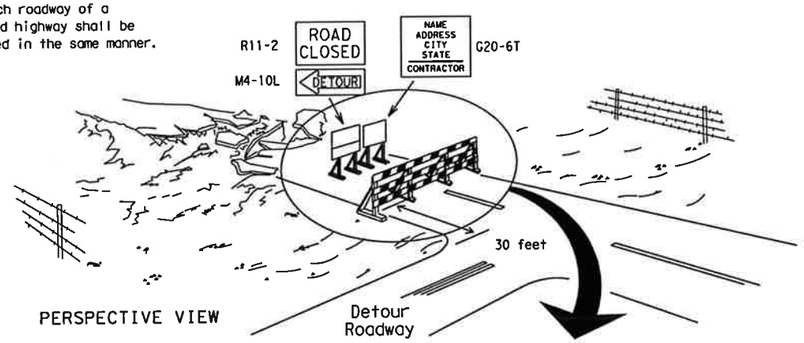
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

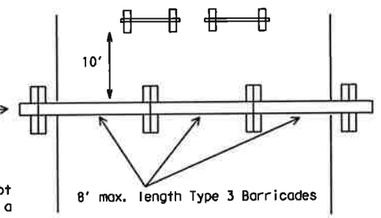
TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

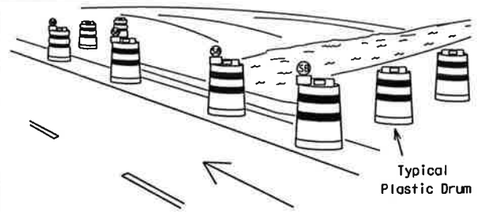
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

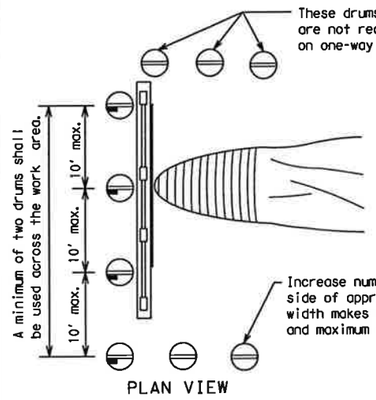
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

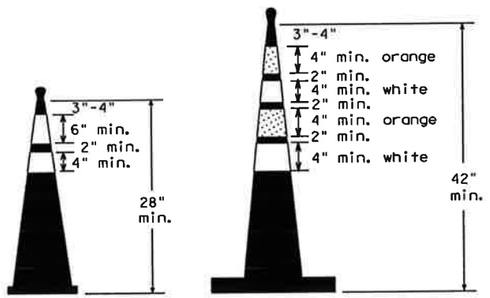
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.



PLAN VIEW

LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

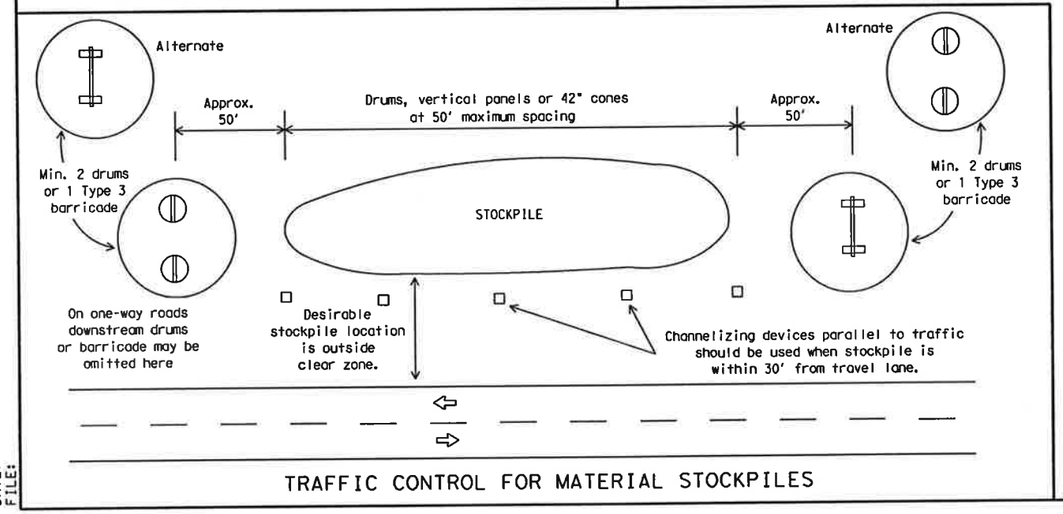


Two-Piece cones | One-Piece cones | Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.

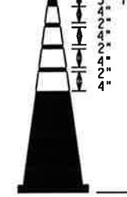
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers used at night shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



EDGELINE CHANNELIZER

1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping pattern: four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-13

FILE: bc-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				
9-07	DIST	COUNTY		SHEET NO.
7-13				

DATE:
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WORK ZONE PAVEMENT MARKINGS

GENERAL

1. The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
6. When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(12).
2. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

1. Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
2. Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

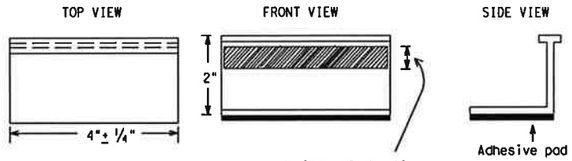
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
4. Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

1. Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
2. The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
3. Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
10. Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



STAPLES OR NAILS SHALL NOT BE USED TO SECURE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS TO THE PAVEMENT SURFACE

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
   A. Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
   B. Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
YELLOW - (two amber reflective surfaces with yellow body).
WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-13

FILE: bc-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				
2-98 11-02 7-13	DIST	COUNTY		SHEET NO.
1-02 9-07				

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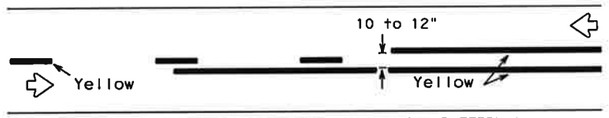
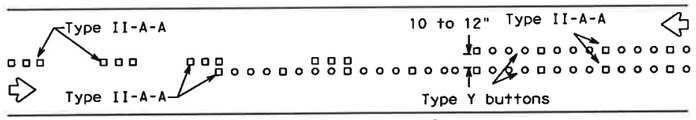
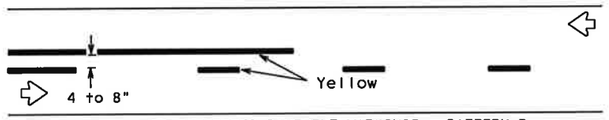
PAVEMENT MARKING PATTERNS



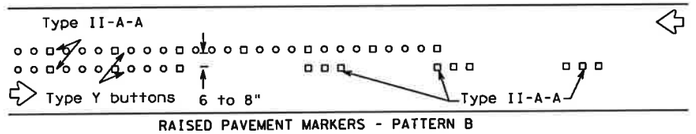
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



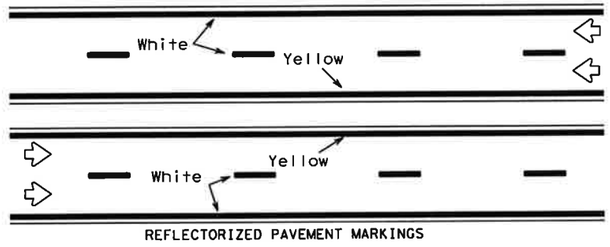
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



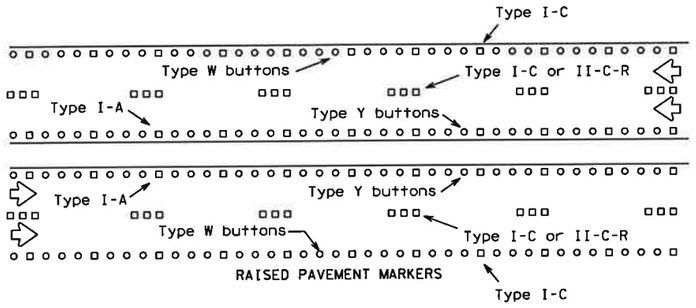
RAISED PAVEMENT MARKERS - PATTERN B

Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer.
Prefabricated markings may be substituted for reflectorized pavement markings.

CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



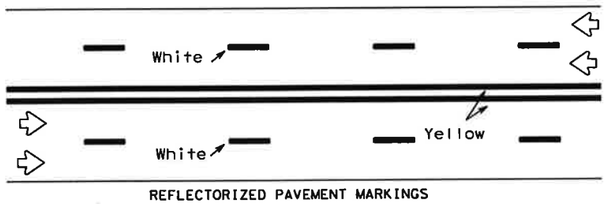
REFLECTORIZED PAVEMENT MARKINGS



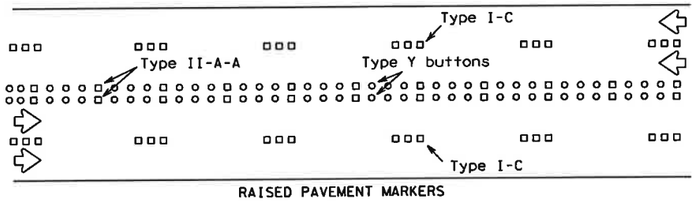
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



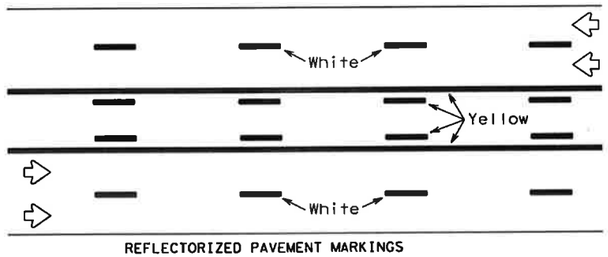
REFLECTORIZED PAVEMENT MARKINGS



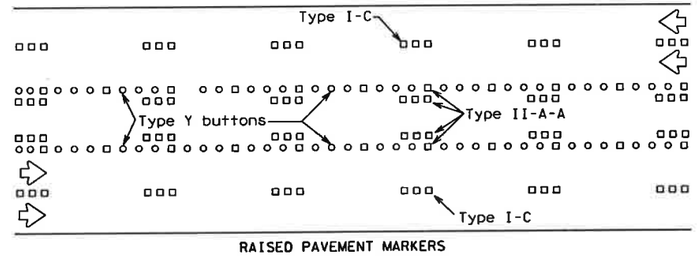
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

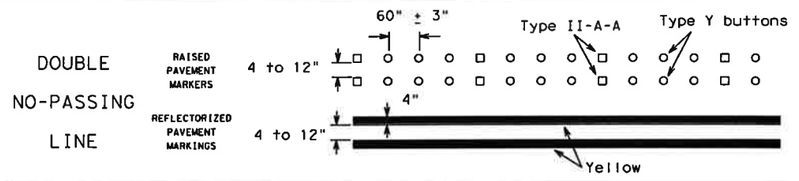


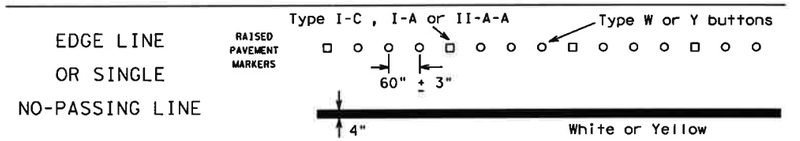
RAISED PAVEMENT MARKERS

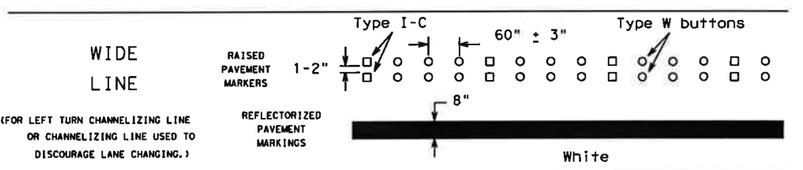
Prefabricated markings may be substituted for reflectorized pavement markings.

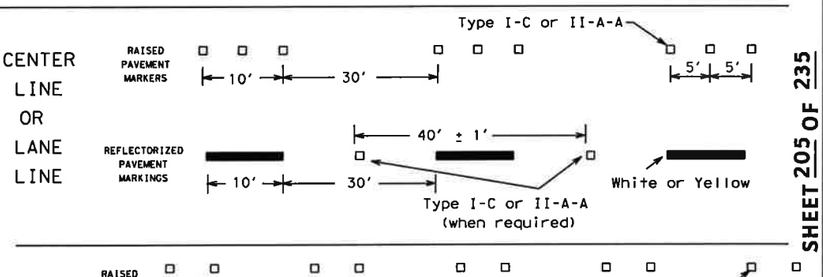
TWO-WAY LEFT TURN LANE

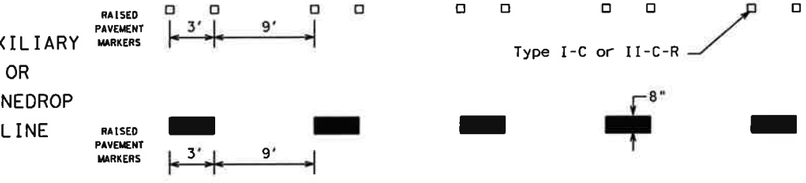
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS





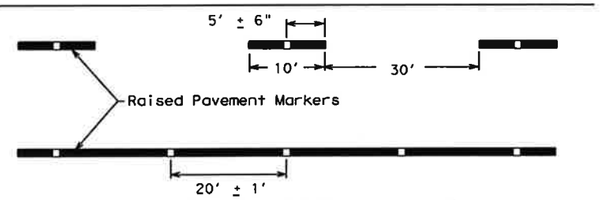






REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



Centerline only - not to be used on edge lines

Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

SHEET 12 OF 12

SHEET 205 OF 235

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-13

FILE: bc-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS 1-97 11-02 7-13 2-98 9-07	DIST	COUNTY		SHEET NO.

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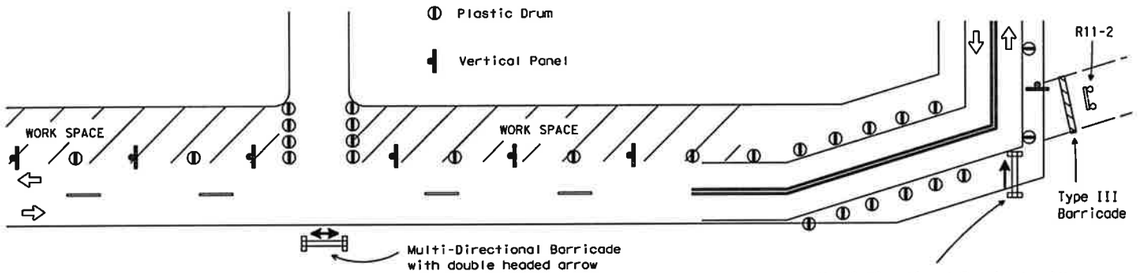
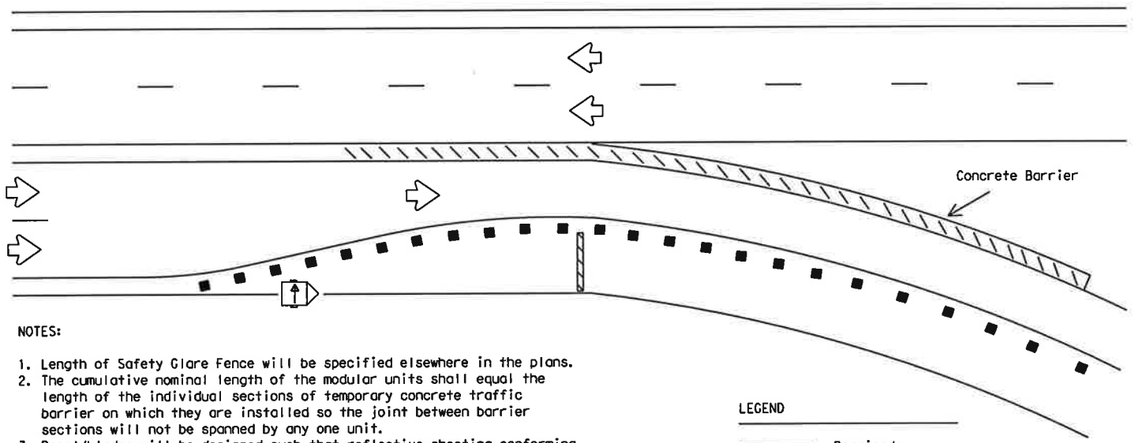
CHANNELIZING DEVICES FOR URBAN ROADWAY TYPE PROJECT



For spacing between devices, see BC(8). Use self-righting supports in areas where there is a high potential for channelizing devices to be struck.

BARRIER DELINEATION WITH SAFETY GLARE FENCE



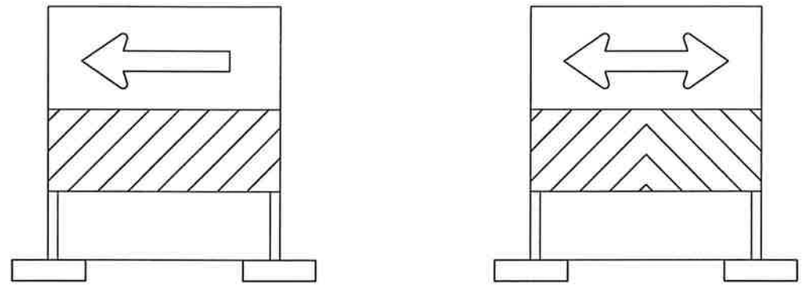
NOTES:

1. Length of Safety Glare Fence will be specified elsewhere in the plans.
2. The cumulative nominal length of the modular units shall equal the length of the individual sections of temporary concrete traffic barrier on which they are installed so the joint between barrier sections will not be spanned by any one unit.
3. Panel/blades will be designed such that reflective sheeting conforming with Departmental Material Specification DMS-8300, Flat Surface Reflective Sheeting, Type C (High Specific Intensity), minimum size of 2 inches by 12 inches can be attached to the edge of the panel/blade. The sheeting shall be attached to one panel/blade per section of concrete barrier not to exceed a spacing of 30 feet. Barrier reflectors are not necessary when panel/blades are installed.
4. Moduler Glare Screens for head light barrier shall meet the requirements of DMS-8610.

LEGEND

- Barricade
- Channelizing devices
- Trailer mounted flashing arrow panel
- Safety glare fence

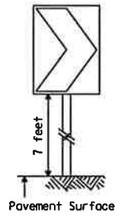
MULTI-DIRECTIONAL BARRICADE



Single Headed Arrow — Double Headed Arrow

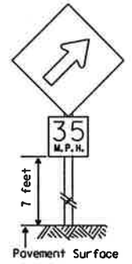
1. Multi-directional barricade shall not be used for lane closures.
2. May be used for sharp changes in alignment, or across roadway from stem of "T" intersection.
3. Typically used for Intermediate Term Stationary, Short Term Stationary or Short Duration work zone operations.
4. See the CWZTCD List for approved designs.

USAGE OF CW1-6, ECW1-6a AND CW1-8 SIGNS



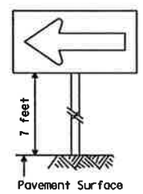
CW1-8

The CHEVRON sign (CW1-8) may be used to replace roadside delineation on curves or used in transitions or tapers.



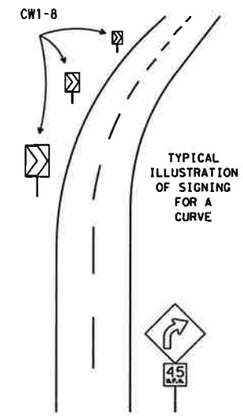
ECW1-6a

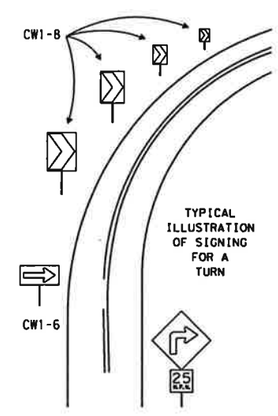
An UPWARD SLOPING ARROW sign (ECW1-6a) is intended to be used to indicate the beginning of a curve or transition. It should be preceded with an appropriate curve sign when needed, and should not be used throughout the curve or transition. Advisory speed plaque is optional.



CW1-6

A LARGE ARROW sign (CW1-6) is intended to be used to give notice of a sharp change in alignment (turn) in the direction of travel. It should be preceded with an appropriate advance construction warning turn sign.





NOTES:

1. CW1-6, ECW1-6a & CW1-8 signs shall be mounted on fixed supports.
2. Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
3. For two-way traffic, use same arrangement of signs on outside of curve for each direction of travel.
4. Appropriate advance warning CURVE or TURN sign with Advisory Speed plaque should be used when needed.

Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be obtained by contacting:

Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3120
Fax (512) 416-3299

Instructions to locate the "CWZTCD" on TxDOT website are:

Start at website - www.dot.state.tx.us
Click on "About TxDOT",
Click on "Organizational Chart",
Click on Traffic Operations Box,
Click on "Compliant Work Zone Traffic Control Devices",
Click on "View PDF".
This site is printable.

PREQUALIFICATION PROCEDURES ARE OBTAINED FROM:

CONSTRUCTION DIVISION-MATERIALS AND TESTS SECTION
TEXAS DEPARTMENT OF TRANSPORTATION (TxDOT)
125 EAST 11th STREET
AUSTIN, TX 78701-2483

DEPARTMENTAL MATERIAL SPECIFICATIONS

FLAT SURFACE REFLECTIVE SHEETING	DMS-8300
DELINEATORS AND OBJECT MARKERS	DMS-8600
MODULER GLARE SCREENS	DMS-8610

COLOR	USAGE	SIGN SHEETING
ORANGE	BACKGROUND	TYPE E (FLUORESCENT PRISMATIC)
WHITE	BACKGROUND	TYPE C (HIGH SPECIFIC INTENSITY)
BLACK	LEGEND & BORDERS	VINYL NON-REFLECTIVE SHEETING

REFER TO THE BC SHEETS FOR SHEETING REQUIREMENT ON CHANNELIZING DEVICES.

The five categories of work duration and their time at a location shall be:

A. Long-term stationary is work that occupies a location more than 3 days.

B. Intermediate-term stationary is work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than 1 hour.

C. Short-term stationary is daytime work that occupies a location for more than 1 hour, but less than 12 hours.

D. Short duration is work that occupies a location up to 1 hour.

E. Mobile is work that moves intermittently or continuously.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN TYPICAL DETAILS

WZ(TD)-03

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
4-98	CONT	SECT	JOB	HIGHWAY
3-03				
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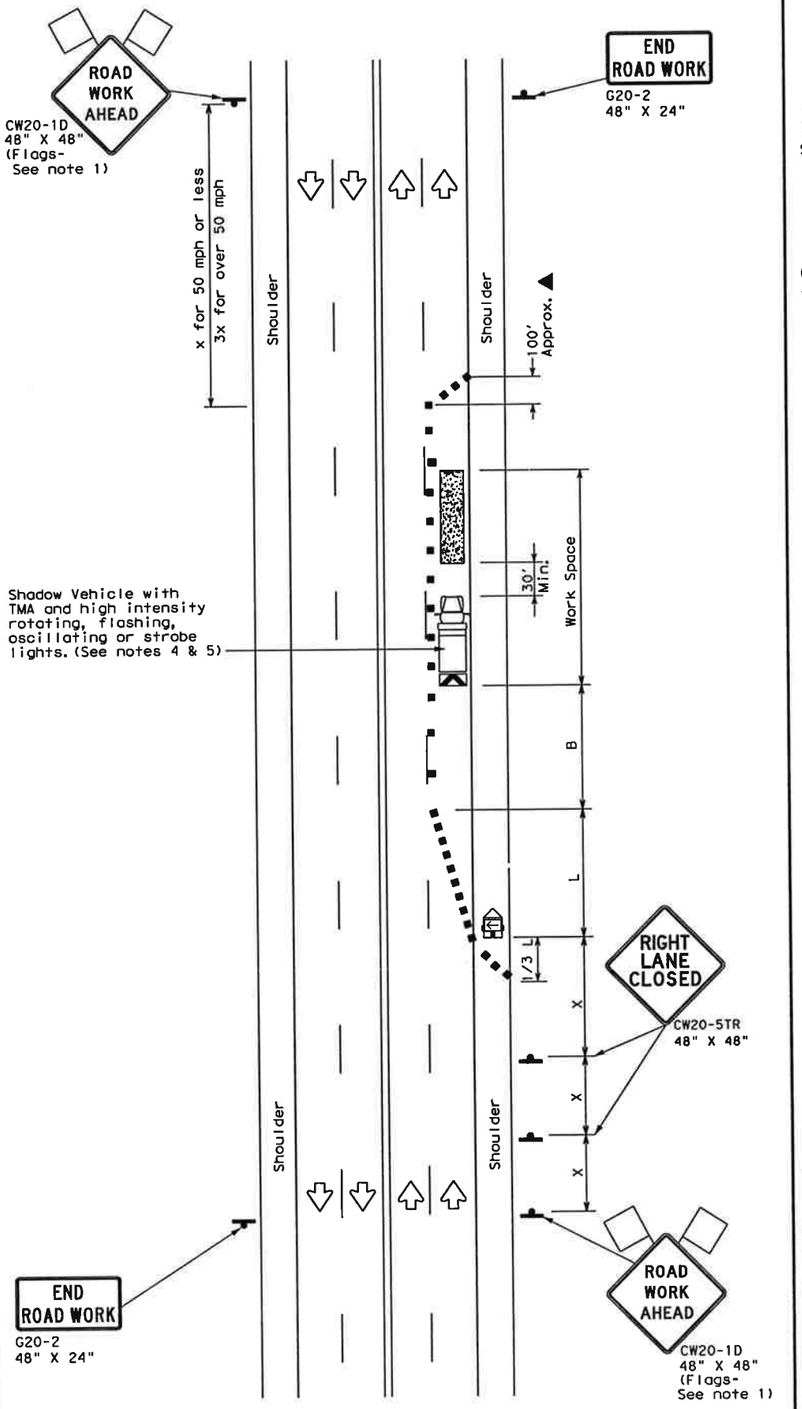
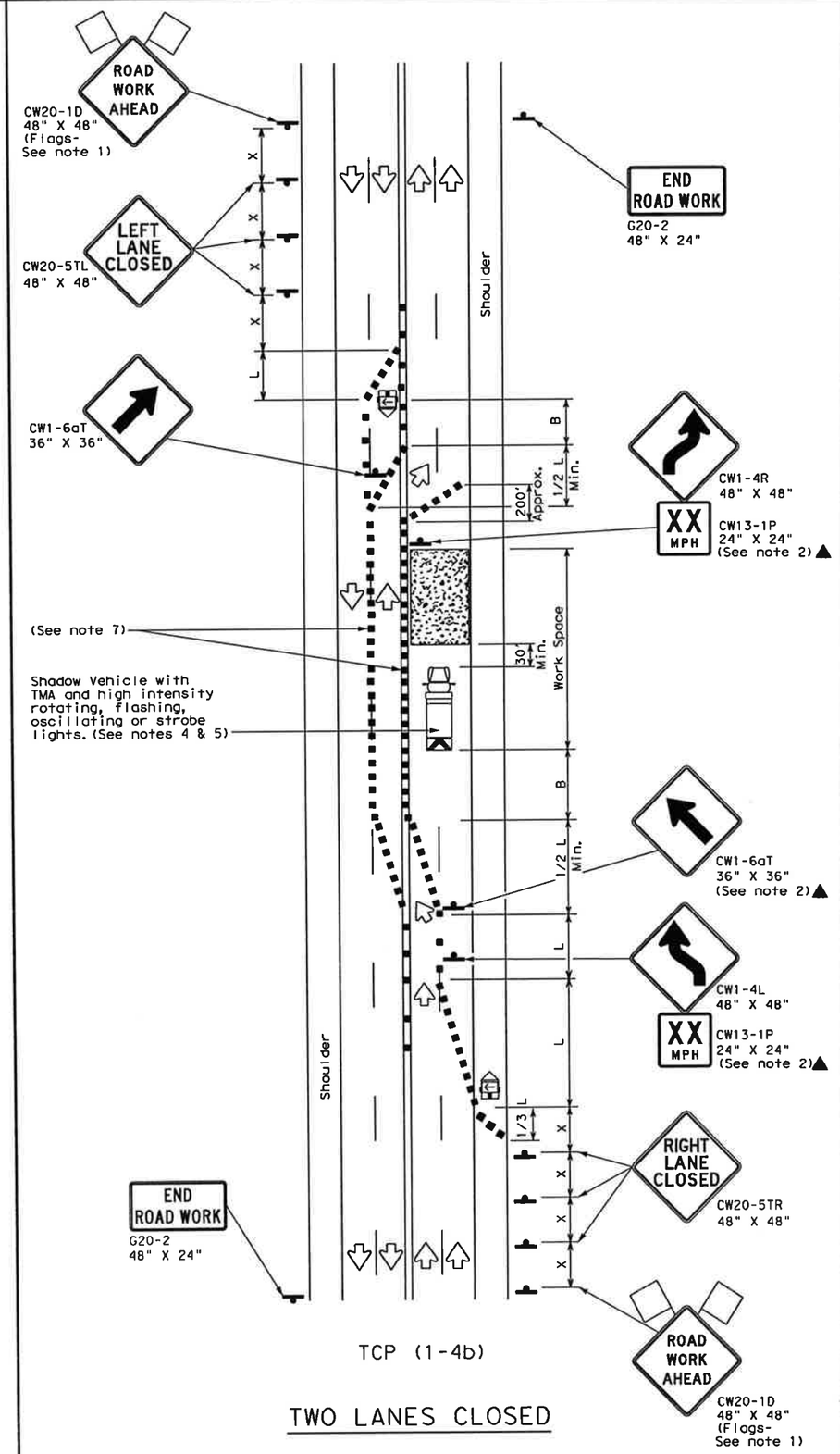
DATE:
FILE:



TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW20-1D "ROAD WORK AHEAD" sign may be repeated if the visibility of the work zone is less than 1500 feet.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-4a)

6. If this TCP is used for a left lane closure , CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline where needed to protect the work space from opposing traffic with the arrow panel placed in the closed lane near the end of the merging taper.

TCP (1-4b)

7. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the areas of conflicting markings, not the entire work zone.

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-12

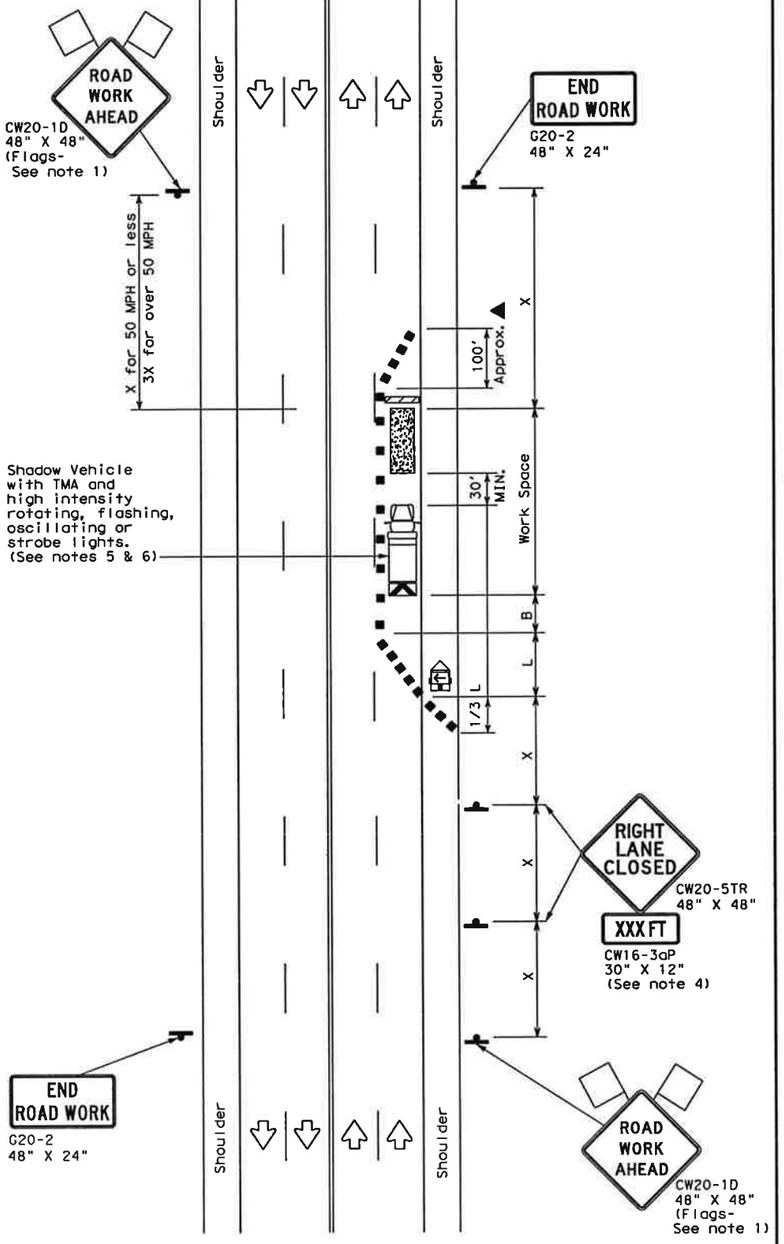
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.

REVISIONS
2-94 2-12
8-95
1-97
4-98

154

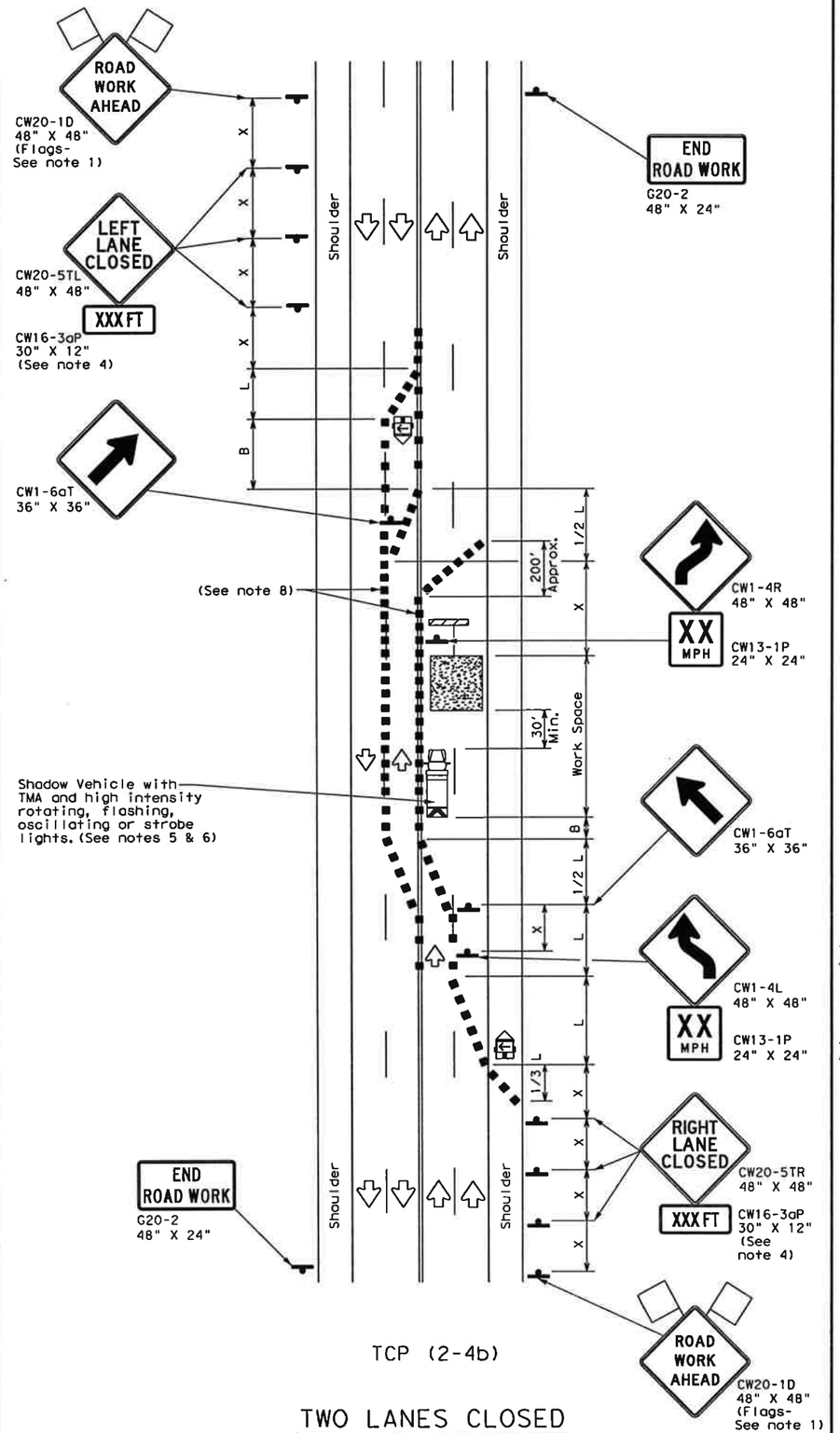
SHEET 207 OF 235

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
		✓	✓	

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
4. For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-4a)

7. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED"signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-4b)

8. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter devices spacing is intended for the area of conflicting markings, not the entire work zone.

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN
LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-12

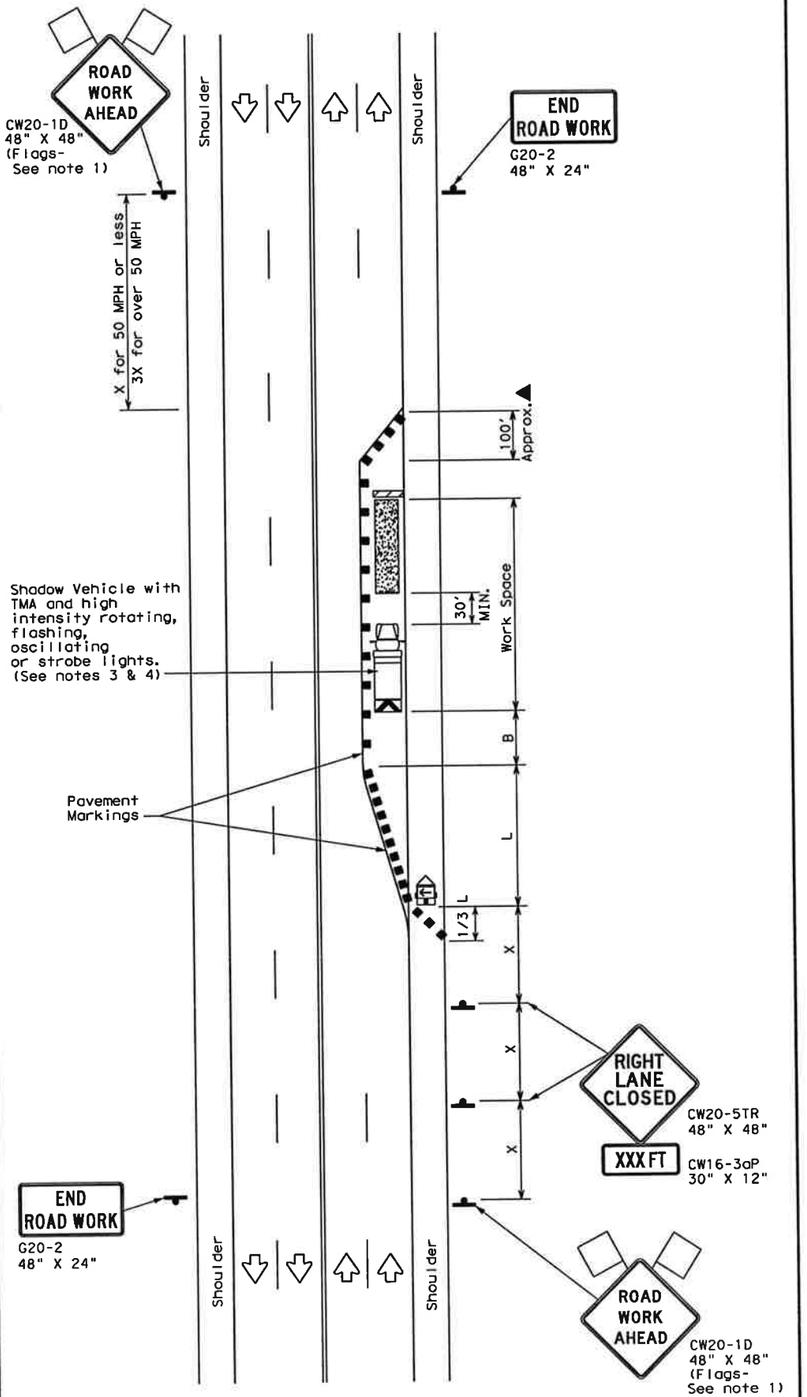
REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
8-95 2-12	CONT	SECT	JOB	HIGHWAY
1-97				
4-98	DIST	COUNTY		SHEET NO.
3-03				

164

SHEET 208 OF 235

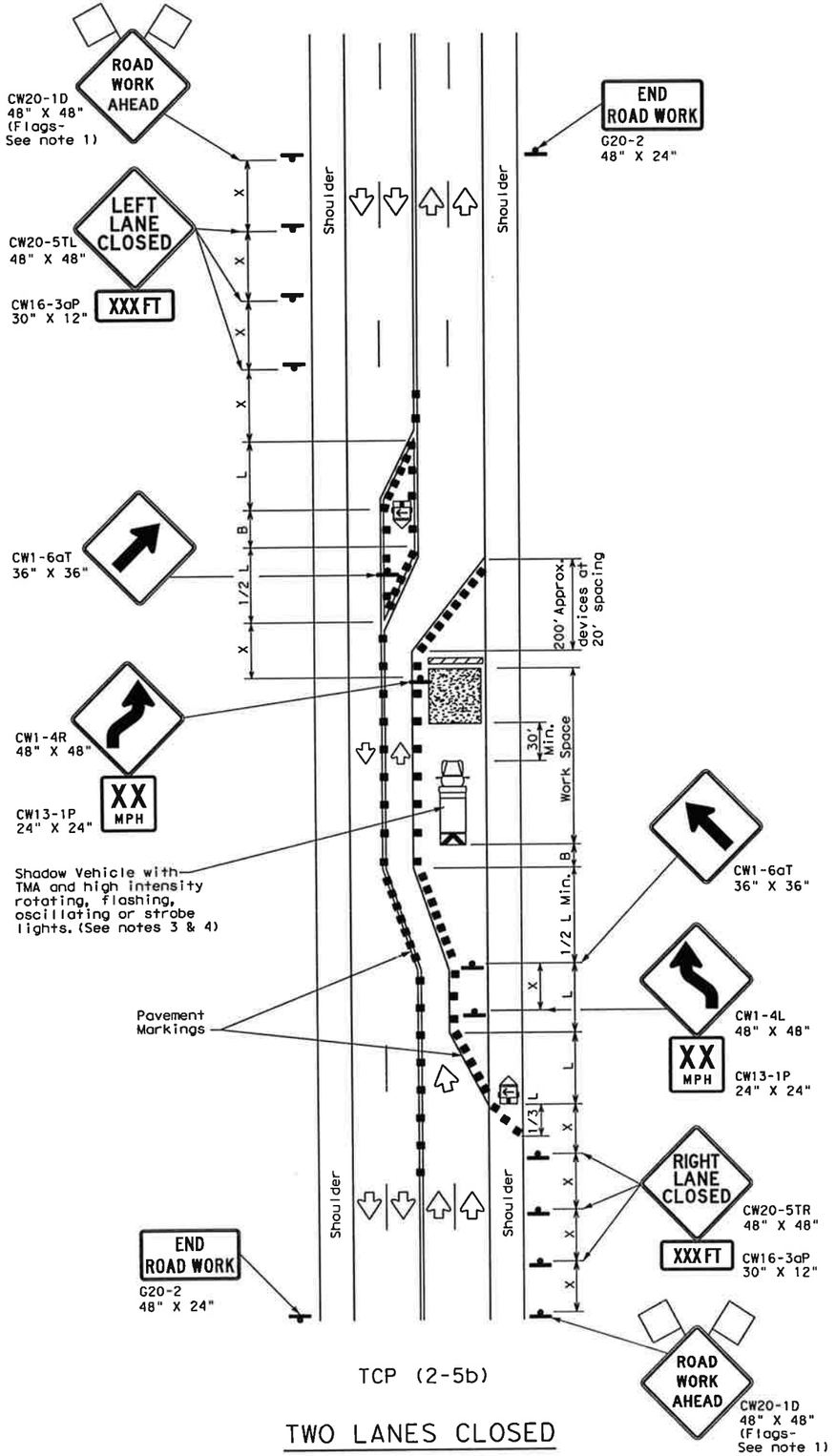
DATE:
FILE:

DATE:
FILE:



TCP (2-5a)

ONE LANE CLOSED



TCP (2-5b)

TWO LANES CLOSED

LEGEND			
	Type 3 Barricade	■ ■	Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
			✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew eposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substitutued for the Shadow Vehicle and TMA.
4. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.
5. The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

6. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic, with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-5b)

7. Conflicting pavement markings shall be removed for long-term projects.

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation
Traffic Operations Division

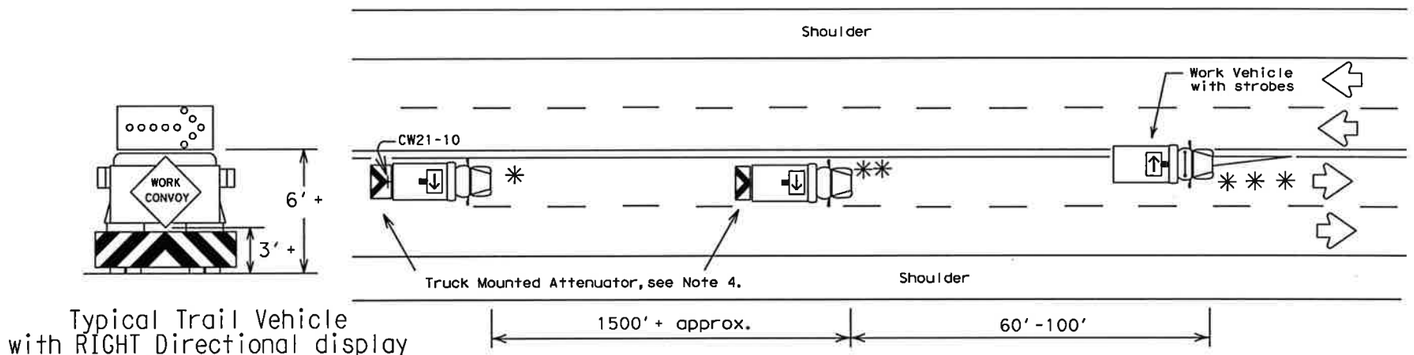
TRAFFIC CONTROL PLAN LONG TERM LANE CLOSURES MULTILANE CONVENTIONAL RDS.

TCP(2-5)-12

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

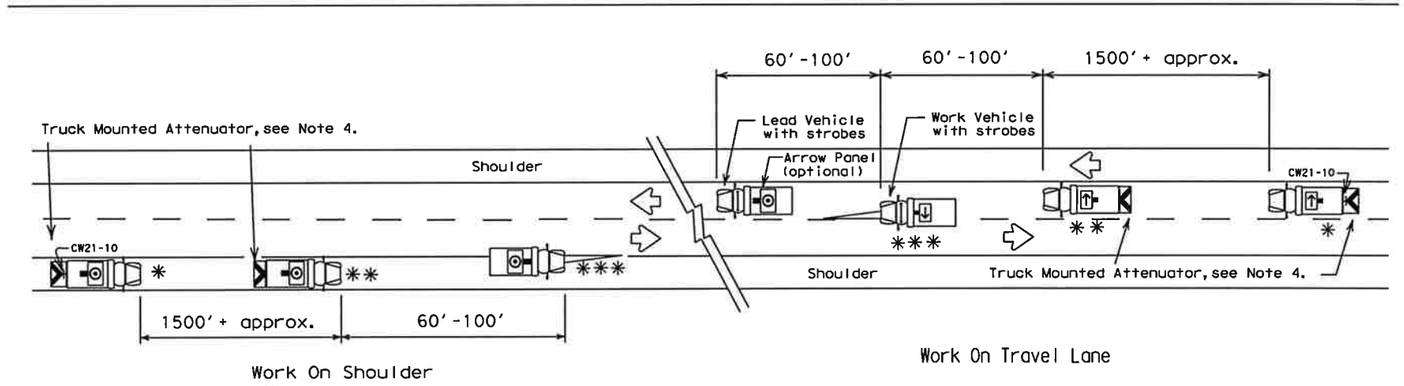
REVISIONS	CONT	SECT	JOB	HIGHWAY
8-95 2-12				
1-97	DIST	COUNTY		SHEET NO.
4-98				
3-03				

165



Typical Trail Vehicle
with RIGHT Directional display
Flashing Arrow Panel

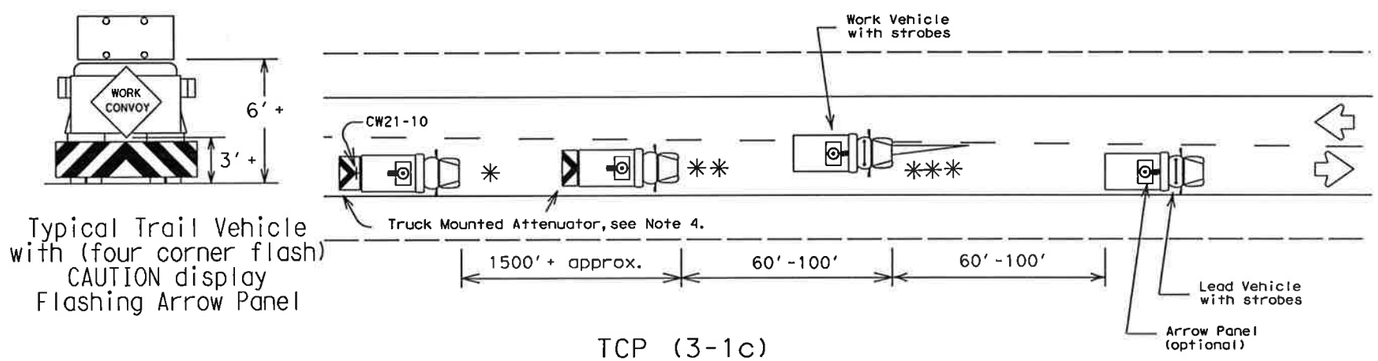
TCP (3-1a)
Undivided Multilane Roadway



Work On Shoulder

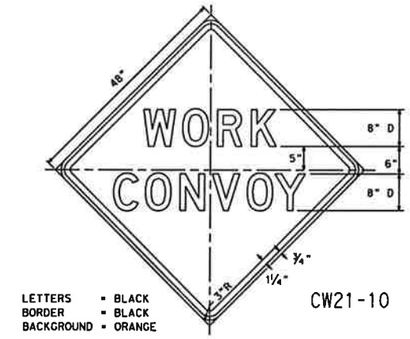
Work On Travel Lane

TCP (3-1b)
Two-Way Roadway With Paved Shoulders



Typical Trail Vehicle
with (four corner flash)
CAUTION display
Flashing Arrow Panel

TCP (3-1c)
Two-Way Roadway Without Paved Shoulders



LETTERS - BLACK
BORDER - BLACK
BACKGROUND - ORANGE

CW21-10

Legend:

- * TRAIL VEHICLE
- * * SHADOW VEHICLE
- * * * WORK VEHICLE
- Truck mounted attenuator
- HEAVY WORK VEHICLE

Arrow Panel Displays

- RIGHT Directional
- LEFT Directional
- RIGHT or LEFT Directional
- CAUTION mode

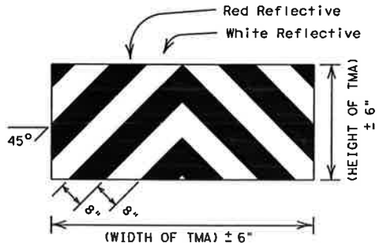
GENERAL NOTES:

1. TRAIL, SHADOW, LEAD, and work vehicles shall be equipped with arrow panels as illustrated. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.
3. The use of yellow rotating beacons or strobe lights on vehicles are required unless otherwise stated elsewhere in the plans.
4. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and the TRAIL VEHICLE are required.
5. Optional striping on the back panel of all truck mounted attenuators shall be 8" red and white reflective sheeting placed in an inverted "V" design. Reflective sheeting shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION D-9-8300, TYPE C.
6. Flashing Arrow Panels shall be Type B or Type C as per BC Standards. The panel operation shall be controlled from inside the vehicle.
7. Each vehicle shall have two-way radio communication capability.
8. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
9. Vehicle spacing between TRAIL VEHICLE and SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE.

Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or faxing:

Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD@mailgw.dot.state.tx.us

Shadow and trail vehicle shall be equipped with Truck Mounted Attenuator.



OPTIONAL STRIPING FOR TMA

STRIPING FOR TMA WILL BE REQUIRED ON ALL PROJECTS AWARDED AFTER JANUARY 1, 2000

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN
MOBILE OPERATIONS
UNDIVIDED HIGHWAYS

TCP(3-1)-98

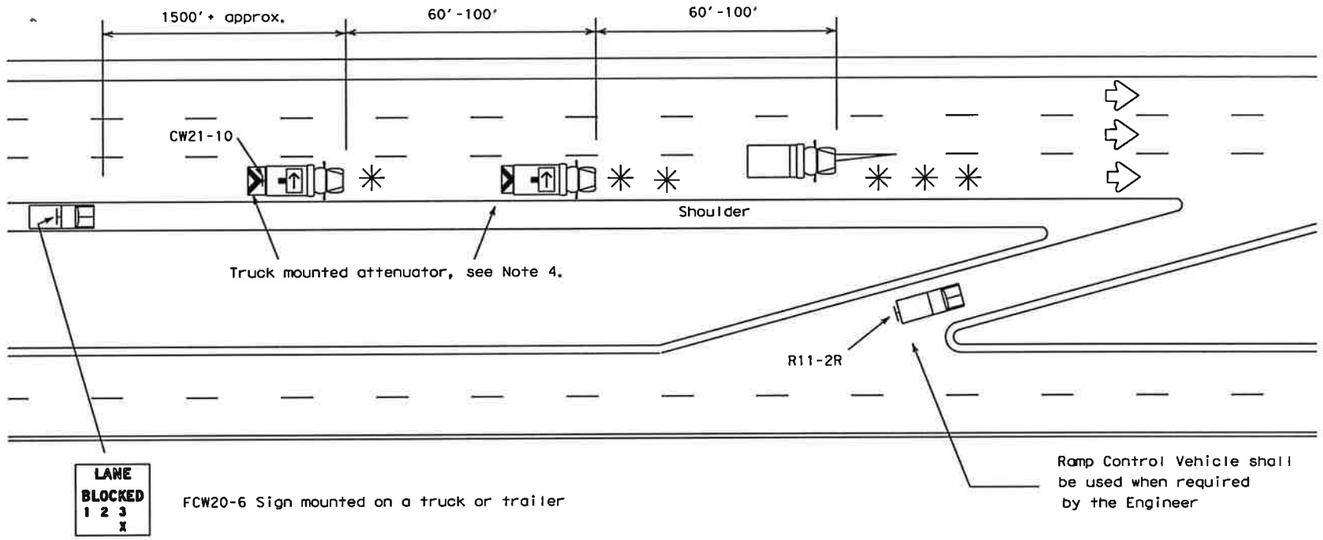
REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
2-94	CONT	SECT	JOB	HIGHWAY
8-95				
1-97	DIST	COUNTY		SHEET NO.
4-98				

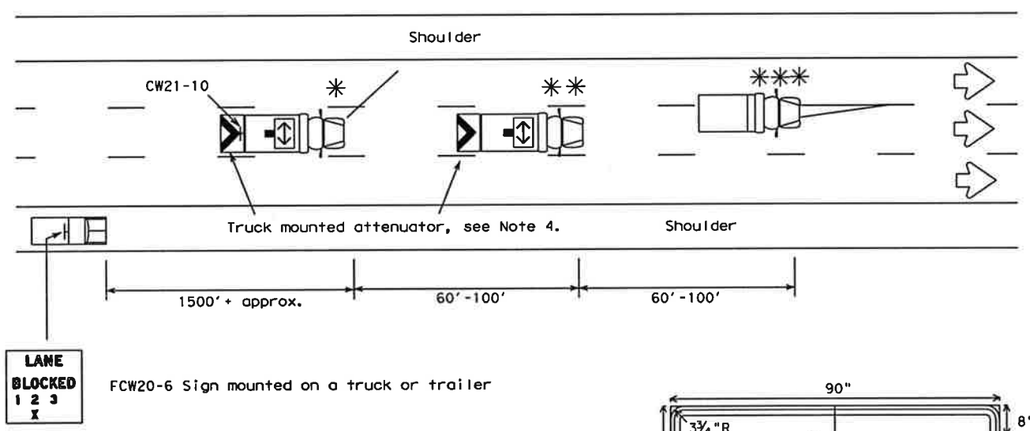
175

SHEET 210 OF 235

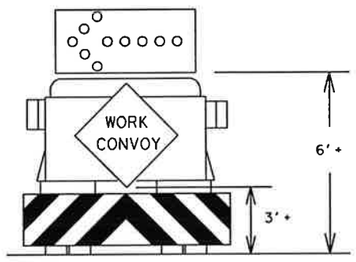
DATE:
FILE:

DATE:
FILE:

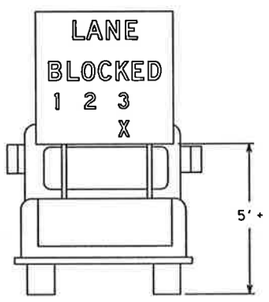




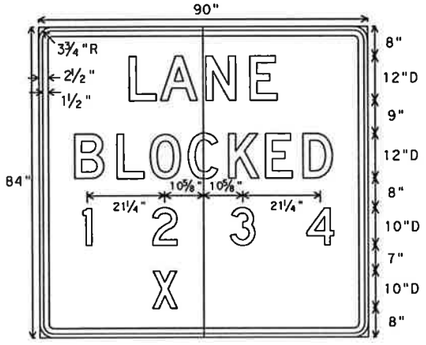
Shadow and trail vehicle shall be equipped with Truck Mounted Attenuator.



Typical Trail Vehicle
with LEFT Directional display
Flashing Arrow Panel

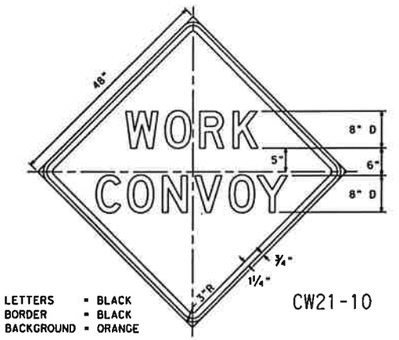


Typical Advance
Warning Vehicle



FCW20-6

LETTERS = BLACK
BORDER = BLACK
BACKGROUND = ORANGE



LETTERS = BLACK
BORDER = BLACK
BACKGROUND = ORANGE

CW21-10

Legend:

* TRAIL VEHICLE
** SHADOW VEHICLE
*** WORK VEHICLE

Truck mounted attenuator

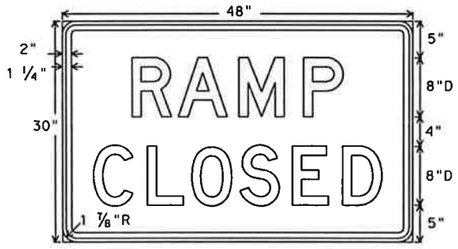
HEAVY WORK VEHICLE

Arrow Panel Displays

RIGHT Directional
LEFT Directional
RIGHT or LEFT Directional
CAUTION mode

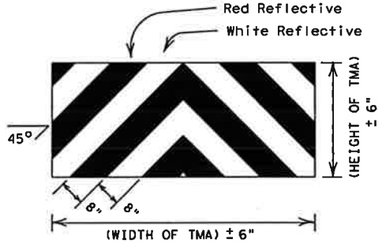
GENERAL NOTES:

1. TRAIL, SHADOW, LEAD, and work vehicles shall be equipped with arrow panels as illustrated. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.
3. The use of yellow rotating beacons or strobe lights on vehicles are required unless otherwise stated elsewhere in the plans.
4. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and the TRAIL VEHICLE are required.
5. Optional striping on the back panel of all truck mounted attenuators shall be 8" red and white reflective sheeting placed in an inverted "V" design. Reflective sheeting shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION D-9-8300, TYPE C.
6. Flashing Arrow Panels shall be Type B or Type C as per BC Standards. The panel operation shall be controlled from inside the vehicle.
7. Each vehicle shall have two-way radio communication capability.
8. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
9. Vehicle spacing between TRAIL VEHICLE and SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE.
10. The LANE BLOCKED sign (FCW20-6) shall be used on divided highways and may be mounted on a truck or trailer. For divided highways with two lanes in each direction, the RIGHT or LEFT LANE CLOSED sign (CW20-5, 48" x 48") may be substituted for the LANE BLOCKED sign (FCW20-6).



R11-2R

LETTERS = BLACK
BORDER = BLACK
BACKGROUND = WHITE



OPTIONAL STRIPING FOR TMA

STRIPING FOR TMA WILL BE REQUIRED ON ALL PROJECTS AWARDED AFTER JANUARY 1, 2000

Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or faxing:

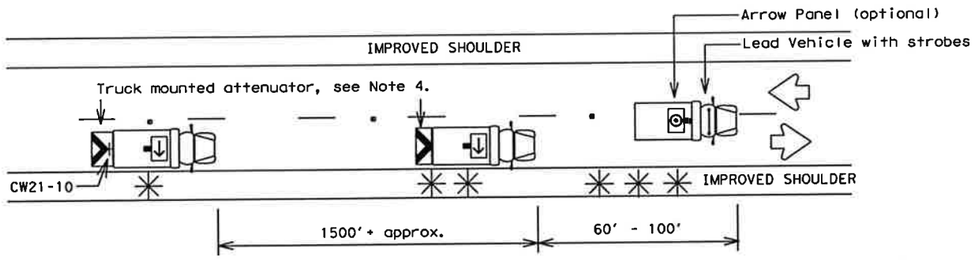
Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD@mailgw.dot.state.tx.us

Texas Department of Transportation
Traffic Operations Division

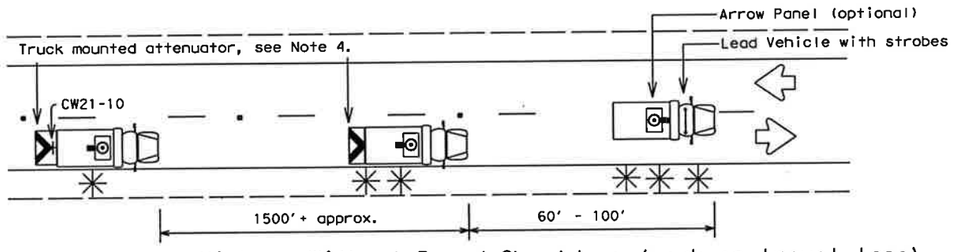
TRAFFIC CONTROL PLAN
MOBILE OPERATIONS
DIVIDED HIGHWAYS
TCP(3-2)-98

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
2-94	CONT	SECT	JOB	HIGHWAY
8-95				
1-97	DIST	COUNTY		SHEET NO.
4-98				

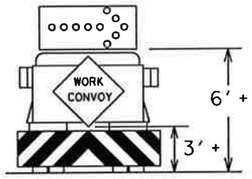
DATE:
FILE:



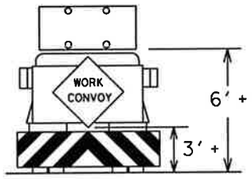
Two Lane Highway With Paved Shoulders (work on travel lane)



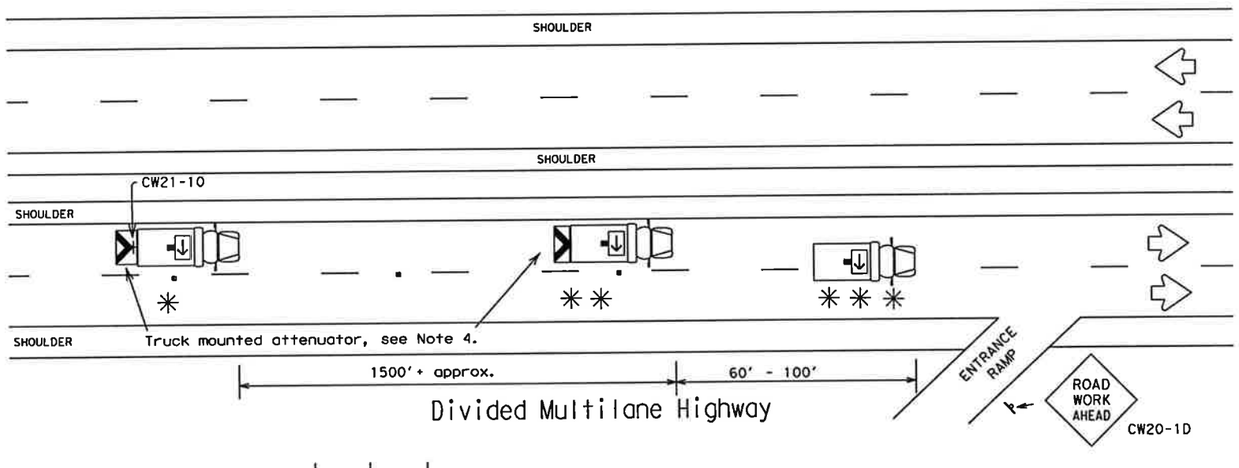
Two Lane Highway Without Paved Shoulders (work on travel lane)



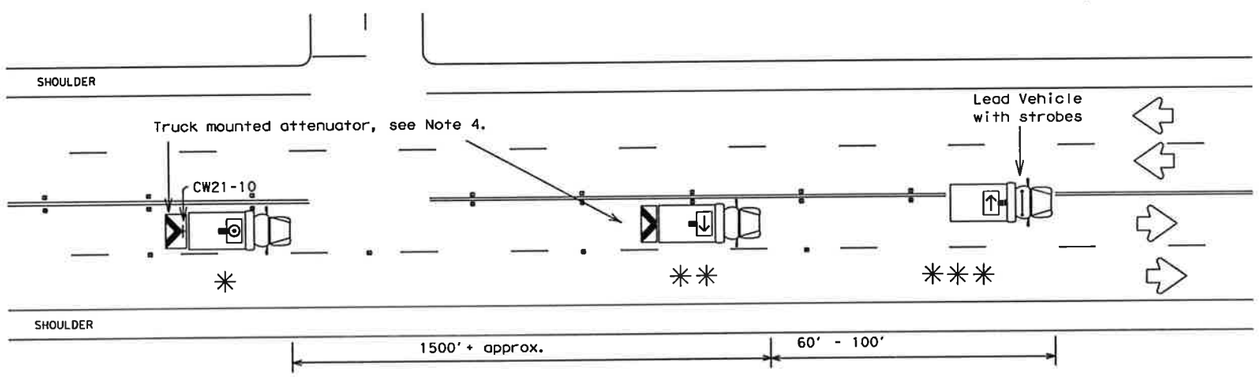
TYPICAL TRAIL VEHICLE
RIGHT Directional display
Flashing Arrow Panel



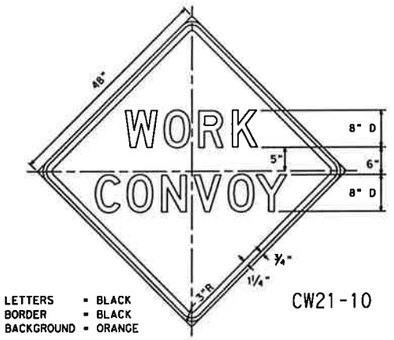
TYPICAL TRAIL VEHICLE
with (four corner flash)
CAUTION display
Flashing Arrow Panel



Divided Multilane Highway



Undivided Multilane Highway



CW21-10

Legend:

- * TRAIL VEHICLE
- ** SHADOW VEHICLE
- *** WORK VEHICLE
- Truck mounted attenuator
- HEAVY WORK VEHICLE

Arrow Panel Displays

- RIGHT Directional
- LEFT Directional
- RIGHT or LEFT Directional
- CAUTION mode

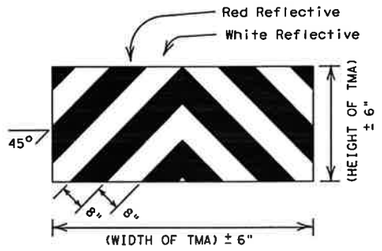
GENERAL NOTES:

1. TRAIL, SHADOW, LEAD, and work vehicles shall be equipped with arrow panels as illustrated. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.
3. The use of yellow rotating beacons or strobe lights on vehicles are required unless otherwise stated elsewhere in the plans.
4. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and the TRAIL VEHICLE are required.
5. Optional striping on the back panel of all truck mounted attenuators shall be 8" red and white reflective sheeting placed in an inverted "V" design. Reflective sheeting shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION D-9-8300, TYPE C.
6. Flashing Arrow Panels shall be Type B or Type C as per BC Standards. The panel operation shall be controlled from inside the vehicle.
7. Each vehicle shall have two-way radio communication capability.
8. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
9. Vehicle spacing between TRAIL VEHICLE and SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE.

Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or faxing:

Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD@mailgw.dot.state.tx.us

Shadow and trail vehicle shall be equipped with Truck Mounted Attenuator.



OPTIONAL STRIPING FOR TMA

STRIPING FOR TMA WILL BE REQUIRED ON ALL PROJECTS AWARDED AFTER JANUARY 1, 2000

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION TCP(3-3)-98

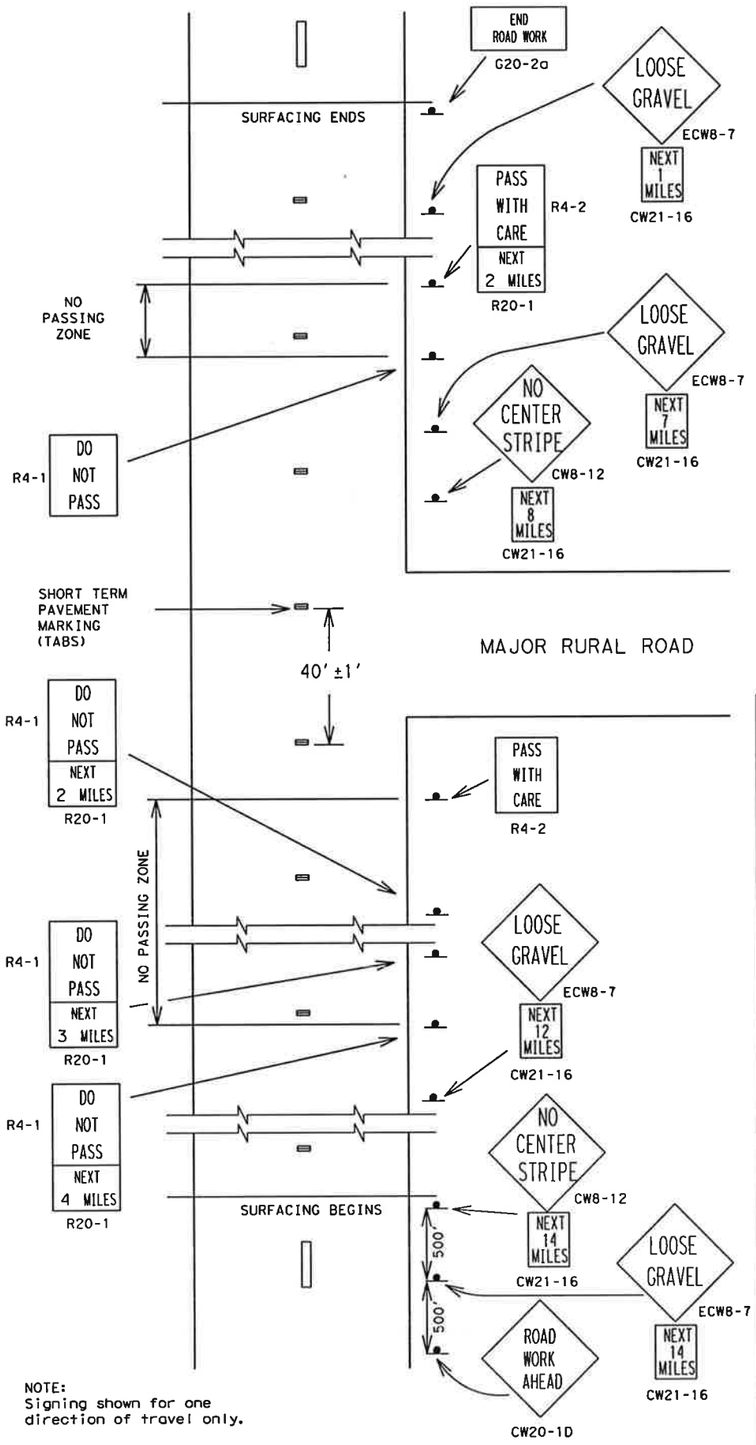
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

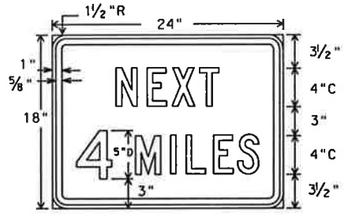
REVISIONS
2-94
8-95
1-97
4-98

CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.

177

SHEET 212 OF 235

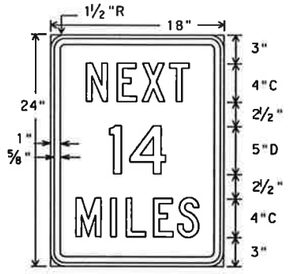




R20-1
24"x18"

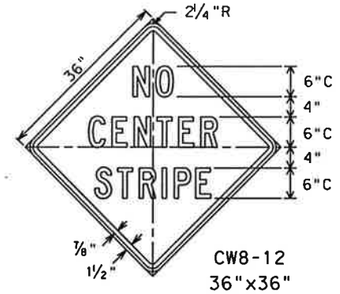
Legend - Black
Border - Black
Background - White Refl.

FOR USE WITH REGULATORY SIGNS ONLY



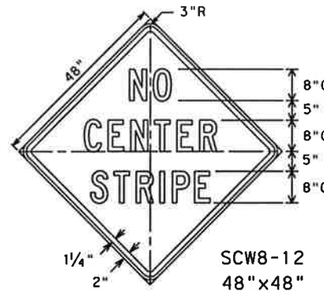
CW21-16
18"x24"

Legend - Black
Border - Black
Background - Orange Refl.



CW8-12
36"x36"

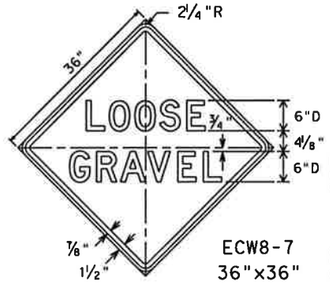
Legend - Black
Border - Black
Background - Orange Refl.



SCW8-12
48"x48"

Legend - Black
Border - Black
Background - Orange Refl.

FOR USE WITH CONSTRUCTION WARNING SIGNS ONLY

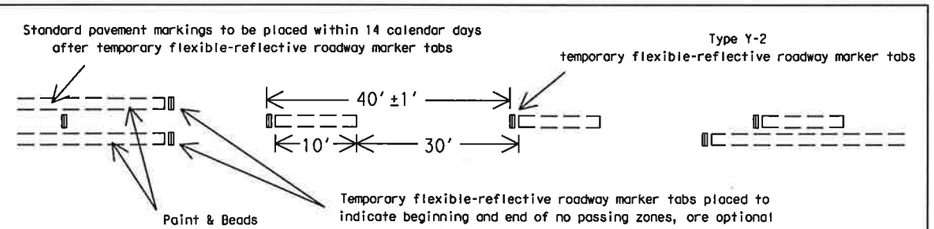


ECW8-7
36"x36"

Legend - Black
Border - Black
Background - Orange Refl.

TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS

for surfacing projects only



GENERAL NOTES

The traffic control devices detailed on this sheet will be furnished and erected as directed by the Engineer on sections of roadway where the surfacing operation has covered or obliterated existing pavement markings. These traffic control devices are to be used to supplement those required by BC Standards.

"DO NOT PASS" SIGN (R4-1) and NO-PASSING ZONES

Prior to the beginning of construction, all currently striped no-passing zones should be signed with the DO NOT PASS sign (R4-1) and PASS WITH CARE sign (R4-2) placed at the beginning and end of each zone for each direction of travel except as otherwise provided herein. Signs marking these individual no-passing zones need not be covered prior to construction if the signs supplement the existing pavement markings.

At the discretion of the Engineer, in areas of numerous no-passing zones, several zones may be combined and signed as a single zone. If passing is to be prohibited over one or more lengthy sections, a DO NOT PASS sign and a NEXT XX MILES sign (R20-1) may be used at the beginning of such zones. The DO NOT PASS and NEXT XX MILES signs should be repeated every mile to the end of the no-passing zone. In areas where there is considerable distance between no-passing zones, the end of a no-passing zone may be signed with a PASS WITH CARE and NEXT XX MILES sign.

Depending on traffic volumes and length of sections, it may be desirable to prohibit passing throughout the project to prevent damage to windshields and lights. The DO NOT PASS and NEXT XX MILES sign should be used and repeated as often as necessary for this purpose. Where several existing zones are to be combined into one individual no-passing zone, the sign at the beginning of the zone should be covered until the surfacing operation has passed this location so as not to have the DO NOT PASS sign conflict with existing pavement markings. Also, unless one days operation completes the entire length of such combined zones, care must be taken to place DO NOT PASS and PASS WITH CARE signs in order to sign the beginning and end of the no-passing zones in the area where the surfacing operation has stopped for the day.

R4-1 and R4-2 signs should be mounted on fixed supports as detailed on BC Standards. These signs are to remain in place until standard pavement markings are placed.

"NO CENTER STRIPE" SIGN (CW21-15)

At the time construction activity obliterates the existing centerline (low volume roads may not have an existing centerline), a NO CENTER STRIPE sign (CW8-12) should be erected at each end of the work area and just beyond major rural intersections and other location deemed necessary by the Engineer. Where possible, the signs erected at each end of the work area should be located in such a manner that drivers can read the sign and immediately see the change to no centerline. The NO CENTER STRIPE sign should be supplemented with the NEXT XX MILES sign (CW21-16) mounted below it.

The NO CENTER STRIPE sign should be erected as detailed on BC Standards. These signs are to remain in place until standard pavement markings are placed.

"LOOSE GRAVEL" SIGN (ECW8-7)

When construction begins, a LOOSE GRAVEL sign (ECW8-7) should be erected at each end of the work area and repeated at intervals of approximately two (2) miles in rural areas and closer in urban areas. The LOOSE GRAVEL sign should be supplemented with the NEXT XX MILES sign (CW21-16) mounted below it.

The LOOSE GRAVEL sign should be erected as detailed on BC Standards. They should remain in place until the loose gravel condition no longer exists.

PAVEMENT MARKINGS

Short term pavement markings for surfacing projects shall use Temporary Flexible-reflective Roadway Marker Tabs. Tabs are to be installed to provide true alignment for striping crews or as directed by the Engineer. Tabs will be placed at the spacing indicated. Tabs should be applied to the pavement no more than two (2) days before the surfacing is applied. After the surfacing is rolled and swept the cover over the reflective strip shall be removed. Tabs shall NOT be used to simulate edge lines.

Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or faxing:

Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD@mailgw.dot.state.tx.us

TYPICAL USAGE:				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	✓

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL DETAILS for SURFACING OPERATIONS

TCP(7-1)-98

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
4-92	CONT	SECT	JOB	HIGHWAY
1-97				
4-98	DIST	COUNTY		SHEET NO.

DATE:
FILE:

DATE:
FILE:

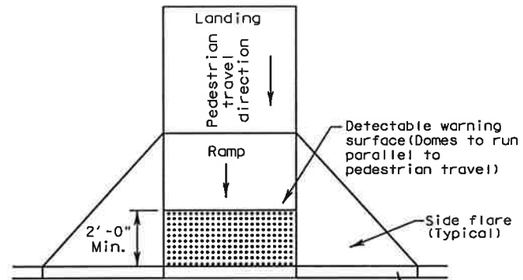
General Notes

Curb Ramps

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Lesser slopes that will still drain properly should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5'x 5' passing areas at intervals not to exceed 200' are required.
4. Landings shall be 5'x 5' minimum with a maximum 2% slope in any direction.
5. Maneuvering space at the bottom of curb ramps shall be a minimum of 4'x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
6. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the current edition of the Texas Accessibility Standards (TAS) and 16 TAC 68.102.
9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5'x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Handrails are not required on curb ramps. Provide curb ramps wherever on accessible route crosses (penetrates) a curb.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Provide a smooth transition where the curb ramps connect to the street.
16. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
17. Existing features that comply with TAS may remain in place unless otherwise shown on the plans.

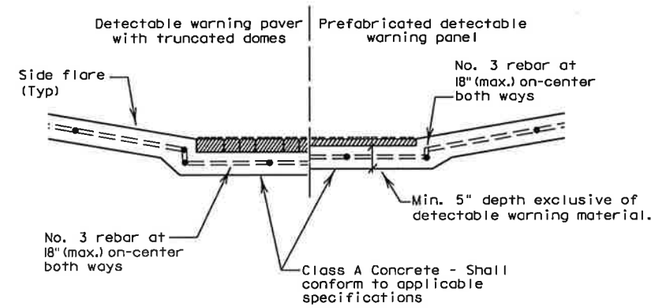
Detectable Warning Material

18. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with Section 705 of the TAS. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
19. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
20. Detectable warning surfaces must be slip resistant and not allow water to accumulate.
21. Detectable warning surfaces shall be a minimum of 24" in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
22. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb. Align the rows of domes to be perpendicular to the grade break between the ramp run and the street. Detectable warning surfaces may be curved along the corner radius.
23. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

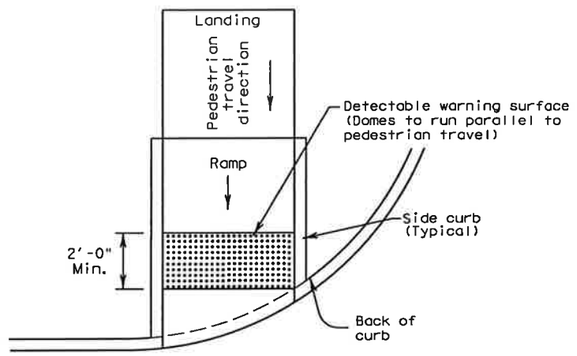


PERPENDICULAR CURB RAMP

Typical placement of detectable warning surface on sloping ramp run.

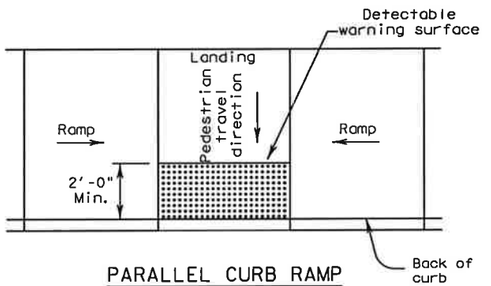


SECTION: CURB RAMP AT DETECTABLE WARNING



DIRECTIONAL CURB RAMP

Typical placement of detectable warning surface on sloping ramp run.



PARALLEL CURB RAMP

Typical placement of detectable warning surface on landing at street edge.

DETECTABLE WARNINGS

SHEET 214 OF 235

Detectable Warning Pavers

24. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
25. Lay full-size units first followed by closure units consisting of at least 25 percent of a full unit. Cut detectable warning paver units using a power saw.

Sidewalks

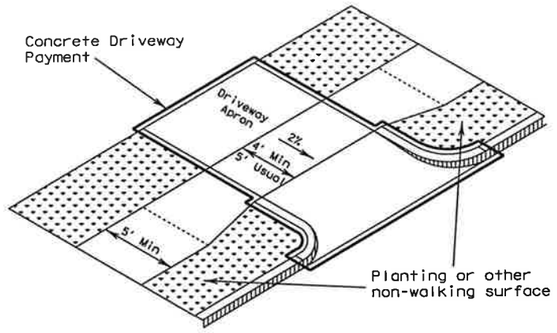
26. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within one or more reach ranges specified in TAS 308.
27. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
28. Street grades and cross slopes shall be as shown elsewhere in the plans.
29. Changes in level greater than 1/4 inch are not permitted.
30. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than 5% must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with TAS 505.
31. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
32. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
33. Sidewalk details are shown elsewhere in the plans.

Texas Department of Transportation | Design Division Standard

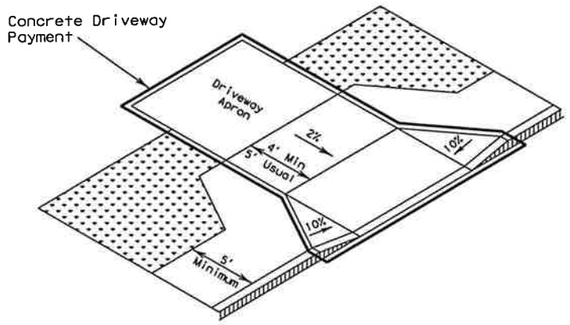
PEDESTRIAN FACILITIES CURB RAMPS

PED-12A

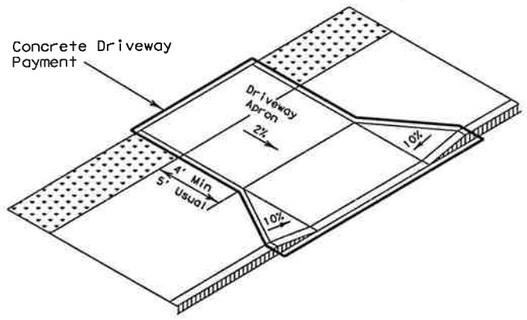
FILE: ped12a.dgn	DN: TxDOT	CK: PK	DW: TxDOT	CK: HD
©TxDOT March 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS VP June 13, 2012	DIST	COUNTY		SHEET NO.



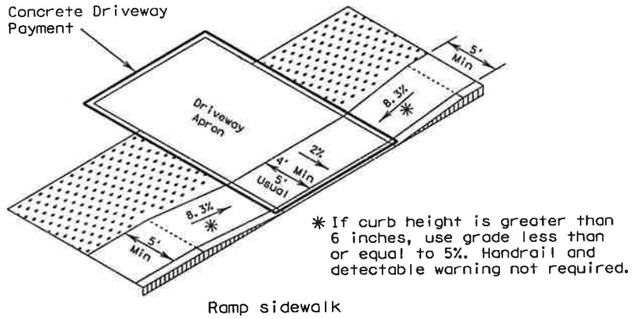
Setback sidewalk



Apron offset sidewalk



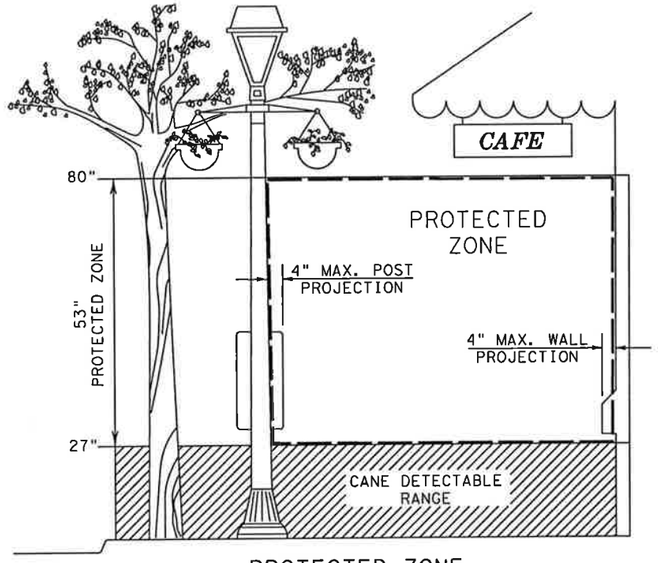
Wide sidewalk



* If curb height is greater than 6 inches, use grade less than or equal to 5%. Handrail and detectable warning not required.

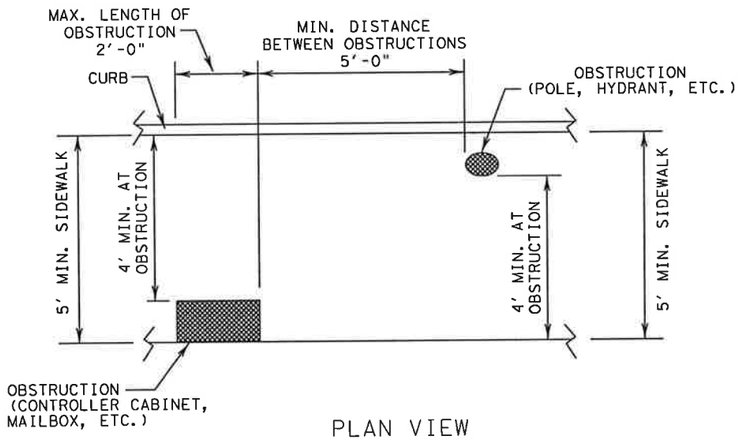
Ramp sidewalk

SIDEWALK TREATMENT AT DRIVEWAYS



PROTECTED ZONE

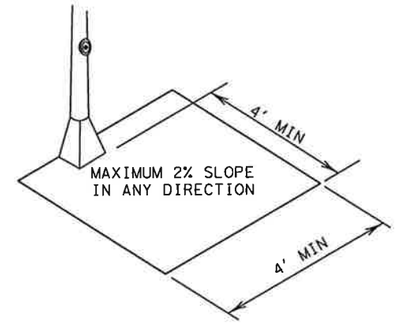
In pedestrian circulation area, maximum 4" projection for post or wall mounted objects between 27"and 80" above the surface.



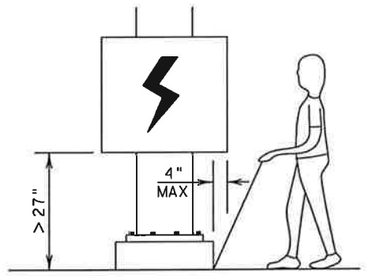
PLAN VIEW

PLACEMENT OF STREET FIXTURES

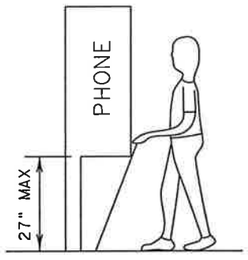
(ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' x 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.)



CLEAR GROUND SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



When an obstruction of a height greater than 27" from the surface would create a protrusion of more than 4" into the pedestrian circulation area, construct additional curb or foundation at the bottom to provide a maximum 4" overhang.



Protruding objects of a height ≤ 27" are detectable by cane and do not require additional treatment.

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

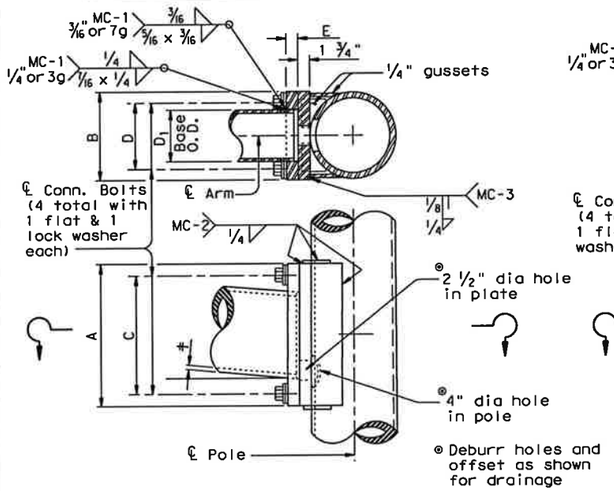
PED-12A

FILE: ped12a.dgn	DN: TxDOT	CK: PK	DW: TxDOT	CK: HD
© TxDOT March 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS VP June 13, 2012	DIST	COUNTY		SHEET NO.

DATE:
FILE:

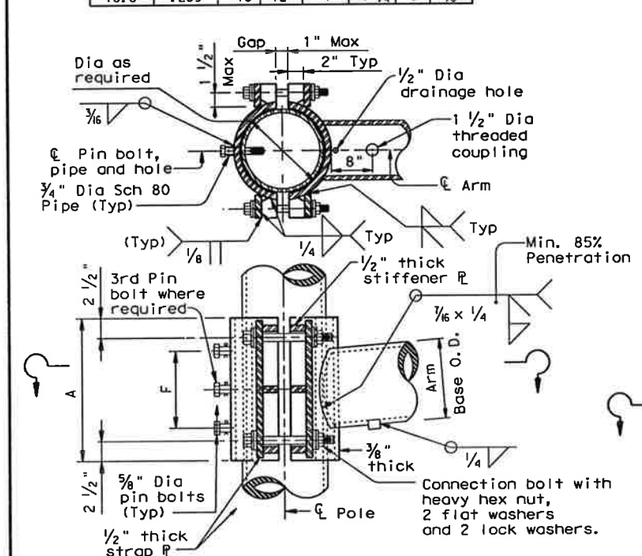
DATE:
FILE:

ARM SIZE D_1	ARM SIZE ∓	A	B	C	D	E	CONN BOLT DIA
in.	in.	in.	in.	in.	in.	in.	in.
6.5	.179	12	9	9	6	1 ¾	1
7.5	.179	13	9	10	6	1 ¾	1
8.0	.179	14	10	11	7	2	1 ¼
9.0	.179	16	11	13	8	2	1 ¼
9.5	.179	17	12	14	9	2	1 ¼
9.5	.239	18	12	15	9	2	1 ¼
10.0	.239	18	12	15	9	2	1 ¼
10.5	.239	18	13	15	10	3	1 ½
11.0	.239	18	13	15	10	3	1 ½



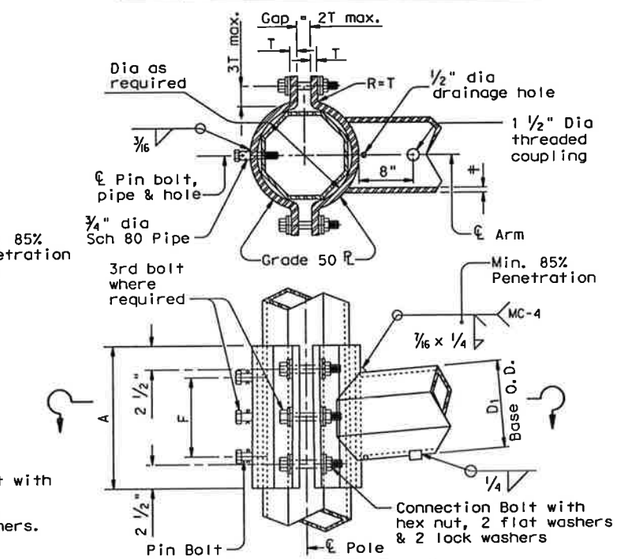
FIXED MOUNT DETAIL 1

ARM SIZE D_1	ARM SIZE ∓	A	F	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	ea.	in.	ea.	in.
6.5	.179	12	6	4	1	2	⅝
7.5	.179	14	8	4	1	2	⅝
8.0	.179	14	8	4	1	2	⅝
9.0	.179	16	10	4	1	2	⅝
9.5	.179	18	12	4	1 ¼	3	⅝
9.5	.239	18	12	4	1 ¼	3	⅝
10.0	.239	18	12	4	1 ¼	3	⅝

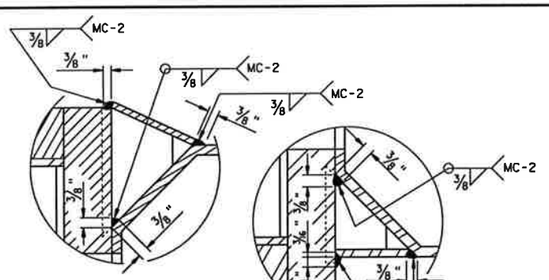


CLAMP-ON DETAIL 1

ARM SIZE D_1	ARM SIZE ∓	A	F	T	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	in.	ea.	in.	ea.	in.
7.0	.179	12	6	¾	4	¾	2	⅝
7.5	.179	14	8	¾	4	¾	2	⅝
8.0	.179	14	8	¾	4	¾	2	⅝
9.0	.179	16	10	⅞	4	1	2	⅝
10.0	.179	18	10	⅞	4	1	2	⅞
9.5	.239	18	10	1	6	1	3	⅝
10.0	.239	18	10	1	6	1	3	⅝

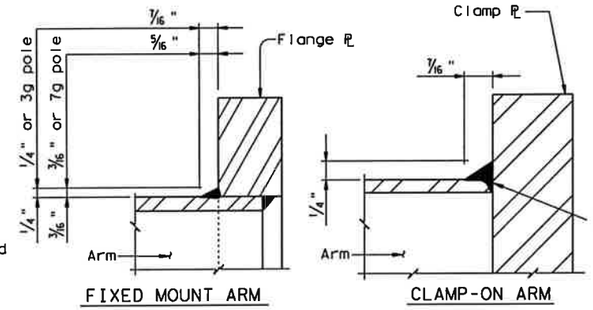


CLAMP-ON DETAIL 2



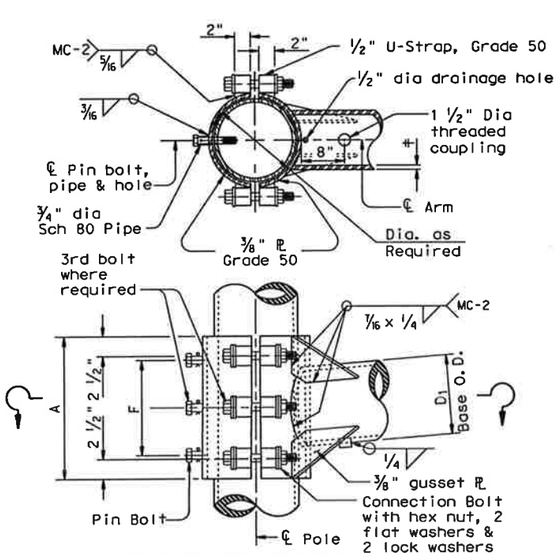
DETAIL A

DETAIL B



ARM BASE WELD DETAILS

ARM SIZE D_1	ARM SIZE ∓	A	F	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	ea.	in.	ea.	in.
6.5	.179	12	6	4	1	2	⅝
7.5	.179	14	8	4	1	2	⅝
8.0	.179	14	8	4	1	2	⅝
9.0	.179	16	10	4	1	2	⅝
9.5	.179	18	12	6	1	3	⅝
9.5	.239	18	12	6	1	3	⅜
10.0	.239	18	12	6	1	3	⅝



CLAMP-ON DETAIL 3

MATERIALS	
Round Shafts or Polygonal Shafts ①	ASTM A595 Gr.A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 ②
Plates ①	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325 or A449, except where noted
Pin Bolts	ASTM A325
Pipe ①	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Misc. Hardware	Galvanized steel or stainless steel or as noted

① ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

② ASTM A1011 SS Gr.50 material shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

SHEET 216 OF 235

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies. A Maximum 1 ½" wide vertical slotted hole shall be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1"

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the detail.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

NOTE:

Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and ¾" dia pipe shall have 7/16" dia holes for a ⅞" dia galvanized cotter pin. Back clamp plate shall be furnished with a ¾" dia hole for each pin bolt. An 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

MAST ARM CONNECTIONS

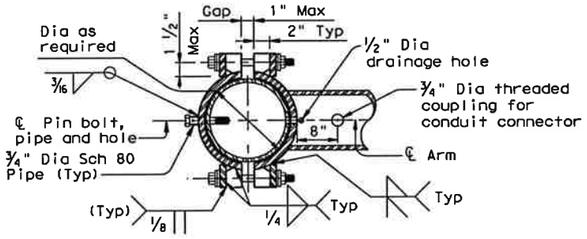
MA-C-12

REVISIONS	DN: MS	CK: JSY	DW: MWF	CK: JSY
5-96	CONT	SECT	JOB	HIGHWAY
5-09				
1-12	DIST	COUNTY		SHEET NO.

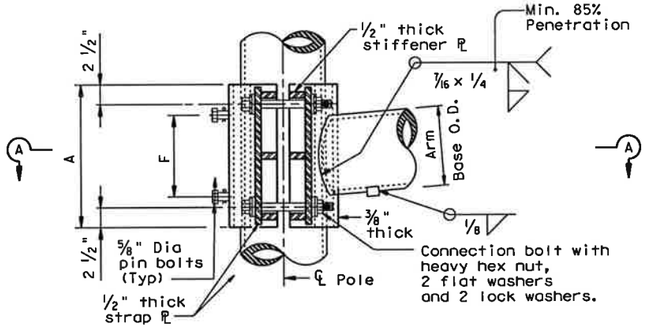
126A

DATE:
FILE:

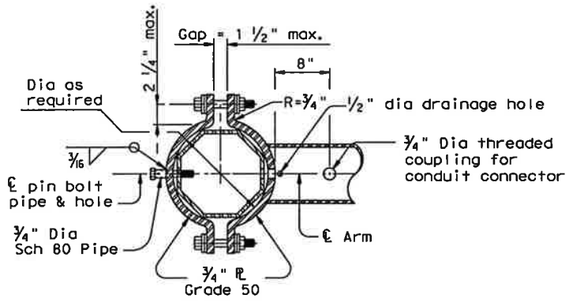
TABLE OF DIMENSIONS for ILSN Support Arm Clamp-on Details 1, 2 and 3						
ILSN ARM SIZE	A	F	CONN. BOLTS		PIN BOLTS	
			No.	Dia	No.	Dia
3 in. dia Schedule 40 Pipe	in.	in.	ea.	in.	ea.	in.
	10	4	4	¾	2	⅝



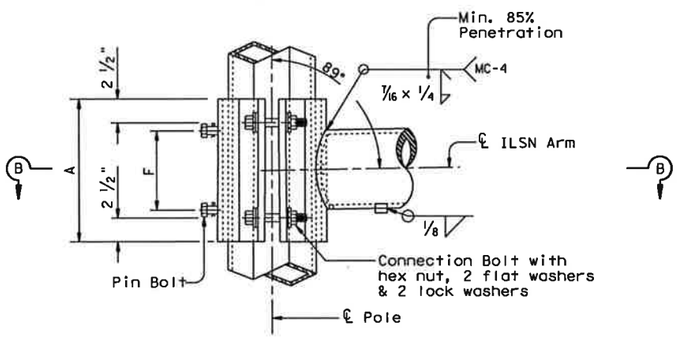
SECTION A-A



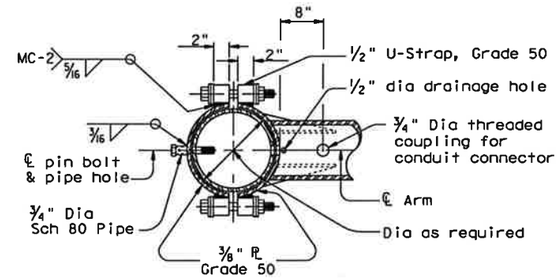
ILSN CLAMP-ON DETAIL 1



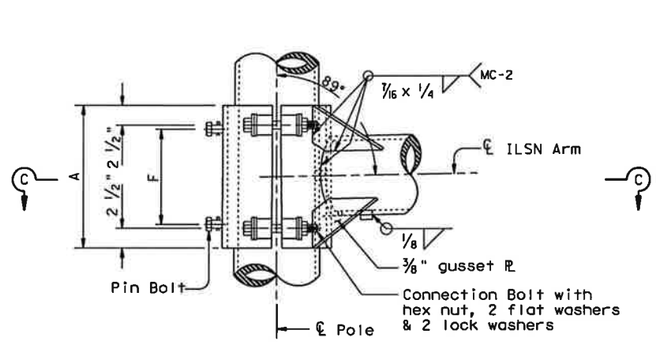
SECTION B-B



ILSN CLAMP-ON DETAIL 2



SECTION C-C



ILSN CLAMP-ON DETAIL 3

GENERAL NOTES:

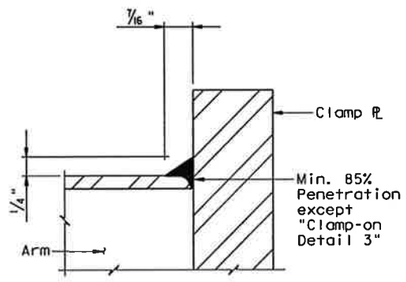
Clamp-on details shall be used for ILSN support arm assemblies. A 1 ½" inch diameter hole shall be cut in the front clamp plate for wiring access. A matched hole shall be field drilled through the pole to provide wire access after arm is oriented. Deburr both holes.

Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the details.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

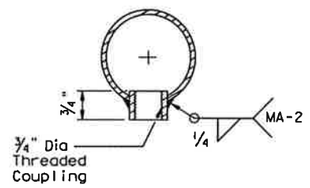
NOTE:

Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and ¾" dia pipe shall have 3/16" dia holes for a 1/8" dia galvanized cotter pin. Back clamp plate shall be furnished with a ¾" dia hole for each pin bolt. An 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.



CLAMP-ON ARM

ARM BASE WELD DETAILS



ILSN ARM COUPLING DETAIL

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

MAST-ARM CONNECTIONS

MA-C(ILSN)-12

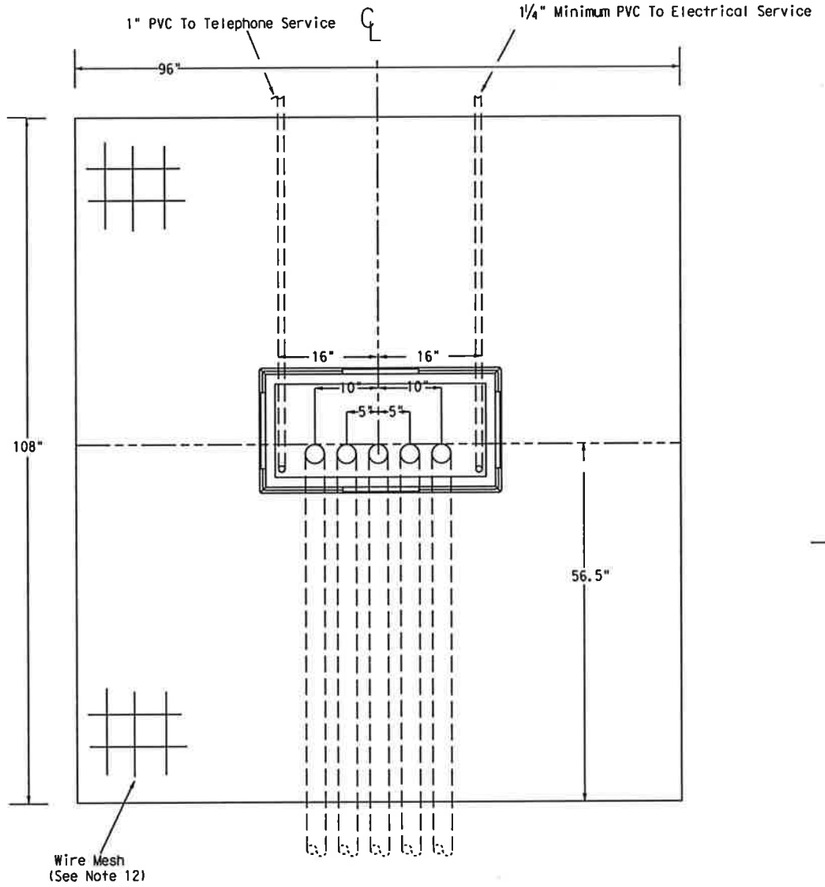
DN: MS	CK: JSY	DW: MMF	CK: JSY
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.

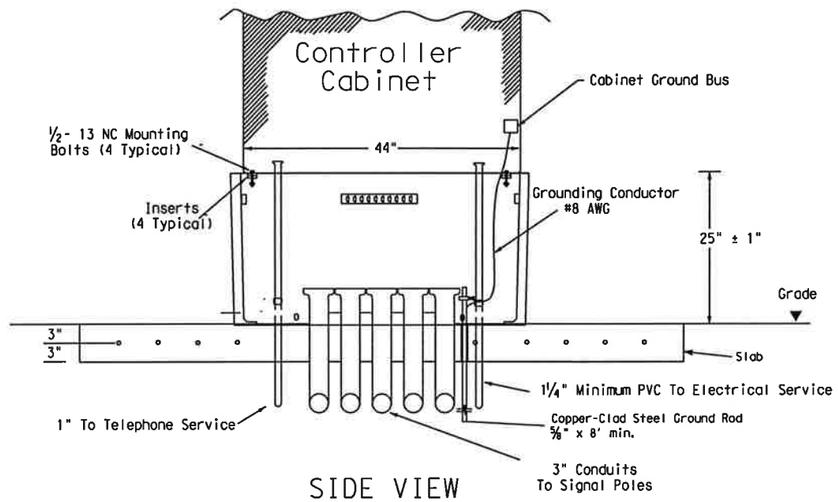
REVISIONS
5-96
1-12

1268

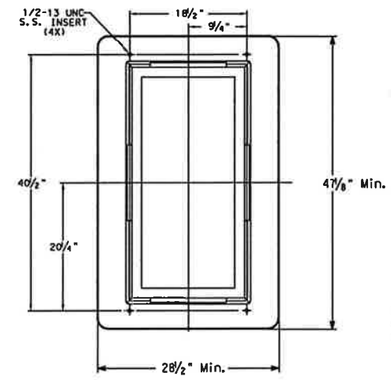
SHEET 217 OF 235

TOP VIEW
(Slab & Base)





SIDE VIEW
(Slab & Base)



CABINET BASE

TRAFFIC SIGNAL CONTROLLER BASE:

1. Provide a traffic signal controller base (cabinet base) manufactured of polymer concrete material consisting of calcareous and siliceous stone; glass fibers and thermoset polyester resin. The polymer concrete cabinet base must be reinforced on the inside of the cabinet base with fiberglass matting. Provide one of the following bases: Armorcast Part # A6001848X24, Quazite Model # PG3048Z709, or other as approved by TxDOT Traffic Operation Division.
2. The polymer concrete material must have a minimum compressive strength of 10,300 pounds per square inch (psi), minimum flexural strength of 3600 psi, and minimum shear strength of 3600 psi.
3. The polymer concrete cabinet base must conform to the dimensions shown and must accommodate a standard TxDOT basemount cabinet.
4. Supply the cabinet base with four ½"-13 UNC stainless steel inserts for attachment of the cabinet to the base. Inserts must withstand a minimum torque of 50 ft-lb and a minimum straight pull out strength of 750 lbs.
5. Provide the cabinet base with 4 cable racks mounted one on each side of the base 2" to 7 " from the top edge of the base. Unless approved otherwise, cable racks must be 1-1/2 x ⅜ x ⅜ inch steel channel with eight T-slots spaced at 1-1/2 inches. The cable racks must easily accommodate the insertion of tie wraps to attach field wiring to the racks to serve as strain relief. Secure cable racks to the base using ½"-13 UNC stainless steel screws and inserts.
6. The cabinet base, when secured to the concrete slab with controller cabinet attached, must withstand a minimum wind load of 125 mph or a 850 lb force applied at 49" above the bottom of the base without causing the base or cabinet to come out of their anchored position or cause any permanent deformation. The manufacturer must supply certification by an independent testing laboratory or sealed by a Texas Licensed Professional Engineer. Provide the cabinet base with hardware for attachment to a concrete slab.
7. The traffic signal base must be permanently marked either by impress or by permanent ink with the manufacturer's model number and name or logo.
8. Seal the base to the concrete with a silicone caulk bead and fastened to the slab per manufacturer's instructions.

CONCRETE SLAB:

9. Traffic signal controller pad must be a portland cement concrete slab poured in place, must conform to the dimensions shown, and must be level.
10. Bond a #8 AWG copper ground wire and an 8 ft ground rod bonded to the reinforcing mesh by a suitable UL Listed clamp and terminated to the cabinet grounding bus for the purpose of providing a local ground for the electrical grounding conductor. The electrical grounding conductor specified in Item 680-3.A.4 is required and must be terminated to the cabinet ground bus.
11. Install a PVC sleeve to prevent the ground rod from direct embedment in the slab.
12. Provide welded wire mesh 6X6-W2.9 X W2.9 for reinforcement. Provide joints and splices in the mesh with a minimum 6-inch overlap. Center the mesh between top and bottom and provide a minimum 3 inch cover on the edges.
13. Provide Class B concrete minimum for the slab in accordance with Item 421. Construct the slab in accordance with Item 531.

CONDUITS:

14. Stub up and run 3-inch conduits through the slab to the various traffic signal poles and ground boxes as shown on the layouts. Install the number of conduits as shown on layouts plus two additional 3 inch conduits for future use. Terminate the conduits with a bushing between 2 and 4-inches above the slab.
15. Extend conduits for future use at least 18-inches from the edge of the slab, terminate underground with a coupling, and cap and seal so that the seal can be removed without damaging the coupling. This must also apply to unused telephone conduit.
16. Stub up two separate conduits through the slab from the electrical and telephone services. Run the conduit for the electrical feed directly to the electrical service enclosure. Run the conduit for the telephone line directly to the telephone service, usually located on the same pole as the electrical service. Telephone must not under any circumstance share a conduit with any other function.
17. Terminate electric and telephone conduits above the slab with a coupling. After the base is installed, extend the conduits above the top of the base and secure to the base using a steel one-hole strap or similar suitable substitute.

CONTROLLER CABINET:

18. Anchor the controller cabinet to the base using four stainless steel 1/2-13 NC bolts.
19. The silicone caulk bead specified in Item 680.3.B must be RTV 133.

PAYMENT:

20. Bid TS-CF as subsidiary to Item 680.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL CONTROLLER CABINET BASE AND PAD

TS-CF-04

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.

12-04 REVISIONS

DATE:
FILE:

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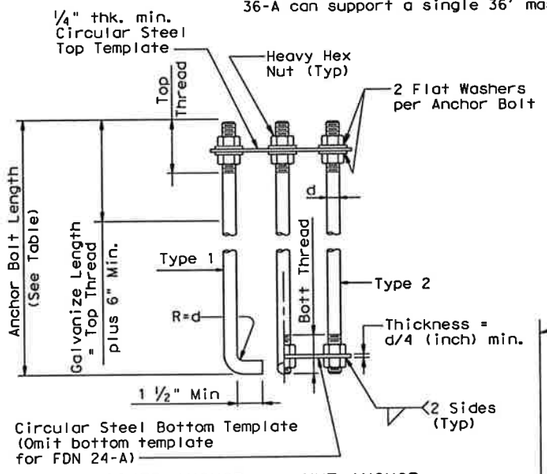
FOUNDATION DESIGN TABLE

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 10	15	40	ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips	
24-A	24"	4- #5	#2 at 12"	5.7	5.3	4.5	¾"	36	12 ¾"	1	10	1	Pedestal pole, pedestal mounted controller.
30-A	30"	8- #9	#3 at 6"	11.3	10.3	8.0	1 ½"	55	17"	2	87	3	Mast arm assembly. (see Selection Table)
36-A	36"	10- #9	#3 at 6"	13.2	12.0	9.4	1 ¾"	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"	15.2	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"	17.4	15.6	11.9	2 ¼"	55	23"	2	271	9	Mast arm assembly. (see Selection Table)

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

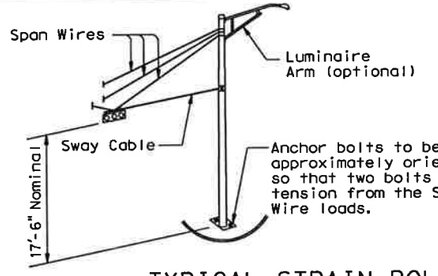
		FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	32'	48'		
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
		28' X 28'			
		32' X 28'	32' X 32'		
			36' X 36'		
			40' X 36'		
			44' X 28'	44' X 36'	
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH		36'	44'	
	MAXIMUM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

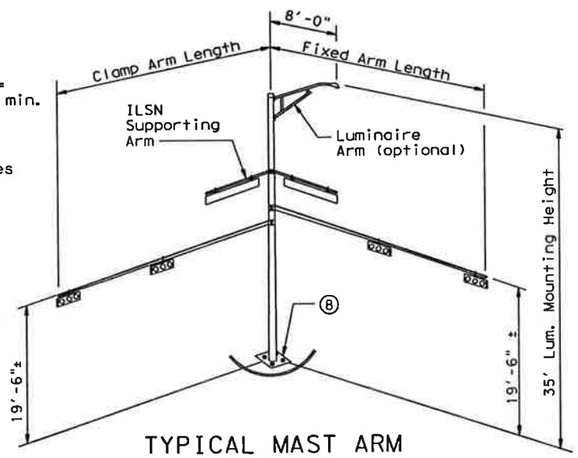


HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY

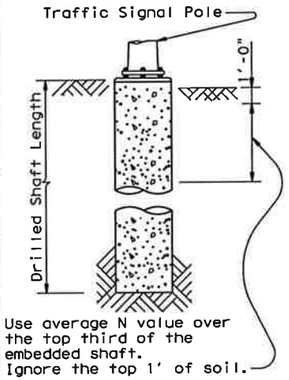


TYPICAL STRAIN POLE ASSEMBLY



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

TYPICAL MAST ARM ASSEMBLY



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.

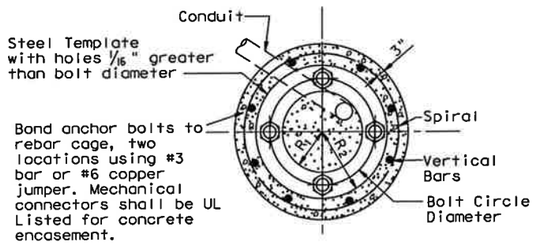
④ Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

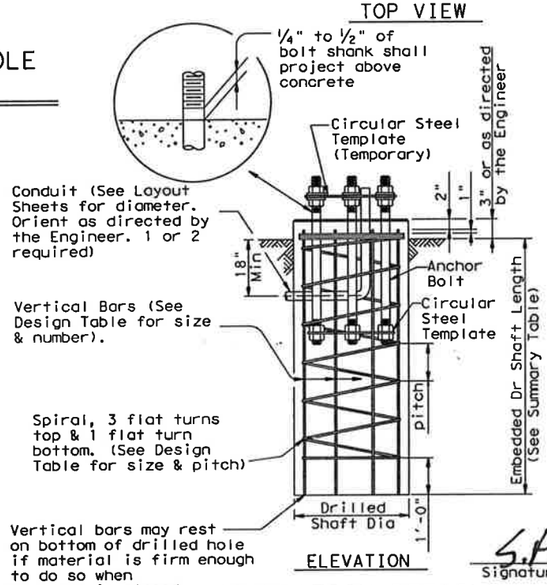
⑤ If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

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

ANCHOR BOLT & TEMPLATE SIZES						
BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

⑦ Min dimensions given, longer bolts are acceptable.





FOUNDATION DETAILS

FOUNDATION SUMMARY TABLE ③

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH ⑥ (FEET) 24-A	30-A	36-A	36-B	42-A
BELT LINE AT								
COMMERCIAL DR	10	30-A	2		11			
SURVEYOR BLVD	10	36-A	1			13		
		30-A	1		11			
RUNYON RD	10	30-A	2		11			
HAWK SIGNAL	10	36-A	2			13		
TOTAL DRILLED SHAFT LENGTHS*					55	39		

* DRILL SHAFT LENGTHS FOR MAST ARM/POLE ASSEMBLIES OVER 48' ARE ON SHEET LMA (5) - 12

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".

SHEET 219 OF 235

STATE OF TEXAS
S. P. BOOTH
94903
LICENSED
PROFESSIONAL ENGINEER

S. P. Booth, P.E. 10/29/13
Signature of Registrant Date

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

© TxDOT August 1995	DN: MS	CK: JSY	DW: MAO/MAF	CK: JSY/TEB
REVISIONS 5-96 11-99 1-12	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.

128

DATE:
FILE:

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FILE:

I. GENERAL REQUIREMENTS FOR ALL ELECTRICAL WORK

The location of all conductors, conduits, junction boxes, ground boxes, and electrical services is diagrammatic only and may be shifted by the Engineer to accommodate local conditions.

Materials shall be new and unused. Materials and installation shall comply with the applicable provisions of the National Electrical Code (NEC), National Electrical Manufacturers Association (NEMA) standards, and shall be Underwriters Laboratories (UL) Listed unless otherwise shown on the plans or specifications or approved by the Engineer in writing. Faulty fabrication or poor workmanship in any material, equipment, or installation shall be justification for rejection. When reference is made to UL, it can be considered to mean a Nationally Recognized Independent Testing Lab (NRTL). Comparable standards of Canadian Standard Association, Electrical Testing Laboratories or Factory Mutual can be equal to the referenced UL standard. Where reference is made to NEMA listed devices, IEC listed devices shall not be considered to be an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing.

With the exception of high strength bolts, miscellaneous nuts, bolts and hardware may be stainless steel when plans specify galvanized, provided that bolts are 1/2 inch or less in diameter. The Contractor shall provide the following electrical test instruments as required by the Engineer to confirm compliance with the contract and the NEC. Those test instruments are voltmeter, amp probe, megger (1000 volt DC) and torque wrenches. All meters shall have been properly calibrated within one year. Calibration certification shall be provided to the Engineer upon request. Calibration certification tag shall also be applied to the meter. The Contractor shall operate meters during inspection as requested by the Engineer. Grounding shall be as shown on the plans and in accordance with the NEC. Metallic conduit, light poles, luminaires on bridge structures, and all metal enclosures shall be bonded to the system-grounding conductor. The ground rod in each ground box or junction box at the bridge ends, and in each ground box installed for underpass lighting will also be bonded to the system grounding conductor. The grounding conductor shall be bare or, if insulated, shall be green. Ground rods, connectors, and bonding jumpers will not be paid for separately, but will be subsidiary to the various bid items.

SUBMITTALS:

The contractor shall submit for approval six (6) copies of catalog cut sheets for each of the following three (3) categories.
Category 1. Electrical services including photocell.
Catagory 2. Breakaway disconnects, heat shrink tubing, heat shrink filler tape, GelCaps and ground boxes which will include loading capacity certification.
Category 3. Highmast assembly kits, when applicable. See Item 614 "Highmast Illumination Assemblies". Submittals shall be legible and shall be marked to indicate which product on a cut sheet is to be supplied. Where manufacturers provide warranties and guarantees as a customary trade practice, the Contractor shall furnish to the State such warranties and guarantees.
Any deviation from plans or specifications, including deviations due to plan error should be prominently displayed on the submittal. Any changes not prominently noted in submittal and incorporated into the work without proper authorization will constitute grounds for rejection of that portion of the work.

II. CONDUIT

A. MATERIALS

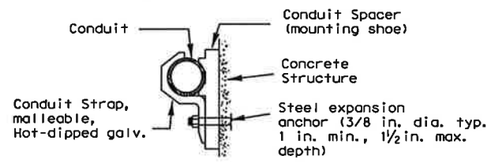
1. Conduit and fittings shall be UL Listed for the intended use shown on plan sheets.
2. Conduit shall be the type shown by descriptive code or shown elsewhere on the plans. Substitution of the various types of conduits will not be permitted. All flexible conduit in rigid metallic conduit (RMC) systems shall be Liquidtight Flexible Metal (LFMC) conduit. All flexible conduit in PVC systems shall be Liquidtight Flexible Non-metallic conduit (LFNC).
3. All exposed conduits shall be RMC, unless otherwise specifically shown on the plans. All metal conduit shall be properly grounded.
4. Couplings, connectors, conduit bodies, grounding bushings, and offset nipples for RMC shall be electro-zinc plated steel or hot dipped galvanized malleable iron, threaded or threadless compression type, rain-tight and shall be UL listed for the intended use.
5. Expansion joints for metal conduit shall be provided with an internal or external bonding jumper and shall be UL listed.
6. Unless otherwise shown on the plans, junction box minimum sizes shall be in accordance with the following table which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes are present, the conductors shall be counted as if all are of the larger size. Situations not applicable to the table shall be sized in accordance with NEC 370-28.

AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

7. RMC system junction boxes equal to or smaller, in any dimension, than 12 x 12 x 6 (HxWxD), surface mounted and containing conductors #8 or larger, shall be hot dipped galvanized cast iron with minimum wall thickness of 3/16 inch, shall have external mounting lugs, and shall be UL listed Crouse-Hinds Type WAB, OZ/Gedney Type YS or approved equal. Unless otherwise shown elsewhere on the plans, RMC system junction boxes larger than the aforementioned boxes but equal to or smaller, in any dimension, than 18 x 18 x 6 (HxWxD) shall be 14-ga. stainless steel; RMC system junction boxes larger than 18 x 18 x 6 (HxWxD) shall be 12-ga. stainless steel. All metal junction boxes shall be equipped with a threaded hole or lug for grounding. Stainless steel boxes 12 x 12 x 6 and larger need not be UL Listed but shall meet the other requirements of the NEC and shall have ribs, stiffeners, or thicker metal and shall have external mounting feet. Junction boxes with an internal volume of more than 100 cu. in. may be supported by connection of two or more rigid metal conduits, where specifically shown on the plans or where approved by the Engineer.
8. Junction boxes containing only #10 or #12 AWG conductors shall be Crouse Hinds Type GRFX, Appleton Type JBOX, two-gang FD, or similar approved cast iron box. Boxes shall be sized according to NEC Table 370-16(a).
9. IMC and EMT conduit shall not be used unless specifically required by the plan layout sheets. Junction boxes in EMT conduit systems shall be made from galvanized sheeting and shall be UL listed and approved for outdoor use, unless otherwise noted on the plans. Sheet metal junction boxes shall be sized in accordance with the NEC. Junction boxes for IMC conduit systems shall meet the requirements of boxes used with RMC systems.
10. Junction boxes in PVC conduit systems shall be PVC, intended for outdoor use, unless otherwise noted on the plans.
11. Elbows in PVC conduit systems one inch and larger shall be rigid metal, with the exception of traffic signal systems which may have PVC elbows instead of rigid. If any part of the rigid metal elbow is buried less than 18 inches underground the elbow and rigid metal extension shall be grounded. Grounding shall be accomplished by means of a grounding bushing installed on the extension. Unless specifically shown on the plans, rigid metal elbows containing, or entering ground boxes containing only communications conductors, loop detectors, or other low voltage power limited circuits need not be grounded unless a ground wire is present in the conduit or ground box. The rigid metal elbows located in concrete foundations may be extended with PVC conduit and need not be grounded provided that the end of the elbow nearest the end of the conduit run exiting the foundation is at least 2 inches below the concrete. RMC elbows will not be eliminated. RMC elbows will not be paid for directly, but will be subsidiary to various bid items.
12. High-Density Polyethylene (HDPE) conduit shall meet the requirements of Item 622, Duct Cable, except that the HDPE conduit, when bid under Item 618, Conduit, shall not contain factory installed conductors. Fittings for HDPE conduit shall be UL listed as an electrical conduit connector or shall be thermally fused using an electrically heated wound wire resistance welding method. HDPE conduit may be substituted for bored schedule 40 or schedule 80 PVC conduit. When such substitution is made, bored HDPE shall be schedule 40 of the size PVC being replaced. The HDPE conduit shall transition to PVC (or RMC elbow when required) at the bore pit. Size and schedule shall be as shown on the plans. Substituted conduit may not be extended to ground boxes or foundations; RMC elbows shall be installed at ground boxes and foundations. RMC elbows will not be eliminated.
13. All conduit support hardware including straps, nuts, bolts, screws, retaining anchors and washers shall be hot dipped galvanized or stainless steel. Strut type conduit straps shall be stainless steel or hot dipped galvanized. Strut type straps need not be made of malleable type material. Stamped-cadmium plated straps will not be allowed. Straps having only one mounting hole shall not be allowed for use on conduits 2 inches and larger with the exception of electrical service poles where stainless steel standoff straps will be allowed. Two piece conduit straps designed to be used with a mounting shoe shall be installed only with the correctly sized shoe.

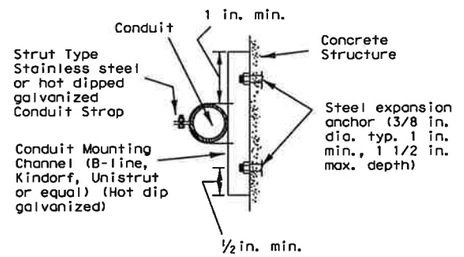
B. CONSTRUCTION METHODS

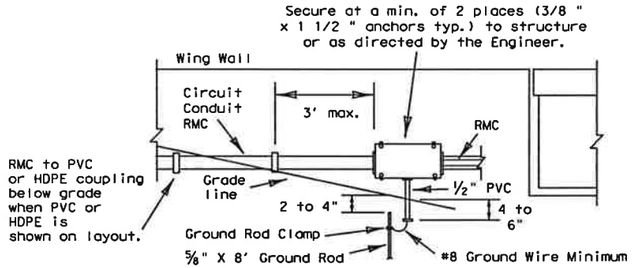
1. Conduit in structures shall have expansion fittings at structure expansion joints. All straight runs of RMC conduit exposed on structures such as bridges shall have expansion joints installed at maximum intervals of 150 feet. Expansion joints shall be installed so they allow for movement of the conduit. Installation of the joint in such a manner that will not allow for movement shall be repaired at no expense to the state. The method of determining the final setting length of the expansion joint shall be provided to the Engineer upon request.
2. Conduit supports shall be spaced at maximum intervals of 5 feet. Conduit spacers shall be used with metal conduit placed on surfaces of concrete structures (See conduit mounting options).
3. Conduit supports shall not be attached directly to prestressed concrete beams except as shown specifically in the plans and approved by the Engineer.
4. Unless otherwise shown on the plans, conduit placed beneath existing roadways, driveways, or sidewalks, or after the base or surfacing operation has begun, shall be accomplished by jacking or boring. The Contractor shall back fill and compact the bore pits to the bottom of the conduit prior to installing connecting conduit or duct cable to prevent bending of the connection.
5. Conduit trenched in the subgrade of new roadways shall be backfilled with excavated material, unless otherwise noted on the plans. Conduit trenched in the sub-base of new roadways shall be backfilled with cement-stabilized base.
6. Open ends of all conduit and raceways shall be fitted with temporary caps or plugs to prevent entry of dirt, debris and rodents during construction. The temporary cap may be constructed of duct tape, but in all cases shall be tightly fixed to the conduit and shall be durable. The contractor shall clean out the conduit and prove it clear in accordance with Standard Specifications Item 618.3 prior to installing any conductors.
7. Conduit entry into the top of enclosures such as safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes shall be made weatherproof using conduit sealing hubs, or threaded bosses.
8. A bonding jumper shall be installed from each grounding bushing to the nearest grounding rod, grounding lug, and/or equipment grounding conductor. All jumpers shall be the same size as equipment grounding conductor. Conduit used as casing under roadways for duct cable need not be grounded if duct extends full length through the casing. At electrical services, grounding electrode conductor shall be a solid Copper #6 AWG.
9. Metal junction boxes shall be bonded to the grounding conductor in accordance with the NEC.
10. Conduits entering ground boxes shall be placed so that the conduit ends shall be not less than 3 inches nor more than 6 inches from bottom of box (See ground box detail on sheet ED(3).
11. Conduit ends shall be sealed with heat shrink boots with waterproof sealant, urethane foam, or by other methods approved by the Engineer. Sealing shall be done after completion of any required pull tests. Duct tape shall not be used as a permanent conduit sealant. Silicone caulking shall not be used as a sealant.
12. All strut mounting material and hardware shall be hot-dip galvanized or shall be stainless steel. The cut ends of strut and non-galvanized rigid metal conduit threads shall be cooted with a zinc rich paint (90% or more zinc content). Zinc rich paint may only be used to touch up galvanized material as allowed under item 445.6 galvanizing. The painting of non-galvanized material with a zinc rich paint shall not be considered as an approved alternative for galvanized materials.
13. All PVC conduit terminations shall be fitted with bushings or bell ends. All metal conduit terminations shall be fitted with a grounding type bushing.



CONDUIT MOUNTING OPTIONS

(Attachment to concrete surfaces)
(See para. II.B.2)

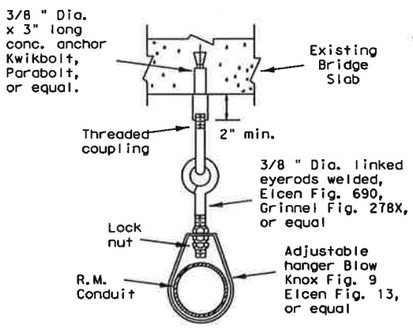




TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL

NOTES

1.) Ground rod clamp to be UL listed for direct burial.
2.) For conduit placed in structure, use flush-mounted box.
3.) Bond junction box and metal conduits to equipment grounding conductor and grounding electrode conductor using listed connector.
4.) Seal all conduits entering the junction box from underground.
5.) Install bell end or bushing on 1/2 " PVC conduit both ends.
6.) Ground rod to be driven within 8 inches of 1/2 inch PVC conduit end.



CONDUIT HANGER DETAIL

(Attachment to horizontal surfaces)
Hangers need not be UL listed for electrical use
ie: plumber pipe hangers are acceptable

5/03 Revision

1 Revised notes.

Texas Department of Transportation
Traffic Operations Division

ELECTRICAL DETAILS-CONDUIT

ED(1)-03

REVISIONS
4-98
12-00
3-03
5-03

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.

71A

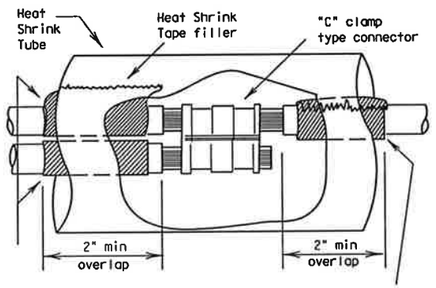
I. ELECTRICAL CONDUCTORS

A. MATERIALS

1. Insulated conductors shall be NEC Type XHHW. Insulated conductors shall be color coded in accordance with the NEC, articles 200, 250, and 310; i.e. Insulation of grounded conductors (neutrals) shall be white. Grounding conductors (ground wires) shall be bare or insulation shall be green. Insulation of ungrounded conductors (hots) shall be any color except green, white, or gray. Identification of conductors #6 American Wire Guage (AWG) and smaller shall be by continuous jacket color. Color coding of electrical conductors #4 AWG and larger shall be either by continuous color jacket or by colored tape. Colored tape marker shall consist of a half-lap of tape covering a 6-inch length of conductor.
2. Where two or more circuits are present in one conduit or enclosure, the conductors of each circuit shall be identified by a permanent non-metallic tag at each accessible location. The tag shall be fastened to the conductors by two plastic straps. Each tag shall indicate circuit number, letter, or other identification shown in the plans.
3. Grounding electrode conductor #6 AWG for bonding to ground rod at electrical service, shall be solid. Connection of conductor to ground rod shall be made using UL Listed connectors designed for such purposes.
4. Heat Shrink Tape filler shall be used to seal the ends of heat shrink tubing around two or more conductors that are insulated with heat shrink tubing. Tape material shall have a minimum dielectric strength of 225 volts per mil and shall be cross-linked butyl rubber. Tape shall be supplied in rolls and shall have a backing (release paper) to prevent the tape from sticking to itself.
5. Heat shrink tubing shall be heavy wall, UL listed for 600 volts or greater and shall have factory applied internal sealant.
6. GelCaps shall be UL listed for 600-volt applications. GelCap shall have see-through elastomer molded cover. Cover shall be filled with high dielectric insulating gel silicone sealant to provide waterseal. Cover shall be held in place by snap-lock, molded clamp made of UV stable polypropylene.
7. Splicing materials, insulating materials, breakaway disconnects, GelCaps and fuse holders will not be paid for directly but shall be subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. After conductors have been installed in conduit, a pull test shall be made on conductors. When any length of conductor cannot be freely pulled, the Contractor shall make any needed alterations or repairs at no expense to the State.
2. The Contractor shall perform insulation resistance tests in accordance with Item 620, "Electrical Conductors." The Contractor shall coordinate with the Engineer to witness the tests.
3. A sufficient length of conductor for making up connections shall be left in ground boxes (2 feet minimum, 3 feet maximum, to point of splice, 3 feet minimum, 4 feet maximum, when conductor is pulled through with no splice), enclosures, weatherheads and pole bases (1 foot minimum, 1.5 feet maximum).
4. Splices shall be made only in junction boxes, ground boxes, pole bases, or electrical enclosures and shall be made with listed compression or screw type pressure connectors, terminal blocks, bolted lugs, or split bolt connectors. Splices shall be insulated with heavy wall heat shrink tubing or GelCaps and shall be made so as to provide a watertight splice. Heat shrink sleeve shall overlap conductor insulation a minimum of 2 inches on both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, the Contractor shall increase the diameter of the conductors insulation using heat shrink filler tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Tape shall be visible after completion of all splices. Where filler tape is used but not visible, the Engineer shall approve each individual splice by conducting a physical inspection of each splice. When it appears the tubing has been burned, or overheated the tubing shall be considered to be defective and shall be replaced.
5. GelCaps when used in place of heat shrink method of splicing, shall be sized and installed according to manufacturer's specifications. (Raychem GelCap and GelCap SL or equal.)
6. Wire nuts may be used for #8 AWG or smaller conductors in above-ground junction boxes, but not in pole bases or ground boxes. Wire nuts shall be positioned upright to prevent the accumulation of water. Wire nuts used at these locations shall have factory applied waterproof sealant.
7. Conductors in illumination poles shall be supported by a J-hook in the top of the pole.
8. All conductors bid under Item 620 "Electrical Conductors" shall have breakaway electrical disconnects installed anytime conductors pass through a break-away support device.
9. For terminating the conductors, insulation-jacketing material shall be removed in such a manner as to not nick any of the individual strands of the conductor. When individual conductor strands are removed, the conductor shall be considered to be damaged.
10. When a conductor or cable has been damaged, or fails to pass an insulation resistance test, the conductor shall be replaced.
11. Duct tape, black electrical tape, or wire nuts shall not be used in the repair of a damaged conductor.
12. For terminations, no more than one wire may be installed under a single pressure connector, unless the device is listed for more than one wire.
13. Conductors connected to break-away in line fuse holders must be installed in accordance with the specific manufacturer's installation instructions. Where threaded connections are made, they shall be properly torqued. Where crimp type connections are made, crimps shall be made using properly sized crimping pliers. Proper conductor terminations are critical to the safe operation of break-away devices.
14. Waterproofing boots shall be properly trimmed to fit snugly around the conductor so as to provide a water proof connection. No more than one wire may enter a single opening in any one boot. Water proofing boots must provide the correct number of openings. Where only one wire is to be connected to a boot, the boot may not be a two wire type.

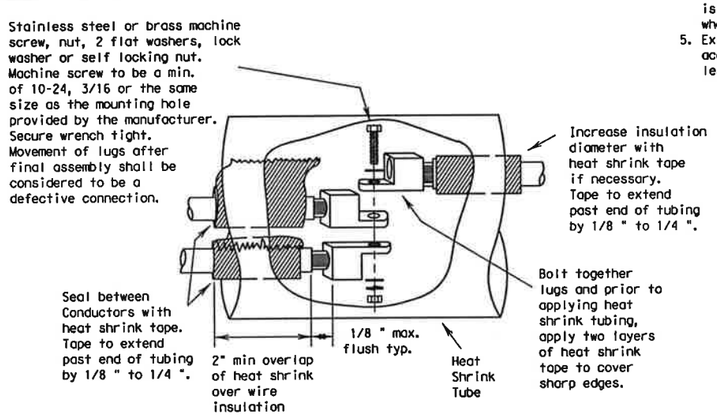


Seal between Conductors with heat shrink tape. Tape to extend past end of tubing by 1/8 " to 1/4 ".

Increase insulation diameter with heat shrink tape if necessary. Tape to extend past end of tubing by 1/8 " to 1/4 ".

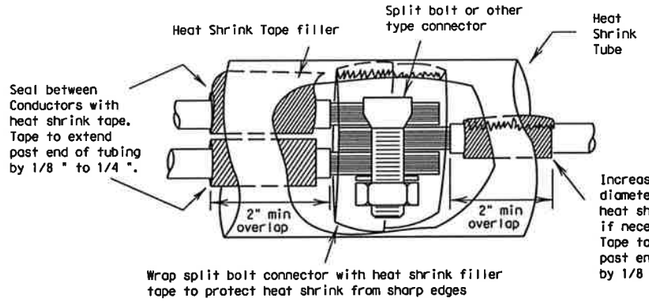
SPLICE OPTION 1

C-CLAMP



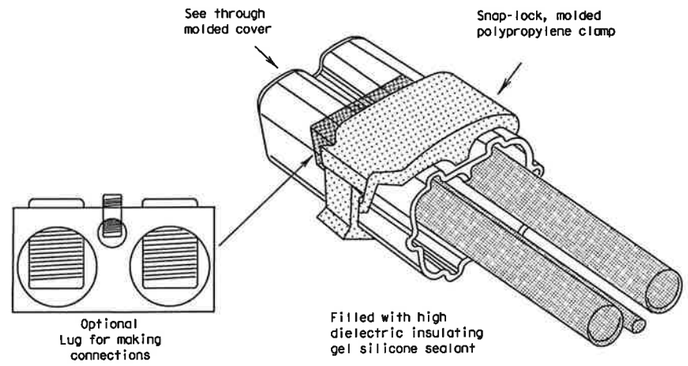
SPLICE OPTION 2

BOLTED WIRE LUGS



SPLICE OPTION 3

SPLIT BOLT



SPLICE OPTION 4

GELCAP

GelCap shall be sized and installed according to manufacturers specifications

15. All conduits that contain circuit wiring of 50 volts or more shall contain an equipment grounding conductor (EGC). Conduit for traffic signals shall have an EGC, with a minimum size of #8 AWG stranded. Unless otherwise shown on the plans, the EGC for all other conduits shall be the same AWG size as the largest current carrying conductor contained in that conduit. The EGC shall be paid for item 620-Electrical Conductors.

C. TEMPORARY WIRING

1. Temporary conductors and electrical equipment to provide power for utilization equipment, shall be installed in accordance with the NEC article 305. All temporary wiring materials and methods shall comply with the standard sheets. All power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade, supplied from a utility power source, shall be provided with a ground fault circuit interrupter.
2. Residual current protective devices (GFCI) may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.
3. Where wire nuts are approved for temporary wiring, they shall be of the self-sealing type.
4. All conductor splices must be contained within a listed enclosure, ground box or the splices will be more than ten feet above grade vertically and more than five feet horizontally from any metal structure. Where temporary conductors are installed in any area that is likely to be subjected to vehicle traffic, or mobile construction equipment, the vertical clearance to ground shall be at least 18 feet when measured at the lowest point. Where power conductors are to be supported by a span wire, the span wire shall be properly grounded.
5. Existing conduit containing service conductors uncovered during the construction process shall be repaired in a timely manner in accordance with the NEC. Existing non-metallic conduit exposed during construction shall not be left exposed above grade, or with less than eighteen inches of cover, without protective methods approved by the Engineer.

Texas Department of Transportation
Traffic Operations Division

ELECTRICAL DETAILS-CONDUCTORS

ED(2)-03

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
10-93
4-98
12-00
3-03

CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.

71B

DATE:
FILE:

II. GROUND RODS

A. MATERIALS

1. All ground rods installed at electrical services, including supplemental lightning protection ground rods specified by the plans in other locations such as pole bases, shall be copper clad and UL listed. Rods shall be a minimum diameter of 5/8 inch. The length shall be a minimum of 8 feet. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets.
2. Ground rod clamps shall be listed to be in direct contact with the soil. Where concrete encasement is required, the clamp shall be listed for concrete encasement.

B. CONSTRUCTION METHODS

1. Ground rods installed in locations such as pole bases, to provide supplemental lightning protection need not be totally in contact with the soil. Where called for in the plans, rods may be encased in soil or concrete or any combination of soil and concrete. When concrete encased, the connection of the conductor to the rod shall be readily accessible for inspection or repairs. When driven into the soil the upper end shall be between 2 to 4 inches below finished grade. Ground rods shall not be placed in the same drilled hole as a timber pole.
2. Ground rods shall be installed such that the end imprinted with the rod's part number is installed as being the upper end.
3. Non-conductive coatings such as concrete splatter shall be removed from the rod at the clamp location.
4. Routing of lightning protection ground rod wires shall be run as short and straight as possible. Where bends are required they shall have a minimum radius of four inches.
5. Unless specifically called for by the plans, conduits used for ground rod wires shall be non-metallic. Where metal conduits are specified, a grounding bushing and properly sized bonding jumper shall be provided and properly installed on each end.
6. Where rocky soil or a solid rock bottom is encountered when driving a ground rod and the horizontal trench placement method is the only viable solution, written authorization from the Engineer must be obtained.

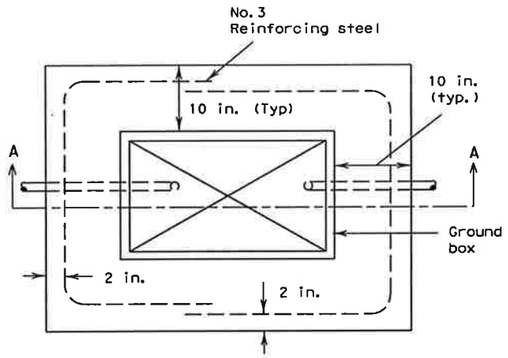
III. GROUND BOX

A. MATERIALS

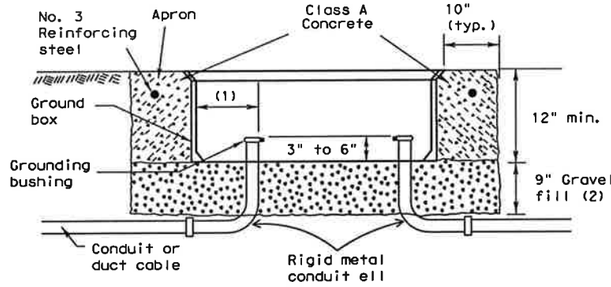
1. Ground boxes 16x30x24 inches (WxLxD) or smaller shall be polymer concrete of the type required by the descriptive code shown elsewhere. Larger ground boxes shall be as shown elsewhere in the plans.
2. All ground boxes and covers shall be permanently marked either by impress or by permanent ink, with manufacturer's model number and manufacturer's name or logo.
3. Covers shall be bolted down, and bolt holes in the box shall be arranged to drain dirt.
4. Ground box Types A, B, C, D & E shall meet the following requirements:
   a. Ground boxes and covers be manufactured from polymer concrete reinforced with continuous strands of woven or stitched borosilicate fiberglass cloth. The polymer concrete shall be made from catalyzed polyester resin, sand and aggregate, and shall have a minimum compressive strength of 11,000 psi. Polymer concrete containing chopped fiberglass or fiberglass reinforced plastic is not acceptable.
   b. Minimum inside dimensions shall be as follows (width x length x depth):
      Type A shall be 11.5 inches x 21 inches x 10 inches, (122311)
      Type B shall be 11.5 inches x 21 inches x 20 inches, (122322)
      Type C shall be 15.25 inches x 28.25 inches x 10 inches, (162911)
      Type D shall be 15.25 inches x 28.25 inches x 20 inches, (162922)
      Type E shall be 11.5 inches x 21 inches x 16 inches, (122317)
   c. Bottom edge of box or extension shall be footed with a minimum 1 1/4 inch flange.
   d. Ground boxes shall withstand 600 lbs. per sq. ft. applied over the entire sidewall with less than 1/4 inch deflection per foot length of box. Ground boxes and covers shall withstand a test loading of 20,000 lbs. over a 10 inch by 10 inch area centered on the cover with less than 1/2 inch deflection. Ground boxes and covers shall meet Western Underground Standards 3.6. Manufacturer shall supply certification by an independent laboratory or sealed by a Texas-Licensed Professional Engineer.
   e. Covers shall be 2 inch (nominal) thick polymer concrete. All hardware shall be stainless steel. Cover shall be secured with two 1/2 inch stainless steel bolts. Bolts shall be self-retaining and shall withstand a minimum of 70 ft-lbs. torque and shall have a minimum 750 lbs. straight pull out strength. Nuts shall be floating and shall provide a minimum of 1/2 inch movement from the center of the nut. Covers shall be skid resistant, minimum 0.5 coefficient of friction. Covers shall be interchangeable between manufacturers and shall conform to the dimensions shown herein. Unless otherwise approved by the Engineer, cover shall be legibly imprinted with the following words in minimum 1 inch letters:
      Ground Boxes containing wiring for traffic signals shall be labeled, Danger High Voltage Traffic Signal.
      Ground boxes containing wiring for illumination systems shall be labeled, Danger High Voltage Illumination.
      Ground boxes containing wiring for traffic management systems shall be labeled, Danger High Voltage Traffic Management.
      Ground boxes containing wiring for sign illumination systems shall be labeled, Danger High Voltage Sign Illumination.
      Ground boxes containing wiring for traffic signals that also contain illumination, powered by the signal electrical service, shall be labeled, Danger High Voltage Traffic Signal.

B. CONSTRUCTION METHODS

⚠1
1. Ground boxes shall be set on a 9 inch (minimum) bed of aggregate from 3/4 " up to 2" in size. Aggregate shall be in place prior to setting box and conduits shall be capped. Any gravel or dirt in conduit shall be removed.
2. When required by Item descriptive code, construction of an apron encasing a ground box including concrete and reinforcing steel shall not be paid for directly but shall be subsidiary to the ground box. Reinforcing steel may be field bent. Concrete for aprons shall be considered miscellaneous concrete for testing purposes. Aprons shall be cast in place.
3. Conduit holes may be cut in the walls of type B & D boxes at least 18 inches beneath the cover.
4. If, within the limits of this project, the Contractor must utilize an existing ground box equipped with a metal cover, the Contractor shall bond the cover to the grounding conductor with a 3 foot long flexible stranded jumper the same size as the grounding conductor. Connection of bonding jumper to metal ground cover shall not be paid for directly but shall be subsidiary to various bid items. The box(es) must be clearly shown on the plans with plan notes fully describing the work required.
5. If there are other ground boxes with metal Covers within the project limits but not involved in the contract, the Engineer may direct the Contractor to ground the covers, designating and identifying the specific boxes in writing. This work will be paid for separately.
6. Termination to metal ground box covers shall be made using a tank ground type lug.



PLAN VIEW

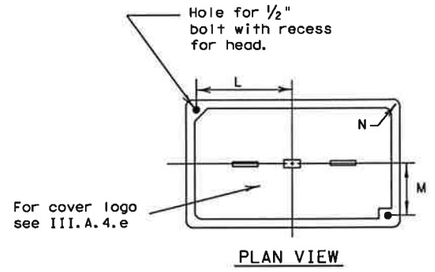


SECTION A - A

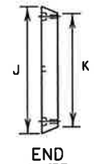
APRON FOR GROUND BOXES

(Where required)

(1) Final position of end of conduit shall not exceed one-half the distance to the side of box opposite the conduit entry.
(2) Place gravel "under" the box. not "in" the box. Gravel should not encroach on the interior volume of the box.
(3) Install bushing on the upper end of all ells.
(4) Where a ground rod is present in the ground box, connect it to any and all equipment grounding conductors using a listed connector.
(5) Maintain sufficient space between all conduits so as to allow for proper installation of bushings.
(6) All conduits shall be installed in a neat and workmanlike manner.
(7) All conduits installed in the ground box shall be sealed after completion of conductor installation and any required pull tests. Silicone shall not be used as sealant.



PLAN VIEW



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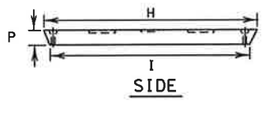

SIDE

GROUND BOX COVER

GROUND BOX COVER DIMENSIONS								
BOX	DIMENSIONS (INCHES)							
SIZE	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 1/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2

5/03 Revision

⚠1 Revised notes.

Texas Department of Transportation
Traffic Operations Division

ELECTRICAL DETAILS- GROUND BOXES

ED(3)-03

REVISIONS
4-98
12-00
3-03
5-03

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.

71C

DATE:
FILE:

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DATE:
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ELECTRICAL SERVICES NOTES

All work, materials, services, and incidentals, whether or not specifically shown on the plans, which may be necessary for a complete and proper electrical service installation as specified in the plans to obtain electrical power shall be paid for, performed, furnished and installed by the Contractor. The Contractor shall contact the Utility for metering and shall comply with all Utility requirements.

Primary line extensions, connection charges, meter charges, and other charges by the Utility company to provide power to the location shown, when required, shall be paid for under force account work. The costs associated with these charges shall be approved by the Engineer prior to engaging the Utility company to do the work. The Contractor shall consult with the appropriate Utility to determine costs and requirements, and shall coordinate the Utility's work as approved by the Engineer. The Contractor shall be reimbursed only the amount billed by the Utility. No additional amount for supervision of the Utility's work will be paid.

Materials shall be new and unused, materials and installation shall comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards and shall be Underwriters Laboratories (UL) Listed. Electrical Service conduits, conductors, disconnects, contactors, circuit breaker panel sizes, and branch circuit breakers, shall be as shown in the Electrical Service Data elsewhere in the plans. Faulty fabrication or poor workmanship in any material, equipment, or installation shall be justification for rejection.

The Contractor shall submit for approval no less than six (6) copies of catalog cut sheets on electrical service materials. Submittals shall be legible and shall be marked to indicate which product on a cut-sheet is to be supplied. Where manufacturers provide warranties and guarantees as a customary trade practice, Contractor shall furnish to the State such warranties or guarantees.

The Contractor shall provide locks keyed with Master #2195 for all lockable electrical enclosures. Keys and locks become property of the State. Unless otherwise approved by the Engineer, enclosures shall not be energized until locks are provided and all bolts are installed.

Circuit directories, where provided, shall be filled out. All breakers and components in shop built panels and enclosures shall be labeled with duo-colored plastic labels. Letters shall be a minimum 3/8 " in height.

Enclosures with external disconnects that de-energize all equipment inside the enclosure, need not have dead front trim, except that incoming line terminations shall be protected from incidental contact.

When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used. All wiring and components shall be rated for 75 degrees C. Minimum size for service entrance conductors shall be #6 XHHW.

I. Safety Switch. A safety switch, placed ahead of the meter, shall only be used when specified by the Utility and when shown on the Electrical Service Data. The switch shall be UL Listed, heavy duty type, 600 volt, unfused, with a UL type 3R enclosure and equipped with a solid neutral (s/n) assembly. The switch shall be padlockable in the "on" position.

II. Service Type. Electrical service types A, C, D, and T shall be as schematically detailed on ED(4) or ED(5). Other service types shall be as detailed elsewhere on the plans.

III. Branch Circuit Breakers. Circuit breakers shall be thermal magnetic and have a minimum interrupting capacity of 10,000 amps and a voltage rating compatible with their use. Circuit breakers shall be sized as shown in the electrical service data. Circuit breakers in panelboards and load centers shall be full size and designed exclusively for the panelboard or load center in use. Tandem and half-width breakers shall not be used. All circuit breakers shall be permanently and clearly marked identifying the circuit or device supplied. Circuit breakers shall be UL Listed to UL489.

IV. Circuit Breaker Panelboard. Panelboards shall be UL Listed. Panelboards shall have copper busses, a minimum of 6 one-pole spaces or as required in the electrical service data, and when required will be rated for service equipment. Enclosure shall meet or exceed UL type 3R classification. Panelboards shall have a threaded hub conduit entry for conduit entering the top of the enclosure. Circuit breakers shall be bolt-in type only.

V. Circuit Breaker Load Center. Load centers shall be UL Listed.
Load centers for type T services may have copper or aluminum busses, all other load centers will be copper bus only. Load center will have a minimum of 4 one-pole spaces, and shall be rated for service equipment. Enclosure shall meet UL type 3R classification. Load centers shall have a threaded hub conduit entry for conduit entering the top of the enclosure. Circuit breakers shall be plug-in type only. Load centers for type T services shall accomodate a maximum of 6 one-pole breakers.

VI. Separate or Auxiliary Enclosure. Separate enclosures for HOA, photocell and lighting contactors for types D & T Services shall be a UL Listed assembly with outer door. Interior shall have dead front trim. HOA switch operator shall extend through the dead front trim. Photocell shall be mounted inside the enclosure as described in paragraph XIII when required by descriptive code. Separate enclosures shall meet the construction requirements of paragraph VIII. E, except that separate enclosure shall not have external operating handle, need not have a data pocket and door may latch at only one point. All equipment may be located in one enclosure instead of two, when approved by the Engineer.

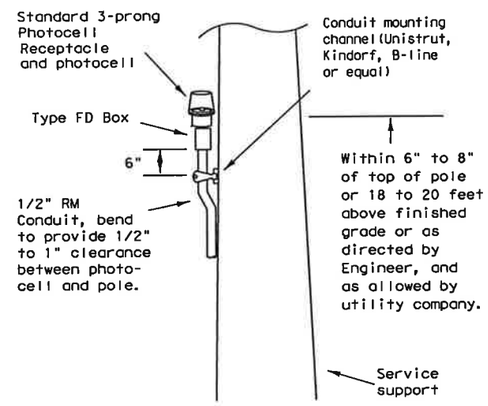
VII. Where a Type D or T service is provided, laminated "as built" drawings are required as shown on ED(5) VIII E; shall be delivered before completion of the work, to the Engineer in lieu of placement within these smaller enclosures. Conduit may not enter the back wall of a service enclosure penetrating the equipment mounting panel. Provide grounding bushings on all metal conduits, terminate bonding jumper to grounding bus. Grounding bushing is not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss such as a meter base.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

ELEC SERV TY X (XXX/XXX) XXX (XX) XX (X) XX (X)

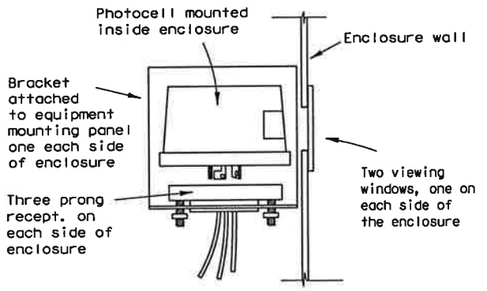
- Schematic Type
- Service Voltage (V / V)
- Disconnect Amp Rating (000 indicates main lug only)
- SS= Safety switch ahead of meter
  NS= No switch ahead of meter and/or no meter required
- Enclosure Type
  GS= Galvanized steel (see ED(5)VIII,D)
  SS= Stainless steel
  AL= Aluminum
- Photocell Mounting Location
  T= Top of pole
  E= Inside service/separate enclosure
  L= Luminaire mounted
  N= None
- Service Support Type
  GC= Granite concrete
  OC= Other concrete
  TP= Timber pole
  SP= Steel pole
  SF= Steel frame
  OT= Pole by others or paid for separately
  EX= Existing pole
  TS= Switch gear to be placed on traffic signal pole
  RT= Rectangular structural tubing
  PS= Pedestal Service (see ED(5)VIII,G)
- O= Overhead service
  U= Underground service

Example: ELEC SERV TY A(240/480)100(NS)SS(E)GC(O)



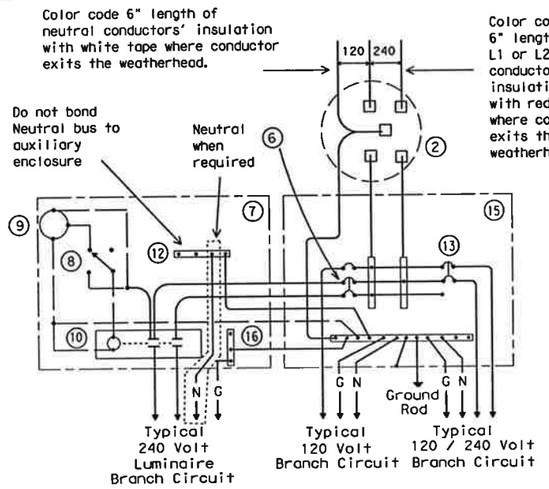
TOP MOUNTED PHOTOCELL

Conduit support spacing 3 feet from enclosure; 5 feet max.



ENCLOSURE MOUNTED PHOTOCELL

For photocell specifications see ED(5),XIII.



SCHEMATIC TYPE T

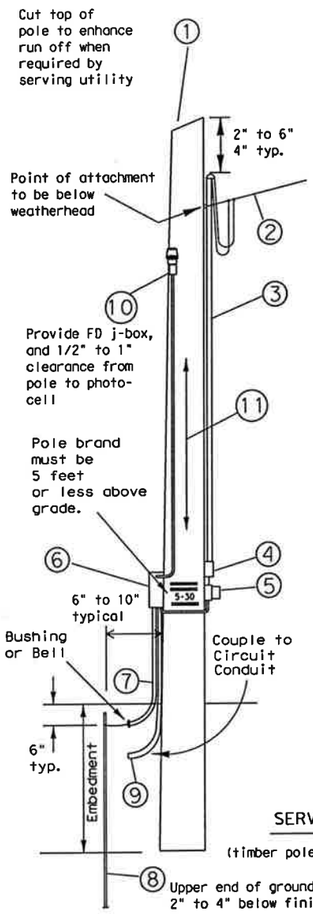
120/240 VOLTS - THREE WIRE

Install photocell and lighting contactor when shown on Electrical Service Data.

SCHEMATIC LEGEND

1 - omitted
2 - Meter (when required)
3 - Service Assembly Enclosure
4 - Main Disconnect Breaker (Not Used)
5 - Omit
6 - Circuit Breaker, 15 Amp typical for control circuit wiring
7 - Auxiliary Enclosure
8 - Control Station ("H-O-A" Switch)
9 - Photo Electric Control (enclosure-mounted shown)
10 - Lighting Contactor
11 - Power Distribution Terminal Blocks (Not Used)
12 - Neutral Bus required when 120 v. lights are controlled by lighting contactor
13 - Branch Circuit Breaker (See Electrical Service Data)
14 - Circuit Breaker Panelboard (Not Used)
15 - Load Center
16 - Ground Bus

——— Power Wiring
– – – Control Wiring
—N— Neutral Conductor (when required-to serve 120 v. loads only)
—G— Equipment grounding conductor-always required



1 - Class 5 pole, height as required
2 - Service drop from utility company (attached below weatherhead)
3 - Service conduit and service entrance conductors (RMC) (See Electrical Service Data)
4 - Safety switch (when required)
5 - Meter (when required)
6 - Service enclosure
7 - No. 6 bare grounding electrode conductor in 1/2 " PVC to ground rod - extend 1/2 " PVC 6" underground.
8 - 5/8 " x 8' Copper clad ground rod - drive ground rod completely underground unless otherwise approved by the Engineer.
9 - RM conduit - same size as branch circuit conduit.
10 - Photocell and conduit - if top mounted. (See Electrical Service Data)
11 - When required by the serving utility provide bare #6 awg copper conductor. Run wire from pole top to butt wrap or copper butt plate. Protect conductor to a height of 8 ft above finish grade.

LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

(If applicable)

- Liquidtight flexible metal conduit, may be used when meter and service enclosure are mounted 90 to 180 degrees to each other. Size shall be same as service entrance conduit.
- LFMC shall not exceed 3 ft. and shall be securely supported within one ft. of each end. No strap required for LFMC shorter then 12"
- Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting.
- A neutral conductor must be installed within the LFMC.
- Bend in liquidtight flexible metal conduit shall not exceed 180 degrees.
- A pull test is required on all installed conductors, at least six inches of free conductor movement shall be demonstrated to the satisfaction of the Engineer.

SERVICE SUPPORT TYPE TP (O)

(timber pole, overhead service, typical arrangement)

8 Upper end of ground rod to be 2" to 4" below finished grade

TIMBER POLE NOTES

1. Conduit and electrical conductors attached to the electrical service pole and underground within 12 inches of service pole shall not be paid for directly but shall be subsidiary to the service pole.
2. Pole top mounted photocell, install on north side of pole or in service enclosure as required. See Electrical Service Data.
3. Attach meter and service equipment with stainless steel or galvanized channel (Unistrut, Kindorf, or equal). Gain pole as required to provide flat surfaces for each strut. Paint ends of galvanized channel with zinc rich paint. Gain depth 5/8" max. Gain height 1 7/8" max. Strut to be 1" max. deep, and 1 5/8" wide max. Secure each strut section to timber pole with two galvanized or SS lag bolts, 1/4" diameter min. by 1 1/2" length min. Place flat cut galvanized or SS washer on each lag bolt. Gain pole in a neat and workmanlike manner.
4. Embedment depth shall be as required in Item 627 Treated Timber Poles.
5. Poles trimmed for excess length shall be trimmed from the top end only.

Texas Department of Transportation
Traffic Operations Division

ELECTRICAL DETAILS- SERVICE SCHEMATICS AND SUPPORT-TYPE TP (OVERHEAD)

ED(4)-03

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.

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3-03

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SHEET 223 OF 235

DATE:
FILE:

SERVICE ENCLOSURE NOTES

VIII. Service Assembly Enclosures. All service assemblies and enclosures shall be UL Listed for the intended purpose.

A. Shop built or shop assembled service assemblies (all types except Type T and Type D without lighting contactor or enclosure mounted photo cell) and all auxiliary equipment enclosures mounted with service equipment and paid for as part of Item 628, "Electrical Services", shall be built or assembled by a UL Listed Industrial Control Panel shop and shall have a unique serial numbered UL Label with the words "LISTED ENCLOSED INDUSTRIAL CONTROL PANEL". The same or an additional label shall have the name, location, and phone number of the shop, the UL file number of the shop, the shop order or drawing number, date of manufacture or assembly, and the line voltage. The service assembly enclosure shall also be labeled "SUITABLE ONLY FOR USE AS SERVICE EQUIPMENT".

B. Conduit entries into the top of enclosures shall have threaded hub. Conduit entries through the equipment mounting back plate will not be allowed.

C. All service enclosure front doors shall be permanently labeled "DANGER HIGH VOLTAGE". Label shall be a self sticking type, intended for outdoor installation. Lettering style, layout and colors of red, black and white shall be as required by OSHA. Label letters shall be 1 to 1 1/2 inches high or as high as the enclosure door width will permit for smaller services. Separate or auxiliary lighting enclosures need not be OSHA labeled when mounted in the same viewing plane as the service enclosure front door. Where only one type of load is served by the service, the service door shall be marked using duo-colored plastic labels or self adhesive vinyl weather resistant labels, minimum of 1 inch high; applied in a neat and workmanlike manner. On the label will be the service number shown on the plans as well as identifying the load served specifically (i.e. lighting, landscaping, signals, traffic management or other wording as directed by the Engineer). Safety switches need not be OSHA labeled unless specifically required by the serving utility.

D. Type GS enclosures will only be allowed for service Types D and T without an enclosure mounted photocell and/or lighting contactor and the Type C panelboard. This spec will allow an "off the shelf" product meeting these specifications to be used. Type GS enclosures shall be made from pre-galvanized steel sheeting, hot dipped galvanized steel, or powder coat painted steel unless shown differently on the plans. Steel enclosures shall be painted inside and outside; galvanized enclosures may be painted. Unless otherwise approved by the Engineer, painted enclosures shall be gray, beige, white or light green. Panelboard/loadcenter enclosures shall meet UL type 3R requirements, shall have a dead front trim, and an outer padlockable door preventing unauthorized persons from operating contained equipment. Galvanized steel is no longer allowed for Types A,C,or custom-built D or T enclosures. If GS is shown in the descriptive code for any of these, an AL shall be provided.

E. Type AL enclosures for service Types A and C shall meet UL type 3R requirements and shall also meet additional requirements of this paragraph. The enclosure shall have both a main disconnect remote operator handle and a door latch handle. Die-cast handles are not acceptable. The main disconnect remote operator shall be flange-mounted, shall interlock the door when in the "on" position, and shall be padlockable in both the "on" or "off" positions. Door latch shall latch at two or more points, operate by a handle separate from disconnect switch and be capable of being locked. Door closure clamps will not be allowed. Lock must be keyed to Master #2195. All the enclosures shall have either a continuous stainless steel piano hinge with stainless steel pin or enclosures less than 30 inches may have two heavy duty hinges, those over 30 inches must have three. Heavy duty two and three point hinges shall have a 0.185 inch minimum diameter electro-zinc plated steel pin or a stainless steel pin. Two point hinged doors shall be rated for 56 lbs of loading. Three point hinged doors shall be rated for 70 lbs of loading. The door shall have an attached data pocket constructed of either thermoplastic or metal. Pocket shall be 12" x 12", unless that size will not fit in enclosure. The pocket shall then be as large as possible, as approved by the Engineer, and mechanically attached with stainless steel nuts and bolts, or stainless steel or aluminum rivets. Enclosure shall include an equipment mounting panel installed inside the enclosure on collar studs or tapped bosses, and constructed of a minimum 12 guage galvanized steel. Equipment mounting panels shall not be painted. Enclosure shall have factory installed external mounting feet. Enclosure door shall be capable of opening at least 130 degrees, with arm or other approved means to hold the door open. Only the enclosure exterior will be primed and painted. Paint color shall be beige or gray and shall be powder coat paint as shown below. Condensation drainage shall be provided in the bottom of the enclosure before leaving the factory. The Contractor shall prepare and submit a schematic drawing unique to an individual service. The approved drawing shall be laminated and placed in the document pocket of the service at the time of shipment to the job site. All applicable wiring diagrams and plan sheet layouts for all equipment and branch breaker circuits supplied by that service shall also be laminated and placed in the document pocket prior to shipping. Type AL enclosures for Type D and T services with enclosure mounted photocell and/or lighting contactor shall have the loadcenter interior mounted in an enclosure with properly adopted dead front trim. Types D and T shall not have a loadcenter exterior "can" mounted inside another enclosure meeting these specifications. (Do not put one enclosure inside another enclosure). Types D and T with enclosure mounted photocell and/or lighting contactor shall meet the additional requirements of this paragraph except that remote-operating handle will not be provided.

F. Type SS enclosures for Type A and C shall meet all the requirements above for their respective type AL. Type SS enclosures for D and T shall meet all the requirements above for their respective type AL. Stainless Steel shall not be painted.

G. PS enclosure shall be as detailed and specified on ED(8). Galvanized steel will not be allowed for any pedestal service. If GS is shown in the descriptive code an AL will be provided.

IX. Powder Coat Paint. Powder coating shall be either a polyester thermosetting resin, a zinc rich primer with a TGIC (triglycidyl isocyanurate) powder overcoating, or a zinc-rich epoxy powder, applied by either electrostatic spray or fluidized bed immersion, high temperature oven cured, high density, low gloss, 4 mil thick (minimum), coating. Adhesion shall meet the 5A or 5B classifications of ASTM D3359. Finish shall be uniform in appearance and free of scratches.

X. Main Disconnect. Main disconnect device shall be a circuit breaker, as specified in the Electrical Service Data, shall be two or three pole, and rated for the voltage and amperage specified. Circuit breaker shall be an UL Listed thermal-magnetic circuit breaker controlled by flange-mounted remote operator in the service assembly enclosure when required. Circuit breakers shall have a minimum interrupting rating of 10,000 Amps. When the utility company provides a transformer larger than 50 KVA, Contractor shall verify that the available fault current is less than the circuit breaker amps interrupting capacity (AIC) rating and shall provide documentation from the Utility to the Engineer. Documentation shall be submitted at the same time as other electrical submittals. Circuit breaker shall be UL Listed to UL489. No backfed breakers will be allowed for use as a main disconnect.

XI. Control Circuit. Control circuit protection shall be 15 amp circuit breaker.

XII. Control Station ("H-O-A" Switch). Control station shall be a maintained-contact, three position selector switch in an UL type enclosure. Switch shall be rated 600 volts and shall be fitted with "Hand-Off-Auto" legend.

XIII. Photo Electric Control. Photo electric control shall consist of a photocell, internal lightning arrester, and relay or bimetallic switch mounted inside a weatherproof enclosure with standard 3-prong twist lock photocell plug and receptacle. The enclosure shall be made of poly-acrylic with clear acrylic window. Enclosure chassis shall be molded thermosetting plastic. The photocell shall have a polyethylene gasket, and shall have a hermetically sealed cadmium sulfide cell. The arrester shall have an enclosed type expulsion arrester rated 2.0 kV sparkover with 5,000 amps follow-through. Relay or switch shall be time delay type with normally closed contacts. Photo electric control shall be rated a minimum of 1800 VA, voltage as required. Enclosure mounted photocells shall be the same as above except that the photocell shall be mounted inside the enclosure. The enclosure shall have two acrylic paned windows, or other material approved by the Engineer, one on each side of the enclosure. Each window shall be rectangular approximately one inch by two inches, round 2 inch diameter, or as otherwise approved by the Engineer. Bracket and photocell's receptacle will be mounted inside enclosure next to each window. Except for window side, 2" of clearance is required on all sides of photocell for ease of replacement. The photocell's receptacle is held in place by two mounting screws on bracket and located next to each window of the enclosure. The 3-prong twist lock photocell shall be mounted in a position to receive light from the window closest to the photocell. The photocell shall be mounted in a position to receive light from one window. Top of pole mounted photocells shall be mounted as shown on ED(4). The Contractor shall be responsible for proper operation of the photo-electric control. The Contractor shall move and/or adjust or shield the photocell from stray or ambient nighttime light or shall make any other adjustments required for proper operation. The photocell shall face North when practicable. Unless otherwise shown on the plans, the photocell shall turn on the illumination system at 1.0 +(-) 0.5 footcandle and turn off the illumination system at two footcandles higher than turn on.

XIV. Lighting Contactor. Lighting contactor shall be a UL Listed NEMA rated lighting contactor, two-pole or multipole as required, electrically held type designed to control high pressure sodium lighting loads, with silver alloy double break contacts rated at 240 volts, 480 volts or 600 volts as required. Lighting contactor shall not be the DIN rail mounted type.

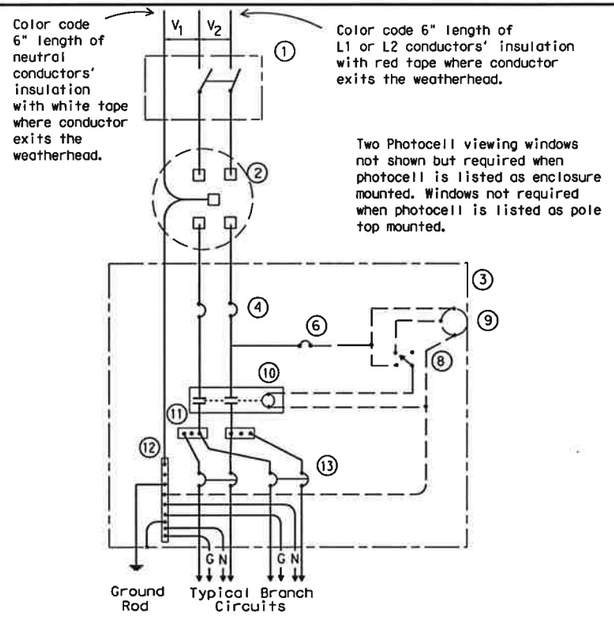
XV. Power Distribution Terminal Blocks. Power distribution terminal blocks shall be rated for 600 volts and shall be used for line side connections to branch circuit breakers where more than one circuit breaker is required. Lugs on blocks shall be properly sized for conductors being used. Only one conductor shall be placed under each lug.

XVI. Neutral/Ground Bus. Neutral/ground bus shall be a factory made bus permanently bonded to the enclosure with properly sized lugs for grounding and neutral conductors.

SCHEMATIC LEGEND

1 - Safety Switch (when required)
2 - Meter (when required)
3 - Service Assembly Enclosure
4 - Main Disconnect Breaker (See Electrical Service Data)
5 - Omit
6 - Circuit Breaker, 15Amp
7 - Auxiliary Enclosure
8 - Control Station ("H-O-A" Switch)
9 - Photo Electric Control (enclosure-mounted shown)
10 - Lighting Contactor
11 - Power Distribution Terminal Blocks
12 - Neutral/Ground Bus
13 - Branch Circuit Breaker (See Electrical Service Data)
14 - Circuit Breaker Panelboard (See Electrical Service Data) (If Type C is shown as AL or SS on descriptive code, this is the service assembly enclosure only. Panelboard enclosure is GS unless otherwise noted.
15 - Load Center

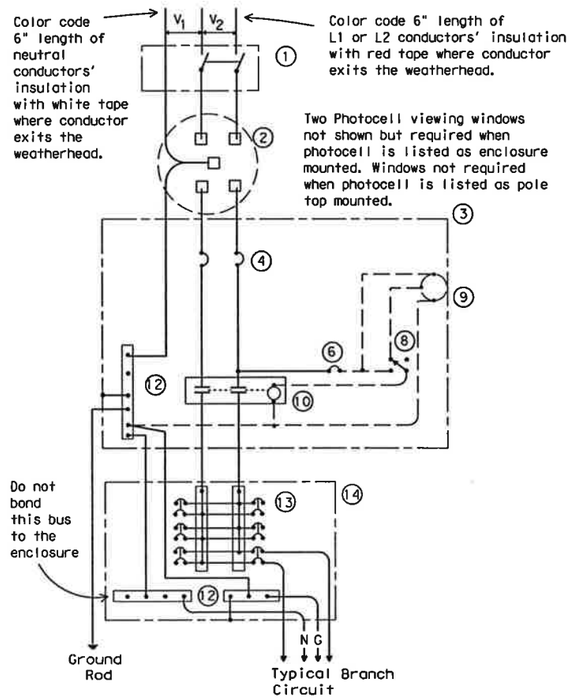
———— Power Wiring
– – – – Control Wiring
——N—— Neutral Conductor (when required) serve 120 v. loads only)
——G—— Equipment grounding conductor-always required



SCHEMATIC TYPE A

THREE WIRE

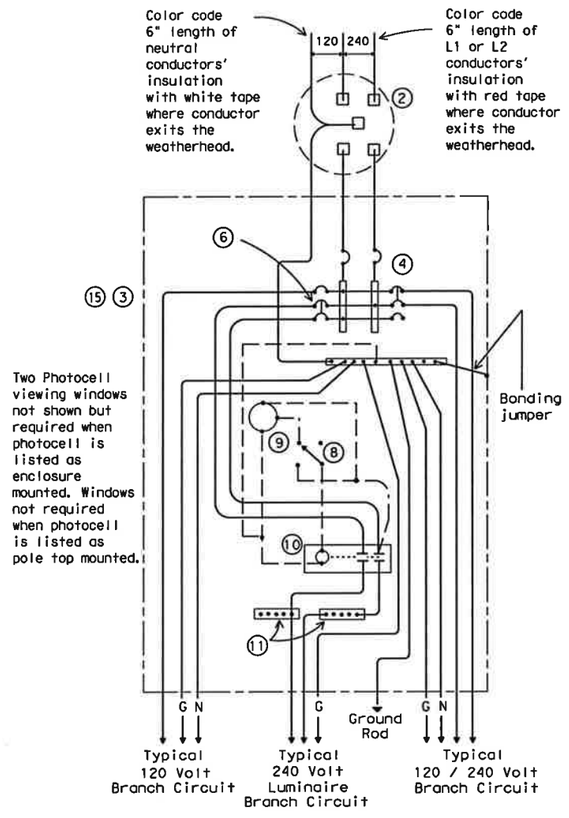
[Maximum feeder circuit size (High Mast Poles): 100 amps for two pole 480V, 125 amps for one or two pole 120V or 240V. Maximum branch circuit size: 50 amps.]



SCHEMATIC TYPE C

THREE WIRE

[Maximum feeder circuit size (High Mast Poles): 100 amps for two pole 480V, 125 amps for one or two pole 120V or 240V. Maximum branch circuit size: 50 amps.]



SCHEMATIC TYPE D

120/240 VOLTS - THREE WIRE

[Install photocell and lighting contactor when shown on Electrical Service Data. See Type D service notes.]

TYPE D SERVICE NOTES

Photocell and lighting contactor shall be located either in the same UL type 3R enclosure with load center or, if approved by Engineer, in separate enclosure. There shall be a window on each side of enclosure to allow operation of photocell. Both photocell contactor and breaker area shall have dead front trim. Enclosure, except for RT and PS supports, shall not exceed 36 inches in height or 16 inches in width unless approved by the Engineer. Ty D load center with lighting controls or TY D separate lighting control enclosure shall have power distribution blocks for a minimum of 4, #8 conductors per phase.

Texas Department of Transportation
Traffic Operations Division

ELECTRICAL DETAILS- SERVICE ENCLOSURE & NOTES

ED(5)-03

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.

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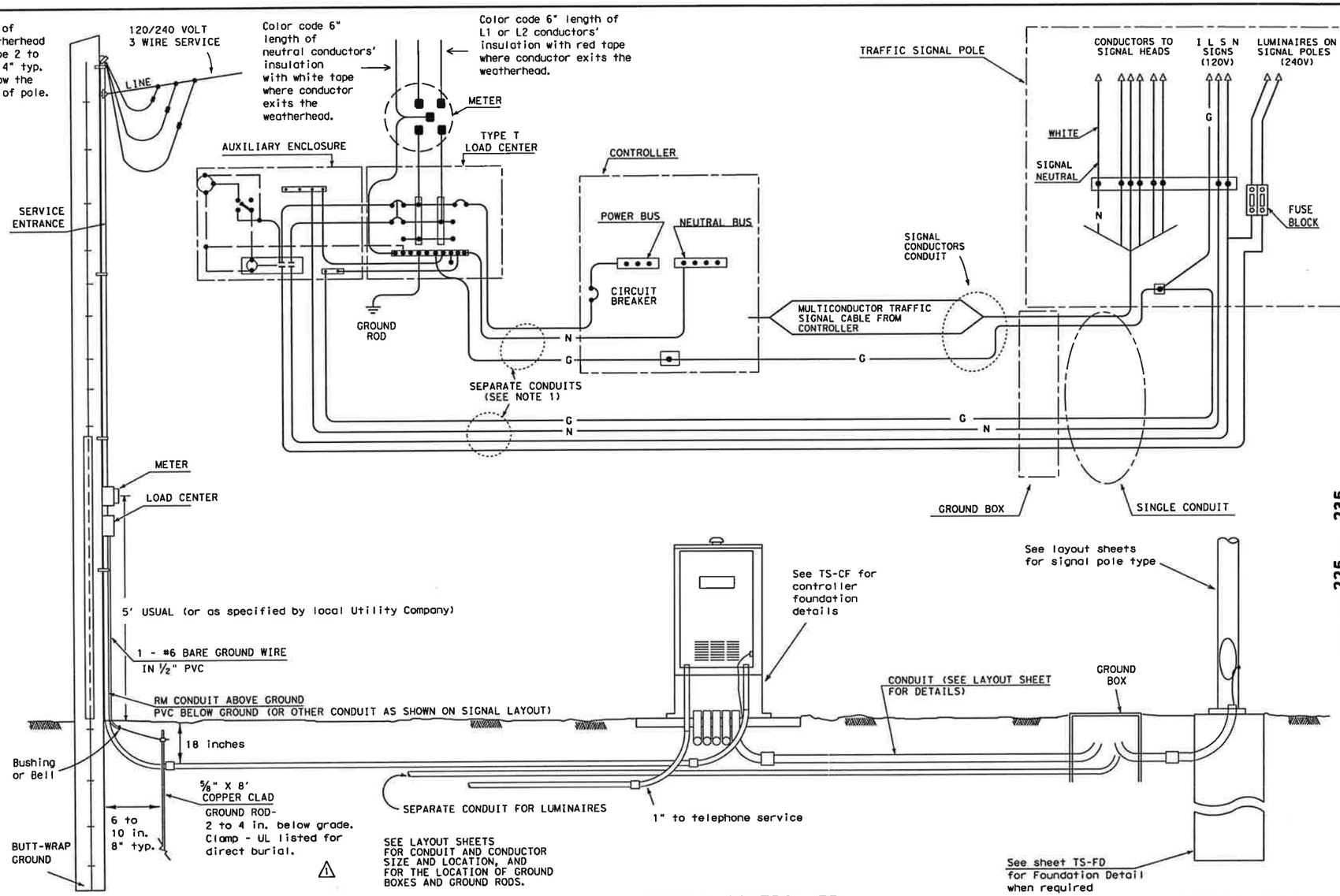
NOTES:

1. Luminaire conductors shall not be looped through controller cabinet.
2. Electrical system to include an equipment grounding conductor noted here as "G". All exposed metal parts are to be bonded to grounding conductor.
3. Photocell, when required, shall be mounted at top of pole or in enclosure as shown on ED(4) and ED(5) and as required by descriptive code.
4. Roadway lighting fixtures, when required, shall be in accordance with the material and construction methods of the Item, "Roadway Illumination Assemblies" except for the test period for proper operation of the luminaires. Installed roadway lighting luminaires and internally lighted street name signs shall be tested for proper operation as a part of the associated traffic signal system.
5. Internally lighted street name signs (ILSN), when required, shall be in accordance with the Item "Internally Lighted Street Name Signs". Because of the electrical isolation of ILSN hinges, a #12 green grounding conductor shall be run to the ILSN fixture.
6. Install ground rod at alternate location when directed by the Engineer. Maintain a minimum of 8 ft in contact with the earth.
7. Liquidtight flexible metal conduit (LFMC), may be used when meter and service enclosure are mounted 90 to 180 degrees to each other. LFMC shall be same size as service entrance conduit. LFMC shall not exceed 3 ft. and shall be securely supported within one foot of each end. No strap required for a LFMC shorter than 12". Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. A neutral conductor must be installed within the LFMC. Bend in liquidtight flexible metal conduit shall not exceed 180 degrees.
8. Minimum embedment depth as per Item 627 Treated Timber Poles.
9. Pole to be set plumb.
10. Back fill thoroughly tamped in 6 in. lifts. Place 6 inches additional backfill above grade around pole base to allow for settling, as per Item 627.
11. Excess pole length shall be trimmed from the top at a slope to aid water run off.
12. Gain pole two places for each meter, service, separate or auxiliary enclosure. See ED(4) for details.
13. All illumination and power conductors to be pull tested and megged. Do not meg traffic signal cable.
14. Enclosures are to be locked, and ground box covers are to be bolted before power is applied to the circuit.
15. Conduits entering top of enclosures to be fitted with conduit sealing hub or threaded boss, such as meter hub. Off-set nipple, when required, shall not be zinc-die-pressure cast. All metal conduits not connected to conduit sealing hub, or threaded boss must have a grounding bushing. Terminate bonding jumper to ground bus. All conduits entering enclosures shall be sealed. Silicone shall not be allowed.



ELECTRICAL SERVICE

(TYPE T TIMBER POLE SHOWN AS EXAMPLE, SEE ELECTRICAL DETAILS, LAYOUT SHEETS, AND ELECTRICAL SERVICE DATA SHEET FOR SERVICE REQUIRED AND FOR DETAILS.)

SIGNAL CONTROLLER

SIGNAL POLE

Unless shown elsewhere in the plans, electrical service data for Types D and T shall be as follows.

ELECTRICAL SERVICE DATA

ELECTRICAL SERVICE DESCRIPTION(SEE ED(4))	SERVICE CONDUIT SIZE (RMC)	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN DISCONNECT CKT. BRK. POLE/AMP	TWO-POLE CONTACTOR AMPS ***	PANELBD./ LOADCENTER AMP RATING (MIN)	CIRCUIT NO.	BRANCH CKT. BRK. POLE/AMPS	KVA LOAD
TY D (120/240)070(NS)AL(E)**(*)	1 1/4 ⚠1	3/#4	N/A	2P/70	30	100	T.S. Lighting	1P/50 2P/15	<7.1
TY T (120/240)000(NS)GS(E)**(*)	1 1/4 ⚠1	3/#4	N/A	None	30	70	T.S. Lighting	1P/50 2P/15	<7.1

*** Eliminate photocell, contactor and seperate enclosure if lighting, or internally lighted signs are not required by plans
** See descriptive code in estimate for service support type.
* See descriptive code in estimate for overhead or underground service.

5/03 Revision

⚠1 Revised notes.

Texas Department of Transportation
Traffic Operations Division

ELECTRICAL DETAILS- TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

ED(7)-03

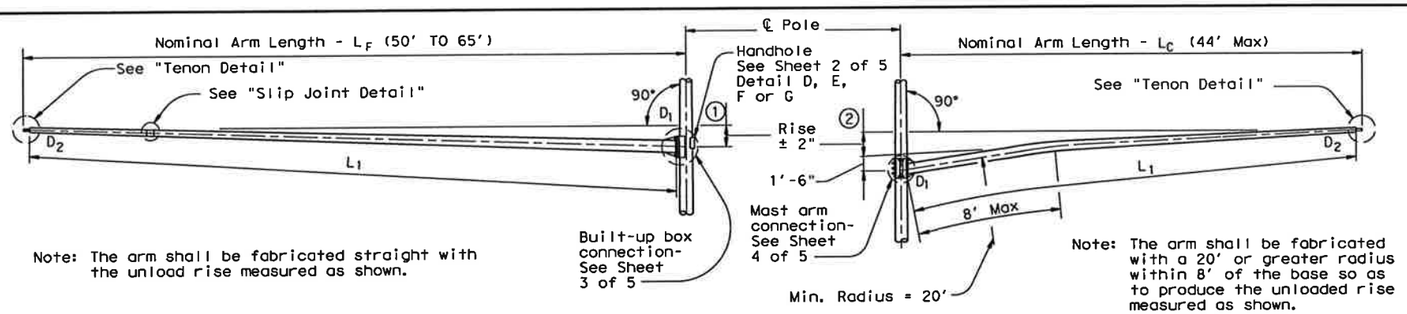
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.

REVISIONS
4-98
12-00
3-03
5-03

71G

SHEET 225 OF 235

DATE:
FILE:



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

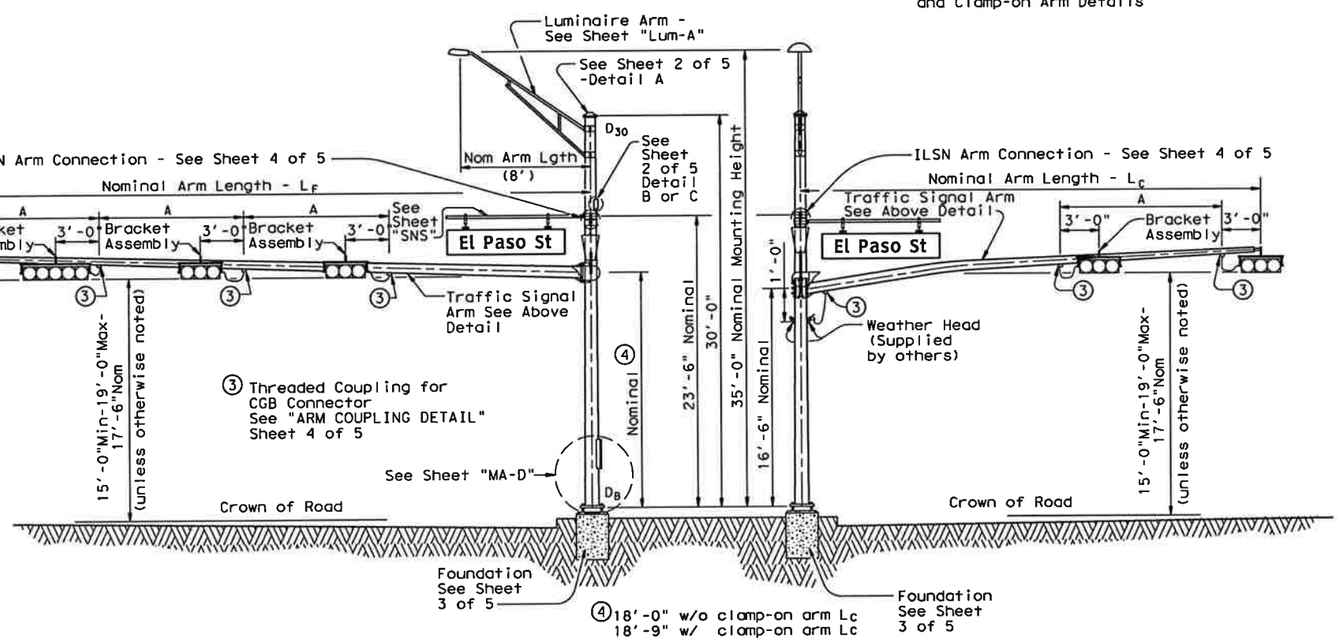
Note: The arm shall be fabricated with a 20' or greater radius within 8' of the base so as to produce the unloaded rise measured as shown.

FIXED MOUNT TRAFFIC SIGNAL ARM

① See Sheet 3 of 5 for Arm Rise

CLAMP-ON TRAFFIC SIGNAL ARM (IF REQUIRED)

② See Sheet 4 of 5 for Arm Rise and Clamp-on Arm Details



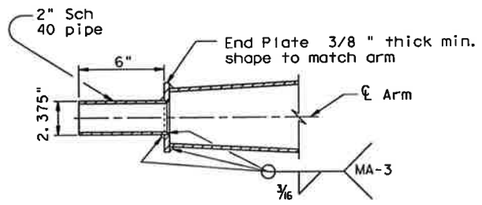
④ 18'-0" w/o clamp-on arm Lc
18'-9" w/ clamp-on arm Lc

ELEVATION
(Showing fixed mount arm)

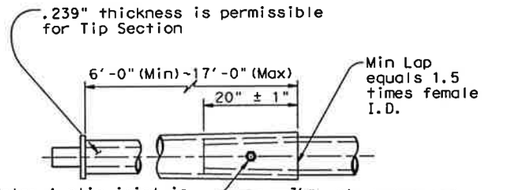
STRUCTURE ASSEMBLY

ELEVATION
(Showing clamp-on arm)

TABLE OF DIMENSIONS "A"										
Arm Length	24'	28'	32'	36'	40'	44'	50'	55'	60'	65'
Arm Type II	10'	11'	12'	13'						
Arm Type III			10'	11'	12'	12'				
Arm Type IV							12'	12'	12'	12'



TENON DETAIL



Note: A slip joint is permissible for arms 50' and greater in length. The slip joint shall be made in the shop, but may be match marked and shipped disassembled.

Tack weld nut to thread projection after making joint. Repair damaged galvanizing in accordance with Item 445, "Galvanizing".

SLIP JOINT DETAIL (FIXED MOUNT ARM)

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed can be either 100 mph or 80 mph plus a 1.3 gust factor. If clamp-on traffic signal is required, designs are based on an arm included angle of 90 degrees or more. Angles of less than approximately 75 degrees will require a special design.

Poles are designed to support one 8'-0" luminaire arm, two 9'-0" internally lighted street name (ILSN) signs and two traffic signal arms with limited length combinations.

Each arm with its related attachment is shown below

Arm	Equivalent DL ⑤	WL EPA ⑤⑥
8' Luminaire Arm	Luminaire 60 lbs	1.6 sq ft
9' ILSN Arm	Sign 85 lbs	11.5 sq ft
50' to 65' Fixed Mount Arm	Signal Loads 310 lbs	52 sq ft
Up to 44' Clamp-on Arm	Signal Loads 180 lbs	32.4 sq ft

⑤ Equivalent dead load plus horizontal wind load applied at the end of arm except ILSN arm, which applied 4.5' from the centerline of the pole.

⑥ Effective projected area (actual area times drag coefficient) for the application of horizontal wind load.

Except as noted in Sheet 1 thru 5 of 5, other details not covered shall refer to Standard Sheet "MA-D" for pole details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Material, fabrication tolerances, and shipping practices shall also meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing" after fabrication.

Deviations from the details and dimensions shown herein require submission of shop drawings in accordance with the Item 441, "Steel Structures". Alternate designs are not acceptable.

Installation of damping plate for the long mast arm is not recommended.

Provision of the bracket assembly used to support the traffic signal heads shall be under the direction of the Engineer for approval.

Design also conforms to NCHRP Report 412 for fatigue resistance except that there are no stiffeners at the base plate. TxDOT is conducting tests to determine if stiffeners at the base plate will or will not result in optimal performance; depending upon the results of the tests, poles may need a retrofit to ensure optimal fatigue performance.

SHEET 226 OF 235

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)
LMA(1)-12

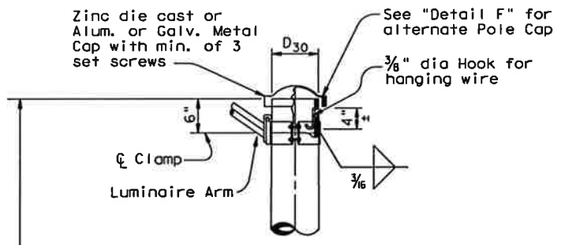
Sheet 1 of 5

REVISIONS	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
4-20-01 1-12	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.

131A

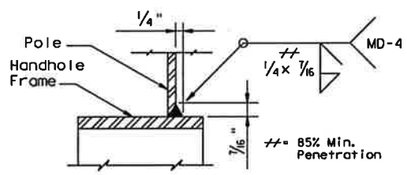
DATE:
FILE:

DATE:
FILE:

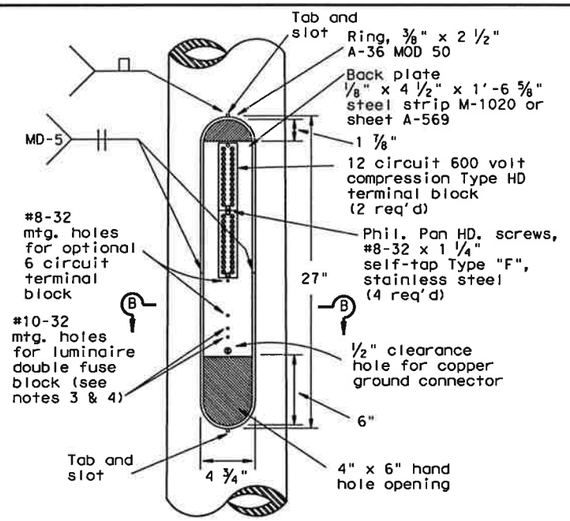


DETAIL A

(for pole with luminaire)



DETAIL H

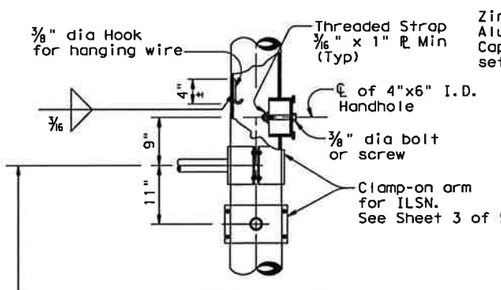


ACCESS COMPARTMENT

MATERIALS	
Round Shafts or Polygonal Shafts (7)	ASTM A595 Gr.A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 (8)
Plates (7)	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325, or A449 except where noted
Pin Bolts	ASTM A325
Pipe (7)	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Misc. Hardware	Galvanized steel or stainless steel or as noted

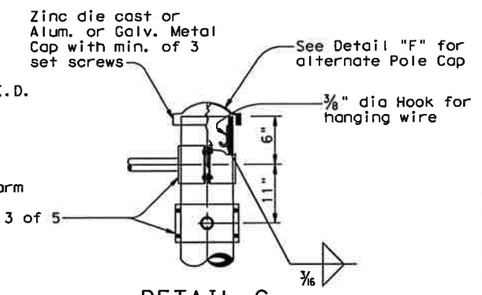
(7) ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F, or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

(8) ASTM A1011 SS Gr.50 shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

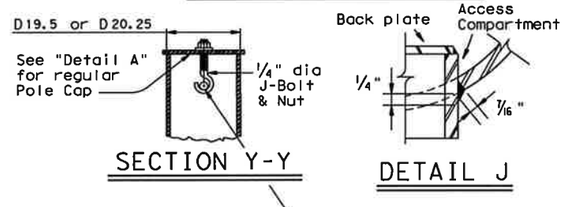


DETAIL B

(If ILSN applied)

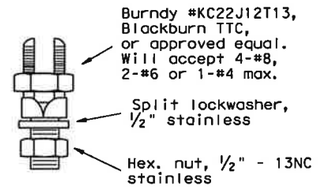


DETAIL C

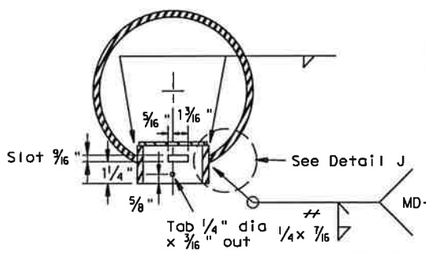


SECTION Y-Y

DETAIL J

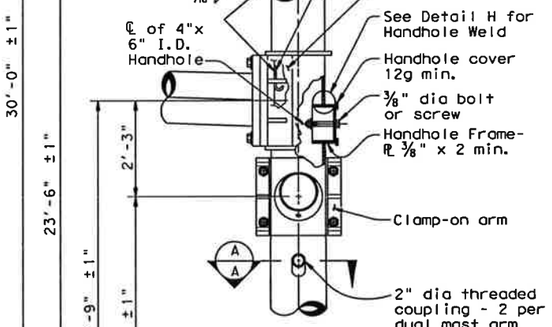


COPPER GROUND CONNECTOR



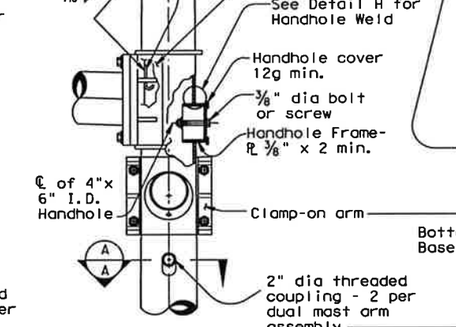
SECTION B-B

Opening for access compartment shall be no more than 1/16 inch wider than the access compartment itself.



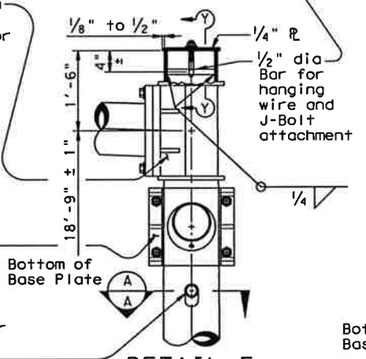
DETAIL D

(for 30' pole with luminaire and ILSN sign)



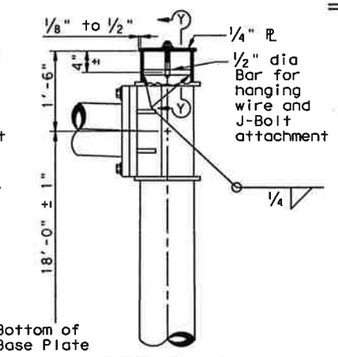
DETAIL E

(for 24' pole with ILSN sign and no luminaire, single or dual mast arm)



DETAIL F

(for 20.25' pole with no ILSN sign and no luminaire, dual mast arm)

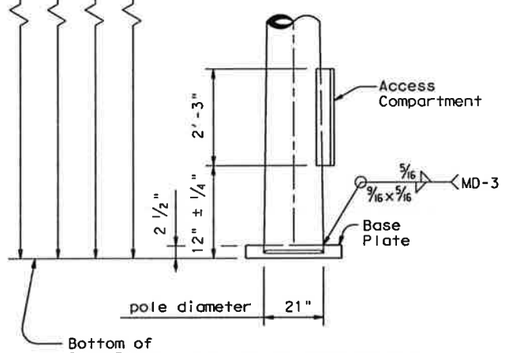


DETAIL G

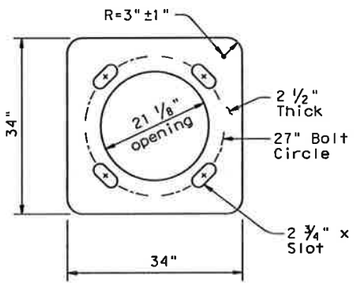
(for 19.5' pole with no ILSN sign and no luminaire, single mast arm)

ACCESS COMPARTMENT NOTES:

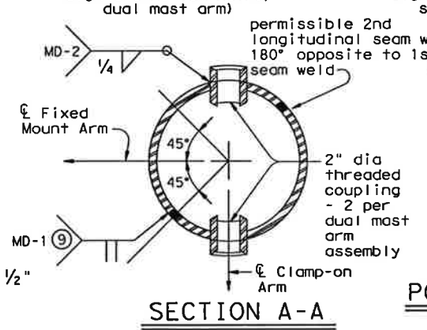
1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
2. The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 1/4" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or Ilsco SSS-5). The traffic signal contractor shall install the kit items in the field.
3. The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.
4. Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.



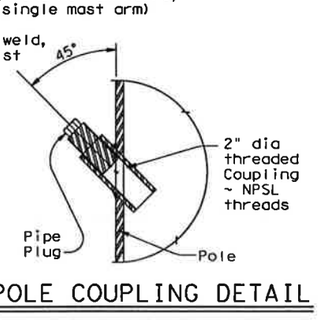
POLE ELEVATION



BASE PLATE



SECTION A-A



POLE COUPLING DETAIL

(9) Longitudinal seam weld must be oriented within 90° (45° rotation each side) along the fixed mount arm. 60% min penetration required, 100% penetration within 6" of circumferential base weld.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

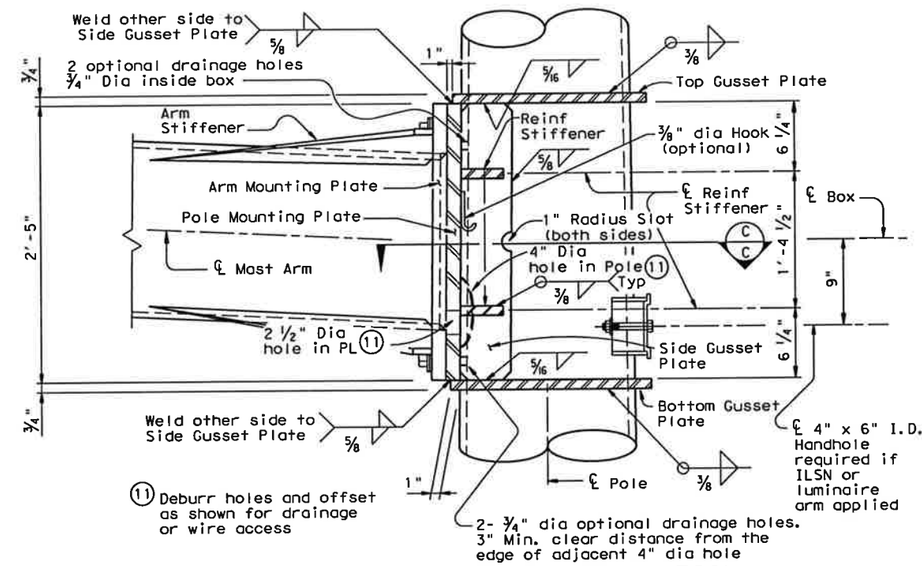
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

Sheet 2 of 5

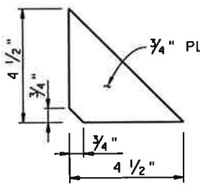
LMA(2)-12

© TxDOT July 2000	DN: JSY	CK: ARC	DW: TGG	CK: JSY
REVISIONS	CONT	SECT	JOB	HIGHWAY
4-20-01				
1-12	DIST	COUNTY		SHEET NO.

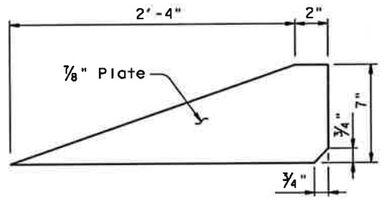
131B



BUILT-UP BOX CONNECTION

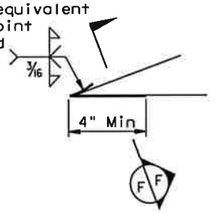


REINFORCING STIFFENER



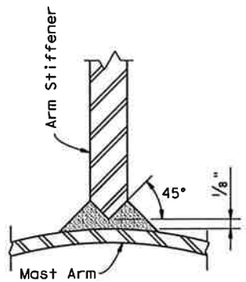
ARM STIFFENER
(Cut to match arm inclination and taper)

Provide Detail shown in SECTION F-F or equivalent 100% complete joint penetration weld from both sides.



Only 4" length at tip of Arm Stiffener requires a complete joint penetration weld. Smooth weld radius to connect Stiffener. Only a fillet weld is required for the remaining weld length.

DETAIL "K"



SECTION F-F

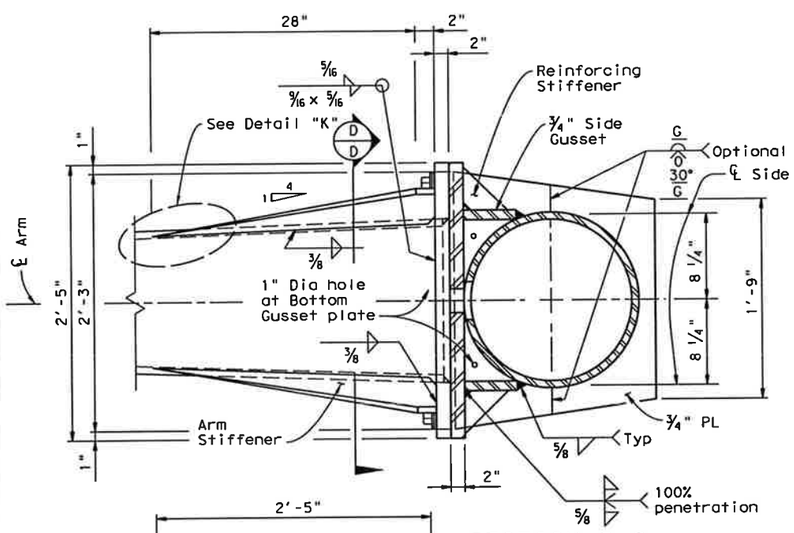
Fixed Mount Arm L_F	ROUND POLES (13)					Foundation Type
	D_B	$D_{19.5}$ or $D_{20.25}$	D_{24}	D_{30}	(12) thk	
ft.	in.	in.	in.	in.	in.	
50', 55' 60', 65'	21.0	18.2	17.6	16.8	.3125	48-A

Fixed Mount Arm L_F	ROUND ARMS (13)				
	L_1	D_1	D_2	(12) thk	Rise
ft.	ft.	in.	in.	in.	
50	49	18.5	11.7	.3125	3'- 3"
55	54	18.5	11.0	.3125	3'- 7"
60	59	18.5	10.3	.3125	3'-11"
65	64	18.5	9.6	.3125	4'- 4"

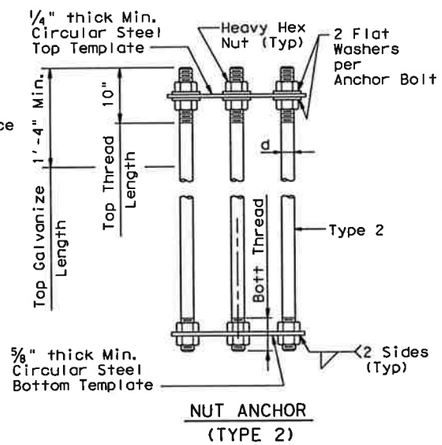
D_B = Pole Base O.D.
$D_{19.5}$ = Pole Top O.D. with no Luminaire and no ILSN (single mast arm)
$D_{20.25}$ = Pole Top O.D. with no Luminaire and no ILSN (dual mast arm)
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L_F = Fixed Arm Length

(12) Thickness shown is minimum, thicker materials may be used.

(13) Shaft profile 16-sided or 18-sided is considered to be equivalent to round section.

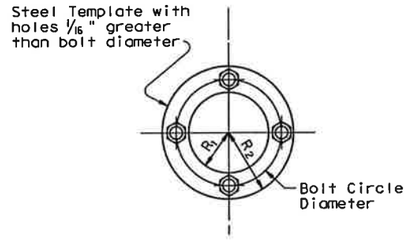


SECTION C-C



NUT ANCHOR
(TYPE 2)

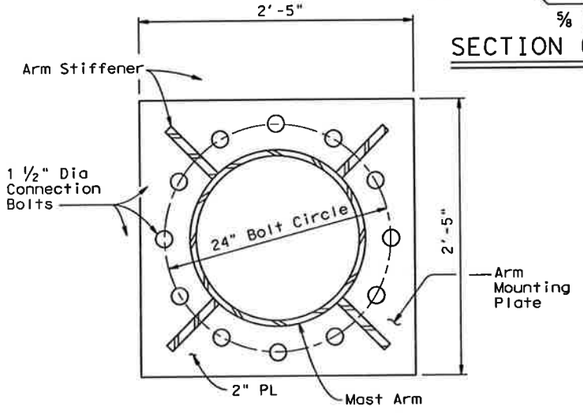
ANCHOR BOLT ASSEMBLY



TEMPLATE DETAIL

ANCHOR BOLT & TEMPLATE SIZE						
Bolt Dia in.	Length ‡	Top Thread	Bottom Thread	Bolt Circle	R_2	R_1
2 1/2"	5'-2"	10"	6 1/2"	27"	16"	11"

‡ Min dimension given, longer bolts are acceptable.



SECTION D-D

FOUNDATION DESIGN TABLE													
FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		DRILLED SHAFT LENGTH-ft (16), (17), (18)			ANCHOR BOLT DESIGN (14)				FOUNDATION DESIGN LOAD (15)		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							
48-A	48"	20 #9	#4 at 6"	21.9	19.5	14.7	2 1/2"	55	27"	2	490	10	50' to 65' Mast arm assembly.

SEE SHEET "TS-FD" FOR ADDITIONAL DETAILS.

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

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

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

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

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

GENERAL NOTES:

Built-up Box Connection: For the welded arm-to-pole connection as a build-up box configuration illustrated here is an example only, fabricators are required to submit a shop drawing of box connection for approval. The drawing shall specify the details of each box element, welds of arm-to-pole connection, arm-to-plate socket connection, and arm rise creation. Specify the proper location of drain holes along the pole. 2 1/2" dia hole in the pole mounting plate and 4" dia hole in pole need to be aligned for wiring access or drainage. Arm stiffeners cut to match arm inclination and taper shall also be included.

The deviation from flat for either arm or pole mounting plate shall not exceed 1/32 in., which is measured along the center of mounting plate to a radial distance of 13.5 in. The deformed-from-flat connection between arm and pole mounting plates shall not be allowed if the center of both mounting plates cannot contact directly.

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

Texas Department of Transportation
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TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

Sheet 3 of 5 LMA(3)-12

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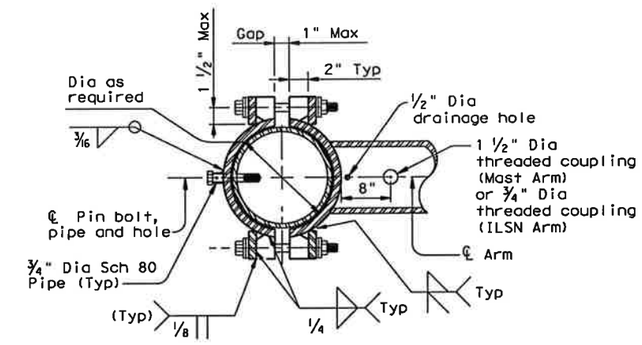
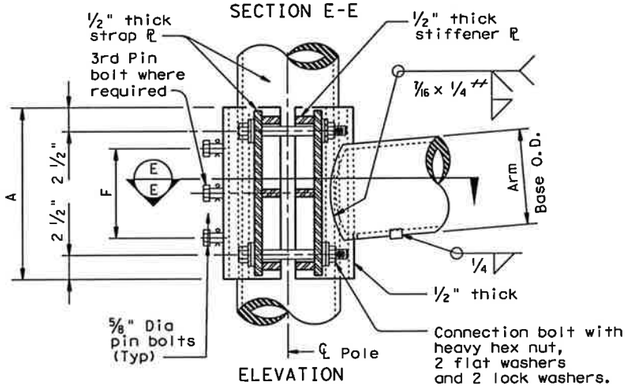


SECTION E-E



ELEVATION
(Mast Arm or ILSN Arm to pole)

= 85% Min. Penetration

CLAMP-ON CONNECTION

80 MPH WIND

Clamp-on Arm Lc	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	thk (12)	Rise	L_1	D_1	D_2	thk (12)	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"

100 MPH WIND

Clamp-on Arm Lc	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	thk (12)	Rise	L_1	D_1	D_2	thk (12)	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	8.0	5.3	.179	1'-8"	19.1	8.0	3.5	.179	1'-7"
24	23.1	9.0	5.8	.179	1'-9"	23.1	9.0	3.5	.179	1'-8"
28	27.1	9.5	5.7	.179	1'-10"	27.1	10.0	3.5	.179	1'-9"
32	31.0	9.5	5.2	.239	1'-11"	31.0	9.5	3.5	.239	1'-10"
36	35.0	10.0	5.1	.239	2'-0"	35.0	10.0	3.5	.239	1'-11"
40	39.0	10.5	5.1	.239	2'-3"	39.0	11.0	3.5	.239	2'-1"
44	43.0	11.0	5.1	.239	2'-8"	43.0	11.5	4.0	.239	2'-3"

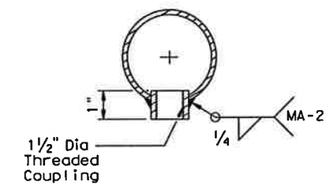
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
Lc = Clamp-on Arm Length

(12) Thickness shown is minimum, thicker materials may be used.

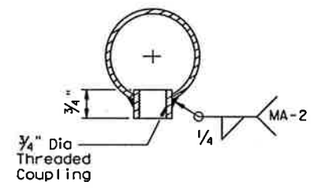
CLAMP-ON ARM CONNECTION

ILSN Arm Size		A	F	4 Conn. Bolts	⅝" Dia. Pin Bolts
Sch 40 pipe Dia	Thick			Dia	No.
in.	in.	in.	in.	in.	ea
3	.216	10	4	¾	2

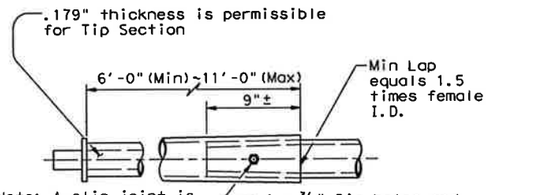
Mast Arm Size		A	F	4 Conn. Bolts	⅝" Dia. Pin Bolts
Base Dia	Thick			Dia	No.
in.	in.	in.	in.	in.	ea
6.5	.179	12	6	1	2
7.5	.179	14	8	1	2
8.0	.179	14	8	1	2
9.0	.179	16	10	1	2
9.5	.179	18	12	1 ¼	3
9.5	.239	18	12	1 ¼	3
10.0	.239	18	12	1 ¼	3
10.5	.239	18	12	1 ¼	3
11.0	.239	18	12	1 ¼	3
11.5	.239	18	12	1 ¼	3



ARM COUPLING DETAIL



ILSN ARM COUPLING DETAIL

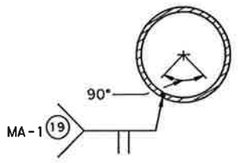


Note: A slip joint is permissible for arms 40' and greater in length. The slip joint shall be made in the shop, but may be match marked and shipped disassembled.

SLIP JOINT DETAIL (CLAMP-ON ARM)

Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL

(19) Longitudinal Seam Weld must be oriented within the lower 90° of the signal arm.
60% Min penetration
100% penetration within 6" of circumferential base welds.

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies or ILSN arm support. For a clamp-on mast arm, a maximum 1 ½" wide vertical slotted hole may be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1". For an ILSN arm, a 1 ½" diameter hole shall be cut in the front clamp plate for wire access. A matched hole shall be field drilled through the pole to provide wire access after arm is oriented. Deburr both holes.

Where duplicate parts occur on a detail, welds shown for part shall apply to all similar parts on the detail.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces. Pin bolts shall be ASTM A325 with threads excluded from the shear plane. Pin bolt and ¾" diameter pipe shall have 3/16" diameter holes for a 1/8" diameter galvanized cotter pin. Back clamp plate shall be furnished with a ¾" diameter hole for each pin bolt. An 11/16" diameter hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

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FILE:

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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: See note above plus: one (or two if ILSN attached) small hand hole, clamp-on simplex	24' Poles with ILSN: See note above plus one small hand hole	19.50' (Single Mast Arm) 20.25' (Dual Mast Arm) Poles with no Luminaire and no ILSN: See note above

Single Mast Arm

Lf ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
50	50L		50S		50	
55	55L		55S		55	
60	60L		60S		60	
65	65L		65S		65	

Dual Mast Arm

Lf ft.	Lc ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
50	20	5020L		5020S		5020	
	24	5024L		5024S		5024	
	28	5028L		5028S		5028	
	32	5032L		5032S		5032	
	36	5036L		5036S		5036	
	40	5040L		5040S		5040	
	44	5044L		5044S		5044	
55	20	5520L		5520S		5520	
	24	5524L		5524S		5524	
	28	5528L		5528S		5528	
	32	5532L		5532S		5532	
	36	5536L		5536S		5536	
	40	5540L		5540S		5540	
	44	5544L		5544S		5544	
60	20	6020L		6020S		6020	
	24	6024L		6024S		6024	
	28	6028L		6028S		6028	
	32	6032L		6032S		6032	
	36	6036L		6036S		6036	
	40	6040L		6040S		6040	
	44	6044L		6044S		6044	
65	20	6520L		6520S		6520	
	24	6524L		6524S		6524	
	28	6528L		6528S		6528	
	32	6532L		6532S		6532	
	36	6536L		6536S		6536	
	40	6540L		6540S		6540	
	44	6544L		6544S		6544	

Shipping Parts List

Traffic Signal Arms (Fixed Mount) (1 per pole)
Ship each arm with listed equipment attached

Nominal Arm Length	Type IV Arm (4 Signals) 3 Bracket Assembly and 4 CGB Connectors	
ft.	Designation	Quantity
50	50IV	
55	55IV	5
60	60IV	1
65	65IV	

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	

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

Nominal Arm Length	Quantity
7' Arm	USE EXISTING
9' Arm	USE EXISTING

Traffic Signal Arms (80 MPH Clamp-On Mount) (1 per pole) Ship each arm with listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal) 2 CGB connector and 1 clamp w/bolts and washers		Type II Arm (2 Signals) 1 Bracket Assembly and 3 CGB connectors, and 1 clamp w/bolts and washers		Type III Arm (3 Signals) 2 Bracket Assembly and 4 CGB connectors, and 1 clamp w/bolts and washers	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80			
32			32II-80		32III-80	
36			36II-80		36III-80	
40					40III-80	
44					44III-80	

Traffic Signal Arms (100 MPH Clamp-On Mount) (1 per pole) Ship each arm with listed equipment attached

Nominal Arm	Type I Arm (1 Signal) 2 CGB connector and 1 clamp w/bolts and washers		Type II Arm (2 Signals) 1 Bracket Assembly and 3 CGB connectors, and 1 clamp		Type III Arm (3 Signals) 2 Bracket Assembly and 4 CGB connectors, and 1 clamp	
ft.	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-100					
24	24I-100		24II-100			
28	28I-100		28II-100			
32			32II-100		32III-100	
36			36II-100		36III-100	
40					40III-100	
44					44III-100	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
2 1/2 "	5' - 3"	6

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.

Foundation Summary Table **

Location Ident.	Avg. N Blow/ft.	No. Each	Drill Shaft *** Length (feet) 48-A
BELT LINE AT			
COMMERCIAL DR	10	2	22
SURVEYOR BLVD	10	2	22
RUNYON RD	10	2	22
Total Drill Shaft Length			132

Notes

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

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

Abbreviations
Lf= Fixed Arm Length
Lc= Clamp-on Arm Length (44' Max.)

STATE OF TEXAS
S. P. BOOTH
94903
LICENSED
PROFESSIONAL ENGINEER
S.P.Booth 10/24/13

Texas Department of Transportation
Traffic Operations Division

LONG MAST ARM ASSEMBLY PARTS LIST

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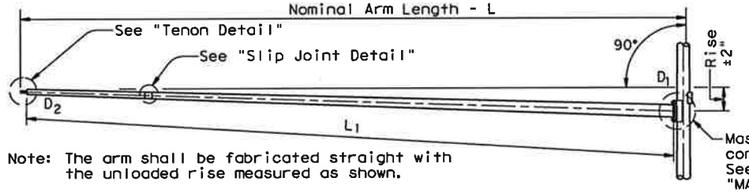
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	① thk	D_B	D_{19}	D_{24}	D_{30}	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	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)

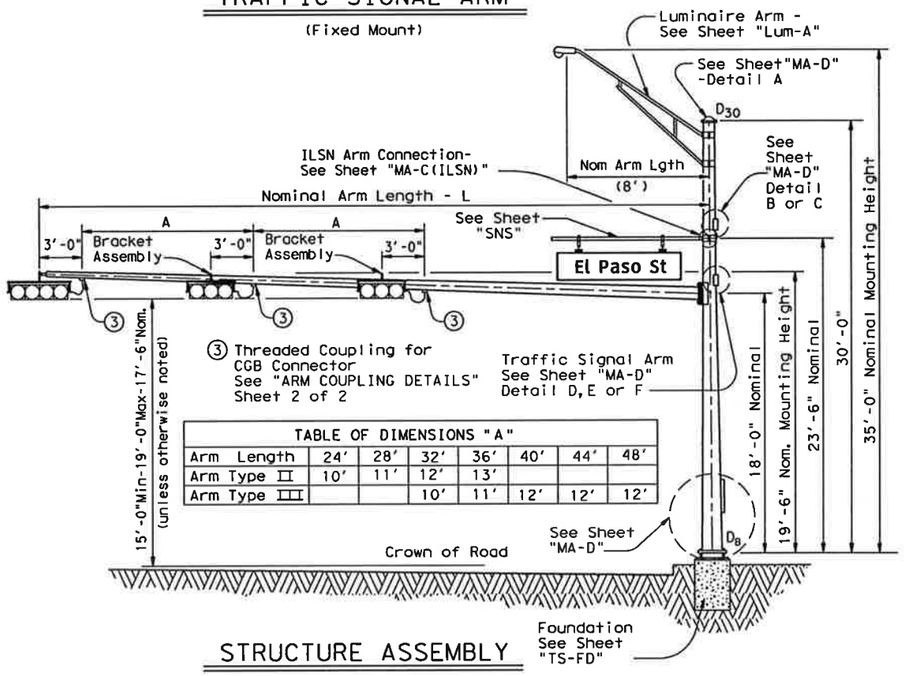


TABLE OF DIMENSIONS "A"

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

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	2
28	28L-80		28S-80		28-80	3
32	32L-80		32S-80		32-80	
36	36L-80		36S-80		36-80	2
40	40L-80		40S-80		40-80	
44	44L-80		44S-80		44-80	
48	48L-80		48S-80		48-80	1

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	2		
28	28I-80		28II-80	3		
32			32II-80		32III-80	
36			36II-80		36III-80	2
40					40III-80	
44					44III-80	
48					48III-80	1

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	

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 ½"	3'-4"	
1 ¾"	3'-10"	8

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.

* EXISTING ILSN TO BE RELOCATED TO NEW MAST ARMS.

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S.P. Booth 10/24/13
Signature of Registrant, P.E. Date

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

SMA-80(1)-12

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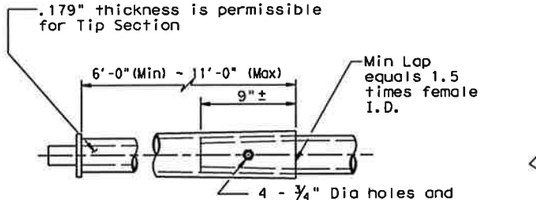
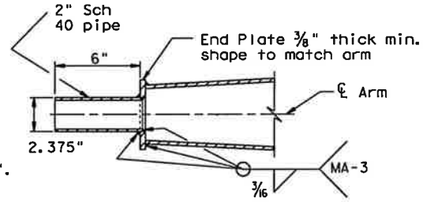


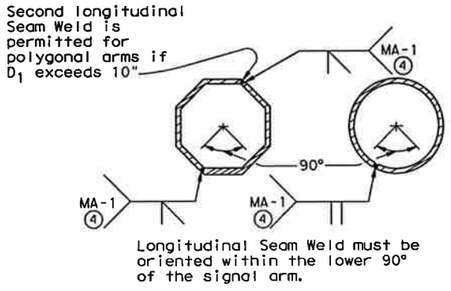
SLIP JOINT DETAIL



TENON DETAIL

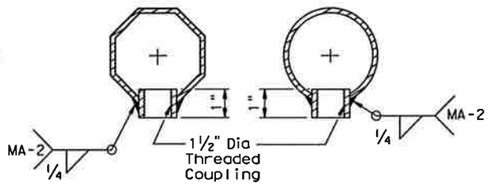
Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL

④ 60% Min. penetration
100% pemetration within 6" of circumferential base welds.



ARM COUPLING DETAILS

VIBRATION WARNING

Mast Arms of SMA and DMA structures and clamp-on Arms of LMA structures of approximately 40 ft or longer are subject to harmonic vertical vibrations in light wind conditions due to the aeroelastic characteristics of a few of the myriads of possible combinations of the following: signal numbers, weights and positions; existence/solidity of backplates; presence of additional attachments to the arm, such as signs and cameras; arm-wind orientation; and arm-pole stiffness.

Such vibrations may cause fatigue damage to the structure and may lead to galloping in moderate wind conditions which may further damage the structure and alarm the public. Tests have indicated that when wind is blowing toward the back side of signal heads having un-vented backplates attached the probability of unacceptable harmonic vibration and/or galloping is rather high.

If backplates are not required for improved visibility they should not be applied to the signal heads or, if they must be applied, they should be vented as a first and inexpensive measure to mitigate vibrations.

The traffic signal mast arms shall be visually inspected in 5 to 20 mph wind conditions after installation of signal heads and any attachments, including any required backpates. If vertical movements with a total excursion (maximum upward excursion to maximum downward excursion) of more than approximately 8" are observed at the arm tip, a damping plate shall be fitted to the arm. See "Damping Plate Mounting Details" on standard sheet, MA-DPD-10.

This visual inspection shall be repeated after each modification of the structure that could affect its aeroelastic response. Excessive vibrations shall not be allowed to continue for more than two days.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor.

Poles are designed to support one 8'-0" luminaire arm, one 9'-0" internally lighted street name sign and one traffic signal arm with a length as tabulated. The specified luminaire load applied at the end of the luminaire arm equals 60 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.6 sq ft. The specified internally lighted street name sign load applied 4.5 ft from the centerline of the pole equals 85 lbs vertical dead load plus horizontal wind load on an effective projected area of 11.5 sq ft. The specified signal load applied at the end of the traffic signal arm equals 180 lbs vertical dead load plus the horizontal wind load on an effective projected area of 32.4 sq ft (actual area times drag coefficient).

See Standard Sheet "MA-D" for pole details, "MA-C" for traffic signal arm connection details, "MA-C (ILSN)" for internally lighted street name sign arm connection details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details. See "MA-C" for material specifications.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing", after fabrication.

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

SMA-80(2)-12

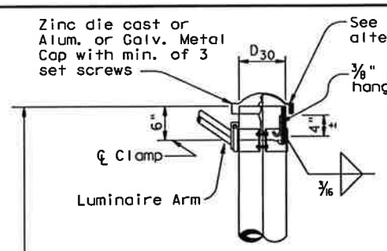
ON: MS	CK: JSY	DW: MMF	CK: JSY

REVISIONS
5-96
1-12

CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.

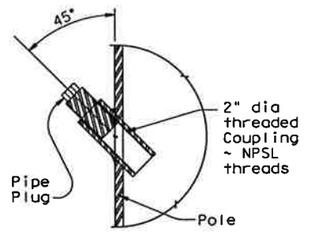
122B

DATE:
FILE:

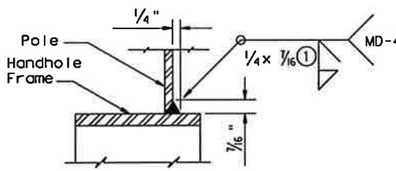


DETAIL A

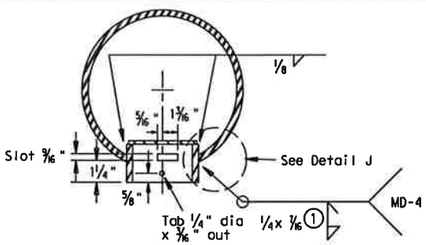
(for pole with luminaire)



POLE COUPLING DETAIL

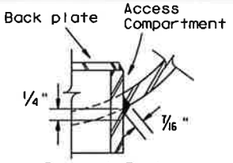


DETAIL G

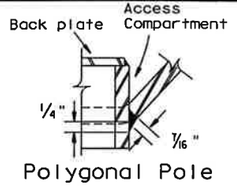


SECTION X-X

Opening for access compartment shall be no more than 1/16 inch wider than the access compartment itself.

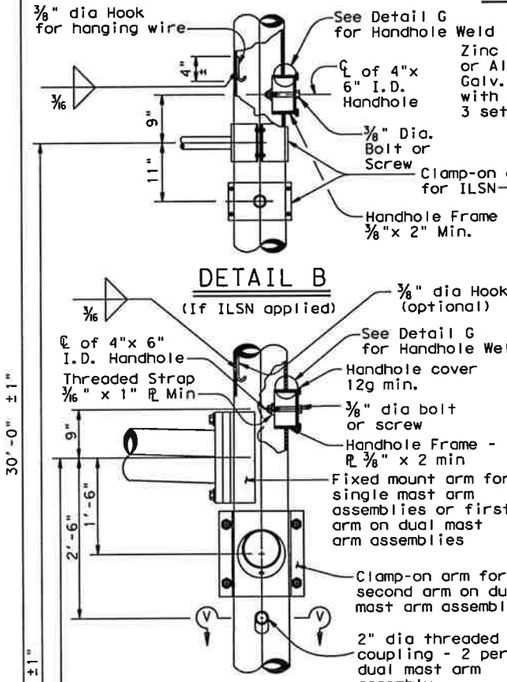


Round Pole

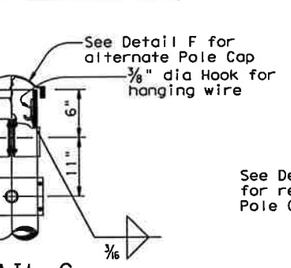


Polygonal Pole

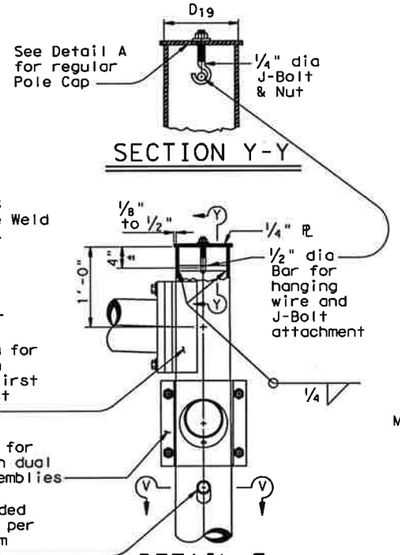
DETAIL J



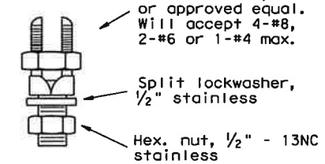
DETAIL B



DETAIL C



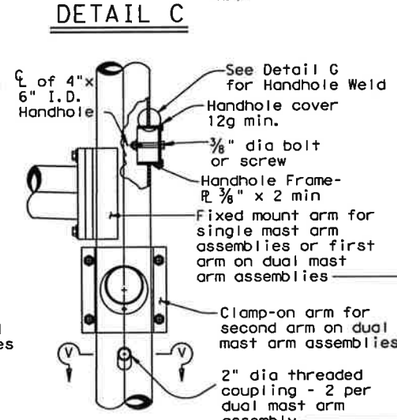
SECTION Y-Y



COPPER GROUND CONNECTOR

DETAIL D

(for 30' pole with luminaire and ILSN sign)



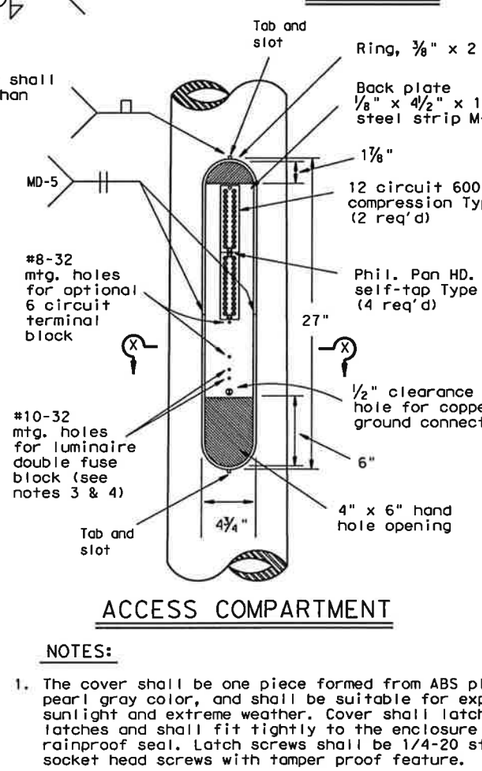
DETAIL E

(for 24' pole with ILSN sign and no luminaire)

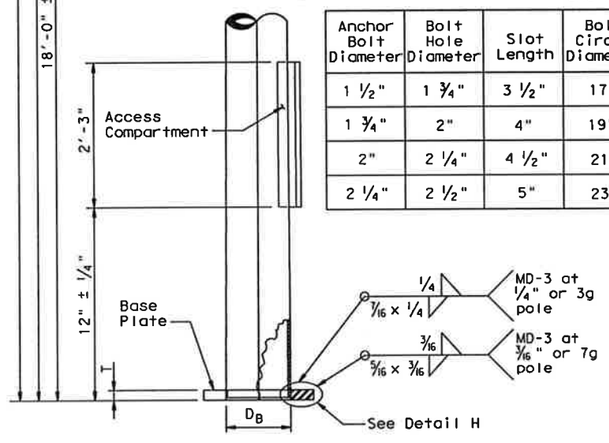
DETAIL F

(for 19' pole with no ILSN sign and no luminaire)

SECTION V-V

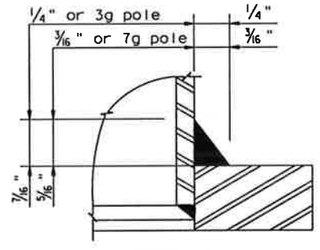


ACCESS COMPARTMENT

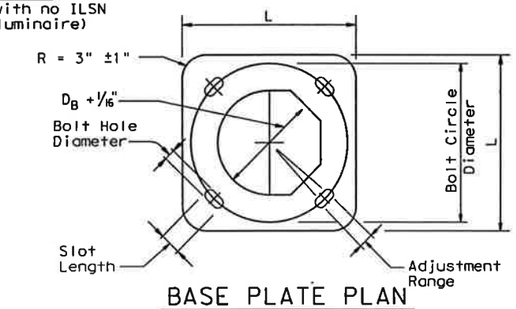


POLE ELEVATION

Anchor Bolt Diameter	Bolt Hole Diameter	Slot Length	Bolt Circle Diameter	Base ℄ Dim. L x T	Adjust. Range
1 1/2"	1 3/4"	3 1/2"	17"	18" x 1 1/2"	13.4°
1 3/4"	2"	4"	19"	20" x 1 3/4"	13.5°
2"	2 1/4"	4 1/2"	21"	22" x 2"	13.6°
2 1/4"	2 1/2"	5"	23"	24" x 2 1/4"	13.7°



DETAIL H



BASE PLATE PLAN

① 85% Min. penetration

② 60% Min. penetration
100% pemetration within 6" of circumferential base welds.

NOTES:

1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
2. The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 1/4" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or Ilsco SSS-5). The traffic signal contractor shall install the kit items in the field.
3. The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.
4. Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.

Texas Department of Transportation
Traffic Operations Division

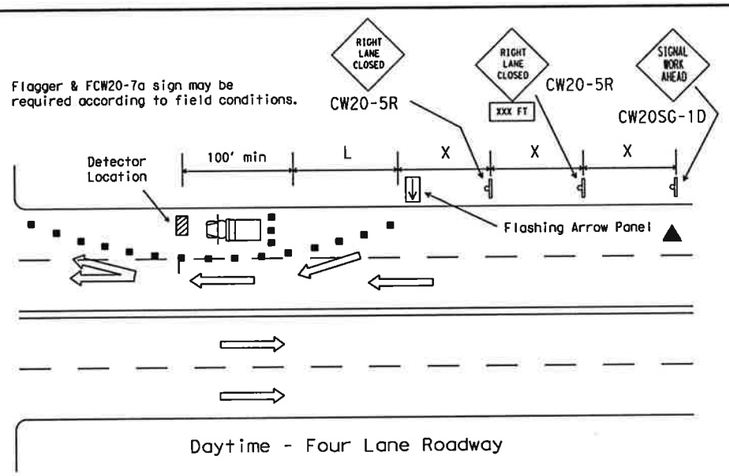
TRAFFIC SIGNAL SUPPORT STRUCTURES MAST ARM POLE DETAILS

MA-D-12

REVISIONS
8-99
1-12

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

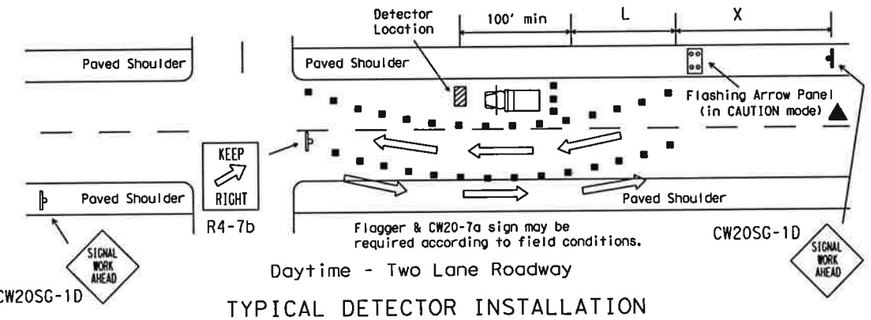
SHEET 233 OF 235



Daytime - Four Lane Roadway

Posted Speed	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Minimum Sign Spacing X Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'	120'
35		205'	225'	245'	35'	70'-90'	160'
40		265'	295'	320'	40'	80'-100'	240'
45	L=WS	450'	495'	540'	45'	90'-110'	320'
50		500'	550'	600'	50'	100'-125'	400'
55		550'	605'	660'	55'	110'-140'	500'
60		600'	660'	720'	60'	120'-150'	600'
65		650'	715'	780'	65'	130'-165'	700'
70		700'	770'	840'	70'	140'-175'	800'
75		750'	825'	900'	75'	150'-185'	900'

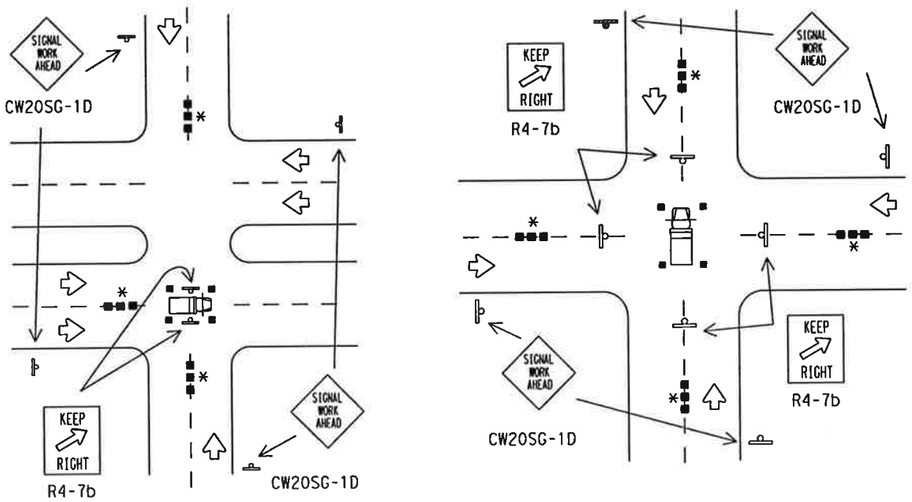
** Taper lengths have been rounded off.
L=Length of Taper (FT.) W=Width of Offset (FT.) S=Posted Speed (MPH)



Daytime - Two Lane Roadway

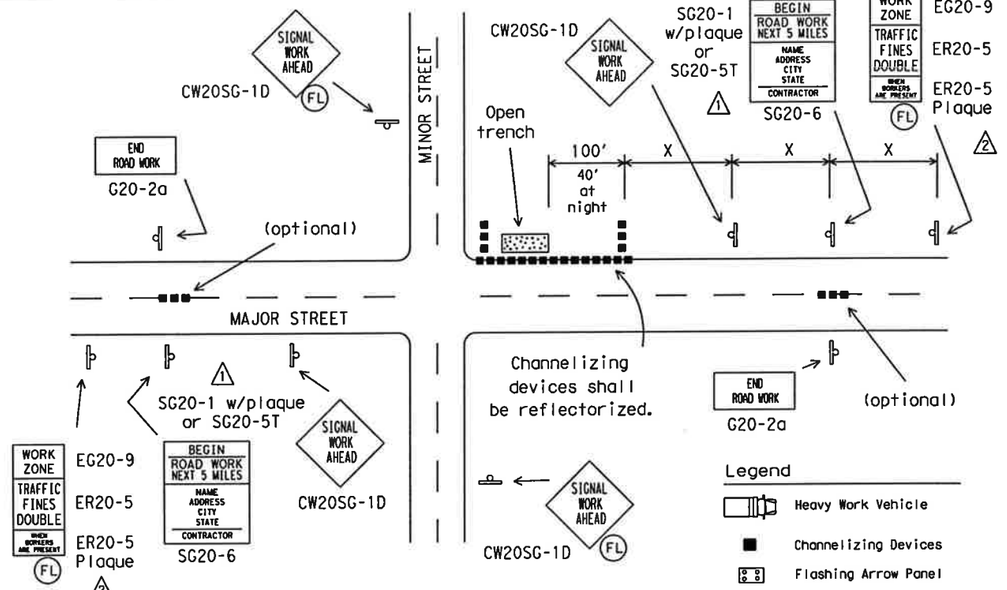
TYPICAL DETECTOR INSTALLATION
OR OTHER WORK OPERATIONS THAT ARE SHORT TERM OR SHORT DURATION

Nighttime Channelizing Devices shall be reflectorized.



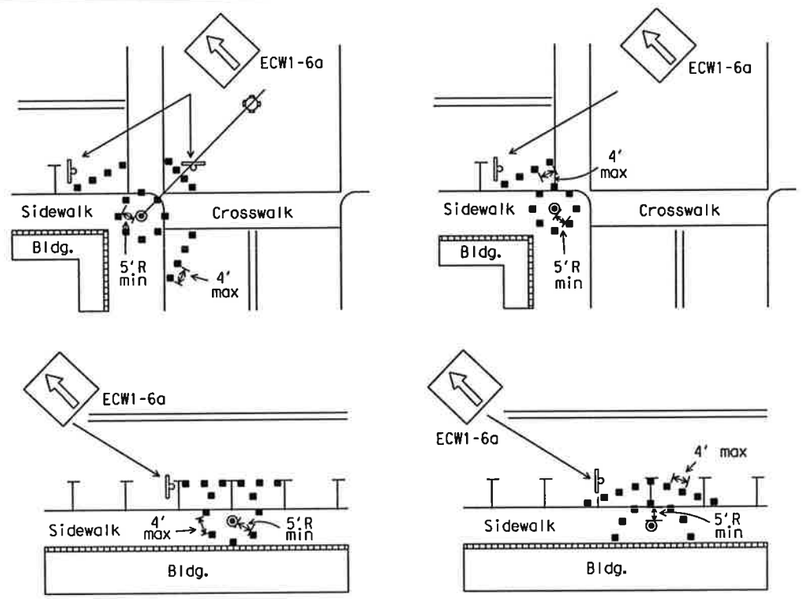
TYPICAL HANGING SIGNAL INSTALLATIONS
OR OTHER WORK OPERATIONS THAT ARE SHORT TERM OR SHORT DURATION

* Advance warning channelizing devices are optional.



TYPICAL ADVANCE SIGNING
FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

Observe Warning Signs State Law (R20-3) shall be required.
See BC(2).
Location will be as directed by the Engineer.



Channelizing devices should not be placed closer than 5 foot radius (minimum) to signal poles.
Parking may be eliminated by placing channelizing devices in spaces.
If pedestrian walkways are blocked, refer to the Texas Manual on Uniform Traffic Control Devices (TMUTCD) Part 6.

TYPICAL RESTRICTED PEDESTRIAN MOVEMENTS
FOR ALL WORK OPERATIONS REGARDLESS OF WORK DURATION

▲ The arrow panel may be omitted when stated elsewhere in the plans.

1. Typical channelizing device is the 28" cone.
2. Plastic drums or vertical panels may be used if approved by the Engineer.
3. For several closely adjoining projects, advance signing may not be required in advance of each intersection, but only in advance of the intersections at the project limits.
4. See details elsewhere in the plans for advance signing requirements.
5. Advance signs shall be in place when signal construction operations are in progress.
6. The contractor shall remove advance signs when no construction operations are underway.
7. Obstructions or hazards at the work area shall be clearly marked and delineated at all times.
8. All holes, trenches or other hazardous areas shall be adequately protected by lights or other protective devices.
9. Trenches shall be covered or surrounded with orange plastic construction fence as directed by the Engineer.
10. Flagger and FCW20-7a sign may be required according to field conditions.
11. Vehicles parked in roadway shall be equipped with two strobes.
12. High level flags at corners of vehicle may also be used.
13. Work operations that require work vehicle in traveled way 20 minutes or less may use cones, high level flags and strobes as advance warning devices.
14. Cones should only be placed around vehicle.
15. Flaggers may be used on high speed rural intersections.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL INSTALLATION TYPICAL DETAILS

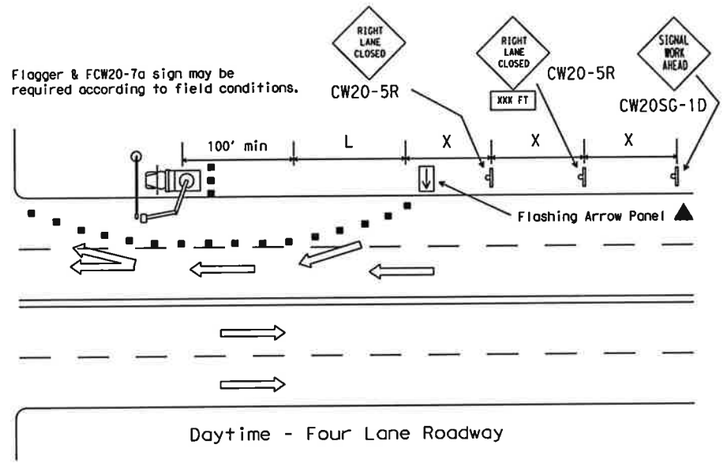
SHEET 1 OF 2 WZ(BTS-1)-03

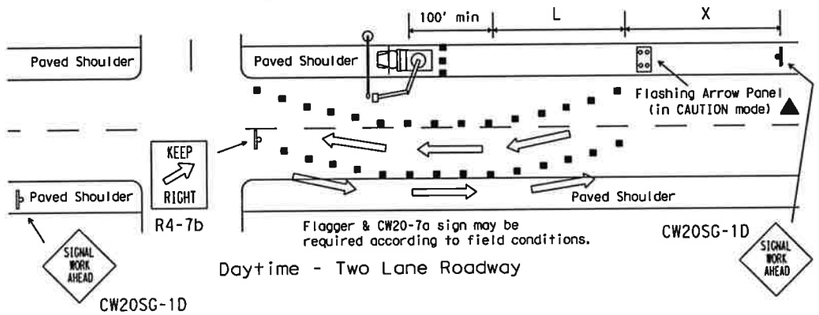
REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
2-98	CONT	SECT	JOB	HIGHWAY
4-98				
10-99	DIST	COUNTY		SHEET NO.
3-03				

116A

DATE:
FILE:

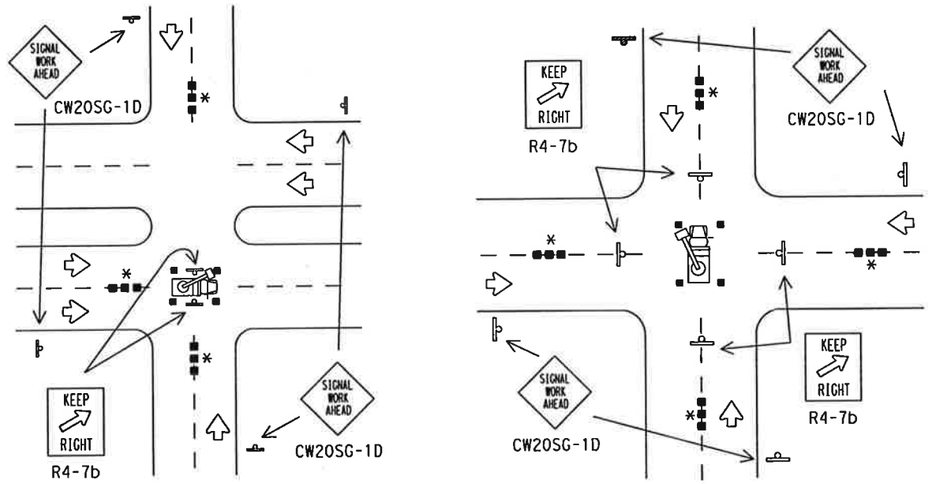
"ABOVE LANE" WORK PERFORMED BY BUCKET TRUCK





▲ The arrow panel may be omitted when stated elsewhere in the plans.

"ABOVE TRUCK" WORK PERFORMED BY BUCKET TRUCK



GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. Nails shall NOT be used to attach signs to any support.
5. All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
6. The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes. The additional signs requested by the Engineer/Inspector shall not be subsidiary.
7. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD). The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so that the Engineer can verify the correct procedures are being followed.
8. The contractor is responsible for sign installations and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
9. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1".
10. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

Duration of Work (as defined by the TMUTCD Part 6)

The types of sign supports, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring that the sign support and substrate meets crashworthiness and length of work requirements.

a. Long-term stationary is work that occupies a location more than 3 days.
b. Intermediate-term stationary is work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than 1 hour.
c. Short-term stationary is daytime work that occupies a location for more than 1 hour, but less than 12 hours.
d. Short duration is work that occupies a location up to 1 hour.
e. Mobile is work that moves intermittently or continuously.

SIGN MOUNTING HEIGHT

1. The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface.
2. The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday.
5. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This type of sign support meets the crashworthiness standards regardless of the direction of impact. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
3. Signs installed on skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
4. When signs are covered, the material used shall be opaque, such as heavy mil black plastic.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face. These materials can damage the retroreflectivity of sign sheeting.
7. Signs shall be removed upon completion of the work.

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact.
6. Rubber (such as tire inner tubes) shall NOT be used for sandbags.
7. Rubber ballasts (such as those used with cones or edgeline channelizers) shall NOT be used as sign support weights.
8. Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
9. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be obtained by contacting:

Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3120
Fax (512) 416-3299

Instructions to locate the "CWZTCD" on TxDOT website are:

Start at website - www.dot.state.tx.us
Click on "About TxDOT",
Click on "Organizational Chart",
Click on Traffic Operations Box,
Click on "Compliant Work Zone Traffic Control Devices",
Click on "View PDF".
This site is printable.

DEPARTMENTAL MATERIAL SPECIFICATIONS

PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
FLAT SURFACE REFLECTIVE SHEETING	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310
VINYL NON-REFLECTIVE SHEETING	DMS-8320

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE E (FLUORESCENT PRISMATIC)
WHITE	BACKGROUND	TYPE C (HIGH SPECIFIC INTENSITY)
WHITE	LEGEND & BORDERS	TYPE C (HIGH SPECIFIC INTENSITY)
BLACK	LEGEND & BORDERS	VINYL NON-REFLECTIVE SHEETING

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL INSTALLATION BARRICADES AND SIGNS

SHEET 2 OF 2 WZ(BTS-2)-03

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
2-98	CONT	SECT	JOB	HIGHWAY
4-98				
10-99	DIST	COUNTY		SHEET NO.
3-03				

1168

DATE:
FILE: