CITY OF FOUNTAINS
HEART OF THE NATION
KANSAS CITY
MISSOURI

ADDENDUM NUMBER 01

Project Number 89008121

Project Title Englewood Boulevard Complete Streets Upgrade
Highway 169 to NW Waukomis Drive

ISSUE DATE: **11-7-17**

Bidders are hereby notified that the Bidding and Contract Documents for the above project, for which Bids are to be received on **November 14, 2017**, are amended as follows:

Information to Bidders The following is provided to Bidders for information only:

Q1.	Where is the CIPP work and Manhole Lining shown in the Plans?
A1.	**Sheet K71. Note revised description for CIPP line items.**
Q2.	Is there retainage or a maintenance bond required for this project?
A2.	**In accordance with federal requirements, retainage and maintenance bonds will not be included in this project.**
Q3.	Are there profile drawings of retaining walls and will handrails be subsidiary to retaining walls? Details of Modular Block walls?
A3.	**There are not profile drawings of the retaining walls. Handrails will be subsidiary to the cost of wall construction. Blocks shall be Big Block/Large block for MSE retaining walls. Typical colors are standard concrete or Buckskin. Facing is typically a natural rock face. Graffiti Protection coating shall be applied. Refer to spec 06310 included in addenda, and 2701 Graffiti Protection.**
Q4.	Where is the information on Bid Item 18 – Vehicle Tracking Device?
A4.	**Sheets K144-K147 and APWA Detail ESC-01.**
Q5.	Is there a separate bid item for 6" MoDOT Type 5 shown under 4" decorative concrete?
A5.	**This quantity is included in Bid Item 13 – Rock Subbase (6" MoDOT Type 5).**
Q6.	Is there a separate bid item for street light poles?
A6.	**Street Light Poles shall be included in cost of Luminaires, see revised line items: Sheet 02, L1, and Spec section 0412.**
Q7.	Is there a typical section for CG-1 Modified Curb and where on the project is it used?
A7.	**CG-1 Modified Curb has been removed and this quantity of curb added to CG-1.**

Contracting Requirements

1. 210-Notice to Contractors. Item 3. Period of Performance: Revise Contract times from 820 calendar days to 850 calendar days.
2. All 12-inch pipe to be restrained the length of Line 3 along N Summit St.
3. Additional fill material can be used by arrangement with owner of Kinsley Commercial site if needed. Soil may need conditioning to meet geotechnical fill requirements.
4. Anti-Collusion Statement to be inserted into Project Manual and included with Bids. Form attached.

Specifications

1. 2200.1.B – Delete "Blue Parkway & Eastwood Trafficway dated April 3, 2012" and replace with "Englewood Road Improvements dated October 30, 2015." The Geotechnical Report (Appendix A) is included in this addendum.

2. Add Section 01075 Water Main Measurement and Payment spec section - attached

Drawings:

1. Sheet K169/Water Plans Sheet 14 – Add detail H.

2. Sheet K170/Water Plans Sheet 15 – Add Service line notes:
    1. Contractor shall pothole and determine locations of existing 16-inch DIP main, 2-inch service line (Reg No. 51506), and existing meter pit location. Coordinate location of new tee, shut off valve, and meter setting with the City.
    2. Contractor shall cut into the existing 16-inch DIP main and install 16"x6" Tee with backing block and 16-inch solid sleeves. Contractor shall provide 6-inch gate valve, 6-inch plug tapped for 2" K Copper with dielectric coupling.
    3. Contractor shall provide 2" K copper and new 2" meter setting in accordance with Water Services Drawing 6207 of the Rules and Regulations for Water Service Line with all appurtenances. City Shall provide 2-inch meter. Contractor shall connect the new meter setting to the existing 2" water service line.
    4. Contractor shall demolish and remove the abandoned 2-inch meter pit.

3. Sheet K160/Water Plans Sheet 005 – Detail A, Delete 24" DIP CL54 and replace with 24" PCCP.

4. Sheet 01 –Revise Index of Sheets as follows: Delete - Street Lighting Plans L1-L15 Replace with - Street Lighting Plans L1-L12

5. Sheet 02 –Replace Quantity sheet with revised.

6. Sheet K03 Asphalt Pavement Section –Revise Asph. Conc. Base Course from 5.5" to 6".

7. Sheets K160-K172/Water Plans Sheet 5-17: Add dropped leaders and water line labels.

8. Sheets K01-K03 Add note regarding 9” Fly Ash Stabilized Subgrade for all pavement.

9. Sheet L1 – Revised quantity table.

NOTE: Bidders must acknowledge receipt of this Addendum by listing the number and date, where provided, on the Bid Form - Document 00410.

SECTION 06310 – LARGE BLOCK GRAVITY RETAINING WALL

PART 1 - GENERAL

A. This section shall cover the furnishing of all labor, materials, and equipment necessary for the installation of a large-block gravity retaining wall in accordance with the information indicated on the Plans and the information contained within the Geotechnical Report.
B. Retaining wall systems are to be furnished as installer design-build structures with design and performance of the wall as a specific obligation of the contractor.

PART 2 - SUBMITTALS

A. Shop Drawings: The contractor shall submit shop drawings of the large-block gravity retaining wall system signed and sealed by a Professional Engineer licensed in the State of Missouri.

B. Calculations: The Contractor shall submit signed and sealed design calculations of the large-block gravity retaining wall system. The design calculations must consider the following as a minimum:

1. External stability, including base sliding, overturning, bearing capacity, and settlement.
2. Internal stability, including pullout and tensile overstress of soil reinforcement and internal sliding between courses.
3. Local stability of segmental units including facing connection and bulging.
4. Global stability.
5. Gravity loads due to soil pressure resulting from grades.
6. Superimposed (surcharge) loads.
7. Connection design between blocks and geosynthetic reinforcement.

PART 3 - MATERIALS

A. Blocks: Concrete for blocks shall be high-strength, low absorption having a minimum 38-day compressive strength of 4,000 psi in accordance with ASTM C94 and ASTM C 1372. The concrete shall have adequate freeze-thaw protection to withstand 300 cycles of accelerated freeze-thaw cabinet exposure in accordance with ASTM C 666, with a maximum absorption rate of seven percent.

B. The exterior dimension of the face shall be approximately 48”x 16” for a full unit and 24” x16” for a half unit. Actual dimensions may vary slightly based upon manufacturer’s standard block sizes. The depth of each unit shall be as required

to construct a gravity retaining wall. Texture shall be a natural rock face and color shall be standard concrete or Buckskin, or as directed by the Owner.

C. Base Leveling Pad: The wall base leveling pad material shall consist of a compacted crushed stone base or non-reinforced concrete as determined by the contractor's retaining wall engineer.

D. Drainage Aggregate: Drainage aggregate shall consist of clean 1" minus crushed stone or gravel meeting the requirements of the Plans.

E. Drainage Pipe: Drainage pipe shall be perforated or slotted PVC pipe manufactured in accordance with ASTM D-3034 or corrugated HDPE pipe manufactured in accordance with ASTM D-1248. Drainage pipe shall be covered with a geotextile filter fabric.

F. Unit adhesive: Adhesive shall be a premium, construction grade suitable for concrete and exterior applications.

G. Backfill: Backfill material shall be job excavated material when approved by the City unless otherwise specified on the Plans.

PART 4 – INSTALLATION:

A. Excavation: Contractor shall excavate to the lines and grades shown on the Plans. Overexcavation shall be filled with approved backfill or drainage fill material compacted to 95% of a standard proctor density. The Contractor shall be careful not to disturb the subbase beyond the lines shown.

B. Foundation Preparation:

1. Foundation soil shall be excavated as required for footing dimensions shown on the Plans or as directed by the City.
2. Compact foundation soil zone to 95% standard proctor prior to installing base leveling pad. Soils not meeting the required strength shall be removed and replaced with acceptable material and retested.

C. Block installation:

1. Follow manufacturer's instructions for installation. The first course of concrete blocks shall be placed on the prepared foundation, checking for alignment and level, and insuring proper contact. Blocks shall be placed side by side for the full length of the wall alignment making sure there are no gaps between blocks.

2. Place drainage aggregate directly behind blocks and compact in six-inch layers to 95 percent of maximum density.
3. Sweep off all excess material from the top of units and install the next course of blocks, drainage fill and backfill.
4. Tracked equipment shall not be operated directly on geo-grid reinforcement. A minimum of six inches of backfill is required prior to the operation of any tracked equipment. Turning of tracked equipment shall be held to a minimum to avoid displacing the fill and damaging the geo-grid.
5. Within twelve inches of the top of the wall, place impervious fill material over the drainage fill and throughout the excavated area. Impervious fill cap shall be graded to drain runoff laterally along the wall alignment.

PART 5 – CERTIFICATION:

A. Upon completion of construction, the wall designer shall certify in writing that the wall system is installed properly. Additional geotechnical testing and/or inspection services, if necessary, shall be the responsibility of the manufacturer and shall be included in the bid price for the wall system.

PART 6 – MEASUREMENT AND PAYMENT:

A. The large-block retaining wall shall be measured in square feet from the top of the wall to the finished grade in front of the wall (the exposed surface of the wall). Payment for large-block gravity retaining walls shall be made at the contract unit price identified in the bid tab and shall constitute full payment for all materials, labor, and equipment necessary to complete the work. Handrail installation shall be subsidiary to the large-block retaining wall work.

END OF SECTION 06310

SECTION 01075

WATER MAIN MEASUREMENT AND PAYMENT

1. SCOPE. This section covers methods of measurement and payment for items of Work for water main relocations and installation of new water mains.

2. WATER MAIN PIPE. Payment for all water main pipe will be made on the basis of the unit price bid for each type. Measurements for payment will be made on a horizontal plane of the water main pipe stationing as determined by surveys made after installation. The unit price bid for each size and type of water main pipe shall include all costs incurred with excavation and trenching, removal of existing thrust blocking if required, removing and stockpiling topsoil, removal of existing piping if required, pipe embedment, piping, pipe laying, jointing materials, including gaskets, glands, and fasteners, restrained joints as required, polyethylene encasement, cutting into existing water mains, and dewatering the existing water main pipe between the connection and the nearest existing sectionalizing valves as required, backfilling with appropriate materials required by the specifications, replacing topsoil, ground water barriers, , cleanup, and all other appurtenant work required to complete the installation of the water main pipe that is not covered under another bid item.

No direct payment will be made for excavation or trenching. Excavation and trenching shall include all materials, equipment, and labor to complete the excavation and trenching work. All excavation and trenching shall be unclassified as to materials that may be encountered. In addition, trenches shall be unclassified as to depth. No separate payment will be made for different types of excavation or varying depths of trenching work.

All excavation and backfill required for other items of Work, not otherwise paid for as installed piping, shall be considered a subsidiary obligation of the CONTRACTOR and the cost of such excavation and backfilling shall be included in the prices bid for the item.

Separate payment will not be made for bracing, sheeting, shoring, or supports that may be needed by the CONTRACTOR to install the water main pipe, valves, fittings, casings and all other appurtenances. All bracing, sheeting, shoring, or supports shall be considered a subsidiary obligation of the CONTRACTOR.

3. CASING PIPE. Payment for casing pipe will be made on the basis of the unit price bid for each location and type as noted in the bid. Measurement for payment will be made horizontally along the longitudinal centerline of the casing from end to end of the casing. The unit price bid for the encasement shall include all costs in connection with excavation and backfilling for the jacking and receiving pits when jacking methods are utilized and excavation requirements for the encasement when cut and cover encasement is allowed, the excess cost of installing pipe in the casing above the amount bid for the pipe laid in open trench, casing insulators, straps, jointing materials, casing spacers, end seals, and all other work required to complete the encasement installation that is not included under another bid item.

4. BENDS WITH BACKING BLOCKS AND PLUGS. Payment for bends and associated backing blocks and plugs will be made on the basis of the unit price bid for each type of fitting above the amount paid for water main installation. The unit price shall include furnishing and installing the fitting; gaskets, glands, and bolts; concrete, reinforcing steel, and accessories for the associated backing block per the standard details; excavation, trenching, and backfill; joint restraint, and all other associated costs not included in another bid item.

5. ADAPTORS AND SLEEVE COUPLINGS. All water main adaptors and sleeve couplings, including bolts, gaskets, and glands, will be paid for at the unit price bid for each item. The unit price shall include all costs associated with the furnishing and installation of the appurtenance above the amount paid for water main installation. The unit price shall include required restraint systems including welding, excavation, trenching, and backfilling not included under the price for water main installation and all other costs not included under another bid item.

6. VALVES. All line and isolation valves will be paid for at the unit price bid for each size and type of valve. The unit price shall include all costs incurred in completing the valve installation over and above the amount paid for water main installation. The unit price shall include furnishing and installing the valve; gaskets, glands, and bolts if required; joint restraint; blocking if required; valve box; extension stem and appurtenances; torque limiting devices for butterfly valves; excavation, trenching, and backfill not included under water main installation; and all other associated costs not included under other bid items. Payment for the additional sleeve coupling required with each butterfly valve according to Construction Detail Drawing No. 09808 shall be made separately under the respective sleeve coupling unit price.

7. AIR RELEASE ASSEMBLIES. Payment for the air release assemblies will be made on the basis of the unit price bid by diameter of the valve. The unit price bid for each air release valve assembly shall include all costs incurred for excavation, trenching, and backfilling not included under the price of water main installation; precast and cast-in-place concrete vaults; reinforcing steel; castings, air valves; miscellaneous piping, isolation valves, 6-inch plugs tapped for 2-inch piping, reducing flanges and other fittings and miscellaneous piping; and all other associated work required to complete the air valve assembly as detailed on the drawings that is not included under another bid item. Payment for 36"x6" Tees or 42"x6" Tees required for air release assemblies shall be made separately under the Tee unit price.

8. REDUCERS. Payment for the reducers will be made on the basis of the unit price bid for each item. The unit price shall include the additional costs over and above that required for water main installation including supplemental excavation, trenching, and backfill; the additional cost of the fitting, including gaskets, glands, and bolts if required; extra shoring, sheeting, or bracing if required; polyethylene encasement; and all other associated costs not included under another bid item. The unit price shall include required restraint systems including welding, excavation, trenching, and backfilling not included under the price for water main installation and all other costs not included under another bid item.

9. TEES WITH BACKING BLOCKS, CROSSES AND WYES. Payment for tees, crosses, wyes, and associated backing blocks will be made on the basis of the unit price bid for each size tee, cross and wye. The unit price shall include excavation, trenching, and backfill not included under water main pipe construction; furnishing and installing the tee, cross or wye, including gaskets, glands, and bolts if required over and above that required for the water main pipe; joint restraint; polyethylene encasement; concrete, concrete placement, reinforcing steel, and finishing; and

all other associated costs not included under other bid items.

10. FIRE HYDRANT ASSEMBLIES. Payment for installation of hydrants will be made on the basis of the unit price bid. The unit price bid for each type of hydrant installation shall include all costs incurred in completing the hydrant work from the connection with the main to the hydrant over and above the price paid for the excavation and installation of the main. The unit price bid shall include excavation and trenching, pipe embedment, piping, fittings, jointing materials, concrete blocking, accessories and appurtenances, backfilling, cleanup, and all other associated costs required to complete the hydrant installation that are not included in another bid item. Payment for all hydrant isolation valves shall be made separately under the respective valve unit price.

11. STRADDLE BLOCKS. Payment for straddle blocks on ductile iron pipe water main will be made on the basis of the unit price bid for the construction of each straddle block per the standard details. The unit price bid for each size of straddle block per diameter of the water main shall include excavation, forms and supports, steel reinforcement, approved restraining device installed on the pipe, concrete, backfilling, cleanup, and all other associated costs required to complete the straddle block that are not included in another bid item.

12. WATER SERVICE TRANSFERS.

A. Payment for the water service transfer for 5600 NW Waukomis Drive (Reg No. 51506) shall be made on the basis of the unit price bid. The unit price bid shall include all costs to furnish and install new 6-inch tapped plug and 30 linear feet of 2" K copper service line and meter pit per standard detail 6207 and all necessary fittings and appurtenances, backfill of the new meter pit and piping; blocking and thrust restraint; drainage, disinfection, and dewatering; disconnecting the existing services from the existing main and plugging and abandoning existing service lines, meter vault, and valves, and all other associated work required to complete the water service transfer that is not covered under another bid item. Payment for the materials and labor to excavate and cut in the new 16"x6" Tee with 6-inch branch valve and new 16-inch solid sleeve on the existing 16-inch ductile iron main shall be made separately under the respective tee, sleeve, and valve unit prices.

B. Payment for the water service transfers for 1506 NW Englewood Road and 5800 N Madison Avenue shall be made separately under the respective pipe, bends, tees, sleeve couplings, valves, straddle block, testing and disinfection unit prices, and all other applicable unit prices required to complete the Work.

END OF SECTION

Appendix A

Report of Subsurface Exploration and Geotechnical Engineering Evaluation

Englewood Road Improvements

REPORT OF SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING EVALUATION

ENGLEWOOD ROAD IMPROVEMENTS
KANSAS CITY, MISSOURI
TSI PROJECT NUMBER 20152010

LUTJEN, INC.
1301 Burlington Street
North Kansas City, Missouri 64116

1322 Adams Street
Kansas City, Kansas 66103

October 30, 2015

TSi
geotechnical, inc.

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PROFESSIONAL SERVICES SINCE 1989

October 30, 2015

Mr. Scott Cargill
LUTJEN, INC.
1301 Burlington Street
North Kansas City, Missouri 64116

Re: Report of Subsurface Exploration and Geotechnical Engineering Evaluation
Englewood Road Improvements
Kansas City, Missouri
TSi Project No. 20152010

Dear Mr. Cargill:

TSi Geotechnical, Inc. (TSi) has completed the authorized subsurface exploration and geotechnical engineering evaluation for the referenced project and is pleased to submit this report of our findings to Lutjen, Inc. (Lutjen). The purpose of our work was to determine subsurface conditions at specific exploration locations and to gather data on which to prepare geotechnical recommendations for the design and construction of the proposed improvements to NW Englewood Road in Kansas City, Missouri. This report describes the exploration procedures used, documents the data obtained, and presents our evaluations and recommendations relative to the geotechnical engineering aspects of the project.

We appreciate the opportunity to assist you with this project. If you have any questions, or if we may be of further service to you, please call us.

Respectfully submitted,
TSI GEOTECHNICAL, INC.

Jim Jacobe, PE
Project Manager

Denise B. Hervey, PE
Principal
ICDF
10-30-15

Kevin D. Friedrichs, PE
Project Manager

STATE OF MISSOURI
KEVIN D. FRIEDRICHS
NUMBER PE-2013010325
PROFESSIONAL ENGINEER
10-30-15

CONTENTS

SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING EVALUATION ENGLEWOOD ROAD IMPROVEMENTS KANSAS CITY, MISSOURI

1.0 SCOPE OF SERVICES

This report summarizes the results of a geotechnical study performed for the proposed improvements to NW Englewood Road in Kansas City, Missouri. The study was performed in general accordance with TSi's proposal to Lutjen, dated October 28, 2014, which identified the following items for inclusion in this study report:

- subsurface conditions at the boring locations;
- laboratory test results;
- influence of groundwater on the project;
- infiltration and dewatering recommendations;
- lateral earth pressures for subsurface structures;
- pavement recommendations;
- minimum setback recommendations for excavations near existing structures;
- seismic site classification per MoDOT guidelines;
- excavation and general construction considerations;
- recommendations for fill and backfill materials, placement, and compaction; and
- recommendations for observation and testing services during construction.

2.0 SITE AND PROJECT DESCRIPTIONS

This project includes the design of Englewood Road from just east of US 169 to Waukomis Drive and will include the relocation of North Summit Street. The proposed roadway will be a two-lane boulevard with raised median, bicycle lanes, sidewalks, street lights, and left turn lanes at the relocated North Summit, North Liberty, and North Mercier intersections. The US 169 interchange will also be improved and will include widening to provide a six-lane section underneath US 169. The project will also include sidewalks behind the bridge piers and traffic signal improvements. A right turn lane will be added to both off-ramps. Enclosed storm sewer systems will be designed as part of the project. MoDOT standard plans or pre-cast typical drawings will be used for the reinforced concrete box culvert just west of North Summit. A single-lane roundabout at the intersection of Englewood Road and Waukomis Drive is also planned for this project. North Summit will be relocated 400 feet to the west and will be improved for approximately 800 feet north of Englewood, and the design professional will evaluate the possibility of constructing a sidewalk up to NW 57th Terrace.

Englewood will be designed as an APWA secondary arterial with AASHTO design standards for K-values. The posted speed limit is 35 mph; therefore, the design speed will be 40 mph. Modification from requirements in APWA standards, and KCMO supplements, will be noted and identified. Improvements to the interchange ramps will be designed to MoDOT standards.

The general location of the project site is shown below. The Site and Boring Location Plans, Figures 1.1 and 1.2 in Appendix A, provide a more detailed plan of the project area.

3.0 FIELD EXPLORATION AND LABORATORY TESTING

3.1 FIELD EXPLORATION

TSi conducted an exploration program between July 24 and October 8, 2015 consisting of fifteen soil borings, designated as Borings B-01 to B-13, B-06A and B-09A; and four pavement cores, designated as C-01 to C-03 and C-01A. The logs from this exploration are included in Appendix B. The approximate locations of the borings are indicated on the Site and Boring Location Plans, Figures 1.1 and 1.2 in Appendix A. The boring locations were selected by Lutjen and staked in the field by TSi. Approximate elevations were provided by Lutjen and based on the survey data.

Borings B-01 and B-04 through B-13 were drilled using a CME -75 track-mounted drill rig to advance hollow-stem auger and continuous flight auger drilling tools to the requested depth or auger refusal. Borings B-06A and B-09A were drilled using a CME-45 truck-mounted drill rig to advance continuous flight auger drilling tools to the requested depth or auger refusal. Due to access, Borings-02 and -03 were drilled with hand auger drilling tools. A geotechnical specialist from TSi directed the exploration procedures in the field, maintained a field log of the conditions encountered in the borings, and collected and classified the samples recovered. Split-spoon and Shelby tube samples were recovered from the borings. Split-spoon samples were recovered from the borings using a 2-inch outside-diameter, split-barrel sampler, driven by an automatic hammer in accordance with ASTM D 1586. The split-spoon samples were placed in plastic bags for later testing in the laboratory. Shelby tube samples were obtained in accordance with ASTM D 1587. The Shelby tube samples were 3 inches in diameter and were preserved by sealing the entire sample in the tube. Borings were backfilled with auger cuttings.

The results of the field tests and measurements were recorded on field logs and appropriate data sheets by TSi's geotechnical specialist. Those data sheets and logs contain information concerning the exploration methods, samples attempted and recovered, indications of the presence of various subsurface materials, and the observation of groundwater. The field logs and data sheets contain the engineer's interpretations of the conditions between samples, based on the performance of the exploration equipment and the cuttings brought to the surface. The final logs included in this report were based on the field logs, modified as appropriate based on the results of laboratory testing of soil samples.

3.2 LABORATORY TESTING

A laboratory testing program was conducted by TSi to determine selected engineering properties of the obtained soil samples. The following laboratory tests were performed on the samples recovered from the borings:

- visual description by color and texture of each sample (ASTM 2488);
- natural moisture content of each sample (ASTM D 2216);
- Atterberg limits on selected cohesive samples (ASTM D 4318);
- sieve analysis of selected granular materials (ASTM D 422);
- unconfined compressive strength of selected cohesive samples (ASTM D 2166);
- unit weight of selected cohesive samples (ASTM D 7263);
- standard Proctor compaction of selected samples (ASTM D 698); and
- California Bearing Ratio (CBR) (ASTM D 1883).

The results of the laboratory tests are summarized on the Logs of Boring. Results of the standard Proctor and CBR are included in Appendix C. The analyses and conclusions contained in this report are based on field and laboratory test results and on the interpretations of the subsurface conditions as reported on the logs. Only data pertinent to the objectives of this report have been included on the logs; therefore, these logs should not be used for other purposes.

4.0 SUBSURFACE CONDITIONS

Details of the subsurface conditions encountered at the boring locations are shown on the logs in Appendix B. The general subsurface conditions encountered and their pertinent engineering characteristics are described in the following paragraphs. Conditions represented by the borings should be considered applicable only at these locations on the dates shown; the reported conditions may be different at other locations or at other times.

4.1 GENERALIZED SUBSURFACE PROFILE

The borings were drilled along the proposed alignment of Englewood Road, most of which encountered native clay soil at the surface. Three borings encountered fill at the surface, Borings B-02, -03 and -06. Borings B-02 and -03 were drilled near Highway 169 and Boring B-06 was drilled within the roadway pavement of the existing Englewood Road. Underlying the surficial soil or fill, all of the borings encountered lean to fat clay (CL or CH, in accordance with the Unified Soil Classification System) with varying amounts of sand, to depths ranging between 2.0 and 20.0 feet.

Shale and/or limestone was encountered below the lean to fat clay in all of the borings except Borings B-02, -03, -07, -09A, -12, and -13. In these six borings, lean and fat clays (CL and CH) continued to boring termination depths.

The standard penetration test (N) values in the clay ranged from 2 to 27 blows per foot (bpf) with an average of 8. Moisture content tests of the clay ranged from 17% to 33% with an average of 24%. Atterberg limits tests on samples of the clay resulted in liquid limits (LL) of 33 to 54 and plasticity index values (PI) of 16 to 34. Dry unit weights of the clay range from 94 to 120 pounds per cubic foot (pcf), with an average of 105 pcf. Unconfined compressive strength tests on samples of the clay resulted in undrained shear strengths of 0.20 to 2.12 tons per square foot (tsf), with an average of 0.76 tsf.

Four pavement cores, C-01 through -03 and C-01A, are summarized in Table 1 below. C-01 was drilled in the shoulder and the other three were drilled in the roadway. Photographs of the pavement cores are included in Appendix D.

TABLE 1.
PAVEMENT THICKNESS

Boring Location	Asphalt (in)	Concrete (in)
C-01	9.00	NE
C-01A	4.25	6.75
C-02	1.50	8.00
C-03	1.50	8.00

NE = Not Encountered

4.2 GROUNDWATER

Groundwater was observed during drilling in three borings at varying depths, summarized in Table 2 below. The presence or absence of groundwater at a particular location does not necessarily mean that groundwater will be present or absent at that location at other times. Seasonal variations, the water level in the nearby creek, and other unknown considerations will cause fluctuations in water levels and the presence of water in the soils. During rainy seasons, groundwater may be present in the fill, perched above the limestone or shale bedrock, or within seams in the limestone bedrock.

TABLE 2.
GROUNDWATER

Boring Location	Groundwater Depth While Drilling (ft.)	Groundwater Elevations (ft.)
B-02	10.0	886.0
B-07	18.5	832.2
B-12	13.0	776.8

5.0 Engineering Assessments and Recommendations

5.1 Construction Considerations and Subgrade Materials

Existing structures adjacent to trenches and excavations should be monitored when the distance between the edge of the excavation and the structure is less than the total depth of the excavation. In these cases, the structure should be closely monitored for any unacceptable movement during construction. If the measurements show unacceptable movement, the construction activities should be halted and stabilization of the adjacent structures should be considered.

The current project plans show new pavement areas over existing drainage swales adjacent to the roadways. The bottoms of these drainage swales will likely be soft, wet, and contain a greater thickness of organic soil than encountered in the surrounding borings. The soft material may continue several feet below the bottom of the drainage swale. TSi recommends that any soft and/or organic soil encountered in these or other areas be excavated until a subgrade is encountered that can pass the proofrolling recommendations described in Section 6.1 of this report.

The project includes extending a concrete box culvert within the creek. TSi probed the base of the creek and determined that limestone and/or intact shale was present within 1 to 2 feet.

5.2 Swelling Shale Considerations

Shale bedrock may be exposed during excavation in some areas. The shale bedrock is of concern with regard to its potential for volume change. This concern applies to this material whether it is in its natural condition or used as fill material. This material tends to swell when it absorbs water and to shrink when it dries out. Some relatively simple design and construction considerations are recommended that will help to maintain the natural moisture content of the shale. Avoiding conditions that could result in excessive wetting or drying of the shale will reduce its potential for volume change. The following design and construction precautions are recommended:

1. Shale material should not be used as backfill within 2 feet of the pavement section or 2 feet of the ground surface in unpaved areas.
2. Shale used as fill should be placed and compacted wet of its optimum moisture content, as discussed in Section 6.5 of this report.
3. The shale maximum particle size should not exceed 2 inches in any dimension.
4. Positive surface drainage should be provided during and after construction to prevent ponding of water in and around the trench.
5. Excavations into shale should be backfilled with lean clay to avoid collecting water in crushed limestone backfill on top of shale.

5.3 Lateral Earth Pressures for Walls and Buried Structures

Lateral earth pressure parameters are provided for the design of the soil nail walls and buried structures such as manholes or concrete boxes that may be included in the project. It is assumed that the walls of these structures will be restricted from movement at the top and therefore should be designed to resist at-rest earth pressures. Earth pressures are a function of the excavation configuration and the backfill materials. Table 3 provides recommended design parameters for subsurface walls with horizontal surfaces behind and in front of the wall. Undrained values should be used for calculation of lateral pressures for those portions of wall that extend below the highest level of anticipated groundwater, or where positive drainage of the wall backfill is not provided.

Significant wall movements would generally be necessary to develop the full values of passive pressures given; typically the passive values stated are reduced by up to one-half for design. The effects of vertical surcharge loads are not included for the stated fluid pressures. Resistance to sliding along the soil/concrete interface at the bottom of the buried concrete structures may be analyzed using an ultimate friction factor of 0.30. An appropriate factor of safety should be applied to this friction factor.

Table 3.
Lateral Earth Pressure Parameters for Walls and Subsurface Structures

Parameter		Crushed Limestone	Cohesive Soil
At-Rest Equivalent Fluid Pressure	Drained	55 pcf	74 pcf
	Undrained	90 pcf	100 pcf
Passive Equivalent Fluid Pressure	Drained	480 pcf	296 pcf
	Undrained	310 pcf	210 pcf
Active Equivalent Fluid Pressure	Drained	35 pcf	52 pcf
	Undrained	80 pcf	88 pcf
Soil Unit Weight		130 pcf	125 pcf
Angle of Internal Friction for Backfill		35°	24°
Assumed Surcharge Condition		None	None
Slope Profile behind Wall		Horizontal	Horizontal

No factor of safety has been applied to the above values.
pcf = pounds per cubic foot

5.4 PAVEMENT DESIGN

A California Bearing Ratio (CBR) test of the native soil was conducted on a combined sample of subgrade soil from 0 to 2 feet across the site. This test resulted in a CBR of 3.1. The CBR test results are included in Appendix C of this report. Based on the general character of the on-site subsurface conditions and assuming a properly prepared subgrade, the measured CBR value of 3 is considered appropriate for use in designing the flexible pavement sections for the site.

Rigid pavement design can be based on a modulus-of-subgrade reaction (k) of 75 pounds per cubic inch (pci) for the subgrade. These values for rigid and flexible pavement design are based on the requirement that the pavement subgrade is prepared in accordance with the recommendations provided in this report.

TSi recommends that the subgrade be stabilized with "Class C" fly ash. Stabilization of the subgrade will provide a stiffer, more durable subgrade, which will improve the durability of the pavements. It will also provide a subgrade that is less prone to disturbance under construction traffic, especially during rainy weather.

A fly ash-treated Proctor and CBR testing was not included in the scope of this exploration. Based upon previous experience, the pavement subgrade should be stabilized with "Class C" fly ash applied at a rate of 15% of the treated soil on a dry weight basis to a depth of 9.0 inches. TSi can determine the optimal percentage of fly ash application in the laboratory using additional soil samples from the site to perform standard Proctor and CBR tests at varying fly ash percentages. The soil should be treated and compacted in lifts with a maximum thickness of 9.0 inches to help mixing of the soil and fly ash. Based on previous experience, a design CBR value of 20 and a modulus-of-subgrade reaction (k) of 240 pci can be used for fly ash-treated soils. This CBR value should be verified during construction using dynamic cone penetrometer (DCP) tests. The stabilized soils should be compacted as recommended in Section 6.5 of this report. Suggested specifications for the fly ash stabilization can be provided if desired.

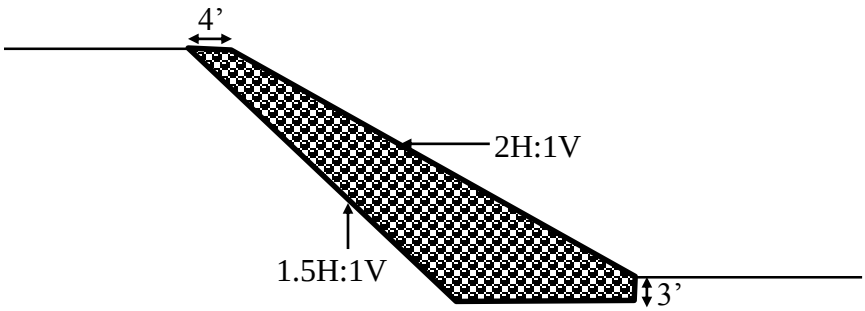
5.5 SLOPE STABILITY

Final grading plans should limit cut and fill slopes to inclinations no steeper than 3 Horizontal to 1 Vertical (3H:1V). Slopes steeper than 3H:1V may be stable, but should be analyzed on a case-by-case basis, and would be harder to maintain. In general, grading should be designed to prevent surface water from collecting at the top of slopes and to avoid concentrated flow over the slopes, which would increase the potential for soil erosion.

If a 2H:1V slope is desired in areas of limited right of way, a rock wedge slope may be constructed. The rock wedge should be constructed of Class C material with a maximum size of 24 inches. The size of the rock wedge depends on the properties of the embankment fill. TSi utilized design friction angles and unit weights of 35 degrees and 135 pounds per cubic foot (pcf) for the rock wedge, and 24 degrees and 125 pcf for the clay material in analyzing the slope for design. The embankment fill parameters were selected to reflect the locally available soils.

Figure 2 below gives the general slope and dimensions of an acceptable rock wedge. In general, grading should be designed to prevent surface water from collecting at the top of slopes and to avoid concentrated flow over the slopes, which would increase the potential for soil erosion.

FIGURE 2
ROCK WEDGE



5.6 SEISMIC SITE CLASSIFICATION

Based on MoDOT EPG Figure 751.9.1.3.3, the project site is located within Seismic Performance Category (SPC) “A”. As such, the soils at the site are not considered susceptible to liquefaction or substantial settlement or loss in strength when subject to the design earthquake loading. The seismic analysis and design procedures outlined in MoDOT EPG 751.9.1 are not required for this project.

6.0 Site Preparation and Excavation Considerations

6.1 Subgrade Preparation

Construction areas should be stripped of existing pavement, organic soil, and any deleterious materials prior to site excavation and grading. Tree stumps and root balls should also be removed. Care should be taken during stripping to prevent excessive disturbance of the underlying soil. After the removal of these materials, and where further excavation is not required, the exposed subgrade should be proofrolled. Proofrolling is accomplished by passing over the subgrade with proper equipment, such as a loaded tandem-axle dump truck or scraper, and observing the subgrade for pockets of excessively soft, wet, disturbed, or otherwise unsuitable soils. Any unacceptable materials thus found should be excavated and either recompacted or replaced with new structural fill.

Prior to placing fill in any area, the subgrade should be scarified to a depth of about 6 inches, the moisture content adjusted to near its optimum moisture content, and the subgrade recompacted in accordance with recommendations made in subsequent sections of this report. The recommended proofrolling and/or scarification and recompaction may be waived if, in the opinion of a geotechnical engineer, this procedure would be detrimental or unnecessary. Following satisfactory preparation of the subgrade, controlled fill material may be placed.

6.2 Excavations

Trenching, excavating, and bracing should be performed in accordance with Occupational Safety and Health Administration (OSHA) regulations and other applicable regulatory agencies. In accordance with the OSHA excavation standards, the existing silt and clay soils at the site are considered Type C, which requires a side slope for excavations of not steeper than 1.5 horizontal to 1.0 vertical (1.5H:1.0V). However, worker safety and classification of the excavation soil is solely the responsibility of the contractor. Also according to OSHA requirements, any excavation extending to a depth of more than 20 feet must be designed by a registered professional engineer. An excavation retention system, such as soldier pile and lagging or sheet piling, may be used as an alternate to sloping back the sides of trench excavations.

6.3 Subgrade Protection

Construction areas should be properly drained in order to reduce or prevent surface runoff from collecting on the exposed subgrade. Any ponded water on the exposed subgrade should be removed immediately. Temporary stormwater swales and collection areas may be required to control surface water flow into low areas of the site.

To prevent unnecessary disturbance of the subgrade soils, heavy construction vehicles should be restricted from traveling through the finished subgrade. If areas of disturbed subgrade develop, they should be properly repaired in accordance with the recommendations in this report.

The clay soils and shale present at the site are highly susceptible to disturbance from construction traffic, especially during rainy weather. Consideration should be given to leaving cut areas 1 to 2 feet higher than planned subgrade until immediately before paving operations are planned. The extra material that is left in place would protect the final subgrade from disturbance.

Immediately prior to construction of the pavement, it is recommended that the exposed subgrade be evaluated to determine whether moisture contents are within the recommended range and to identify areas disturbed by construction operations. Moisture conditioning of wet or dry areas is recommended prior to construction of the pavement section. Areas disturbed by construction traffic should be reworked.

6.4 Fill and Backfill Materials

Soil with decayable material such as wood, trash, metal, or vegetation is typically not acceptable. Shale and fat clay should not be placed within 2 feet of the pavement section. Shale should not be placed within 2 feet of the ground surface in unpaved areas.

Some of the fill material may require the addition of moisture prior to compaction. This should be performed in a controlled manner using a tank truck with a spray bar, and the moistened soil should be thoroughly blended with a disk or pulverizer to produce a uniform moisture content. Repeated passages of the equipment may be required to achieve a uniform moisture content. If fill is placed during the winter season, fill materials should be carefully observed to see that no ice or frozen soils are placed as fill or remain in the base materials upon which fill is placed.

Some of the fill material may require moisture reduction prior to compaction. During warm weather, moisture reduction can generally be accomplished by disking, or otherwise aerating the soil. When air-drying is not possible, a moisture-reducing chemical additive, such as lime or Class C fly ash, may be used as a drying agent.

6.5 Fill and Backfill Placement

Cohesive fill should be compacted to a dry density of at least 95% of the standard Proctor maximum dry density (ASTM D 698) of the soil. Granular material, such as crushed limestone, placed for structure or pavement support, should be compacted to at least 100% of the standard Proctor maximum dry density. The moisture content of silt, clay or granular fill at the time of compaction should be within ±3% of the optimum moisture content of the material as determined by the standard Proctor compaction test. The moisture content of fat clay or shale fill materials should be from the optimum moisture content to 4% above optimum. Fill should be placed in loose lifts not in excess of 8 inches thick, and compacted to the aforementioned criterion. However, it may be necessary to place fill in thinner lifts to achieve the recommended compaction when using small hand-operated equipment.

7.0 CONSTRUCTION OBSERVATION AND TESTING

It is recommended that TSi be retained during construction to perform testing and observation services for the following items:

- observation and documentation of the exposed soil after stripping topsoil during scarification, compaction, and proofrolling;
- testing of asphalt and concrete materials used for paving;
- construction of soil nail walls; and
- placement and compaction of fill materials.

These Quality Assurance services should help verify the design assumptions and maintain construction procedures in accordance with the project plans, specifications, and good engineering practice.

8.0 REPORT LIMITATIONS

This geotechnical report has been prepared for the exclusive use of **LUTJEN, INC.** for the specific application to the subject project. The information and recommendations contained in this report have been made in accordance with generally accepted geotechnical and foundation engineering practices; no other warranties are implied or expressed.

The assessments and recommendations submitted in this report are based in part upon the data obtained from the borings. The nature and extent of variations between the borings may not be evident at this time. If variations appear evident at a later date, it may be necessary to re-evaluate the recommendations of this report.

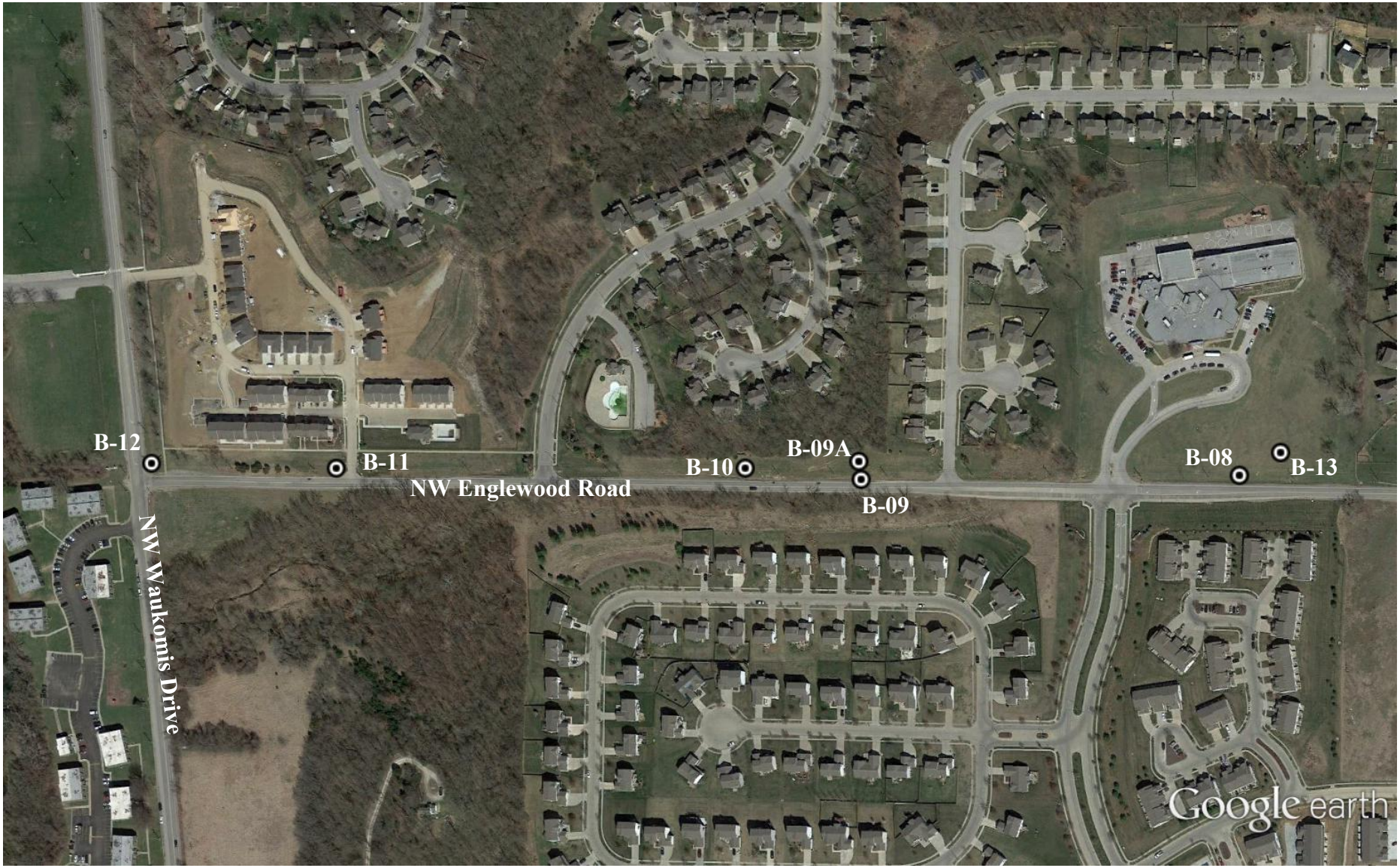
We emphasize that this report was prepared for design purposes only and may not be sufficient to prepare an accurate construction bid. Contractors reviewing this report should acknowledge that the information and recommendations contained herein are for design purposes.

If conditions at the site have changed due to natural causes or other operations, this report should be reviewed by TSi to determine the applicability of the analyses and recommendations considering the changed conditions. The report should also be reviewed by TSi if changes occur in the structure location, size, and type, in the planned loads, elevations, grading and site development plans or the project concepts.

TSi requests the opportunity to review the final plans and specifications for the project prior to construction to verify that the recommendations in this report are properly interpreted and incorporated in the design and construction documents. If TSi is not accorded the opportunity to make this recommended review, we can assume no responsibility for the misinterpretation of our recommendations.

APPENDIX A

Site and Boring Location Plan

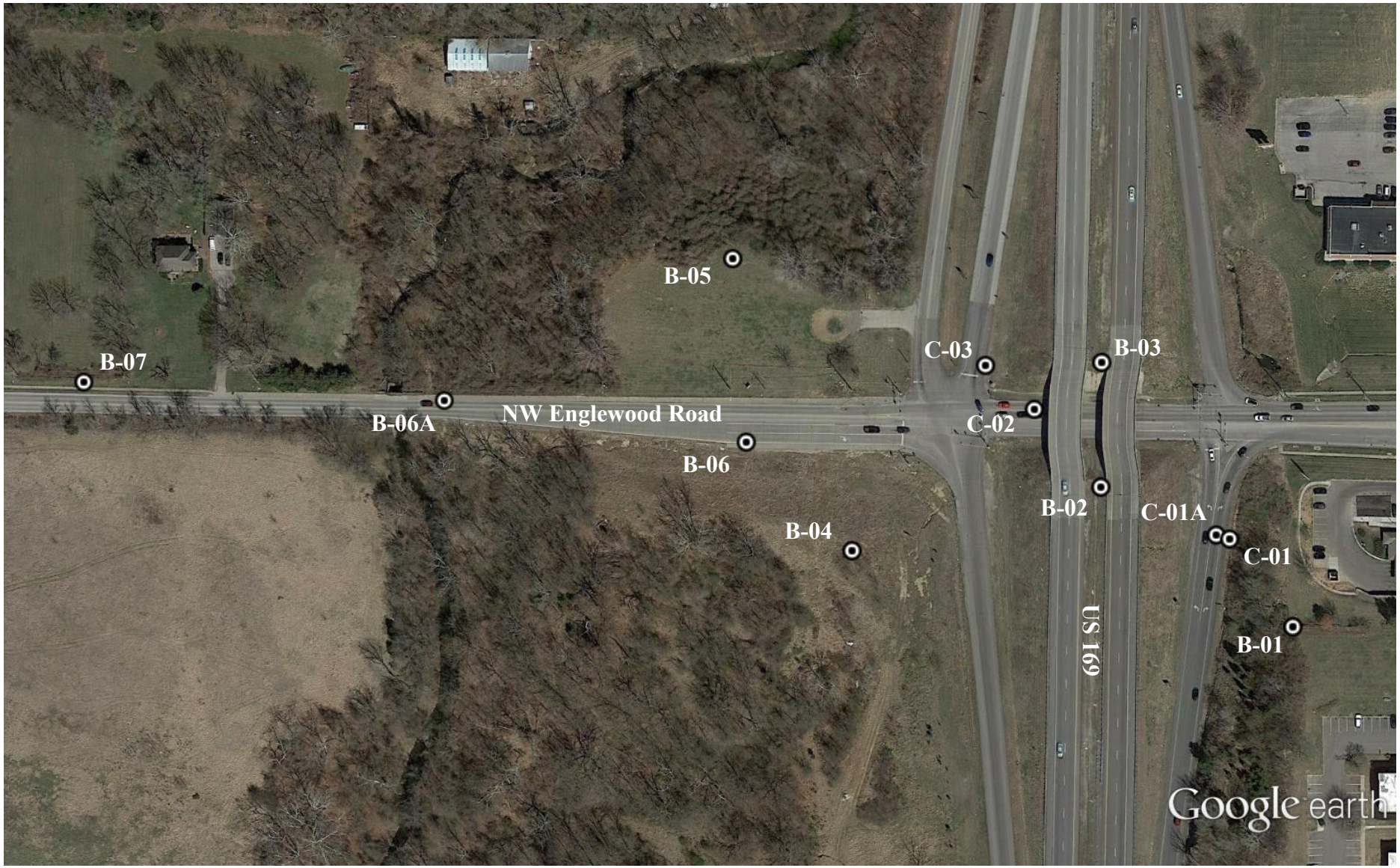


Legend

Bore Hole

N
W E
S

Figure 1.1, Site and Boring Location Plan	Project No. 20152010
Englewood Road Improvements Kansas City, Missouri	
Not to Scale	Approved by: KDF



Legend

Bore Hole

N
W E
S

Figure 1.2, Site and Boring Location Plan	Project No. 20152010
Englewood Road Improvements Kansas City, Missouri	
Not to Scale	Approved by: KDF

APPENDIX B

Logs of Boring
General Notes
Unified Soil Classification System

LOG OF BORING NO. B-01

Project Description: **Englewood Road Improvements**
Kansas City, Missouri

TSi Geotechnical
1322 Adams Street
Kansas City, KS 66103
(913) 749-4010 (913) 749-4011 FAX

Surface El.: **900.1**
Location: **Northing: 1102761.88**
Easting: 2763428.38

Depth, feet	Sample #	MATERIAL DESCRIPTION	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Brown, lean CLAY, with grass and roots										
		Brown, lean CLAY (CL), trace organics										
	SS-1	Brown to light gray, fat CLAY (CH), trace sand (91% passing No. 200 sieve)	72		2 2 4				22	54	21	33
5												
	ST-2	SHALE, brown to light gray, highly weathered, trace sand	89				1.12	113	16			
	SS-3		94		11 22 36				14			
10												
	SS-4		100		20 42 50				14			
15		- gray below 16.0 ft.										
	SS-5		100		14 50/6"				10			
20												
	SS-6		80		30 50/4"				8			
25												

Completion Depth:	38.00
Date Boring Started:	7/25/15
Date Boring Completed:	7/25/15
Engineer/Geologist:	JJ
Project No.:	20152010

Remarks: Boring drilled with CME-75 using HSA and auto SPT.
Groundwater not encountered during drilling.
ST-2 refusal at 7.5 ft.
Auger refusal at 38.0 ft.

The stratification lines represent approximate strata boundaries.
In situations, the transition may be gradual.

Continued Next Page

LOG OF BORING NO. B-01

Project Description: **Englewood Road Improvements**
Kansas City, Missouri

TSi Geotechnical
1322 Adams Street
Kansas City, KS 66103
(913) 749-4010 (913) 749-4011 FAX

Surface El.: **900.1**

Location: **Northing: 1102761.88**
Easting: 2763428.38

Depth, feet	Samples	Sample #	Graphic Log	MATERIAL DESCRIPTION	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
				SHALE, gray, highly weathered, trace sand										
		SS-7			100		50/6"				9			
30														
		SS-8			100		50/5"				9			
35														
				Boring terminated at 38.0 ft.										
40														
45														
50														

Completion Depth: 38.00
Date Boring Started: 7/25/15
Date Boring Completed: 7/25/15
Engineer/Geologist: JJ
Project No.: 20152010

Remarks: Boring drilled with CME-75 using HSA and auto SPT.
Groundwater not encountered during drilling.
ST-2 refusal at 7.5 ft.
Auger refusal at 38.0 ft.

The stratification lines represent approximate strata boundaries.
In situations, the transition may be gradual.

KC LOG WITH LAB ENGLEWOOD GINT.GPJ 10/26/15

LOG OF BORING NO. B-02

Project Description: **Englewood Road Improvements**
Kansas City, Missouri

TSi Geotechnical
1322 Adams Street
Kansas City, KS 66103
(913) 749-4010 (913) 749-4011 FAX

Surface El.: **896.0**
Location: **Northing: 1102884.51**
Easting: 2763208.07

Depth, feet	Sample #	MATERIAL DESCRIPTION	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Brown, lean CLAY, with grass and roots										
		Gray, lean CLAY (CL) with sand and shale pieces (FILL)										
5	ST-1		100				0.51	118	13			
		- brown below 6.0 ft.										
		- gray below 8.0 ft.										
10	ST-2	▽	92				0.32	114	17			
		Gray, lean CLAY (CL)										
	ST-3	- brown and gray below 11.9 ft.	100				2.12	107	22	39	18	21
15		Gray, fat CLAY (CH)										
	ST-4						0.20	94	32			
20		Boring terminated at 20.0 ft.										
25												

Completion Depth: 20.00
Date Boring Started: 8/28/15
Date Boring Completed: 8/28/15
Engineer/Geologist: AB
Project No.: 20152010

Remarks: Boring drilled using hand auger equipment.
Boring offset 10.0 ft. south.
Groundwater encountered at 10.0 ft. during drilling.

The stratification lines represent approximate strata boundaries.
In situations, the transition may be gradual.

KC LOG WITH LAB ENGLEWOOD GINT.GPJ 10/26/15

LOG OF BORING NO. B-03

Project Description: **Englewood Road Improvements**
Kansas City, Missouri

TSi Geotechnical
1322 Adams Street
Kansas City, KS 66103
(913) 749-4010 (913) 749-4011 FAX

Surface El.: **894.0**
Location: **Northing: 1103027.16**
Easting: 2763210.57

Depth, feet	Samples	Sample #	Graphic Log	MATERIAL DESCRIPTION	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
				Brown, lean CLAY, with grass and roots										
				Gray and brown, lean CLAY (CL), with sand and shale pieces (FILL)										
		ST-1			100					100	25			
5														
		ST-2			100				0.60	120	13			
10														
		ST-3		Brown, lean CLAY (CL), with sand - gray and brown, trace sand below 13.1 ft.	100					104	20	33	17	16
15														
		ST-4			100				0.64	104	22			
20				Boring terminated at 20.3 ft.										
25														

Completion Depth: 20.30
Date Boring Started: 8/28/15
Date Boring Completed: 8/28/15
Engineer/Geologist: AB
Project No.: 20152010

Remarks: Boring drilled using hand auger equipment.
Groundwater not encountered during drilling.

The stratification lines represent approximate strata boundaries.
In situations, the transition may be gradual.

KC LOG WITH LAB ENGLEWOOD GINT.GPJ 10/26/15

LOG OF BORING NO. B-04

Project Description: **Englewood Road Improvements**
Kansas City, Missouri

TSi Geotechnical
1322 Adams Street
Kansas City, KS 66103
(913) 749-4010 (913) 749-4011 FAX

Surface El.: **895.4**
Location: **Northing: 1102798.84**
Easting: 2762889.94

Depth, feet	Sample #	Material Description	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Brown, lean CLAY, with grass and roots										
		Brown, lean CLAY (CL)										
5	SS-1		100		2 2 4	1.25			28			
	ST-2		58			3.50	0.95	104	21			
	SS-3		89		4 5 6	2.00			18			
10												
		Tan and gray, fat CLAY (CH)										
	SS-4	(92% passing No. 200 sieve)	100		5 6 10	>4.00			21	50	20	30
15												
		SHALE, tan, moderately weathered										
	SS-5		100		18 29 50/5"	>4.00			13			
20		Boring terminated at 20.0 ft.										
25												

Completion Depth:	20.00
Date Boring Started:	7/24/15
Date Boring Completed:	7/24/15
Engineer/Geologist:	AB
Project No.:	20152010

Remarks: Boring drilled with CME-75 using FA and auto SPT. Groundwater not encountered during drilling.

The stratification lines represent approximate strata boundaries.
In situations, the transition may be gradual.

KC LOG WITH LAB ENGLEWOOD GINT.GPJ 10/26/15

LOG OF BORING NO. B-05

Project Description: **Englewood Road Improvements**
Kansas City, Missouri

TSi Geotechnical
1322 Adams Street
Kansas City, KS 66103
(913) 749-4010 (913) 749-4011 FAX

Surface El.: **872.7**
Location: **Northing: 1103163.22**
Easting: 2762720.26

Depth, feet	Samples	Sample #	Graphic Log	MATERIAL DESCRIPTION	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
				Brown, lean CLAY, with grass and roots										
				Brown, lean CLAY (CL)										
5		SS-1			78		2 3 4	2.00			24			
		ST-2			58			1.25	0.50	99	23			
		SS-3		(89% passing No. 200 sieve)	100		1 3 4	1.50			21	40	17	23
10														
				LIMESTONE, gray, moderately weathered										
				Boring terminated at 12.5 ft.										
15														
20														
25														

Completion Depth: 12.50
Date Boring Started: 7/24/15
Date Boring Completed: 7/24/15
Engineer/Geologist: KH
Project No.: 20152010

Remarks: Boring drilled with CME-75 using HSA and auto SPT.
Groundwater not encountered during drilling.
Auger refusal at 12.5 ft.

The stratification lines represent approximate strata boundaries.
In situations, the transition may be gradual.

KC LOG WITH LAB ENGLEWOOD GINT.GPJ 10/26/15

LOG OF BORING NO. B-06

Project Description: **Englewood Road Improvements**
Kansas City, Missouri

TSi Geotechnical
1322 Adams Street
Kansas City, KS 66103
(913) 749-4010 (913) 749-4011 FAX

Surface El.: **874.6**
Location: **Northing: 1102944.64**
Easting: 2762776.72

Depth, feet	Sample #	MATERIAL DESCRIPTION	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Portland cement concrete (9.0")										
5	SS-1	Gray, lean CLAY (CL), with concrete pieces (FILL)	67		1 3 4				23			
	ST-2	Brown, lean CLAY (CL)	42			3.00	0.73	101	24			
10	SS-3	Gray, fat CLAY (CH)	72		1 2 3				25			
15	SS-4		78		4 5 5				24	54	20	34
20	SS-5	SHALE, greenish brown, highly weathered	67		7 15 13				15			
		Boring terminated at 20.0 ft.										
25												

Completion Depth:	20.00
Date Boring Started:	8/28/15
Date Boring Completed:	8/28/15
Engineer/Geologist:	NC
Project No.:	20152010

Remarks: Boring drilled with CME-75 using FA and auto SPT. Groundwater not encountered during drilling. Boring offset approx. 100 ft. East due to utility conflicts.

The stratification lines represent approximate strata boundaries.
In situations, the transition may be gradual.

KC LOG WITH LAB ENGLEWOOD GINT.GPJ 10/26/15

LOG OF BORING NO. B-06A

Project Description: **Englewood Road Improvements**
Kansas City, Missouri

TSi Geotechnical
1322 Adams Street
Kansas City, KS 66103
(913) 749-4010 (913) 749-4011 FAX

Surface El.: **838.0**
Location: **Northing: 1102987.56**
Easting: 2762351.66

Depth, feet	Samples	Sample #	Graphic Log	MATERIAL DESCRIPTION	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
				Asphaltic concrete (6.0")										
				Dark brown, silty lean CLAY (CL)										
5		SS-1			67		2 2 3				23			
10		SS-2			100		2 2 3				27			
				Brown, fat CLAY (CH)										
15		SS-3		- shaley fat clay below 14.5 ft.	100		3 3 6				23			
				LIMESTONE, gray, highly weathered										
				Boring terminated at 16.8 ft.										
20														
25														

Completion Depth: 16.80
Date Boring Started: 10/8/15
Date Boring Completed: 10/8/15
Engineer/Geologist: KH
Project No.: 20152010

Remarks: Boring drilled with CME-45 using HSA and auto SPT.
Groundwater not encountered during drilling.
Auger refusal at 16.8 ft.

The stratification lines represent approximate strata boundaries.
In situations, the transition may be gradual.

KC LOG WITH LAB ENGLEWOOD GINT.GPJ 10/26/15

LOG OF BORING NO. B-07

Project Description: **Englewood Road Improvements**
Kansas City, Missouri

TSi Geotechnical
1322 Adams Street
Kansas City, KS 66103
(913) 749-4010 (913) 749-4011 FAX

Surface El.: **850.7**
Location: **Northing: 1103018.35**
Easting: 2761926.58

Depth, feet	Samples	Sample #	Graphic Log	MATERIAL DESCRIPTION	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
				Brown, lean CLAY, with grass and roots										
				Brown, lean CLAY (CL), with organics										
				(89% passing No. 200 sieve)										
5		SS-1			94		1 2 2				24	48	17	31
		ST-2			75				0.51	97	26			
				- red-brown, trace sand below 7.0 ft.										
		SS-3			100		1 2 2				27			
10														
		SS-4			100		2 1 3				23			
15														
				▽										
		SS-5			100		1 2 3				25			
20				Boring terminated at 20.0 ft.										
25														

Completion Depth:	20.00
Date Boring Started:	7/25/15
Date Boring Completed:	7/25/15
Engineer/Geologist:	NC
Project No.:	20152010

Remarks: Boring drilled with CME-75 using FA and auto SPT. Groundwater encountered at 18.5 ft. during drilling.

The stratification lines represent approximate strata boundaries.
In situations, the transition may be gradual.

KC LOG WITH LAB ENGLEWOOD GINT.GPJ 10/26/15

LOG OF BORING NO. B-08

Project Description: **Englewood Road Improvements**
Kansas City, Missouri

TSi Geotechnical
1322 Adams Street
Kansas City, KS 66103
(913) 749-4010 (913) 749-4011 FAX

Surface El.: **867.9**

Location: **Northing: 1103019.47**
Easting: 2760877.98

Depth, feet	Sample #	MATERIAL DESCRIPTION	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Brown, lean CLAY, with grass, roots, and gravel										
		Brown, lean CLAY (CL)										
	SS-1	- trace organics from 3.5 to 5.0 ft.	100		2 2 4				23			
5	ST-2	- red-brown below 6.0 ft. (92% passing No. 200 sieve)	67				0.69	101	24	48	15	33
	SS-3		100		2 2 4				24			
10												
	SS-4		100		1 2 2				25			
15												
	SS-5		100		2 4 7				21			
20		SHALE, tan and light gray, highly weathered										
		LIMESTONE, gray, highly weathered										
		Boring terminated at 20.0 ft.										
25												

Completion Depth: 20.00
Date Boring Started: 7/25/15
Date Boring Completed: 7/25/15
Engineer/Geologist: JJ
Project No.: 20152010

Remarks: Boring drilled with CME-75 using FA and auto SPT. Groundwater not encountered during drilling.

The stratification lines represent approximate strata boundaries.
In situations, the transition may be gradual.

KC LOG WITH LAB ENGLEWOOD GINT.GPJ 10/26/15

LOG OF BORING NO. B-09

Project Description: **Englewood Road Improvements**
Kansas City, Missouri

TSi Geotechnical
1322 Adams Street
Kansas City, KS 66103
(913) 749-4010 (913) 749-4011 FAX

Surface El.: **856.8**
Location: **Northing: 1103011.30**
Easting: 2760028.55

Depth, feet	Samples	Sample #	Graphic Log	MATERIAL DESCRIPTION	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
				Brown, lean CLAY, with grass and roots										
				Brown, lean CLAY (CL)										
				Brown, fat CLAY (CH)										
5		SS-1		- 1.0" weathered limestone seam at 4.0 ft.	89		5 4 5	2.00			33			
		SS-2		LIMESTONE, light gray, highly weathered to weathered	100		30 17 50/5"				4			
		SS-3			80		50/5"				3			
10				Boring terminated at 10.0 ft.										
15														
20														
25														

Completion Depth: 10.00
Date Boring Started: 8/11/15
Date Boring Completed: 8/11/15
Engineer/Geologist: KH
Project No.: 20152010

Remarks: Boring drilled with CME-75 using FA and auto SPT. Groundwater not encountered during drilling.

The stratification lines represent approximate strata boundaries.
In situations, the transition may be gradual.

KC LOG WITH LAB ENGLEWOOD GINT.GPJ 10/26/15

LOG OF BORING NO. B-09A

Project Description: **Englewood Road Improvements**
Kansas City, Missouri

TSi Geotechnical
1322 Adams Street
Kansas City, KS 66103
(913) 749-4010 (913) 749-4011 FAX

Surface El.: **864.2**
Location: **Northing: 1103087.18**
Easting: 2760023.12

Depth, feet	Samples	Sample #	Graphic Log	MATERIAL DESCRIPTION	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
				Brown CLAY, with grass and roots										
				Brown, lean CLAY (CL)										
5		SS-1			83		3 6 8				18			
				Light brown, shaley fat CLAY (CH)										
		SS-2		- dark brown below 9.0 ft. - orange-brown below 9.5 ft.	83		3 4 5				22			
10				Boring terminated at 10.0 ft.										
15														
20														
25														

Completion Depth: 10.00
Date Boring Started: 10/8/15
Date Boring Completed: 10/8/15
Engineer/Geologist: KH
Project No.: 20152010

Remarks: Boring drilled with CME-45 using FA and auto SPT. Groundwater not encountered during drilling.

The stratification lines represent approximate strata boundaries.
In situations, the transition may be gradual.

KC LOG WITH LAB ENGLEWOOD GINT.GPJ 10/26/15

LOG OF BORING NO. B-10

Project Description: **Englewood Road Improvements**
Kansas City, Missouri

TSi Geotechnical
1322 Adams Street
Kansas City, KS 66103
(913) 749-4010 (913) 749-4011 FAX

Surface El.: **852.2**
Location: **Northing: 1103060.42**
Easting: 2759771.18

Depth, feet	Sample #	MATERIAL DESCRIPTION	Recovery %	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Water Content, %
		Brown, lean CLAY, with grass and roots				
		Brown, lean CLAY (CL), with limestone pieces				
5	SS-1		44	1 2 2	0.75	19
	SS-2		100	3 8 12	>4.5	25
10	SS-3		100	3 3 3	3.25	17
		SHALE, brown and gray, blocky, highly weathered				
15	SS-4		89	9 9 8	>4.5	15
		- gray, not blocky below 17.5 ft.				
	SS-5		100	32 50/2"		10
20		Boring terminated at 19.2 ft.				
25						

Completion Depth: 19.20
Date Boring Started: 8/11/15
Date Boring Completed: 8/11/15
Engineer/Geologist: KH
Project No.: 20152010

Remarks: Boring drilled with CME-75 using FA and auto SPT. Groundwater not encountered during drilling.

The stratification lines represent approximate strata boundaries.
In situations, the transition may be gradual.

KC LOG WITH LAB ENGLEWOOD GINT.GPJ 10/26/15

LOG OF BORING NO. B-11

Project Description: **Englewood Road Improvements**
Kansas City, Missouri

TSi Geotechnical
1322 Adams Street
Kansas City, KS 66103
(913) 749-4010 (913) 749-4011 FAX

Surface El.: **807.5**
Location: **Northing: 1103058.28**
Easting: 2758752.49

Depth, feet	Samples	Sample #	Graphic Log	MATERIAL DESCRIPTION	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
				Red-brown, lean CLAY, with grass and roots										
				Red-brown, lean CLAY (CL)										
				SHALE, light brown to light gray, highly weathered										
				(90% passing No. 200 sieve)										
5		SS-1			100		4 6 5				15	61	27	34
		ST-2			67						17			
		SS-3			100		10 16 21				17			
10														
		SS-4		LIMESTONE, gray, moderately weathered			50/0"							
				Boring terminated at 13.5 ft.										
15														
20														
25														

Completion Depth: 13.50
Date Boring Started: 7/25/15
Date Boring Completed: 7/25/15
Engineer/Geologist: JJ
Project No.: 20152010

Remarks: Boring drilled with CME-75 using FA and auto SPT.
Groundwater not encountered during drilling.
ST-2 refusal at 7.0 ft.
Auger refusal at 13.5 ft.

The stratification lines represent approximate strata boundaries.
In situations, the transition may be gradual.

KC LOG WITH LAB ENGLEWOOD GINT.GPJ 10/26/15

LOG OF BORING NO. B-12

Project Description: **Englewood Road Improvements**
Kansas City, Missouri

TSi Geotechnical
1322 Adams Street
Kansas City, KS 66103
(913) 749-4010 (913) 749-4011 FAX

Surface El.: **789.8**
Location: **Northing: 1103058.78**
Easting: 2758327.38

Depth, feet	Samples	Sample #	Graphic Log	MATERIAL DESCRIPTION	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
				Dark brown, lean CLAY, with grass and roots										
				Brown, lean CLAY (CL), trace sand										
5		SS-1			100		3 4 5				24			
		ST-2			46			1.00	0.83	102	24			
10		SS-3			100		1 1 2				24			
				▽										
15		SS-4		(92% passing No. 200 sieve)	100		1 2 3				27	43	16	27
20		SS-5			100		WH 1 1				28			
				Boring terminated at 20.0 ft.										
25														

Completion Depth:	20.00
Date Boring Started:	7/25/15
Date Boring Completed:	7/25/15
Engineer/Geologist:	JJ
Project No.:	20152010

Remarks: Boring drilled with CME-75 using FA and auto SPT.
Groundwater encountered at 13.0 ft. during drilling.

The stratification lines represent approximate strata boundaries.
In situations, the transition may be gradual.

KC LOG WITH LAB ENGLEWOOD GINT.GPJ 10/26/15

LOG OF BORING NO. B-13

Project Description: **Englewood Road Improvements**
Kansas City, Missouri

TSi Geotechnical
1322 Adams Street
Kansas City, KS 66103
(913) 749-4010 (913) 749-4011 FAX

Surface El.: **871.2**
Location: **Northing: 1103091.20**
Easting: 2760965.45

Depth, feet	Sample #	MATERIAL DESCRIPTION	Recovery %	RQD	Penetration Blows Per 6 inches	Hand Penetrometer TSF	Undrained Shear Strength, TSF	Unit Dry Weight, lb/cu ft.	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Brown, lean CLAY, with roots and organics										
		Brown, lean CLAY (CL)										
5	SS-1		89		1 4 4				23			
	ST-2		67			2.50	0.89	102	23			
10	SS-3		100		2 3 4				24			
15	SS-4		100		2 3 4				22	43	18	25
20	SS-5	- shaley below 19.0 ft.	89		3 10 17				20			
		Boring terminated at 20.0 ft.										
25												

Completion Depth:	20.00
Date Boring Started:	8/28/15
Date Boring Completed:	8/28/15
Engineer/Geologist:	NC
Project No.:	20152010

Remarks: Boring drilled with CME-75 using FA and auto SPT. Groundwater not encountered during drilling.

The stratification lines represent approximate strata boundaries.
In situations, the transition may be gradual.

KC LOG WITH LAB ENGLEWOOD GINT.GPJ 10/26/15

GENERAL NOTES

The number of borings is based on: topographic and geologic factors; the magnitude of structure loading; the size, shape, and value of the structure; consequences of failure; and other factors. The type and sequence of sampling are selected to reduce the possibility of undiscovered anomalies and maintain drilling efficiency. Attempts are made to detect and/or identify occurrences during drilling and sampling such as the presence of water, boulders, gas, zones of lost circulation, relative ease or resistance to drilling progress, unusual sample recovery, variation in resistance to driving split-spoon samplers, unusual odors, etc. However, lack of notation regarding these occurrences does not preclude their presence.

Although attempts are made to obtain stabilized groundwater levels, the levels shown on the Logs of Boring may not have stabilized, particularly in more impermeable cohesive soils. Consequently, the indicated groundwater levels may not represent present or future levels. Groundwater levels may vary significantly over time due to the effects of precipitation, infiltration, or other factors not evident at the time indicated.

Unless otherwise noted, soil classifications indicated on the Logs of Boring are based on visual observations and are not the result of classification tests. Although visual classifications are performed by experienced technicians or engineers, classifications so made may not be conclusive.

Generally, variations in texture less than one foot in thickness are described as layers within a stratum, while thicker zones are logged as individual strata. However, minor anomalies and changes of questionable lateral extent may appear only in the verbal description. The lines indicating changes in strata on the Logs of Borings are approximate boundaries only, as the actual material change may be between samples or may be a gradual transition.

Samples chosen for laboratory testing are selected in such a manner as to measure selected physical characteristics of each material encountered. However, as samples are recovered only intermittently and not all samples undergo a complete series of tests, the results of such tests may not conclusively represent the characteristics of all subsurface materials present.

NOTATION USED ON BORING LOGS

APPROXIMATE PROPORTIONS

TRACE	<15%
WITH	15-30%
MODIFIER	>30%

Clay or clayey may be used as major material or modifier, regardless of relative proportions, if the clay content is sufficient to dominate the soil properties.

PARTICLE SIZE

BOULDERS		>12 Inches
COBBLES		12 Inches – 3 Inches
GRAVEL		
	Coarse	3 Inches – ¾ Inch
	Fine	¾ Inch – No. 4 Sieve (4.750 mm)
SAND		
	Coarse	No. 4 – No. 10 Sieve (2.000 mm)
	Medium	No. 10 – No. 40 Sieve (0.420 mm)
	Fine	No. 40 – No. 200 Sieve (0.074 mm)
SILT		No. 200 Sieve - 0.002 mm
CLAY		< 0.002 mm

PENETRATION – BLOWS

Number of impacts of a 140-pound hammer falling a distance of 30 inches to cause a standard split-barrel sampler, 1 3/8 inches I.D., to penetrate a distance of 6 inches. The number of impacts for the first 6 inches of penetration is known as the seating drive. The sum of the impacts for the last 12 inches of penetration is the Standard Penetration Test Resistance or "N" value, blows per foot. For example, if blows = 6-8-9, "N" = 8+9 or 17.

OTHER NOTATIONS

Recovery % – length of recovered soil divided by length of sample attempted.

50/2"	Impacts of hammer to cause sampler to penetrate the indicated number of inches
WR	Sampler penetrated under the static loading of the weight of the drill rods
WH	Sampler penetrated under the static loading the weight of the hammer and drill rods
HSA	Hollow stem auger drilling method
FA	Flight auger drilling method
RW	Rotary wash drilling methods with drilling mud
AH	Automatic hammer used for Standard Penetration Test sample
SH	Safety hammer with rope and cathead used for Standard Penetration Test sample

GRAPHIC SYMBOLS

▽ Depth at which groundwater was encountered during drilling

▼ Depth at which groundwater was measured after drilling

⧗ Standard Penetration Test Sample, ASTM D1586

▮ 3-inch diameter Shelby Tube Sample, ASTM D1587

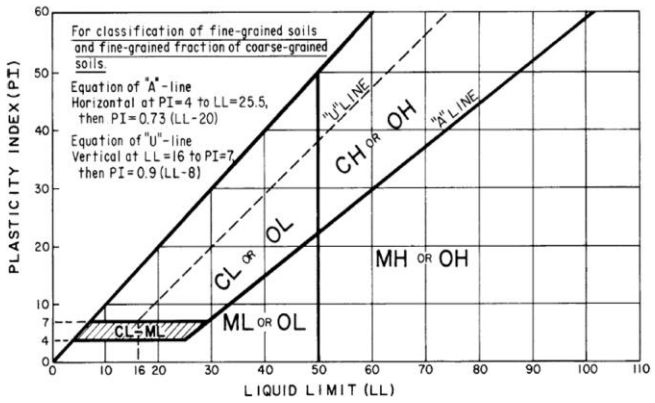
G Sample grabbed from auger

▮▮ NX Size rock core sample

TSi engineering,

UNIFIED SOIL CLASSIFICATION SYSTEM, (ASTM D-2487)

Major Divisions			*Group Symbols*		*Typical Names*	*Laboratory Classification Criteria*		
Coarse-grained soils (More than half of materials is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW		Well-graded gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-Grained soils are classified as follows: Less than 5 per cent GW, GP, SW, SP; More than 12 per cent GM, GC, SM, SC; 5 to 12 per cent Borderline cases requiring dual symbols[b]	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			GP		Poorly graded gravels, gravel-sand mixtures, little or no fines		Not meeting all gradation requirements for GW	
		Gravels with fines (Appreciable amount of fines)	GM[a]	d	Silty gravels, gravel-sand-silt mixtures		Atterberg limits below "A" line or P.1. less than 4	Above "A" line with P.1. between 4 and 7 are *borderline* cases requiring use of dual symbols
				u			Atterberg limits below "A" line with P.1. greater than 7	
			GC		Clayey gravels, gravel-sand-clay mixtures			
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW		Well-graded sands, gravelly sands, little or no fines		$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			SP		Poorly graded sands, gravelly sands, little or no fines		Not meeting all gradation requirements for SW	
		Sands with fines (Appreciable amount of fines)	SM[a]	d	Silty sands, sand-mix mixtures		Atterberg limits about "A" line or P.I. less than 4	Limits plotting in hatched zone with P.I. between 4 and 7 are *borderline* cases requiring use of dual symbols
				u			Atterberg limits about "A" line with P.I. greater than 7	
			SC		Clayey sands, sand-clay mixtures			
Fine-grained soils (More than half of materials is smaller than No. 200 sieve size)	Silts and clays (Liquid limit less than 50)		ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity			
			CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays			
			OL		Organic silts and organic silty clays of low plasticity			
	Silts and clays (Liquid limit greater than 50)		MH		Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts			
			CH		Inorganic clays of medium to high plasticity, organic silts			
			OH		Organic clays of medium to high plasticity, organic silts			
	Highly organic soils		Pt		Peat and other highly organic soils			



[a]Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits; suffix d used when L.L. is 26 or less and the P.1. is 6 or less; the suffix u used when L.L. is greater than 28.

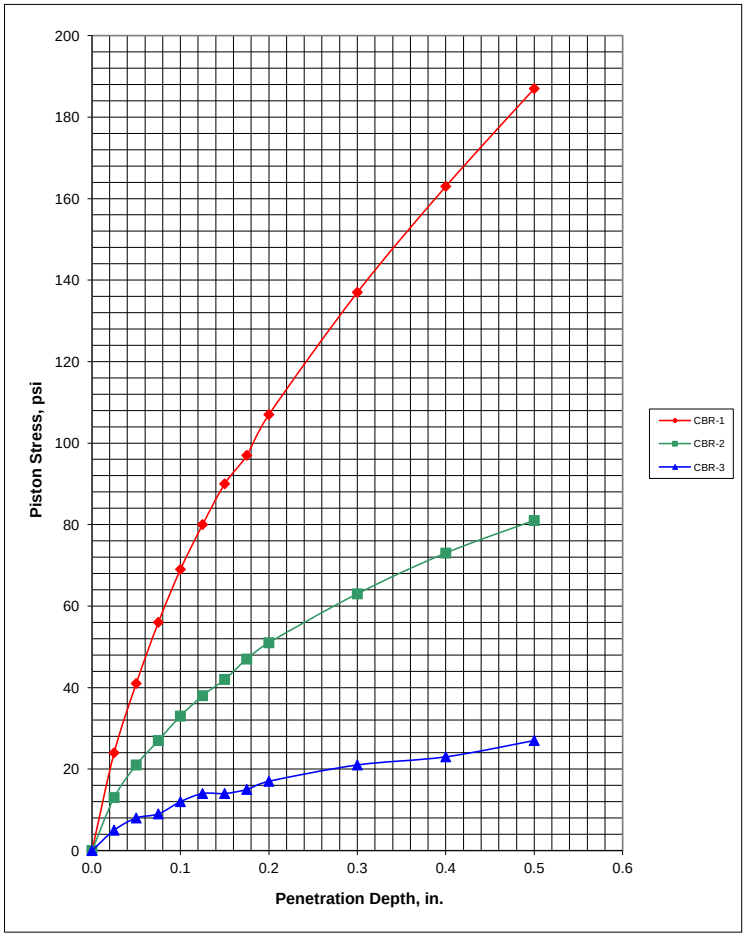
[b]Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC, well-graded gravel-sand mixture with clay binder.

APPENDIX C

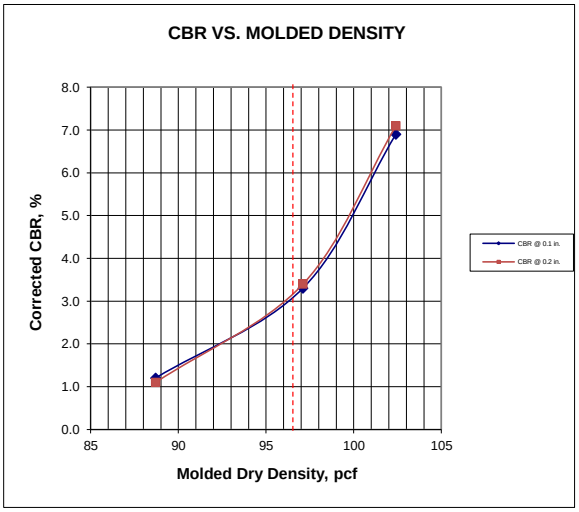
Laboratory Test Results

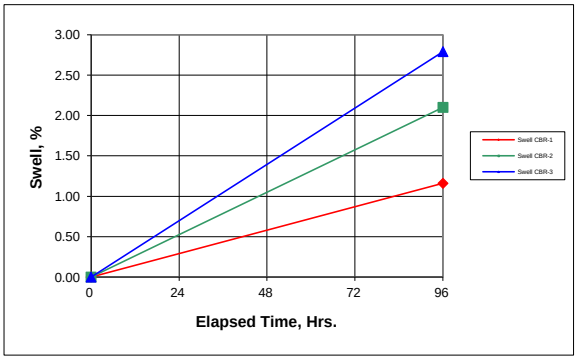
BEARING RATIO TEST REPORT

ASTM D 1883-07



% CBR Value @ 95% Compaction = 3.1 @ 0.1 in. penetration
% CBR Value @ 95% Compaction = 3.2 @ 0.2 in. penetration





	Molded			Soaked			CBR, %		Moisture of Top	Surcharge,	Max.
	Density, pcf	Percent of Max. Dens.	Moisture, %	Density, pcf	Percent of Max. Dens.	Moisture, %	0.10 in.	0.20 in.	1" Layer, %	lbs.	Swell, %
CBR-1	102.4	100.8	18.8	101.9	100.3	20.1	6.9	7.1	25.8	10	1.16
CBR-2	97.1	95.6	18.7	95.9	94.4	23.7	3.3	3.4	28.7	10	2.10
CBR-3	88.7	87.3	18.7	87.8	86.4	27.1	1.2	1.1	34.3	10	2.79

MATERIAL DESCRIPTION	USCS	MAX. DENSITY, pcf	OPTIMUM MOISTURE, %	LL	PI
Lean Clay, brown	--	101.6	18.8	--	--

Remarks:

Compaction Method: ASTM D698

BRAUN INTERTEC
The Science You Build On.

11529 W. 79th Street
Lenexa, Kansas 66214
p| 913.962.0909
f| 913.962.0924
braunintertec.com

Project:	Englewood		
Location:	Kansas City, Missouri		
Client:	TSI Engineering Inc.		
Sample No.:	15-1235		
Boring:	Bulk	Project No.:	B1506400
Depth:	n/a	Date:	8/10/15

Braun Intertec Corporation
11529 W. 79th Street
Lenexa, Kansas 66214
Phone: 913.962.0909

Proctor Report

Report No: PTR:W15-006013-S1
Issue No: 1

Client: Alan Rau
TSi Engineering
1322 Adams Street
Kansas City, KS, 66103
Project: B1506400
TSI On-Call 2015
Local on-call laboratory testing
Shawnee Mission, KS, 66214
TR: Joel Partridge, jpartridge@braunintertec.com

Laboratory Results Reviewed by:

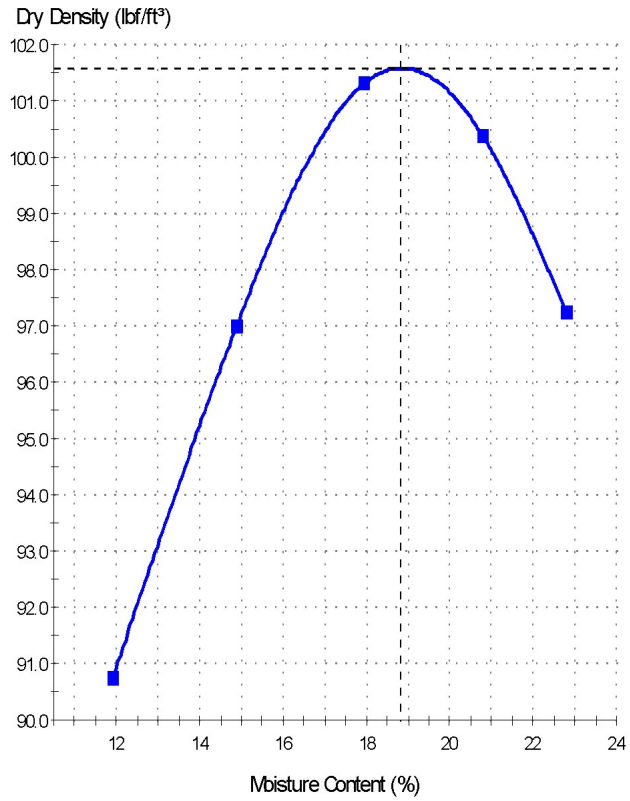
ISO/IEC 17025

Steve Tanquary
Senior Technician
Date of Issue: 8/19/2015

Sample Details

Sample ID:	W15-006013-S1	**Alternate Sample ID:**	15-1235
Date Sampled:	8/3/2015	**Date Submitted:**	8/3/2015
Sampled By:	Contractor	**Sampling Method:**	Grab
Source:	On-Site		
Material:	Lean Clay		
Specification:			
Location:	Englewood: On-Site		
Date Tested:	8/3/2015		

Dry Density - Moisture Content Relationship



Test Results

ASTM D 698 - 07^

Maximum Dry Density (lbf/ft³):	**101.6**
Corrected Maximum Dry Density (lbf/ft³):	**101.6**
Optimum Moisture Content (%):	**18.8**
Corrected Optimum Moisture Content (%):	**18.8**
Method:	A
Preparation Method:	Moist
Retained Sieve No 4 (4.75mm) (%):	0
Passing Sieve No 4 (4.75mm) (%):	100
Visual Description:	Lean Clay, Brown

Comments

^ Only ASTM and AASHTO equivalent test methods are covered by our current AAP accreditation.

APPENDIX D

Pavement Core Photographs

C-01 (Shoulder) **Englewood Road Improvements** **20152010**

Material	Thickness (in)	Notes
Asphalt	9.0	Drilled in shoulder

C-01A (Street) **Englewood Road Improvements** **20152010**

Material	Thickness (in)	Notes
Asphalt	4.25	
Concrete	6.75	Drilled in traffic lane

C-02 **Englewood Road Improvements** **20152010**

Material	Thickness (in)	Notes
Asphalt	1.5	
Concrete	8.0	

C-03 **Englewood Road Improvements** **20152010**

Material	Thickness (in)	Notes
Asphalt	1.5	
Concrete	8.0	

Bidder: _____

CITY OF FOUNTAINS
HEART OF THE NATION
KANSAS CITY
MISSOURI

UNIT PRICES

Project Number

Project Title

NOTE: IN THE EVENT OF DISCREPANCY, UNIT PRICE SHALL GOVERN.

Item No.	Unit	Quantity	Item Description:	Unit	Extension
KANSAS CITY MISSOURI STREET CONSTRUCTION					
			Miscellaneous		
1	L.S.	1	Mobilization		
2	L.S.	1	Construction Staking		
3	Ac.	13.48	Clearing & Grubbing		
4	Ac.	6.51	Tree Removal (No Burning)		
5	C.Y.	6,740	Pavement & Curb Removal		
6	S.F.	503	Signing		
7	Ea.	9	Type 3 Moveable Barricade		
8	Ea.	1	Field Office		
			Grading		
9	Ac.	19.99	Topsoil Removal, Stockpile and Distribution		
10	C.Y.	82,693	Unclassified Excavation		
11	C.Y.	71,472	Embankment		
12	S.Y.	36,897	Subgrade Stabilization (9" Flyash Treatment)		
13	S.Y.	36,897	Rock Subbase (6" MoDOT Type 5)		
14	S.Y.	36,897	Fine Grading (Subgrade)		
15	S.F.	1,261	Modular Block Retaining Wall		
			Erosion Control		
16	L.F.	14000	Silt Fence		
17	Ea.	91	Inlet Protection		
18	Ea.	1	Vehicle Tracking Device		
19	S.Y.	25730	Soil Stability Blanket		
			Pavement		
20	S.Y.	277	2" Mill and Overlay		
21	S.Y.	21,384	2" Asphalt Surface		
22	S.Y.	1,847	6" Asphalt Base		
23	S.Y.	3,615	7" Asphalt Base		
24	S.Y.	15,923	9" Asphalt Base		
25	S.Y.	6,964	Asphalt Extension Under Curb		
26	S.Y.	223	6" Concrete		
27	S.Y.	6,786	8" Concrete		
28	S.Y.	792	4" Concrete (Colored and Textured)		
29	S.Y.	748	8" Concrete (Colored and Textured)		
			Curbs & Sidewalks		
30	L.F.	14,834	Curb & Gutter (Type CG-1)		

31	L.F.	947	Curb & Gutter (Type CG-2)		
32	L.F.	8,864	Curb (Type C-1)		
33	L.F.	264	Mountable Curb & Gutter		
34	L.F.	211	Concrete Sidewalks (4' Wide, 4" Thick)		
35	L.F.	5,111	Concrete Sidewalks (5' Wide, 4" Thick)		
36	L.F.	89	Concrete Sidewalks (6' Wide, 4" Thick)		
37	L.F.	536	Concrete Sidewalks (8' Wide, 6" Thick)		
38	L.F.	4,484	Concrete Sidewalks (10' Wide, 6" Thick)		
39	S.F.	7,641	ADA Curb Ramps (6" Thick w/ Detectable Warning)		
			Pavement Marking and Signage		
40	Ea.	123	Street Sign (Includes Post & All Attached Signs)		
41	Ea.	2	School Zone Flasher Sign		
42	L.F.	56	4" Thermoplastic Solid White Pavement Marking		
43	L.F.	19	4" Thermoplastic Solid Yellow Pavement Marking		
44	L.F.	1,255	4" Thermoplastic Double Solid Yellow Pavement Marking		
45	L.F.	74	4" Thermoplastic Double Dashed Yellow Pavement Marking		
46	L.F.	7,620	6" Thermoplastic Solid White Pavement Marking		
47	L.F.	944	6" Thermoplastic Dotted White Pavement Marking		
48	L.F.	339	8" Thermoplastic Solid White Pavement Marking		
49	L.F.	172	8" Thermoplastic Dotted White Pavement Marking		
50	L.F.	74	24" Thermoplastic Solid White Stop Bar		
51	L.F.	348	24" Thermoplastic Solid White Crosswalk Line		
52	S.Y.	274	12" Thermoplastic Yellow Diagonal Hatch (12' O.C.)		
53	Ea.	11	Thermoplastic White Turn Arrow Pavement Marking		
54	Ea.	3	Thermoplastic White "ONLY" Pavement Marking		
55	Ea.	12	Thermoplastic White Bike Lane Symbol & Arrow Pavement Marking		
56	L.F.	60	4" Epoxy Dashed White Pavement Marking		
57	L.F.	172	4" Epoxy Dotted White Pavement Marking		
58	L.F.	93	4" Epoxy Solid Yellow Pavement Marking		
59	L.F.	80	4" Epoxy Double Solid Yellow Pavement Marking		
60	L.F.	593	6" Epoxy Solid White Pavement Marking		
61	L.F.	598	6" Epoxy Dotted White Pavement Marking		
62	L.F.	269	8" Epoxy Solid White Pavement Marking		
63	L.F.	1,014	12" Epoxy Solid White Pavement Marking		
64	L.F.	110	12" Epoxy Dotted White Pavement Marking		
65	L.F.	180	24" Epoxy Solid White Stop Bar		
66	Ea.	13	Epoxy White Turn Arrow Pavement Marking		
67	Ea.	1	Epoxy White Bike Lane Symbol & Arrow Pavement Marking		
			Storm Sewers		
68	L.F.	351	15" HDPE		
69	L.F.	71	18" HDPE		

70	L.F.	560	24" HDPE		
71	L.F.	99	30" HDPE		
72	L.F.	169	36" HDPE		
73	L.F.	65	42" HDPE		
74	L.F.	2133	15" RCP		
75	L.F.	314	18" RCP		
76	L.F.	1204	24" RCP		
77	L.F.	328	30" RCP		
78	L.F.	101	36" RCP		
79	L.F.	133	4'x5' RCB		
80	L.F.	74	8'x8' RCB		
81	L.F.	178	Dual 13'x15' RCB		
82	Ea.	3	15"-18" HDPE End Section		
83	Ea.	3	24"-36" HDPE End Section		
84	Ea.	1	42"-48" HDPE End Section		
85	Ea.	4	24"-36" RCP End Section		
86	Ea.	1	4'x5' RCB End Section and Wing Walls		
87	Ea.	1	8'x8' RCB End Section and Wing Walls		
88	Ea.	1	Dual 13'x15' RCB End Section and Wing Walls		
89	S.Y.	682	Type II Rock Blanket		
90	S.Y.	2448	Type IV Rock Blanket		
91	Ea.	22	4' Curb Cut Flume		
92	Ea.	1	Std. Junction Box (4' x 4' Inside)		
93	Ea.	1	Std. Junction Box (5' x 4' Inside)		
94	Ea.	2	Std. Junction Box (5' x 5' Inside)		
95	Ea.	1	Std. Junction Box (4' x 11' Inside)		
96	Ea.	1	Doghouse Junction Box (4' x 4' Inside)		
97	Ea.	2	Doghouse Junction Box (5' x 5' Inside)		
98	Ea.	2	Std. Manhole (5' Dia.)		
99	Ea.	3	Std. Curb Inlet (4' x 4' Inside)		
100	Ea.	12	Std. Curb Inlet (5' x 3' Inside)		
101	Ea.	26	Std. Curb Inlet (5' x 5' Inside)		
102	Ea.	1	Std. Curb Inlet (6' x 6' Inside)		
103	Ea.	3	Std. Curb Inlet (7' x 7' Inside)		
104	Ea.	4	Std. Field Inlet (4' x 4' Inside)		
105	Ea.	1	Connect to Existing Structure		
106	Ea.	2	Connect to Existing Box Culvert		
107	Ea.	2	Modify Existing Junction Box		
108	C.Y.	510	BMP Engineered Soil Matrix		
109	L.F.	625	BMP Drain Tile		
			Sanitary Sewers		
110	VF	36	Std. Manhole (4' dia.) Adjustment		
111	L.F.	225	Cured In Place Pipe Lining (18" Pipe)		
112	L.F.	272	Cured In Place Pipe Lining (21" Pipe)		
113	VF	40	Std. Manhole (4' dia.) Lining		

			Water Lines - Non-Participating		
114	LF	979	36" DIP CL 54 waterline (Unrestrained Joint)		
115	LF	1442	42" DIP CL 54 waterline (Unrestrained Joint)		
116	LF	120	4" DIP CL 52 waterline (Restrained Joint)		
117	LF	242	6" DIP CL 52 waterline (Restrained Joint)		
118	LF	663	8" DIP CL 52 waterline (Restrained Joint)		
119	LF	812	12" DIP CL 52 waterline (Restrained Joint)		
120	LF	120	16" DIP CL 54 waterline (Restrained Joint)		
121	LF	40	24" DIP CL 54 waterline (Restrained Joint)		
122	LF	20	30" DIP CL 54 waterline (Restrained Joint)		
123	LF	1262	36" DIP CL 54 waterline (Restrained Joint)		
124	LF	2085	42" DIP CL 54 waterline (Restrained Joint)		
125	LF	50	60" Steel Casing Pipe w/Spacers & End Seals		
126	EA	1	42" CL 54 - 11.25 Degree Bend		
127	EA	5	42" CL 54 - 45 Degree Bend		
128	EA	1	42" CL 54 - 90 Degree Bend		
129	EA	2	36" CL 54 - 11.25 Degree Bend		
130	EA	1	36" CL 54 - 22.5 Degree Bend		
131	EA	7	36" CL 54 - 45 Degree Bend		
132	EA	2	16" CL 54 - 45 Degree Bend		
133	EA	4	12" CL 52 - 45 Degree Bend		
134	EA	4	12" CL 52 - 90 Degree Bend		
135	EA	1	8" CL 52 - 11.25 Degree Bend		
136	EA	1	8" CL 52 - 22.5 Degree Bend		
137	EA	7	8" CL 52 - 45 Degree Bend		
138	EA	5	8" CL 52 - 90 Degree Bend		
139	EA	6	6" CL 52 - 45 Degree Bend		
140	EA	4	4" CL 52 - 45 Degree Bend		
141	EA	2	4" Solid Sleeve Coupling		
142	EA	3	6" Solid Sleeve Coupling		
143	EA	9	8" Solid Sleeve Coupling		
144	EA	3	12" Solid Sleeve Coupling		
145	EA	3	16" Solid Sleeve Coupling		
146	EA	2	24" Solid Sleeve Coupling		
147	EA	1	30" Solid Sleeve Coupling		
148	EA	7	36" Solid Sleeve Coupling		
149	EA	2	42" Solid Sleeve Coupling		
150	EA	2	24" PCCP to DIP Adaptor		
151	EA	2	36" PCCP to DIP Adaptor		
152	EA	3	36"x12" Reducer		
153	EA	1	36"x24" Reducer		
154	EA	1	42"x36" Reducer		
155	EA	2	42"x12" Reducer		
156	EA	1	16"x8" Reducer		
157	EA	1	12"x8" Reducer		

158	EA	1	8"x6" Reducer		
159	EA	1	6"x4" Reducer		
160	EA	6	8"Plug		
161	EA	1	12" Plug		
162	EA	1	24" Plug		
163	EA	2	36" Plug		
164	EA	1	42" Plug		
165	EA	1	Concrete Backing Block for 36" Plug		
166	EA	26	6" Gate Valve		
167	EA	13	8" Gate Valve		
168	EA	5	12" Gate Valve		
169	EA	1	16" Butterfly Valve		
170	EA	5	36" Butterfly Valve		
171	EA	1	42" Butterfly Valve		
172	EA	3	2" Air Release Assembly & Vault		
173	EA	1	3" Air Release Asssembly & Vault		
174	EA	4	8"x6" DIP Tee		
175	EA	2	8"x8" DIP Tee		
176	EA	1	12"x8" DIP Tee		
177	EA	3	12"x6" DIP Tee		
178	EA	1	16"x6" DIP Tee		
179	EA	2	36"x36" DIP Tee		
180	EA	1	36"x12" DIP Tee		
181	EA	5	36"x6" DIP Tee		
182	EA	1	36"x8" DIP Tee		
183	EA	7	42"x6" DIP Tee		
184	EA	2	42"x8" DIP Tee		
185	EA	1	42"x12" DIP Tee		
186	EA	1	42"x8" DIP Cross		
187	EA	1	36"x16" DIP Cross		
188	EA	1	42"x42" DIP Wye		
189	EA	2	Straddle Block on 4" Main		
190	EA	4	Straddle Block on 6" Main		
191	EA	10	Straddle Block on 8" Main		
192	EA	6	Straddle Block on 12" Main		
193	EA	1	Straddle Block on 16" Main		
194	EA	1	Straddle Block on 24" Main		
195	EA	1	Straddle Block on 36" Main		
196	EA	1	Water Service Transfer (Reg 51506)		
197	EA	14	Fire Hydrant Assembly		
198	EA	1	Flushing Assembly for 16-inch Pipe		
199	EA	6	Flushing Assembly for 12-inch Pipe		
200	EA	7	Flushing Assembly for 8-inch Pipe		
201	EA	3	Flushing Assembly for 6-inch Pipe		
202	EA	1	Flushing Assembly for 4-inch Pipe		

203	EA	13	Pipeline Markers		
MODOT STREET CONSTRUCTION					
			Grading		
204	C.Y.	1,776	Pavement, Curb, and Sidewalk Removal		
205	C.Y.	4,281	MoDOT Class A Excavation		
206	C.Y.	1,966	MoDOT Class C Excavation		
207	C.Y.	2,317	MoDOT Compacting Embankment		
208	S.Y.	2,818	Rock Subbase (4" MoDOT Type 5)		
209	S.Y.	5,374	Rock Subbase (6" MoDOT Type 5)		
			Pavement		
210	S.Y.	512	5.75" MoDOT Type A Shoulder (CONC)		
211	S.Y.	6,881	9" Concrete Pavement		
212	TON	124	2" Asphalt Pavement (Englewood Overlay)		
213	S.Y.	333	4" Concrete (Colored and Textured)		
214	S.Y.	1,103	2" Milling		
			Curbs, Sidewalks, & Drives		
215	L.F.	1,129	Curb & Gutter (Type CG-1)		
216	L.F.	1,357	Curb & Gutter (Edge Curb, Type DC-2)		
217	S.Y.	108	Concrete Sidewalks (MoDOT Concrete Median Strip)		
218	S.Y.	760	Concrete Sidewalks (5' Wide)		
219	S.Y.	271	Concrete Shared Use Path (10' Wide)		
220	S.Y.	118	ADA Curb Ramps		
			Pavement Marking & Signage		
221	Ea.	42	Street Signs (Includes Post & All Attached Signs)		
222	Ea.	2	Relocate Existing Signs (Includes Posts and Footings)		
223	L.F.	1,440	4" Solid White Thermoplastic		
224	L.F.	302	4" Dashed White Thermoplastic		
225	L.F.	188	4" Dotted White Thermoplastic		
226	L.F.	780	4" Double Solid Yellow Thermoplastic		
227	L.F.	1,038	6" Solid White Edge Line		
228	L.F.	975	6" Solid White Lane Line		
229	L.F.	1,133	6" Solid Yellow Edge Line		
230	L.F.	376	12" Solid White Thermoplastic		
231	L.F.	140	24" Solid White Thermoplastic		
232	Ea.	31	16"x24" White Thermoplastic Yield Triangle		
233	Ea.	26	White Thermoplastic Turn Arrow		
234	Ea.	2	White Thermoplastic "ONLY"		
			Storm Sewers		
235	L.F.	25	15" RCP		
236	L.F.	197	18" RCP		
237	L.F.	48	21" RCP		
238	L.F.	174	24" RCP		
239	L.F.	15	30" RCP		
240	Ea.	2	18" RCP End Section		

241	Ea.	1	24" RCP End Section with Concrete Toe Wall		
242	Ea.	6	Culvert Cleanout		
243	Ea.	3	Std. Curb Inlet (5' x 3' Inside) (0' - 6' deep)		
244	V.F.	3.2	Extra Depth on Curb Inlet (5' x 3')		
245	Ea.	1	Std. Curb Inlet (5' x 4' Inside) (0' - 6' deep)		
246	Ea.	1	Std. Curb Inlet (8' x 4' Inside) (0' - 6' deep)		
247	Ea.	4	MODOT - Precast Drop Inlet (5' x 4') (Type S) (0'-6' deep)		
248	Ea.	1	Std. Manhole (4' Inside Diameter) (0' - 6' deep)		
249	Ea.	2	Adjust Existing Drainage Structure		
			Miscellaneous		
250	L.S.	1	Demolition		
251	Ac.	0.3	Tree Clearing (no burning)		
252	L.F.	445	Gutter (MoDOT Type B Gutter)		
253	S.Y.	472	Slope Protection (MoDOT Concrete Slope Protection)		
254	L.F.	575	MGS Guardrail, 8' Posts		
255	Ea.	1	MASH Approved Crashworthy End Terminal		
256	Ea.	2	MGS End Anchor Section		
257	Ea.	1	MGS to Type A Guardrail Transition		
			Temporary Traffic Control		
258	S.F.	1018	Signing		
259	Ea.	150	Channelizers		
260	Ea.	30	Type 3 Moveable Barricade		
261	Ea.	3	Flashing Arrow Panel		
262	Ea.	20	Tubular Marker		
263	L.F.	220	Traffic Barrier		
264	Ea.	3	Changeable Message Sign		
265	Ea.	2	Barrier Height Transition		
266	L.F.	4860	4" Temp. Solid White		
267	L.F.	5260	4" Temp. Solid Yellow		
268	L.F.	60	24" Temp. Solid White		
269	L.F.	9970	Pavement Marking Removal		
270	L.S.	1	Traffic Signal No. 1 - Summit/Englewood		
271	L.S.	1	Traffic Signal No. 2 - Western Ramps/Englewood		
272	L.S.	1	Traffic Signal No. 3 - Eastern Ramps/Englewood		
273	S.F.	11785	Retaining Wall beneath 169 Hwy		
			Street Lighting		
274	Ea.	52	LED Luminaire, 35' Mounting Height, 8" arm w/ Pole		
275	Ea.	4	400 Watt HPS Luminaire, 35' Mounting Height, 6' Bracket Arm, w/ Pole		
276	Ea.	8	250 Watt HPS Luminaire, 35' Mounting Height, 6' Bracket Arm, w/ Pole		
277	Ea.	1	150 Watt HPS Luminaire, 30' Mounting Height, 6' Bracket Arm, w/ Pole		
278	Ea.	1	Screw In Base - Small		
279	Ea.	64	Screw In Base - Large		

280	Ea.	1	6" Anit-Theft Device		
281	Ea.	64	8" Anit-Theft Device		
282	Ea.	72	KCMO ID Labels		
283	Ea.	4	Ground Rod		
284	Ea.	6	Pull Box		
285	Ea.	2	Lighting Controller, 1ckt		
286	Ea.	2	Lighting Controller, 2ckt		
287	Ea.	65	Breakaway, Set-Screw HEB Fuse Kits w/ 10A Fuses		
288	Ea.	130	Unfused Breakaway Fuse Kits		
289	L.F.	9740	2#4, 1#6 RHH/RHW/USE		
290	L.F.	765	2#8, 1#8 RHH/RHW/USE		
291	L.F.	2984	3#10 RHW/USE (Internal Pole Wiring)		
292	L.F.	400	3#1, USE		
293	L.F.	10505	2" PVC		
294	L.F.	400	3" PVC		
295	Ea.	4	KCPL Services		
296	Ea.	7	Remove Existing Luminaries: NMF0612 - NMF 0618		
297	Ea.	4	Remove Existing Luminaries: NLF0040 - NLF0043		
298	Ea.	2	Remove Existing Luminaries: NLF0001 - NLF0002		
299	Ea.	11	Remove Existing Luminaries: NMG1001 - NMG1011		
300	Ea.	5	Remove Existing Luminaries: NMG1520 - NMG1524		
LANDSCAPING					
			Trees		
301	EA.	279	Street Trees - 2.5" caliper; B&B		
302	EA.	110	RPM's		
			Shrubs		
303	EA.	1,877	Shrubs - 5 gallon		
			Perennials		
304	EA.	4,056	Perennials - 1 gallon		
			Seeding / Sodding		
305	AC.	6.70	Fescue Seeding		
306	S.Y.	55,176	Bonded Fiber Matrix		
307	S.Y.	21,900	Fescue Sodding		
308	AC.	4.7	Native Seed Mix		
309	AC.	4.7	Temporary Seeding		
			Materials		
310	EA.	10,505	Tree Gator Bags		
311	L.F.	2,435	Steel Edging		
312	S.Y.	4,366	Erosion Blanket		
313	L.F.	3,850	Shovel Cut Edging		
314	SF	925	Decorative Aggregate		
315	C.Y.	8,452	Topsoil		

316	EA.	2	Benches (KC Parks standard)		
317	C.Y.	55.0	CIP Concrete (reinforced)		
318	S.F.F.	797	Native Stone Veneer		
			Entry Monuments and Landscaping		
319	EA.	1	Landscaping at Harden Avenue (re-use existing rock)		
320	EA.	1	Landscaping at North Ames Avenue		
321	EA.	1	Landscaping at North Wyoming Avenue		
322	EA.	1	Landscaping at West Englewood Elementary (remove, store and re-install existing sign)		
323	EA.	1	Landscaping and stonework at North Mercier Drive		
			Total Unit Prices:	TOTAL $	

BASE BID ITEMS	TOTAL	
	QTY	UNIT
LED Luminaire, 35' Mounting Height, 8" Arm	52	Ea.
LED (400 Watt Equivalent) Luminaire, 35' Mounting Height, 6' Bracket Arm	3	Ea.
LED (250 Watt Equivalent) Luminaire, 35' Mounting Height, 6' Bracket Arm	8	Ea.
LED (150 Watt Equivalent) Luminaire, 30' Mounting Height, 6' Bracket Arm	1	Ea.
Screw In Base – Small	1	Ea.
Screw In Base – Large	64	Ea.
PELCO 6" Anti–theft Device	1	Ea.
PELCO 8" Anti–theft Device	64	Ea.
KCMO ID Labels	72	Ea.
Ground Rod	4	Ea.
Pull Box, Type II	6	Ea.
Lighting Controller, 1 Ckt.	2	Ea.
Lighting Controller, 2 Ckt.	2	Ea.
Breakaway, Set–screw HEB Fuse Kits w/ 10A Fuses	65	Ea.
Unfused Breakaway Fuse Kits	130	Ea.
2#4, 1#6G RHH/RHW/USE	9,702	L.F.
2#8, 1#8G RHH/RHW/USE	642	L.F.
3#10 RHW/USE (Internal Pole Wiring)	2,984	L.F.
3#1, USE	400	L.F.
2" PVC	10,344	L.F.
3" PVC	400	L.F.
KCPL Service	4	Ea.
ADD ALTERNATE ITEMS		

REMOVALS	TOTAL	
	QTY	UNIT
Remove Existing Luminaires: NMF0612 – NMF0618	7	Ea.
Remove Exisitng Luminaires: NLF0040 – NLF0043	4	Ea.
Remove Existing Luminaires: NLF0001 – NLF0002	2	Ea.
Remove Existing Luminaires: NMG1001 – NMG1011	11	Ea.
Remove Existing Luminaires: NMG1520 – NMG1524	5	Ea.

GENERAL NOTES:
All work shall comply with the Kansas City, MO, Department of Public Works Standard Construction and materials Specification, Division II Section 2800, Division V Section 5800, and any additional supplements.

1. Contractor shall field verify feed location prior to installation of controller when necessary. Contractor shall notify engineer of descrepancies with locations shown. All adjustments necessary to provide feed point connection shall be at the contractors expense.

2. Area and Raodway classification is Major/Intermediate on Englewood Boulevard and on Wakomis Drive south of the roundabout. Pavement classification is R2 with a LLF of .54. On Wakomis Drive north of the roundabout, Area and Roadway classification is Major/Residential with a LLF of 0.68. For N Summit Street, Area and Roadway classification is Collector/Intermediate with a LLF of 0.54.

3. NW Englewood Blvd: Philips Gardco (CA22L–96L–650–NW–G2–AR1–2–UNV–DD–SP2–BZ) or approved equal.
N. Waukomis: AEL Autobahn ATB2 (ATB2–80BLEDE85–MVOLT–R2–20–P7–DM–SH–NL), Philips Lumec RFL (RFL–241W112LED4KT–R2M–UNIV–DMG–RCD7–SP2–GY3), GE Evolve ERL2 (ERL2–0–27–C3–40–D–GRAY–A– R(20KV/20kA)), or approved equal.
N. Summit: AEL Autobahn ATB2 (ATB2–60BLEDE70–MVOLT–R2–20–P7–DM–SH–NL), Philips Lumec RFL (RFL–145W64LED4KT–R2M–UNIV–DMG–RCD7–SP2–GY3), GE Evolve ERL2 (ERL2–0–18–C3–40–D–GRAY–A– R(20KV/20kA)), or approved equal.
N. Mercier Dr: AEL Autobahn ATBO (ATB0–30BLEDE85–MVOLT–R2–20–P7–DM–SH–NL), Philips Lumec RFM (RFM–72W32LED4KT–R2M–UNIV–DMG–RCD7–SP2–GY3), GE Evolve ERLH (ERLH–0–10–C3–40–D–GRAY–A–R(20KV/20kA)), or approved equal.
Signal Poles (Sheet L6): Philips Gardco (CA22L–96L–650–NW–G2–AR1–2–UNV–DD–SP2–BZ) or approved equal.

4. Poles shall meet APWA Section 2802.15 for 35ft steel (NW Englewood), 35ft aluminum (N. Summit) and 30ft galvanized (N. Mercier) poles in sheet L10 (Single Arm Pole Details).

5. All distribution cable shall be installed in Schedule 40, 2" PVC conduit or in preassembled "cable–in–duct." All conduit runs shall be placed 1ft from back of curb where possible and at a minimum depth of 24".

6. Per APWA Section 5800, all street light poles, materials and controller must be installed within the City's "Right–of–Way."

7. For controller 5, distribution cable shll be 2#8 and 1#8 G, Type RHH/RHW/USE, 600 Volt, copper stranded and color coded black, red (or black) and green (APWA 2802.8) for a grounded 240 Volt system (single phase).

For the remaining controllers cable shall be 2#4 and 1#6 G, Type RHH/RHW/USE, 600 Volt, copper stranded and color coded black, red (or black) and green (APWA 2802.8) for a grounded 240 Volt system (single phase).

8. Cable used within the poles shall be 3 – #10, Type RHW/USE, 600 Volts rated, copper stranded, U.L. listed and color–coded red, black and green according to the NEC.

9. Provide and install in each pole base, 3 single–pole, set–screw, in–line, breakaway, fuseholders. Use Bussman, Littlfuse, Ferraz Shawmut (or approved equal) Model No. HEB–JW–RYC and HEB–JW–RLC–J (last pole). For the 2 "hot" breakaway conductors, place a 10 Amp KTK fuse in each breakaway fuseholder and a NNB Copper Slug in the system ground fuseholder.

10. Individual and system grounds shall be installed on all circuits (pole grounding rods and a ground rod from pole to pole). Grounding shall comply with Section 2808 of standards noted above.

11. All conduit crossings shall be indicated with an aluminum marker in the top of curb. Aluminum markers to be furnished and installed by the contractor.

12. The contractor is responsible for making his own determination as to type and location of underground and overhead utilities as may be necessary to avoid damage. The contractor shall verify location of underground pipelines, conduits, structures and overhead lines by contacting the owners of the utilities.

13. All workmanship and materials shall be subject to inspection and approval by the Streetlighting, Public Works Department. Coordinate a final joint inspection with our Maintenance Supervisor, Carolyn Adkins at (816) 513–9874.

14. Luminaire and Controller Cabinet Labels: The Contractor shall furnish and install luminaire and controller cabinet identification labels according to the construction plans. Identification labels shall consist of three letters and four numerals in vertical orientation with the letters at the top so as to read downward. Legend shall be 2 inch series "C" upper case black characters on silver retro–reflective sheeting with pressure sensitive adhesive backing, as prescribed for use on standard highways signs in the FHWA Manual of Uniform Traffic Control Devices. Labels for decorative poles must be coordinated with the Streetlighting Section at (816) 513–9874.

Steel poles shall be labeled by affixing self–adhesive decal directly on the pole. The label shall be position on the vertical axis of the pole facing the street and 8–10 feet above the pavement surface. Labels on cabinets shall be positioned near the top of the door adjacent to the door hinge.

15. The contractor shall install a cable retainer assembly mounted between a luminaire type pole and foundation anchor. The retainer is designed to secure the electrical conductors to prevent conductor theft. Use PELCO or Hubble or approved equal.

16. Existing equipment that is removed shall be returned to the City of Kansas City.

17. Refer to Magellan Pipeline Company General Encroachment Requirements when working near the pipeline easement.

ENGLEWOOD BOULEVARD & WAKOMIS
DRIVE SOUTH OF ROUNDABOUT DESIGN CRITERIA:

IES Classification: Major/Intermediate
Illuminance Average: 1.2 (City Multiplier) x 13 Lux = 15.6 Lux (Min)
Illuminance Ave/Min: 3 to 1
Luminance Average: 0.9 cd/m²
Luminance Ave/Min: 3 to 1
Luminance Max/Min: 5 to 1
Veiling Luminance Ratio: 0.3 to 1
LLF = 0.54
Pole Arm: 8 inches or 6ft
Wattage: 400 Watt Equivalent LED
Pole height: 35ft
Pole Setback: 3ft

WAKOMIS DRIVE NORTH OF ROUNDABOUT
DESIGN CRITERIA:

IES Classification: Major/Residential
Illuminance Average: 1.2 (City Multiplier) x 9 Lux = 10.8 Lux (Min) or 18 Lux (Max
Illuminance Ave/Min: 3 to 1
Luminance Average: 0.6 cd/m²
Luminance Ave/Min: 3.5 to 1
Luminance Max/Min: 6 to 1
Veiling Luminance Ratio: 0.3 to 1
LLF = 0.68
Pole Arm: 6ft
Wattage: 400 Watt Equivalent LED
Pole height: 35ft
Pole Setback: 3ft

N SUMMIT STREET DESIGN CRITERIA:

IES Classification: Collector/Intermediate
Illuminance Average: 1.2 (City Multiplier) x 9 Lux = 10.8 Lux (Min)
Illuminance Ave/Min: 4 to 1
Luminance Average: 0.9 cd/m²
Luminance Ave/Min: 4 to 1
Luminance Max/Min: 5 to 1
Veiling Luminance Ratio: 0.4 to 1
LLF = 0.54
Pole Arm: 12'
Wattage: 250 Watt Equivalent LED
Pole height: 40ft
Pole Setback: 3ft

DATE:	NO.:	REVISIONS/APPROVALS:
3-8-2016		Prepared for City Review
5-6-2016		Revised Per City Comment
1-20-2017		Submitted for Construction
9-19-2017		Revised Per MoDOT Comment & Change to LED
11-7-2017		Updated LED Description

STATE OF MISSOURI
KRISTIN L. SKINNER
NUMBER PE-2006002856
PROFESSIONAL ENGINEER
[illegible]
11-7-17

Reviewed By: KLS
Designed By: KLS
Drafted By: KLS
Kristin L. Skinner, P.E., PTOE
MO#: 2006002856

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Garden City, MO 64747
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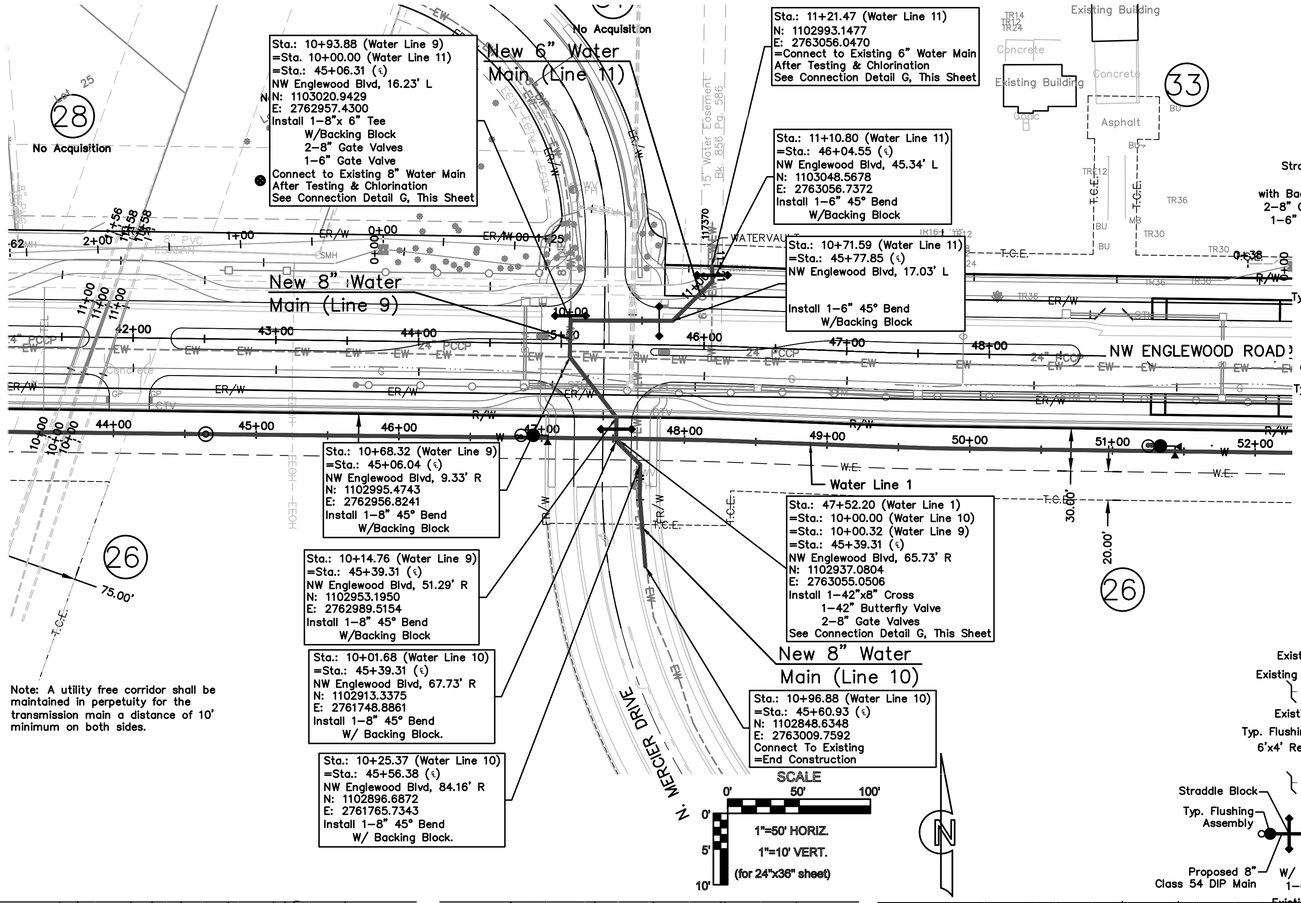
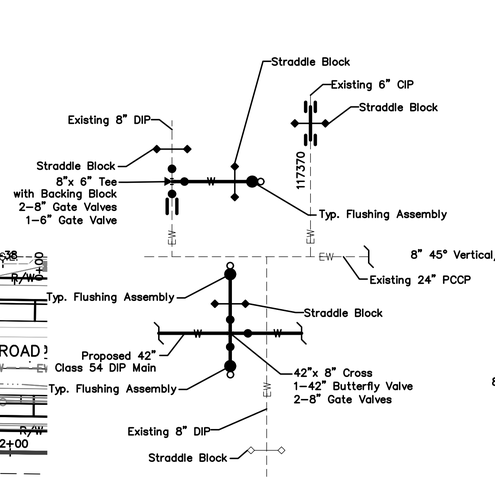
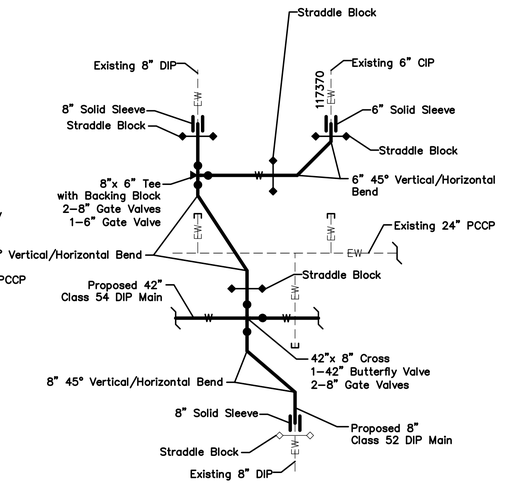
www.priorityengineers.com
MO State Certificate of Authority #: 2011027013

QUANTITIES & GENERAL NOTES
ENGLEWOOD BOULEVARD
COMPLETE STREETS UPGRADE
STP 3311 (402) / KCMO 89008121
Kansas City, Clay & Platte Counties, MO

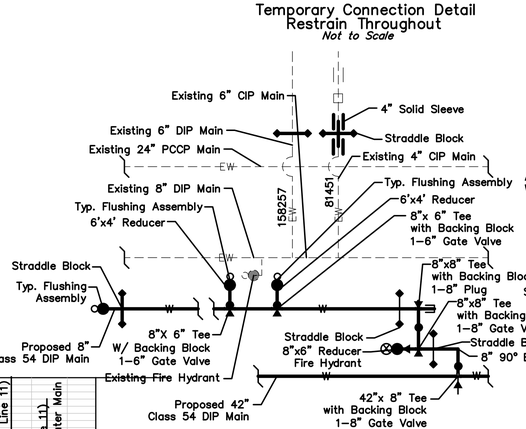
Sheet No.:
L1





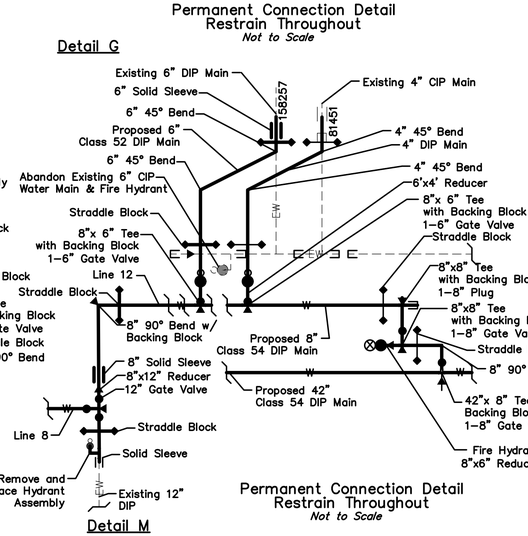


Temporary Connection Detail Restrain Throughout
Not to Scale



Permanent Connection Detail Restrain Throughout
Not to Scale

Detail G



Temporary Connection Detail Restrain Throughout
Not to Scale

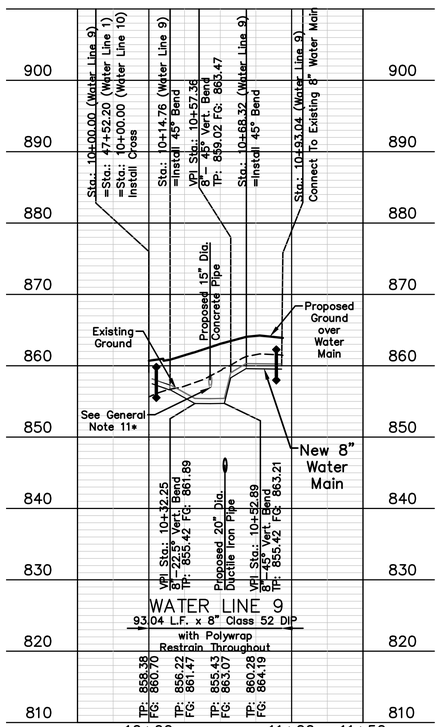
Detail M

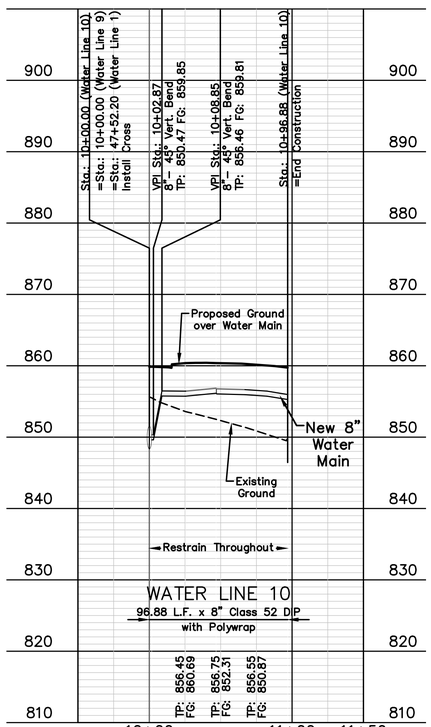
Permanent Connection Detail Restrain Throughout
Not to Scale

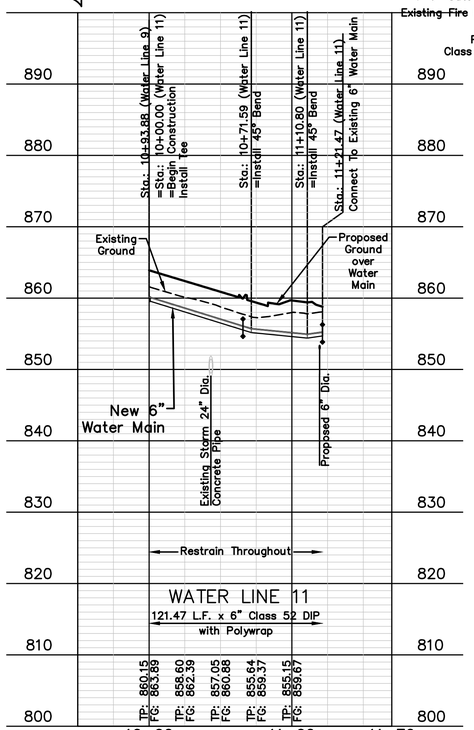
SERVICE TRANSFER TABLE–SEE NOTES, THIS SHEET							
ADDRESS	REGISTER NO.	MAIN TO CURB SIZE	MAIN TO CURB TYPE	CURB IN SIZE	CURB IN TYPE		RELOCATE METER
1506 NW ENGLEWOOD RD	158257	6"	D.I.	6"	D.I.		NO
1506 NW ENGLEWOOD RD	81451	4"	C.I.	4"	C.I.		NO
5800 N MADISON AVE	117370	6"	C.I.	6"	C.I.		NO

Note 1: Contractor To Provide Min. 18" Vertical Separation Between 4" And 8" DIP Service Lines To 1506 NW Englewood Road And New 15" Concrete Storm Pipe. Adjust Vertical Profile Of Water Service Lines In Accordance With WSD Construction Detail Drawing No. 01016–3.

NOTE: Contractor shall fill and compact to 95% standard density to a point 42" Minimum above the top of pipe prior to excavation for the pipe.







DATE:	NO.:	REVISIONS/APPROVALS:
03-07-2016		Prepared for City Permit Submittal
05-06-2016		Revised Per Comments & Resubmitted
12-20-2016		Revised Per Comments & Resubmitted
08-28-2017		Revised Per Comments & Resubmitted

Reviewed By: A.K.H.
Designed By: A.K.H.
Drawn By: G.S.
Lutjen Project No.: 15013

ADAM HILGEDICK P.E. MO# 2014016961

MO State Certificate of Authority #: 2007022824

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www.lutjen.com
surveying
planning
engineering
landscape architecture

Location: L:\Projects\12141-03\Plans\Construction Documents\Right of Way 36x24\WTR – 15013 – Water Plan and Profile.dwg

WATER MAIN PLAN & PROFILE
ENGLEWOOD BOULEVARD COMPLETE STREETS UPGRADE
STP 3311 (402) / KCMO 89008121
Kansas City, Clay & Platte Counties, MO

PROFESSIONAL ENGINEER SEAL

STATE OF MISSOURI · ADAM HILGEDICK · NUMBER PE-2014016961 · PROFESSIONAL ENGINEER · 11-7-17

ADAM HILGEDICK
Civil Engineer
MO# 2014016961

FOR WSD USE:

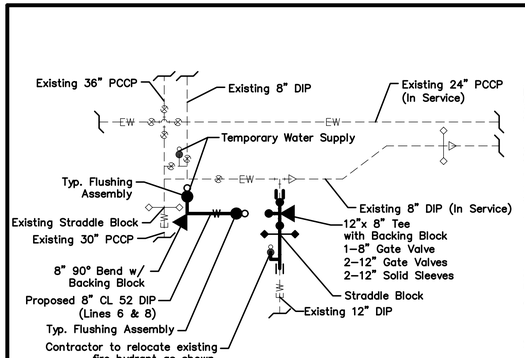
KANSAS CITY, MISSOURI, WATER SERVICES DEPARTMENT

WATER MAIN EXTENSION

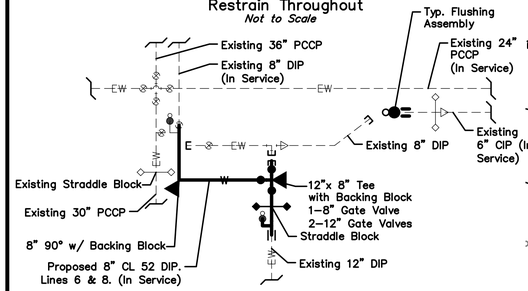
N. SUMMIT STREET
FOR NW ENGLEWOOD ROAD IMPROVEMENTS
KANSAS CITY, CLAY COUNTY, MISSOURI

PLAN & PROFILE

DRAWN BY	CHECKED BY		
A.K.H.	A.K.H.		
CONTRACTOR			DATE COMPLETED
CONTRACT NO.	CONTRACT DATE	DATE	WSD PROJECT NO. 80001953 / DRAWING NO. 20343
PROJECT NO. STP 3311 (402) PW-89008121			(K172) SHEET 017 OF 021

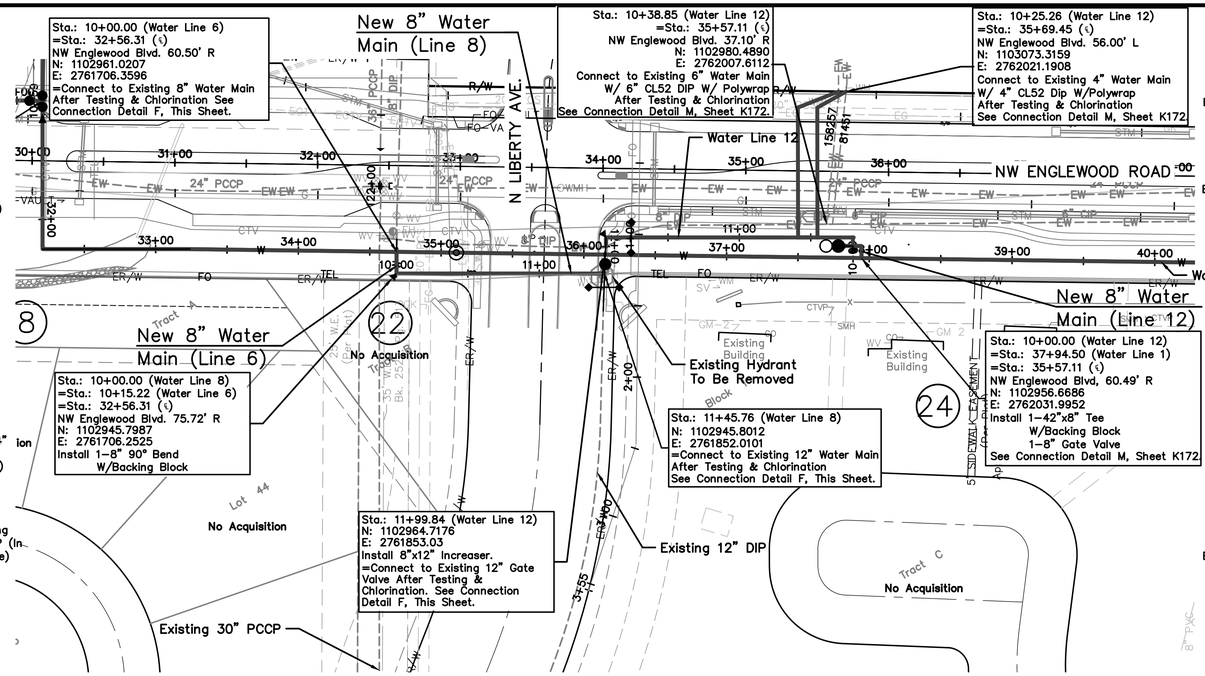


Temporary Connection Detail
Phase 1A–1
Restrain Throughout
Not to Scale



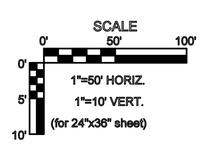
Temporary Connection Detail
Phase 1A–2
Restrain Throughout
Not to Scale

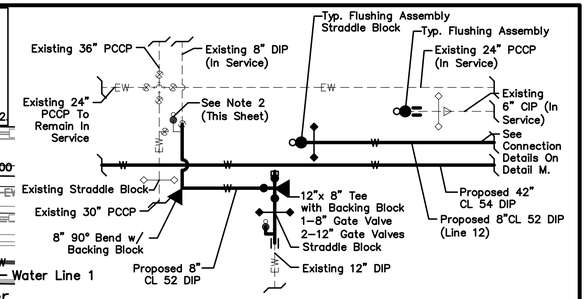
Detail F



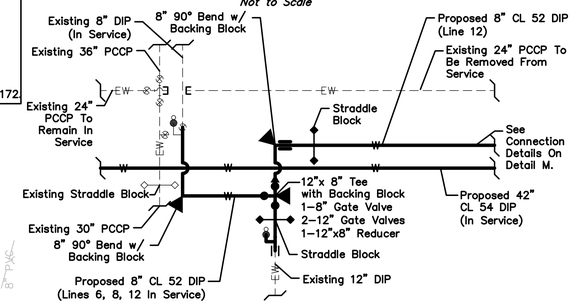
Note: A utility free corridor shall be maintained in perpetuity for the transmission main a distance of 10' minimum both sides of transmission main.

Note: Coordinate with AT&T when installing line 8. Existing telephone utilities in alignment may need relocated.





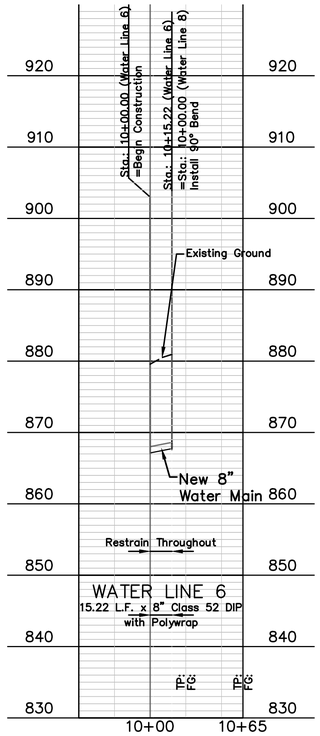
Temporary Connection Detail
Phase 1A–3
Restrain Throughout
Not to Scale

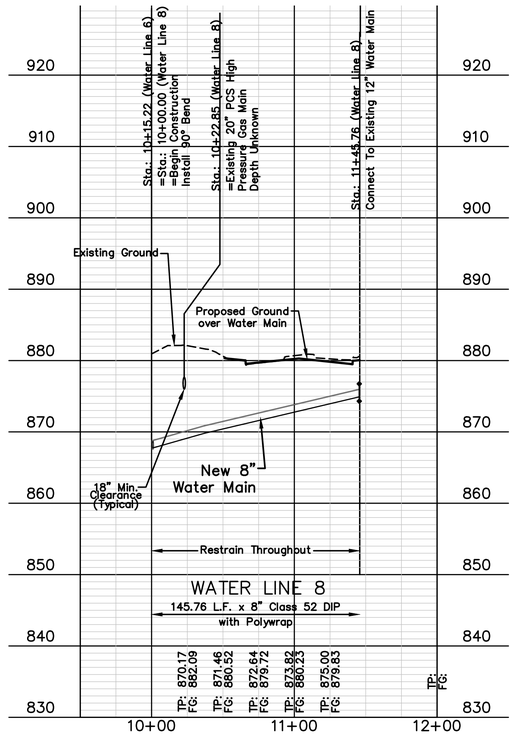


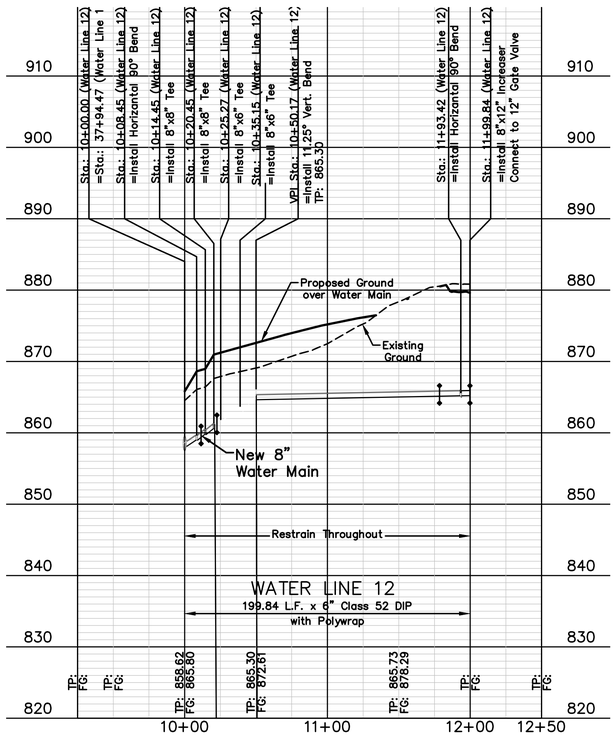
Temporary Connection Detail
Phase 2
Restrain Throughout
Not to Scale

Detail F

NOTE 1: Prior to Installation of 42" Main, the Proposed 8" DIP Main shalled be constructed and put into service (Phase 1A–1, Phase 1A–2 & Phase 1A–3).
NOTE 2: Contractor to support existing fire hydrant on 30" main or temporarily remove and reinstall as necessary.
NOTE 3: Existing 8" East/West 8" DIP And 6" CIP To Be Abandoned In Englewood Blvd.







NOTE: Contractor shall fill and compact to 95% standard density to a point 42" Minimum above the top of pipe prior to excavation for the pipe.

DATE:	NO.:	REVISIONS/APPROVALS:
03-07-2016		Prepared for City Permit Submittal
05-06-2016		Revised Per Comments & Resubmitted
12-20-2016		Revised Per Comments & Resubmitted
08-28-2017		Revised Per Comments & Resubmitted

Reviewed By: A.K.H.
Designed By: A.K.H.
Drawn By: G.S.
Lutjen Project No.: 15013
ADAM HILGEDICK P.E. MO# 2014016961

MO State Certificate of Authority #: 2007022824

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Location: L:\Projects\12141-03\Plans\Construction Documents\Right of Way 36x24\WTR - 15013 - Water Plan and Profile.dwg

ENGLEWOOD BOULEVARD COMPLETE STREETS UPGRADE
STP 3311 (402) / KCMO 89008121
Kansas City, Clay & Platte Counties, MO

WATER MAIN PLAN & PROFILE

PROFESSIONAL ENGINEER SEAL

STATE OF MISSOURI
ADAM HILGEDICK
NUMBER
PE-2014016961
1-7-17
PROFESSIONAL ENGINEER

ADAM HILGEDICK
Civil Engineer
MO# 2014016961

FOR WSD USE:

KANSAS CITY, MISSOURI, WATER SERVICES DEPARTMENT

WATER MAIN EXTENSION

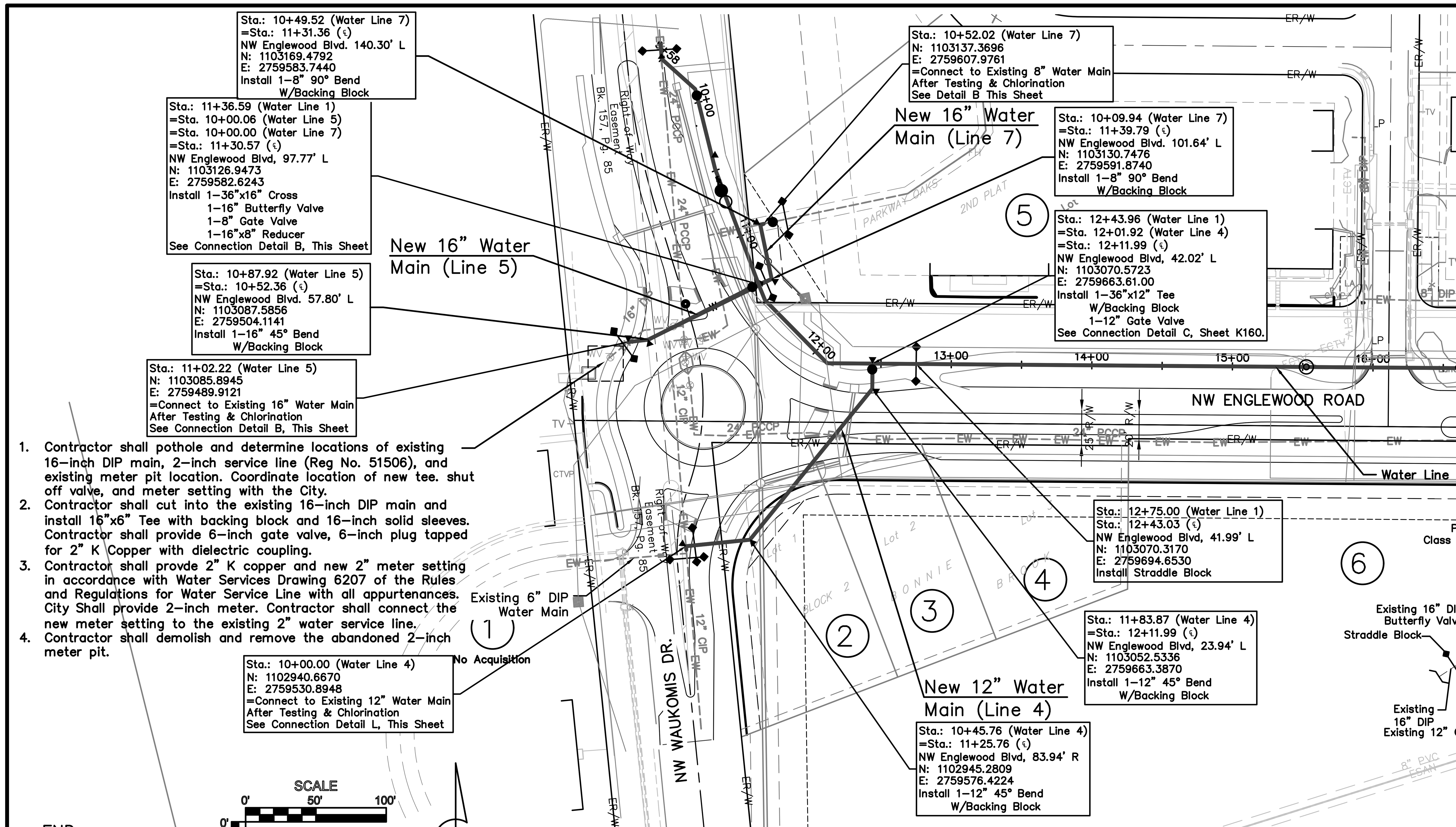
N. SUMMIT STREET
FOR NW ENGLEWOOD ROAD
IMPROVEMENTS
KANSAS CITY, CLAY COUNTY, MISSOURI

PLAN & PROFILE

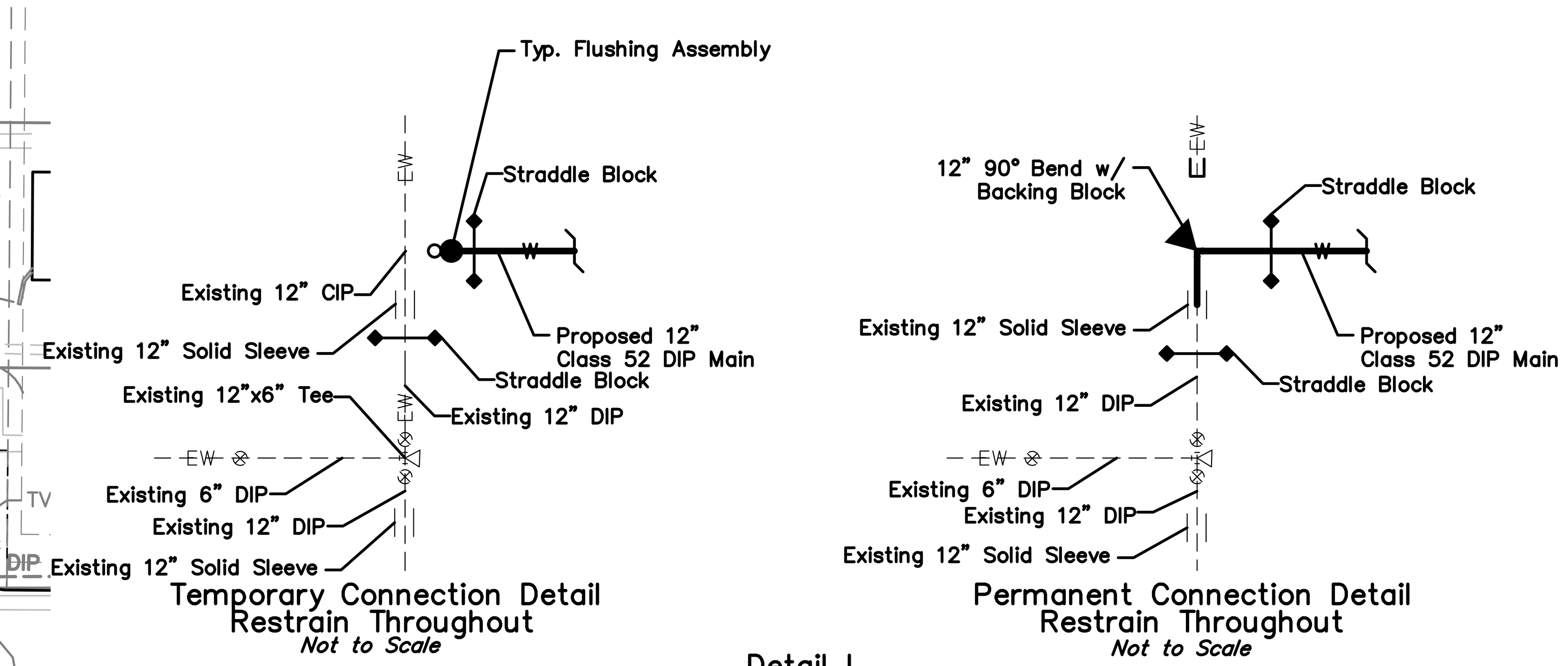
DRAWN BY	CHECKED BY			
A.K.H.	A.K.H.			
CONTRACTOR				DATE COMPLETED
CONTRACT NO.	CONTRACT DATE	DATE	WSD PROJECT NO.	DRAWING NO.
			80001953	20343

PROJECT NO.
STP 3311 (402)
PW-89008121

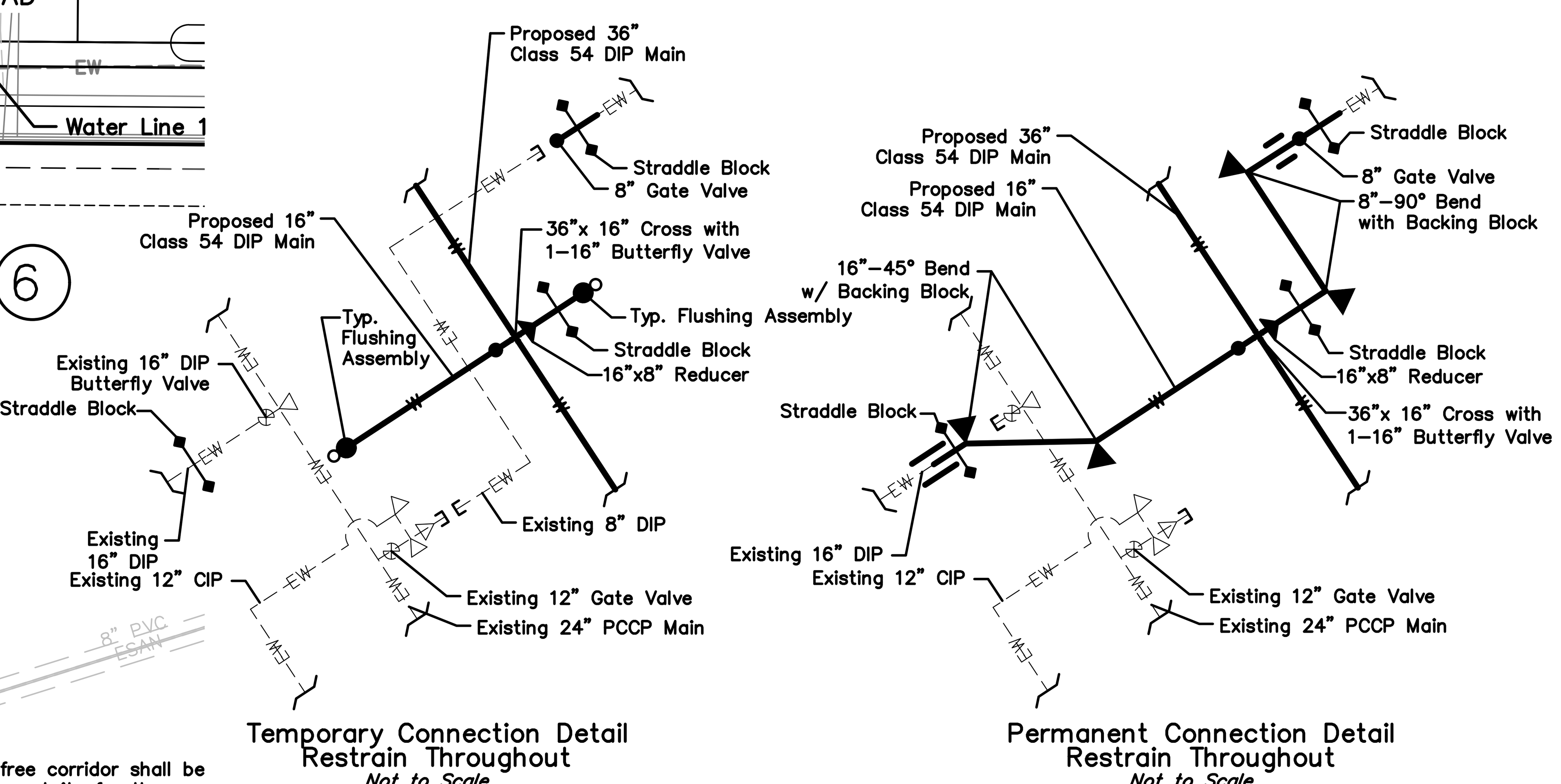
(K171) SHEET 016 OF 021



1. Contractor shall pothole and determine locations of existing 16–inch DIP main, 2–inch service line (Reg No. 51506), and existing meter pit location. Coordinate location of new tee. shut off valve, and meter setting with the City.
2. Contractor shall cut into the existing 16–inch DIP main and install 16"x6" Tee with backing block and 16–inch solid sleeves. Contractor shall provide 6–inch gate valve, 6–inch plug tapped for 2" K Copper with dielectric coupling.
3. Contractor shall provde 2" K copper and new 2" meter setting in accordance with Water Services Drawing 6207 of the Rules and Regulations for Water Service Line with all appurtenances. City Shall provide 2–inch meter. Contractor shall connect the new meter setting to the existing 2" water service line.
4. Contractor shall demolish and remove the abandoned 2–inch meter pit.

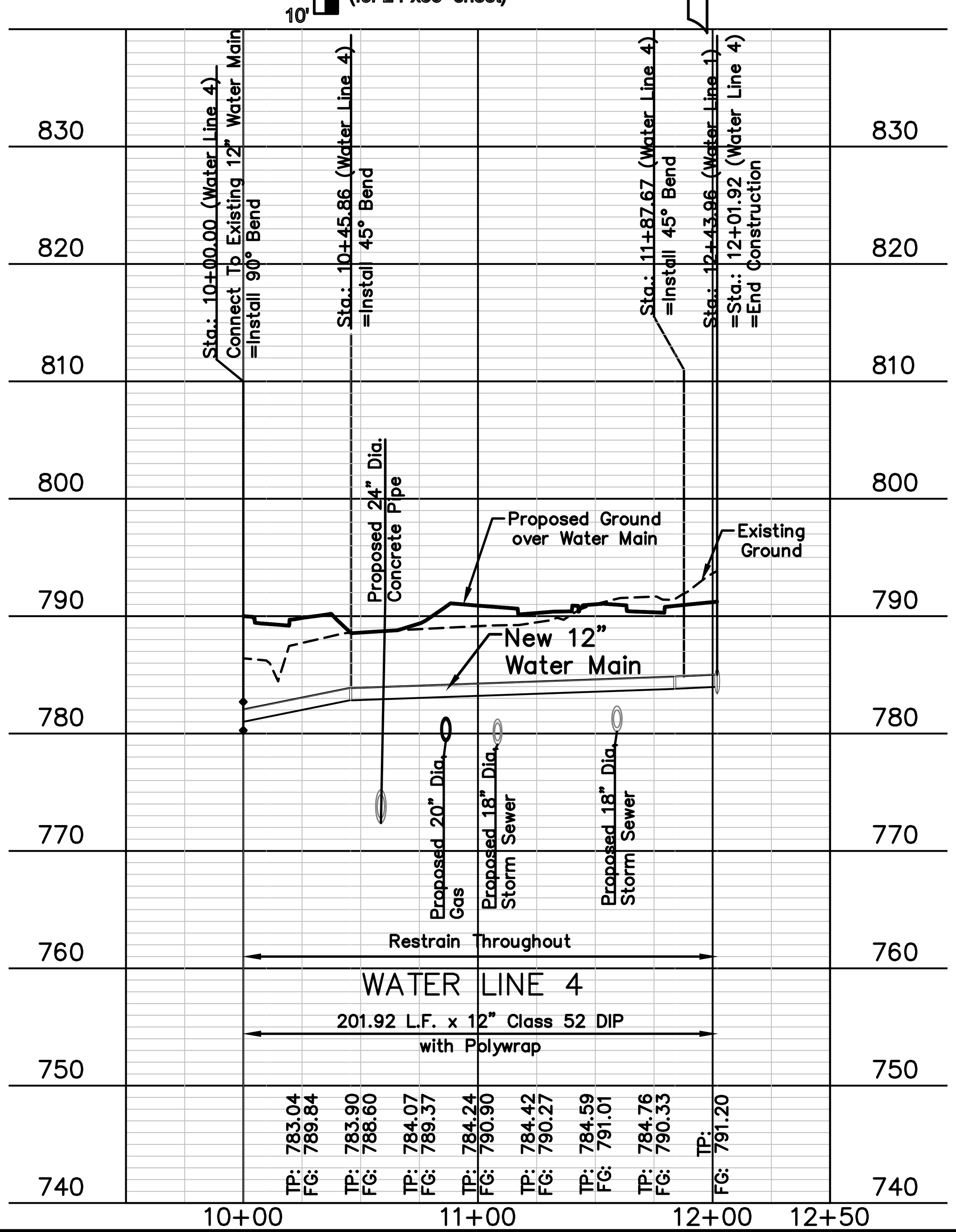


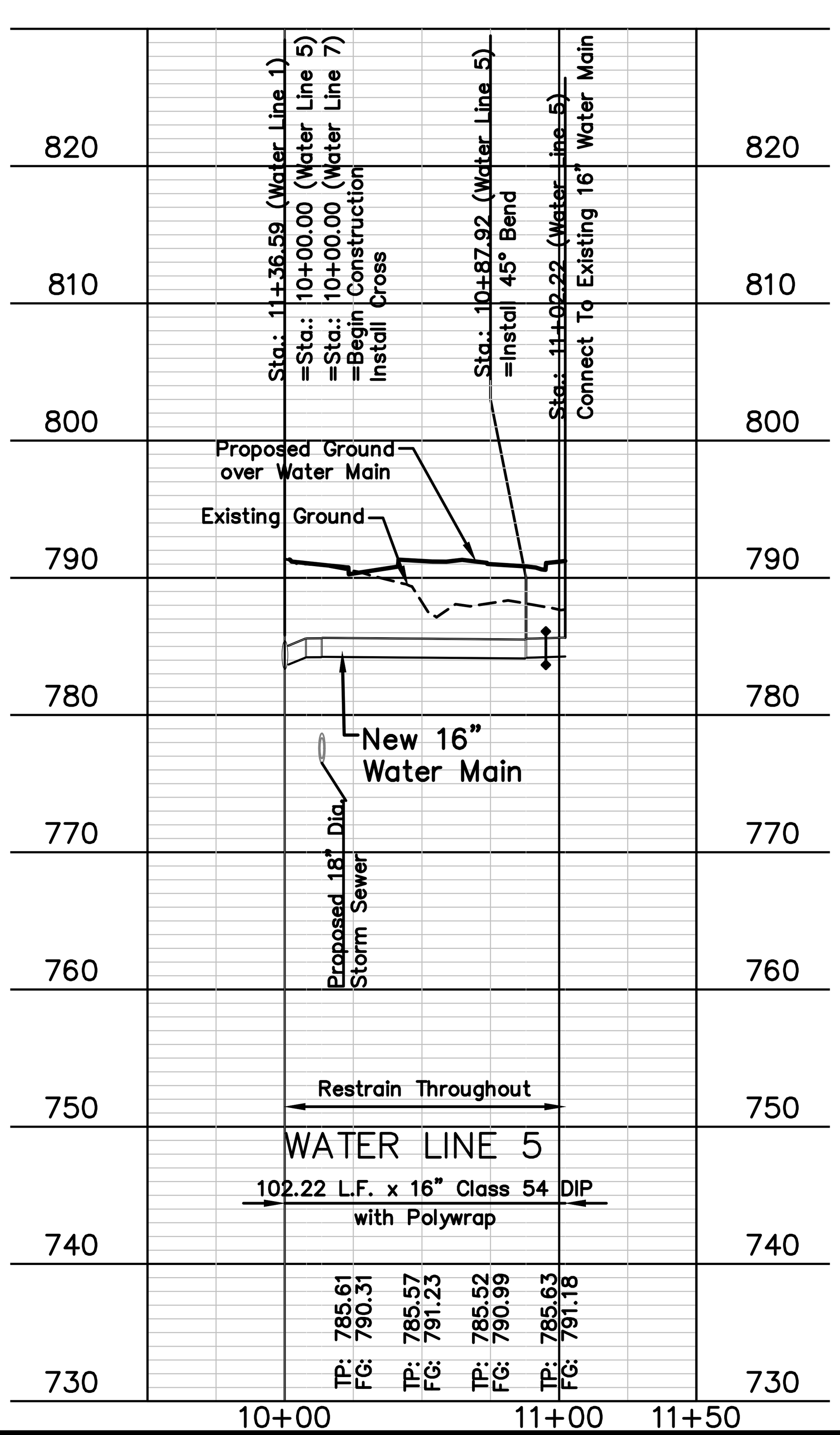
Detail L

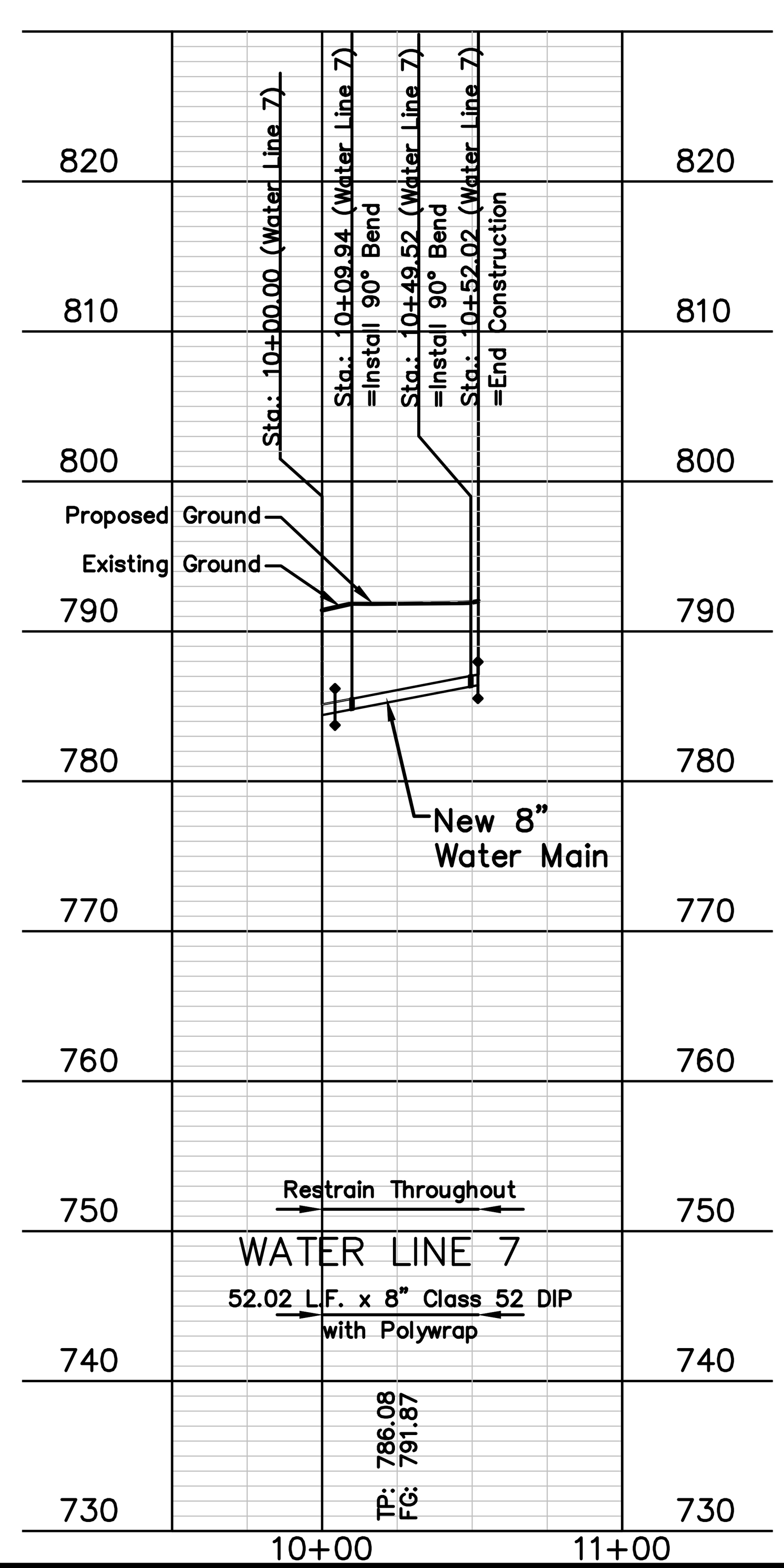


Detail B

Note: A utility free corridor shall be maintained in perpetuity for the transmission main a distance of 10' minimum on both sides.







SERVICE TRANSFER TABLE–SEE NOTES, THIS SHEET							
ADDRESS	REGISTER NO.	MAIN TO CURB SIZE	MAIN TO CURB TYPE	CURB IN SIZE	CURB IN TYPE		RELOCATE METER
5600 NW WAUKOMIS DR	51506	4"	C.I.	2"	C.I.		YES 2–INCH METER

NOTE: Contractor shall fill and compact to 95% standard density to a point 42" Minimum above the top of pipe prior to excavation for the pipe.

REVISIONS/APPROVALS:		
DATE:	NO.:	REVISIONS/APPROVALS:
03-07-2016		Prepared for City Permit Submittal
05-06-2016		Revised Per Comments & Resubmitted
12-20-2016		Revised Per Comments & Resubmitted
08-28-2017		Revised Per Comments & Resubmitted

Reviewed By: A.K.H.
Designed By: A.K.H.
Drafted By: G.S.
Lutjen Project No.: 15013
ADAM HILGEDICK P.E.
MO# 2014016961

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landscape architecture
MO State Certificate of Authority #: 2007022824

Location: L:\Projects\12141–03\Plans\Construction Documents\Right of Way 36x24\WTR – 15013 – Water Plan and Profile.dwg

WATER MAIN PLAN & PROFILE
ENGLEWOOD BOULEVARD COMPLETE STREETS UPGRADE
STP 3311 (402) / KCMO 89008121
Kansas City, Clay & Platte Counties, MO

PROFESSIONAL ENGINEER SEAL
STATE OF MISSOURI
ADAM HILGEDICK
NUMBER PE-2014016961
PROFESSIONAL ENGINEER
11·7·17
ADAM HILGEDICK
Civil Engineer
MO# 2014016961

FOR WSD USE:

KANSAS CITY, MISSOURI, WATER SERVICES DEPARTMENT

WATER MAIN EXTENSION

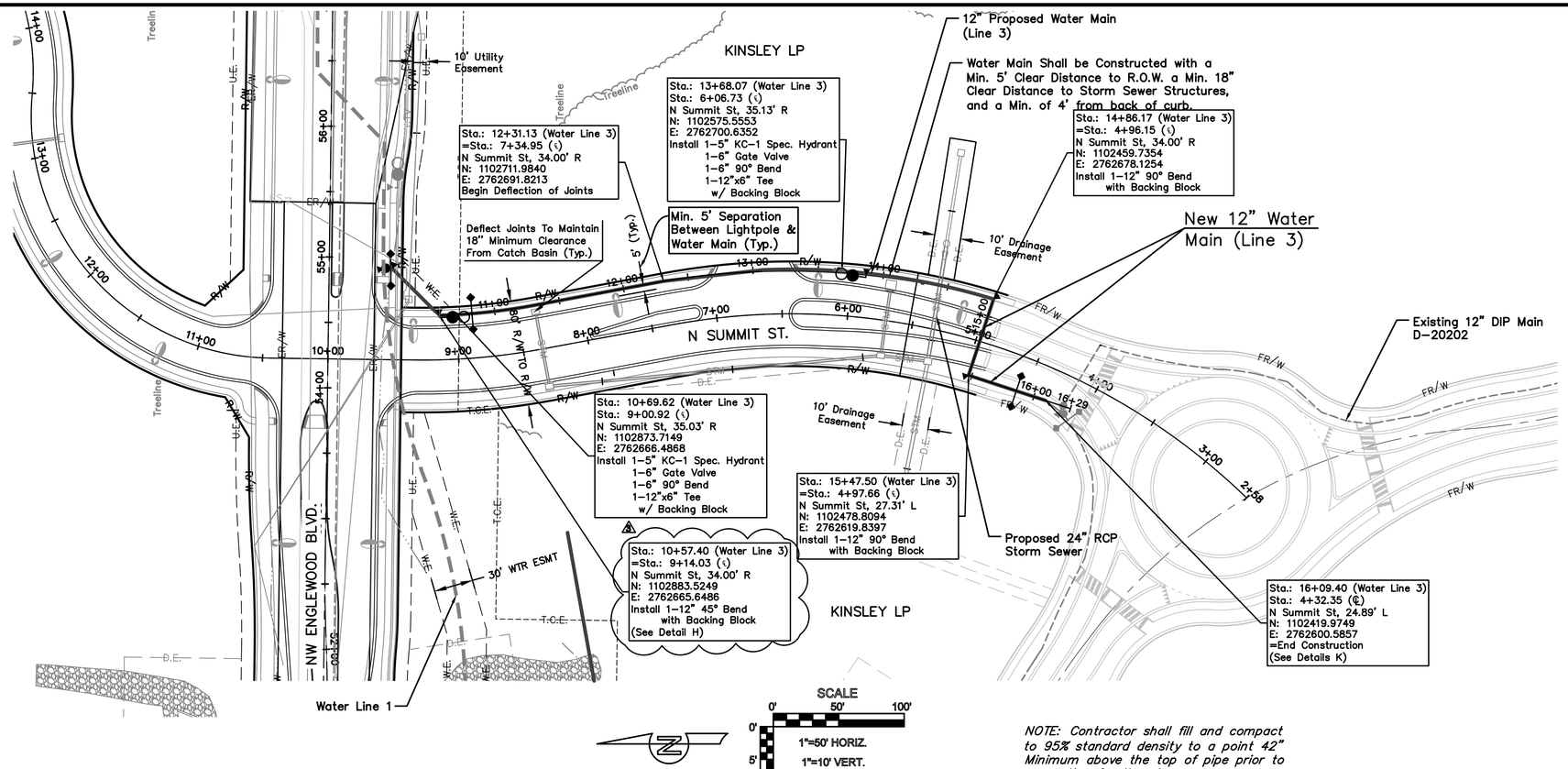
N. SUMMIT STREET
FOR NW ENGLEWOOD ROAD
IMPROVEMENTS
KANSAS CITY, CLAY COUNTY,
MISSOURI

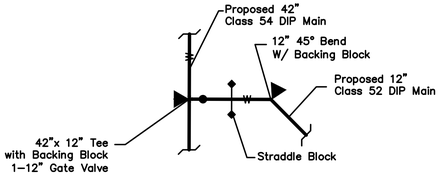
PLAN & PROFILE

DRAWN BY	CHECKED BY				
A.K.H.	A.K.H.				
CONTRACTOR			DATE COMPLETED		
CONTRACT NO.	CONTRACT DATE	DATE	WSD PROJECT NO.	DRAWING NO.	
			80001953	20343	

PROJECT NO.
STP 3311 (402)
PW-89008121

(K170) SHEET 015 OF 021

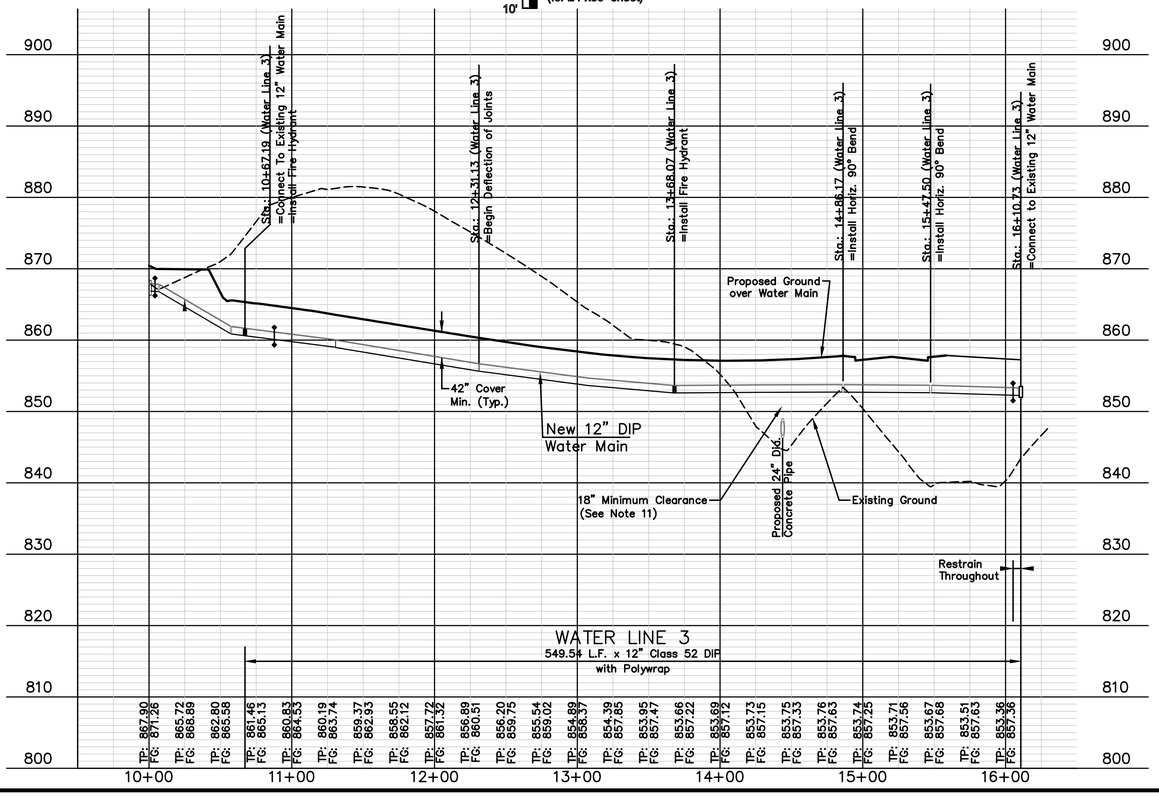


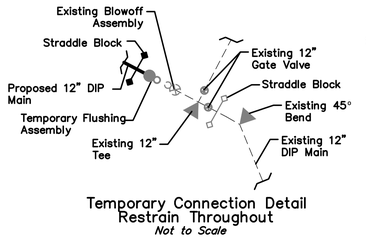


Permanent Connection Detail
Restrain Throughout
Not to Scale

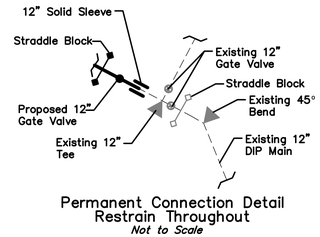
Detail H

Construction of waterline segment along N. Summit south of Englewood Road (Line 3) to be completed by March 1, 2018.





Temporary Connection Detail
Restrain Throughout
Not to Scale



Permanent Connection Detail
Restrain Throughout
Not to Scale

Detail K

DATE:	NO.:	REVISIONS/APPROVALS:
02-22-2017		Final Plan Submittal
07-06-2017	1	Revisions per City Comments
08-10-2017	2	Revisions per City Comments
08-29-2017	3	Revisions per City Comments

Reviewed By: A.K.H.
Designed By: A.K.H.
Drawn By: G.S.
Lutjen Project No.: 15013

ADAM HILGEDICK P.E. MO# 2014016961

MO State Certificate of Authority #: 2007022824

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Location: L:\Projects\12141-03\Plans\Construction Documents\N. Summit Street 36x24\WTR - 15013 - Water Plan and Profile - Summit.dwg

WATER MAIN PLAN & PROFILE

WATER MAIN EXTENSION
N. SUMMIT STREET
STP 3311 (402) / KCMO 80008121
Kansas City, Clay & Platte Counties, MO

PROFESSIONAL ENGINEER SEAL

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PROFESSIONAL ENGINEER

ADAM HILGEDICK
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FOR WSD USE:

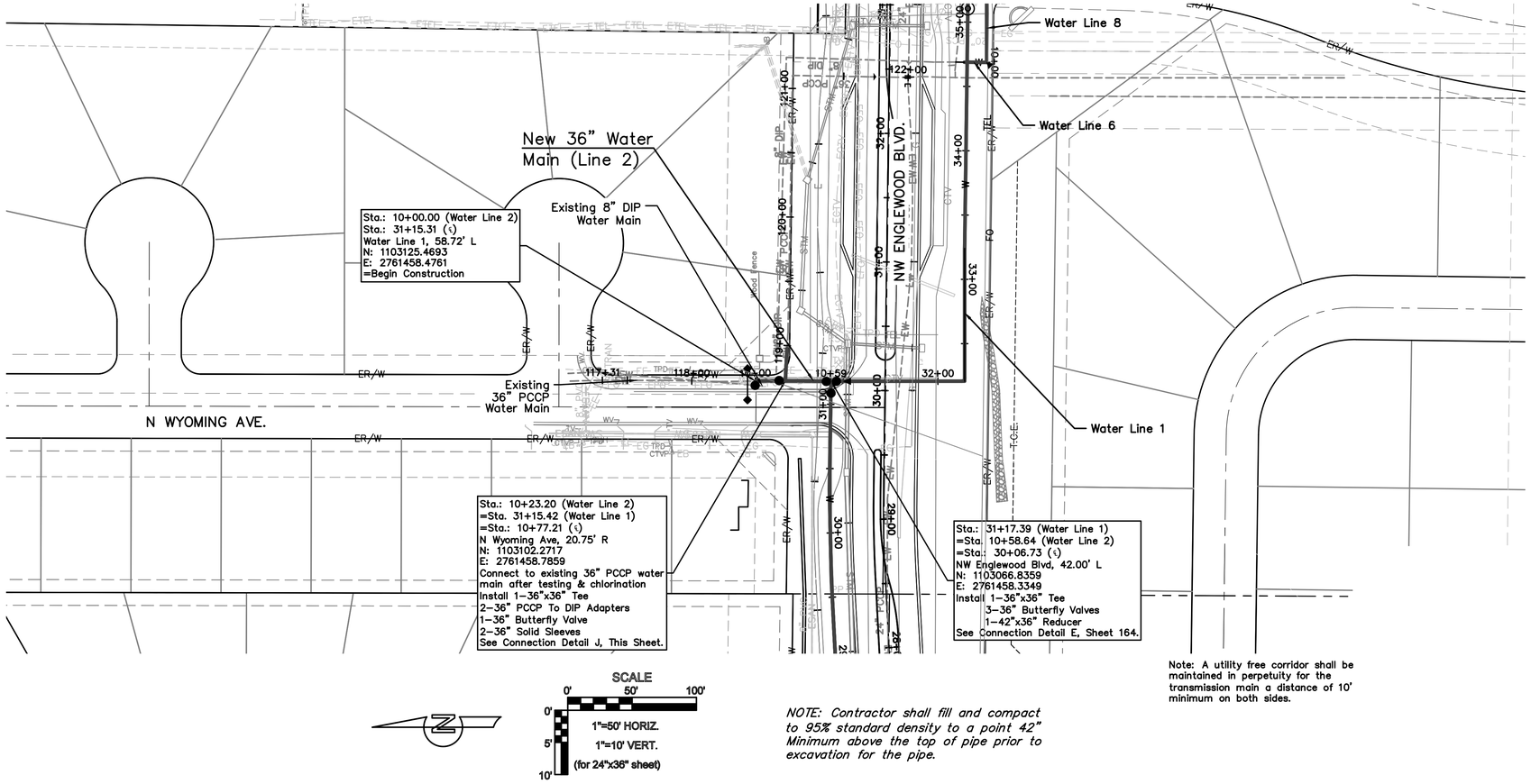
KANSAS CITY, MISSOURI, WATER SERVICES DEPARTMENT

WATER MAIN EXTENSION

N. SUMMIT STREET
FOR NW ENGLEWOOD ROAD
IMPROVEMENTS
KANSAS CITY, CLAY COUNTY, MISSOURI

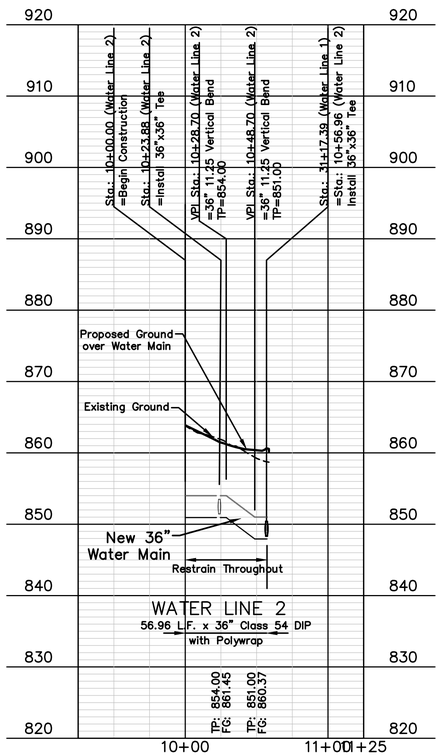
PLAN & PROFILE

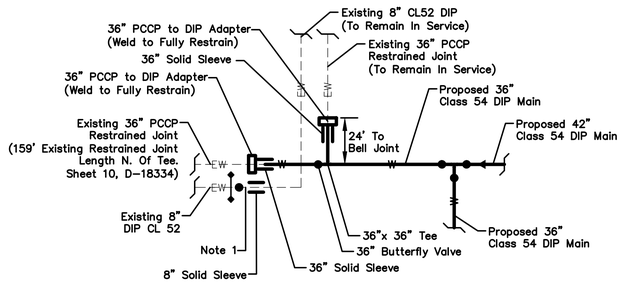
DRAWN BY	CHECKED BY	MAP NO.	RANGE	TWP	SEC
A.K.H.	A.K.H.	C-2202			
CONTRACTOR			DATE COMPLETED		
CONTRACT NO.	CONTRACT DATE	DATE	WORK ORDER NO.	DRAWING NO.	
			M-17-42	20343	
PROJECT NO. 80002025					



Note: A utility free corridor shall be maintained in perpetuity for the transmission main a distance of 10' minimum on both sides.

NOTE: Contractor shall fill and compact to 95% standard density to a point 42" Minimum above the top of pipe prior to excavation for the pipe.





Permanent Connection Detail
Restrain Throughout
Not to Scale

Detail J

Notes:

1.) Install Straddle Block On 8" DIP Main and Cut In 8" Gate Valve To Isolate Main As Needed To Construct Connections To 36" PCCP Mains.

2.) Contractor To Provide 2 Crews To Construct Connections To 36" PCCP Mains, See Detail J.

Reviewed By:	DATE:	NO.:	REVISIONS/APPROVALS:
A.K.H.	03-07-2016		Prepared for City Permit Submittal
Designed By:	05-06-2016		Revised Per Comments & Resubmitted
A.K.H.	12-20-2016		Revised Per Comments & Resubmitted
Drawn By:	08-28-2017		Revised Per Comments & Resubmitted
G.S.			
Lutjen Project No.: 15013			

ADAM HILGEDICK P.E.
MO# 2014016961

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MO State Certificate of Authority #: 2007022824

Location: L:\Projects\1241-03\Plans\Construction Documents\Right of Way 36x24\WTR - 15013 - Water Plan and Profile.dwg

ENGLEWOOD BOULEVARD COMPLETE STREETS UPGRADE
STP 3311 (402) / KCMO 89008121
Kansas City, Clay & Platte Counties, MO

WATER MAIN PLAN & PROFILE

PROFESSIONAL ENGINEER SEAL

STATE OF MISSOURI · ADAM HILGEDICK · NUMBER PE-2014016961 · 11-7-17 · PROFESSIONAL ENGINEER

ADAM HILGEDICK
Civil Engineer
MO# 2014016961

FOR WSD USE:

KANSAS CITY, MISSOURI, WATER SERVICES DEPARTMENT

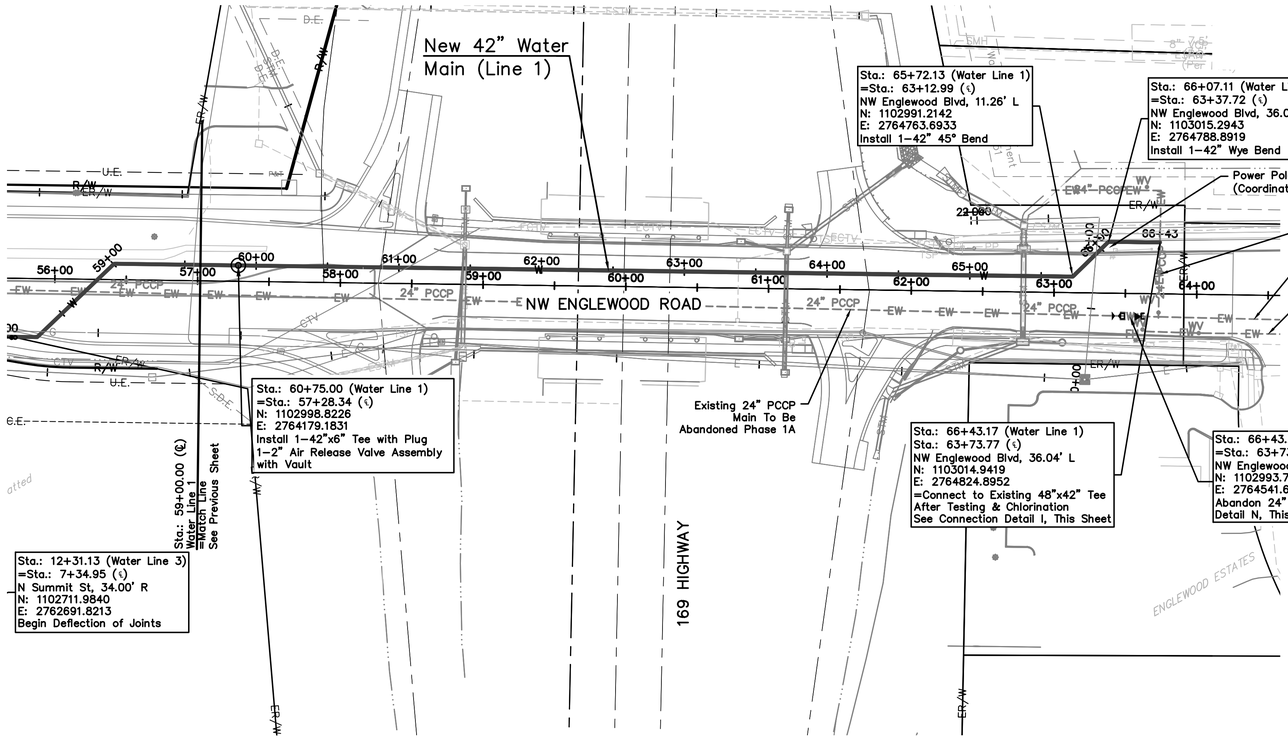
WATER MAIN EXTENSION

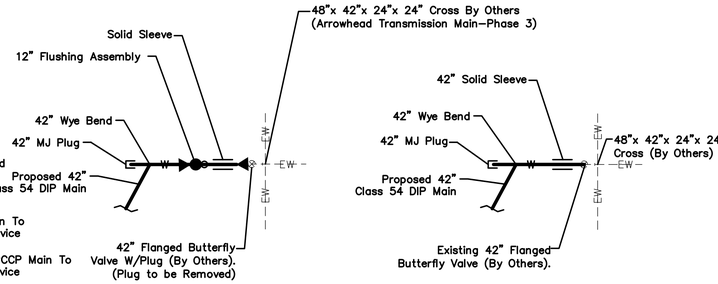
ENGLEWOOD BOULEVARD
NW WAUKOMIS DR. TO NW 55TH TER.
KANSAS CITY, CLAY & PLATTE COUNTIES, MISSOURI

DRAWN BY	CHECKED BY				
A.K.H.	A.K.H.				
CONTRACTOR				DATE COMPLETED	
CONTRACT NO.	CONTRACT DATE	DATE	WSD PROJECT NO.	DRAWING NO.	
			80001953	20343	

PROJECT NO.
STP 3311 (402)
PW-89008121

(K168) SHEET 013 OF 021

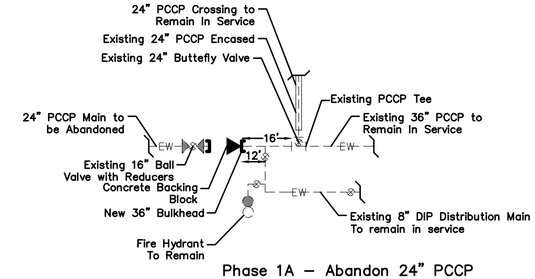




Temporary Connection Detail
Restrain Throughout
Not to Scale

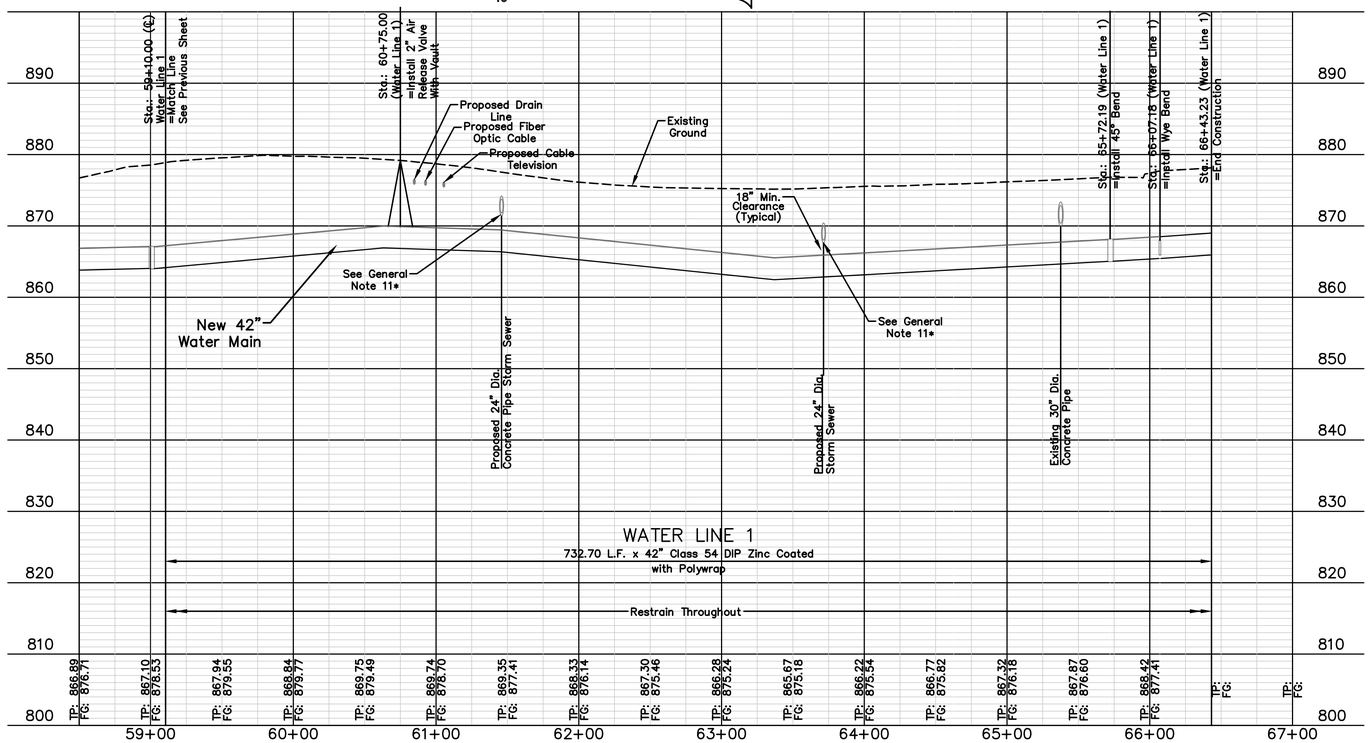
Permanent Connection Detail
Restrain Throughout
Not to Scale

Detail I



Phase 1A - Abandon 24" PCCP
East of N. Liberty Ave
Restrain Throughout
Not to Scale

Detail N



1. Contractor to Pothole Existing Pipe and Fittings Adjacent to 36"x36"x24" Tee and Obtain Measurements and Information Necessary to Order New 36" dished bulkhead. Existing Pipe is PCCP with Rubber and Steel Joints, Supplied by Lock Joint Pipe Co.
2. Provide New 36" Dished Bulkhead, Fabricated with Joint Rings to Mate with the Existing PCCP Joint on the Straight Section of 36" PCCP West of Tee. Weld Fully to Restrain the Bulkhead. Provide Concrete Backing Block for New 36" Bulkhead with a Width at the Bearing Surface ("b") of 20 Feet, Height ("h") at the Bearing Surface of 7 Feet, and Distance Back of 9 Feet Requiring Approximately 25 Cubic Yards of Concrete.
3. Provide Flowable Fill Behind the Concrete Backing Block to Fill Any Voids and to Establish a Minimum Soil Bearing Strength of At Least 2,500 lbs per Square Foot Behind the Block.

NOTE: Contractor shall fill and compact to 95% standard density to a point 42" Minimum above the top of pipe prior to excavation for the pipe.

PROFESSIONAL ENGINEER SEAL

STATE OF MISSOURI ADAM HILGEDICK NUMBER PE-2014016961 PROFESSIONAL ENGINEER 1-7-17

ADAM HILGEDICK
Civil Engineer
MO# 2014016961

FOR WSD USE:

KANSAS CITY, MISSOURI, WATER SERVICES DEPARTMENT

WATER MAIN EXTENSION

ENGLEWOOD BOULEVARD
NW WAUKOMIS DR. TO NW 55TH TER.
KANSAS CITY, CLAY & PLATTE COUNTIES, MISSOURI

DRAWN BY	CHECKED BY				
A.K.H.	A.K.H.				
CONTRACTOR				DATE COMPLETED	
CONTRACT NO.	CONTRACT DATE	DATE	WSD PROJECT NO.	DRAWING NO.	
			80001953	20343	
PROJECT NO. STP 3311 (402) FW-80008121			(K167) SHEET 012 OF 021		

NO.:	REVISIONS/APPROVALS:	DATE:
	Prepared for City Permit Submittal	03-07-2016
	Revised Per Comments & Resubmitted	05-06-2016
	Revised Per Comments & Resubmitted	12-20-2016
	Revised Per Comments & Resubmitted	08-28-2017

Reviewed By: A.K.H.
Designed By: A.K.H.
Drafted By: G.S.
Lutjen Project No.: 15013
ADAM HILGEDICK P.E. MO# 2014016961
MO State Certificate of Authority #: 2007022824

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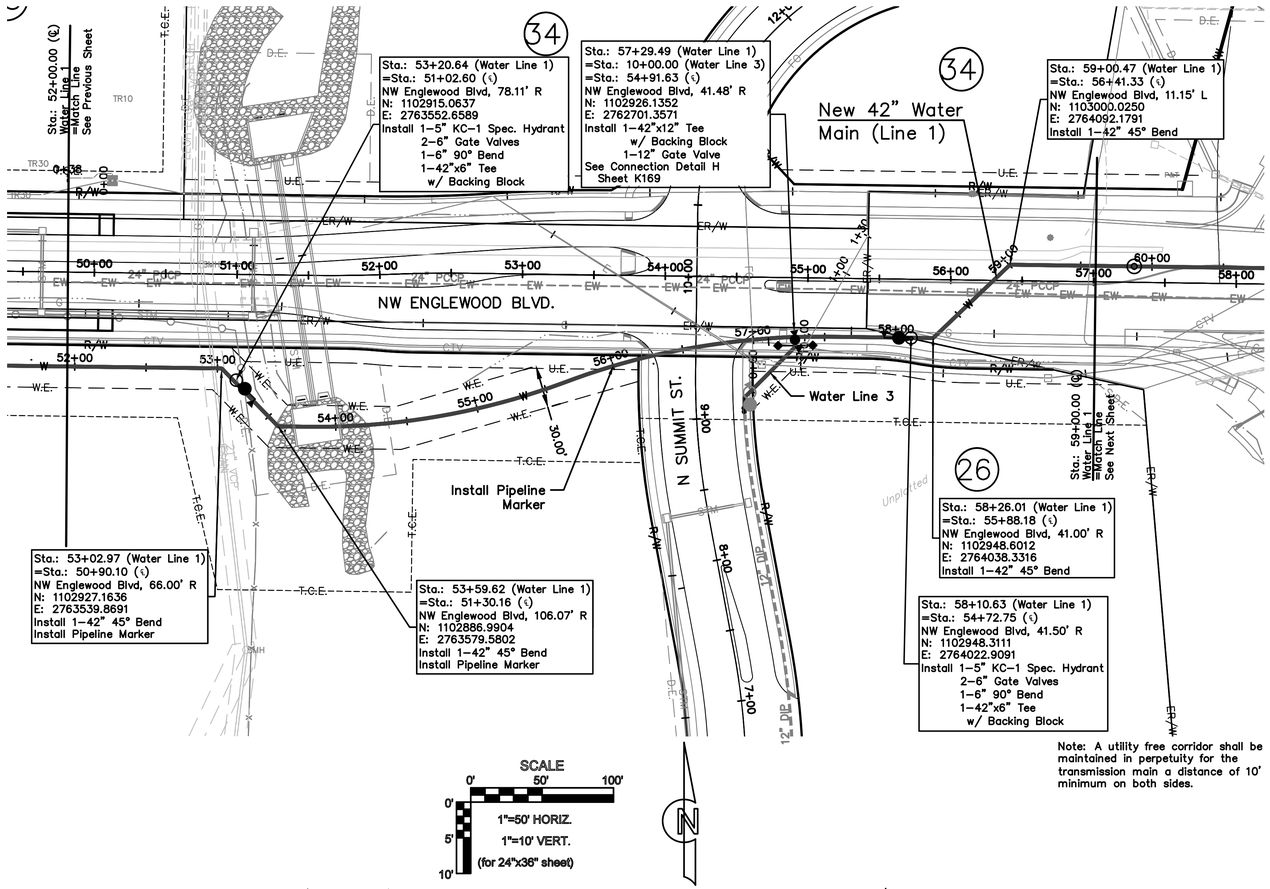

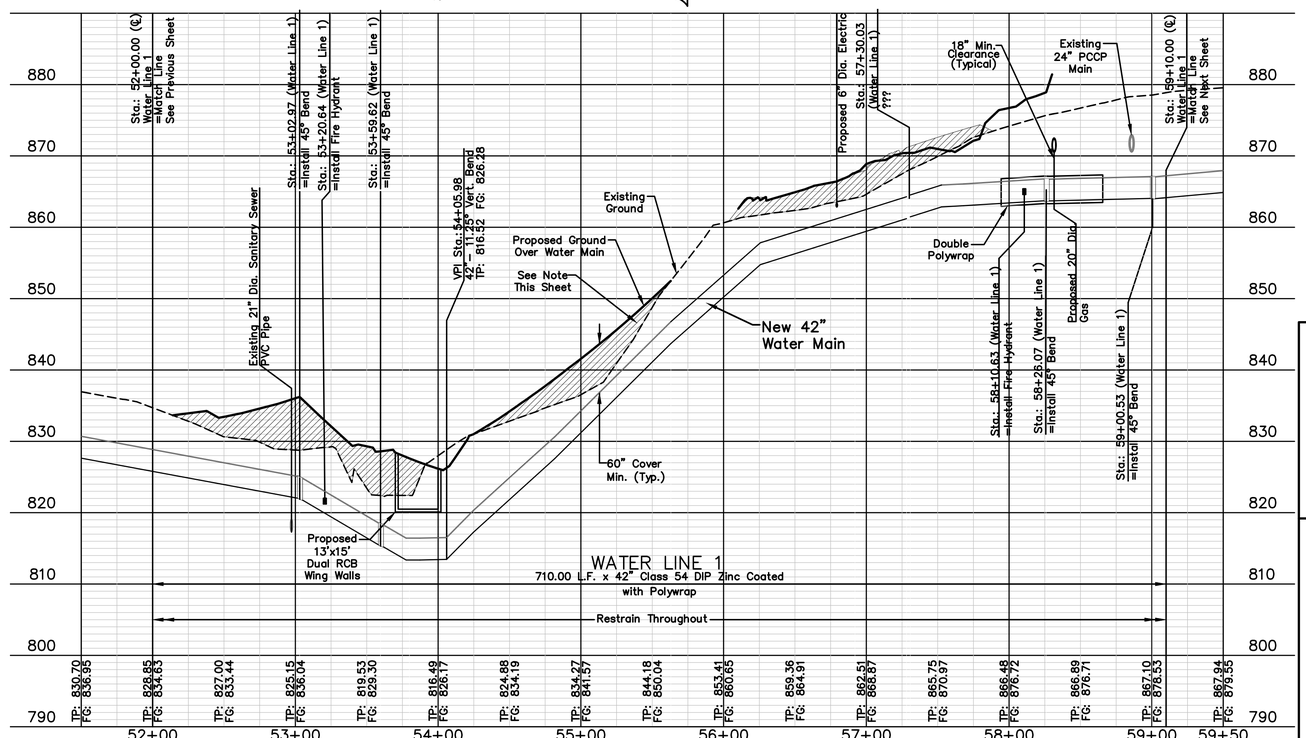

NOTE: Contractor shall fill and compact to 95% standard density to a point 42" Minimum above the top of pipe prior to excavation for the pipe.

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PROFESSIONAL ENGINEER SEAL

STATE OF MISSOURI
ADAM HILGEDICK
NUMBER PE-2014016961
PROFESSIONAL ENGINEER
11-7-17

ADAM HILGEDICK
Civil Engineer
MO# 2014016961

FOR WSD USE:

KANSAS CITY, MISSOURI, WATER SERVICES DEPARTMENT

WATER MAIN EXTENSION

ENGLEWOOD BOULEVARD
NW WAUKOMIS DR. TO NW 55TH TER.
KANSAS CITY, CLAY & PLATTE COUNTIES, MISSOURI

DRAWN BY	CHECKED BY				
A.K.H.	A.K.H.				
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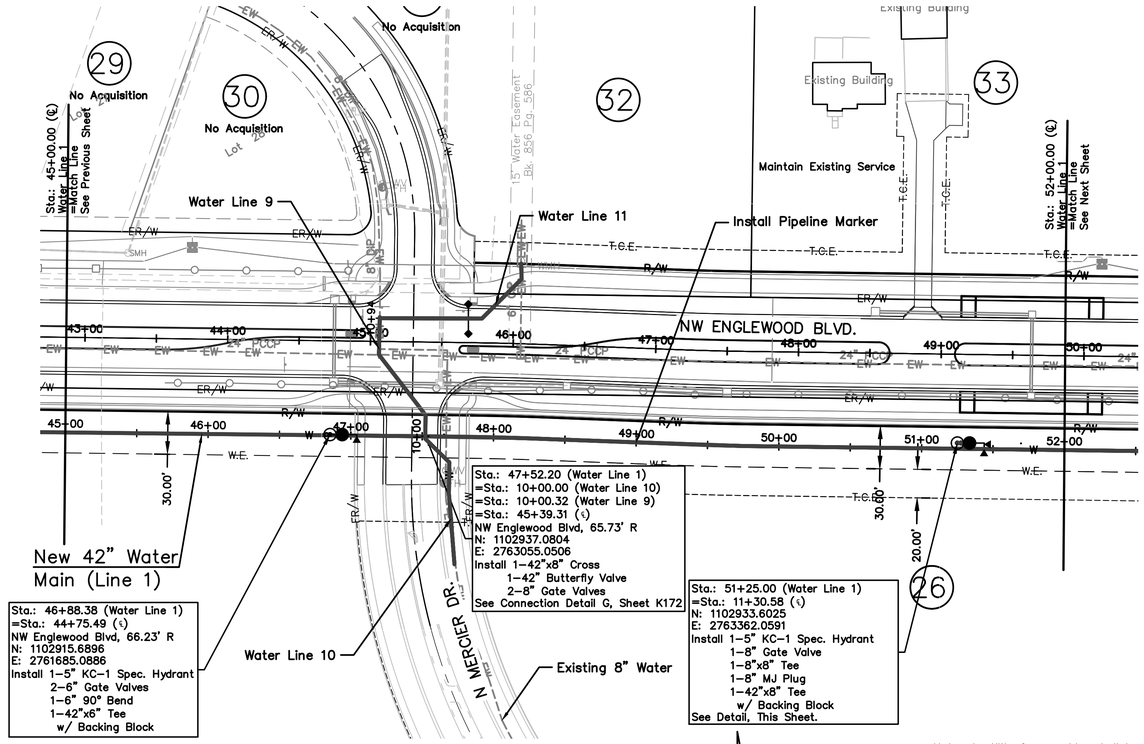
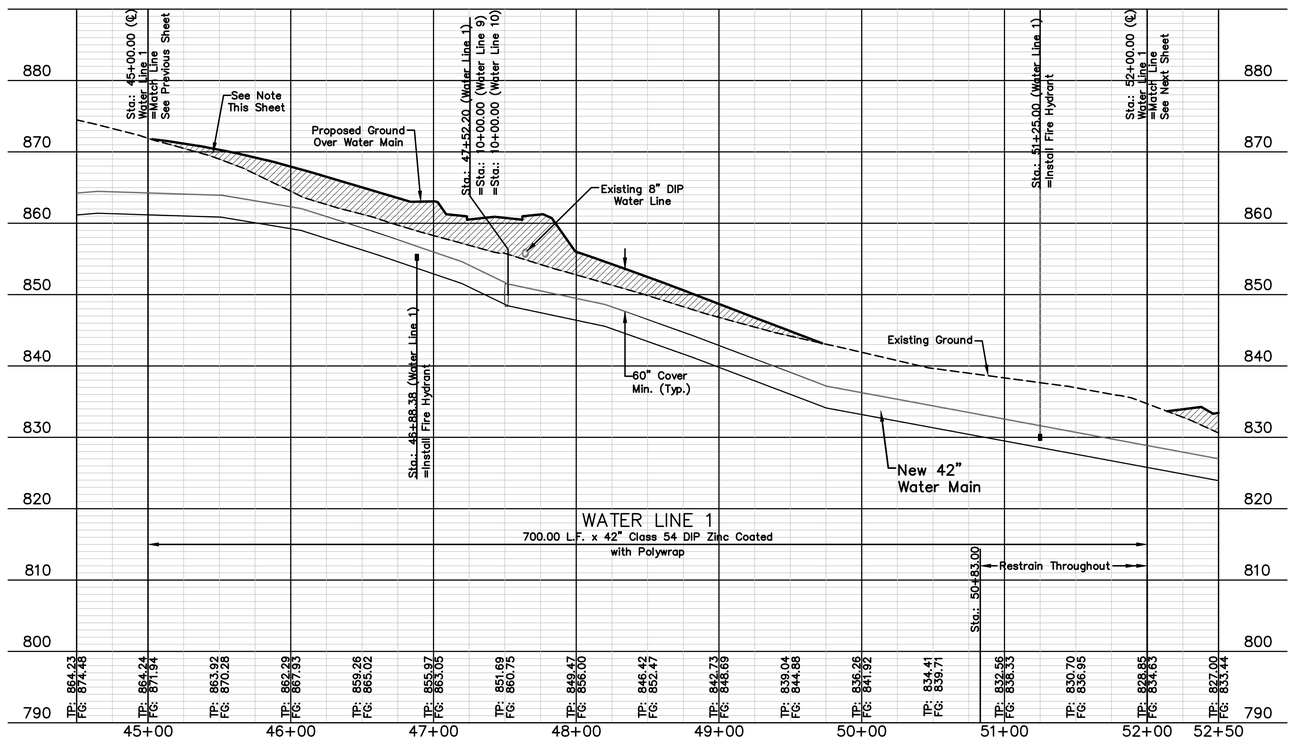
			80001953	20343	

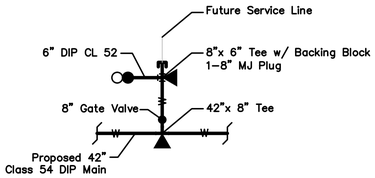
PROJECT NO.
STP 3311 (402)
PW-89008121

(K166) SHEET 011 OF 021



Note: A utility free corridor shall be maintained in perpetuity for the transmission main a distance of 10' minimum on both sides.





Sta.: 51+25.00 2–Valve Hydrant On 42" Transmission Main
Restrain Throughout
Not to Scale

1. *Provide two isolation valves.*
2. *Provide 5' bury hydrant & utilize restrained fittings to meet grade (anchoring "S" bends, locking 90° bends, 45° bends).*

NOTE: Contractor shall fill and compact to 95% standard density to a point 42" Minimum above the top of pipe prior to excavation for the pipe.

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Drawn By: G.S.	12-20-2016		Revised Per Comments & Resubmitted
Lutjen Project No.: 15013	08-28-2017		Revised Per Comments & Resubmitted

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WATER MAIN PLAN & PROFILE
ENGLEWOOD BOULEVARD COMPLETE STREETS UPGRADE
STP 3311 (402) / KCMO 89008121
Kansas City, Clay & Platte Counties, MO

PROFESSIONAL ENGINEER SEAL

ADAM HILGEDICK
Civil Engineer
MO# 2014016961

FOR WSD USE:

KANSAS CITY, MISSOURI, WATER SERVICES DEPARTMENT

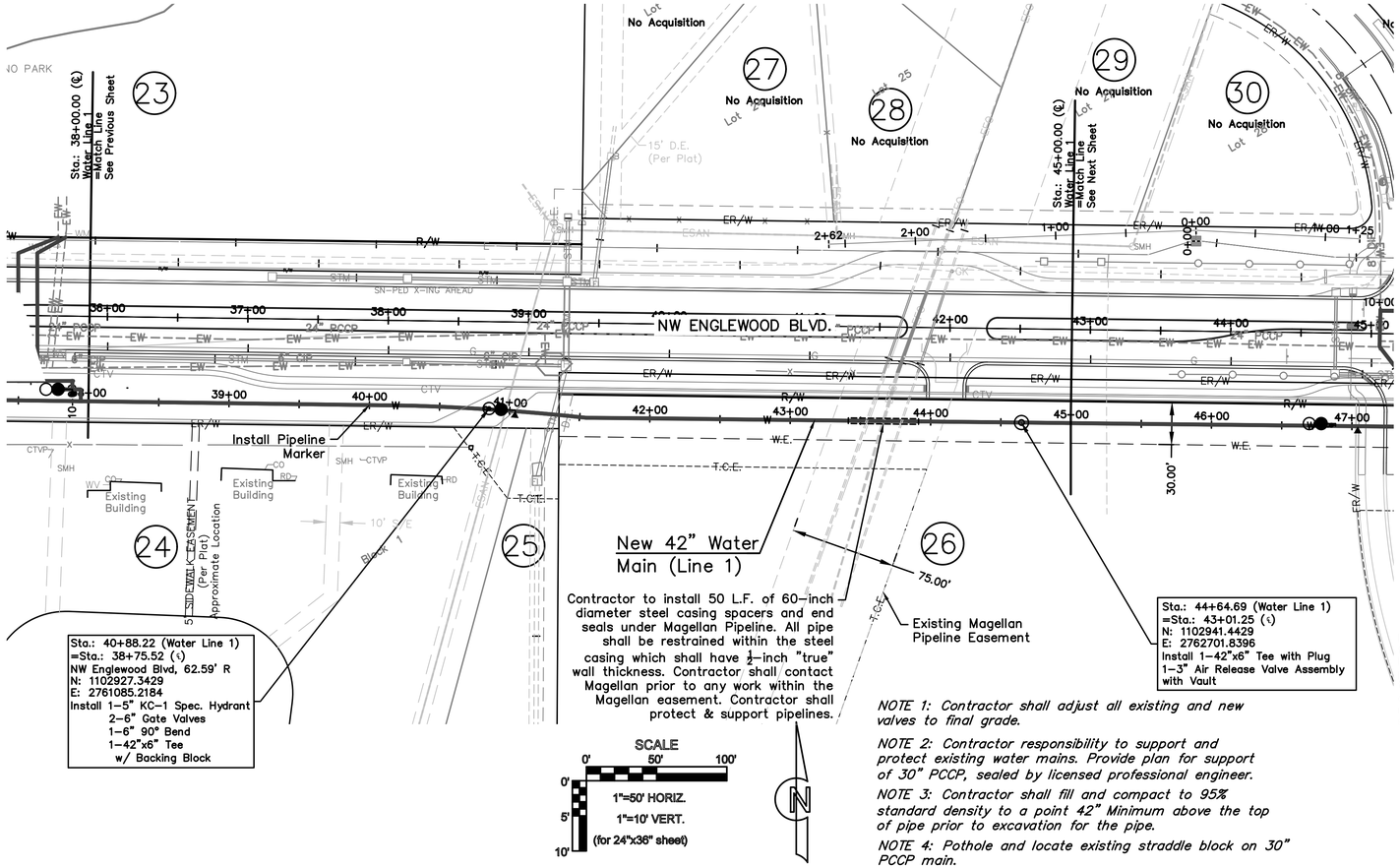
WATER MAIN EXTENSION

ENGLEWOOD BOULEVARD
NW WAUKOMIS DR. TO NW 55TH TER.
KANSAS CITY, CLAY & PLATTE COUNTIES, MISSOURI

DRAWN BY	CHECKED BY				
A.K.H.	A.K.H.				
CONTRACTOR				DATE COMPLETED	
CONTRACT NO.	CONTRACT DATE	DATE	WSD PROJECT NO.	DRAWING NO.	
			80001953	20343	

PROJECT NO.
STP 3311 (402)
PW-89008121

(K165) SHEET 010 OF 021



NOTE: Prior to Installation of 42" Main, the Proposed 8" DIP Main shall be constructed and put into service.

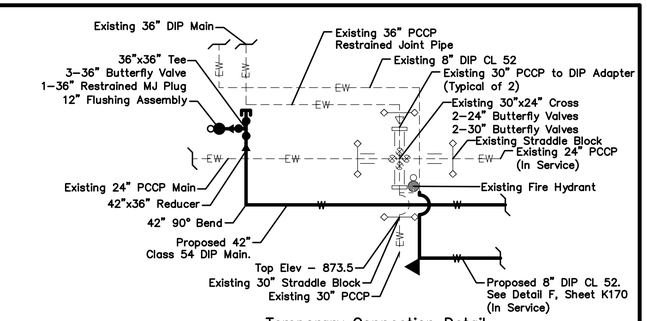
NOTE 1: Contractor shall adjust all existing and new valves to final grade.

NOTE 2: Contractor responsibility to support and protect existing water mains. Provide plan for support of 30" PCCP, sealed by licensed professional engineer.

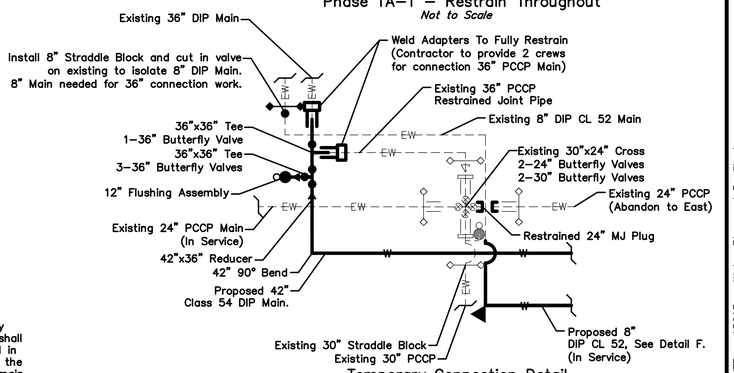
NOTE 3: Contractor shall fill and compact to 95% standard density to a point 42" Minimum above the top of pipe prior to excavation for the pipe.

NOTE 4: Pothole and locate existing straddle block on 30" PCCP main.

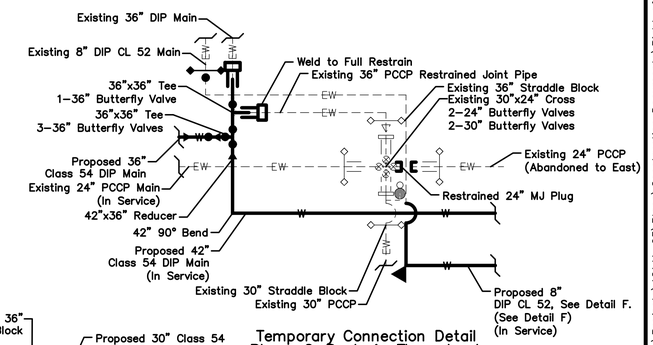
Note: A utility free corridor shall be maintained in perpetuity for the transmission main a distance of 10' minimum on both sides.



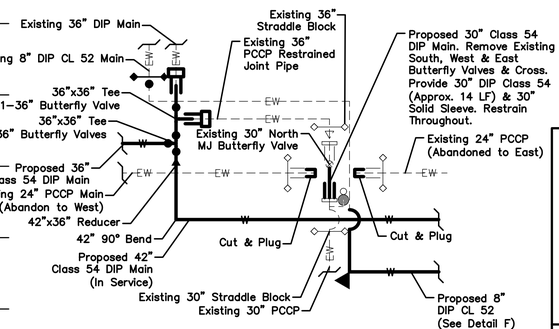
Temporary Connection Detail
Phase 1A-1 - Restrain Throughout
Not to Scale



Temporary Connection Detail
Phase 1A-2 - Restrain Throughout
Not to Scale



Temporary Connection Detail
Phase 2-Restrain Throughout
Not to Scale



Permanent Connection Detail
Restrain Throughout
Not to Scale

Detail E

WARNING
HIGH-PRESSURE PIPELINE(S)
Excavation and/or Construction Prohibited
Without compliance with **State One-Call**, AND
Without Written Permission From
MAGELLAN PIPELINE COMPANY, L.P.

REVISIONS/APPROVALS:	NO.:	DATE:
Prepared for City Permit Submittal	03-07-2016	
Revised Per Comments & Resubmitted	05-06-2016	
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Reviewed By: A.K.H.
Designed By: A.K.H.
Drawn By: G.S.
Lutjen Project No.: 15013

ADAM HILGEDICK P.E.
MO# 2014016961

MO State Certificate of Authority #: 2007022824

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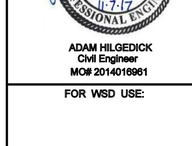
WATER MAIN PLAN & PROFILE

PROFESSIONAL ENGINEER SEAL



ADAM HILGEDICK
Civil Engineer
MO# 2014016961

FOR WSD USE:

KANSAS CITY, MISSOURI, WATER SERVICES DEPARTMENT

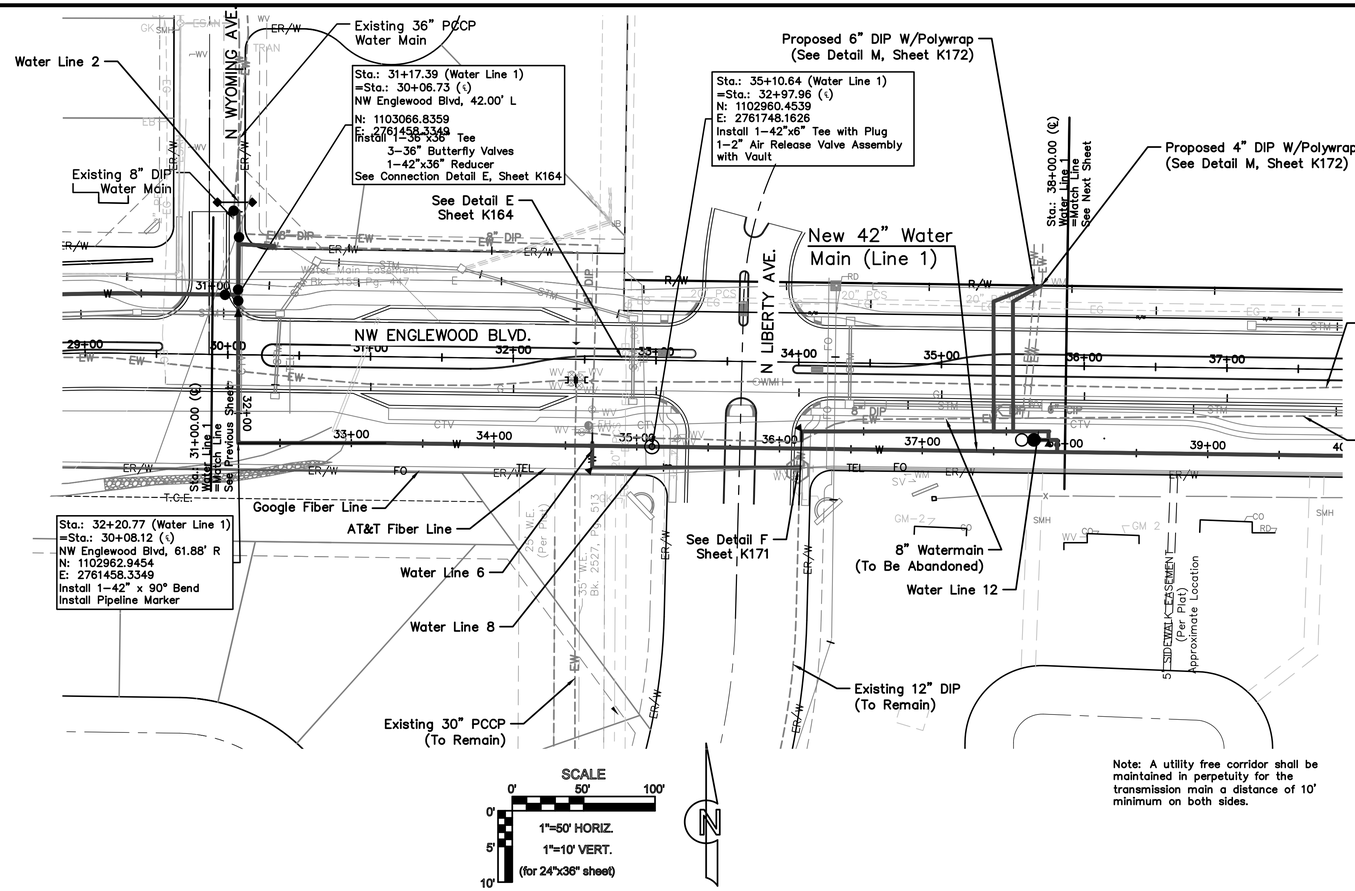
WATER MAIN EXTENSION

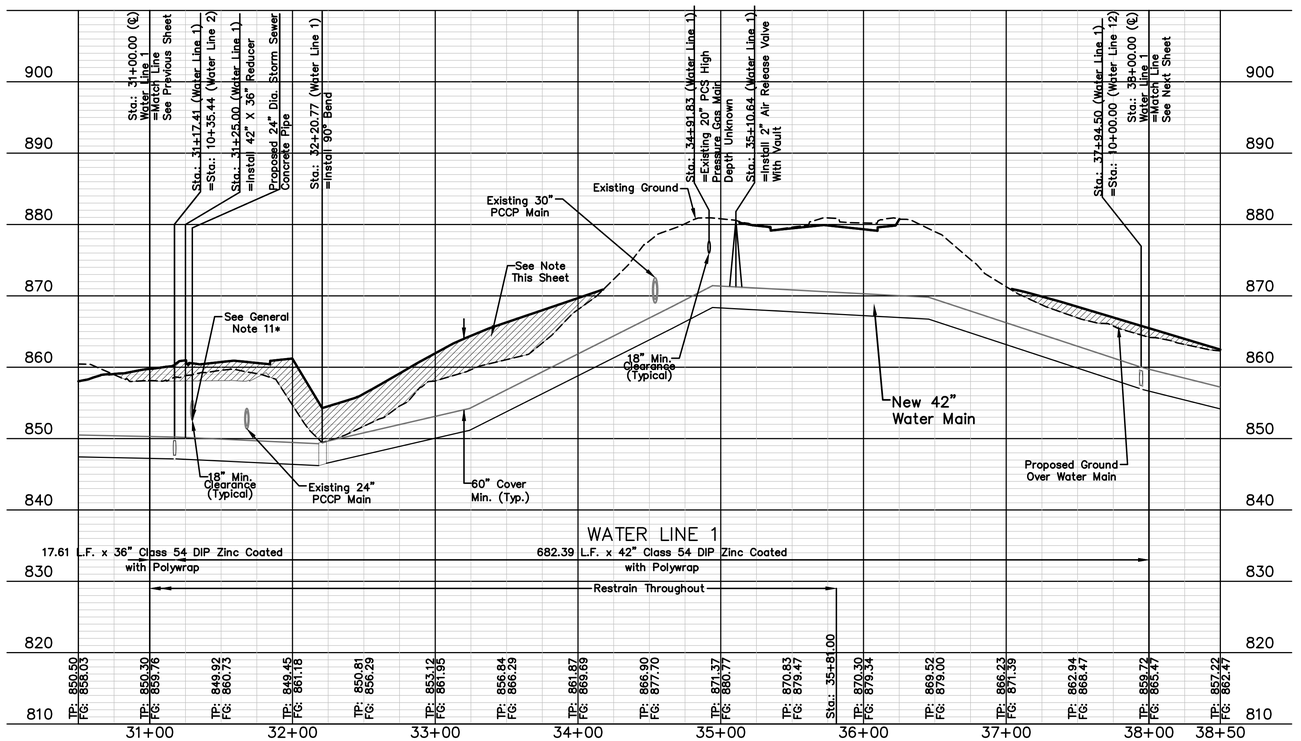
ENGLEWOOD BOULEVARD
NW WAUKOMIS DR. TO NW 55TH TER.
KANSAS CITY, CLAY & PLATTE COUNTIES, MISSOURI

DRAWN BY	CHECKED BY				
A.K.H.	A.K.H.				
CONTRACTOR				DATE COMPLETED	
CONTRACT NO.	CONTRACT DATE	DATE	WSD PROJECT NO.	DRAWING NO.	
			80001953	20343	

PROJECT NO.
STP 3311 (402)
PW-89008121

(K164) SHEET 009 OF 021





NOTE: Contractor shall fill and compact to 95% standard density to a point 42" Minimum above the top of pipe prior to excavation for the pipe.

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ADAM HILGEDICK P.E. MO# 2014016961

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WATER MAIN PLAN & PROFILE
ENGLEWOOD BOULEVARD COMPLETE STREETS UPGRADE
STP 3311 (402) / KCMO 89008121
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PROFESSIONAL ENGINEER SEAL

STATE OF MISSOURI ADAM HILGEDICK NUMBER PE-2014016961 PROFESSIONAL ENGINEER 11-7-17

ADAM HILGEDICK
Civil Engineer
MO# 2014016961

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			80001953	20343	

PROJECT NO.
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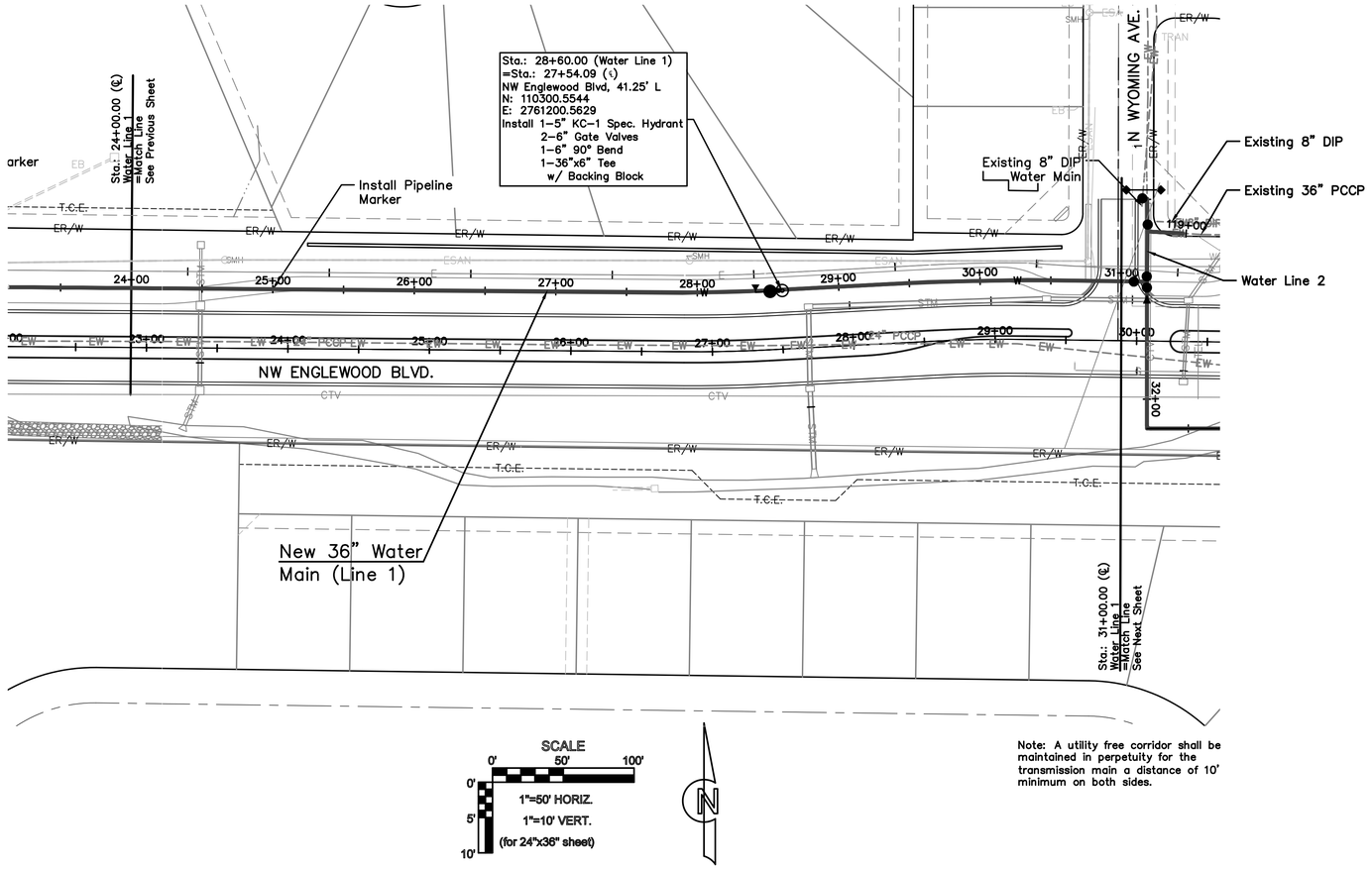
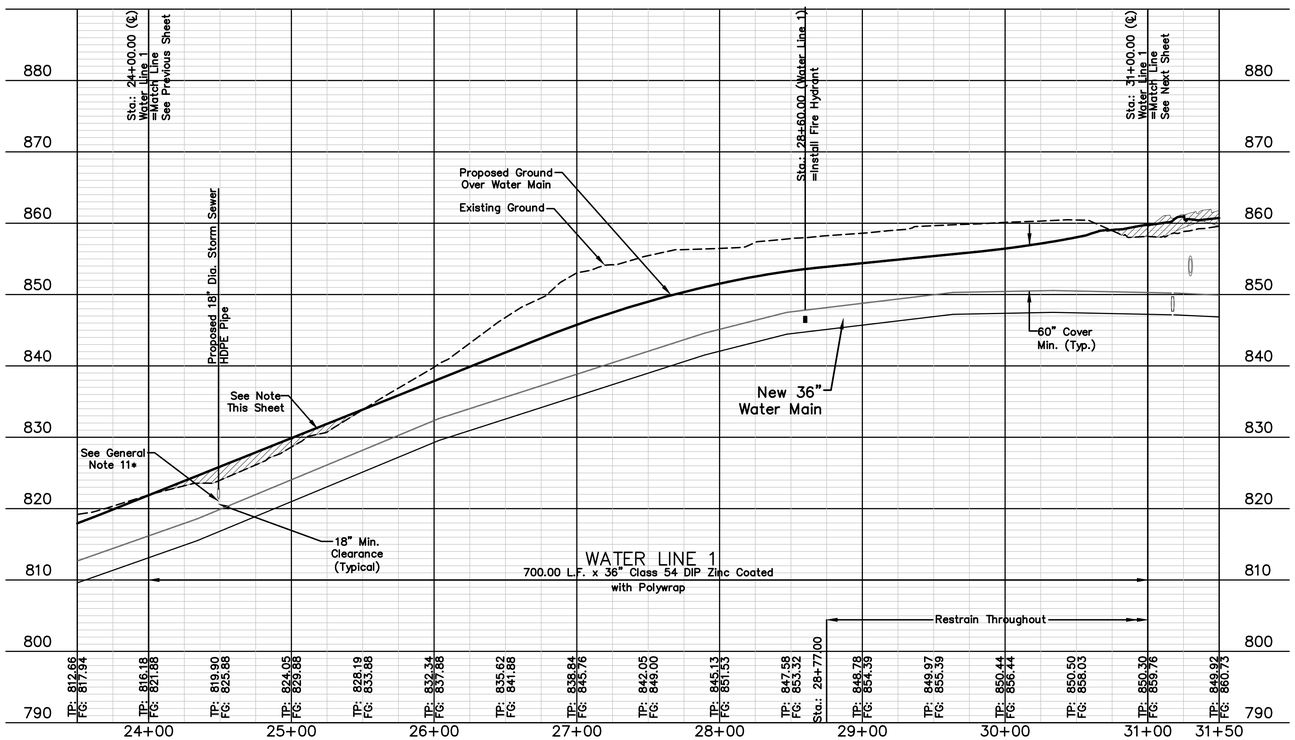
(K163) SHEET 008 OF 021





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STATE OF MISSOURI
ADAM HILGEDICK
NUMBER PE-2014016961
PROFESSIONAL ENGINEER
1:7:17

ADAM HILGEDICK
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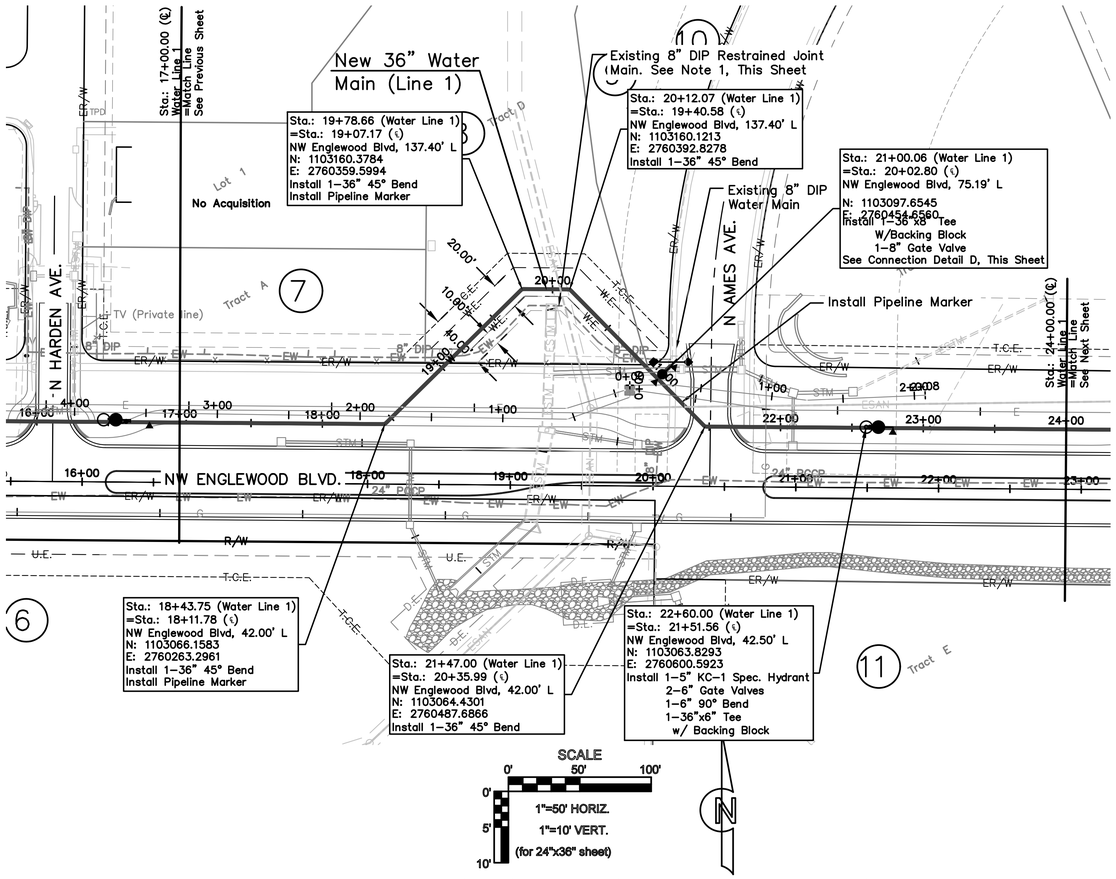
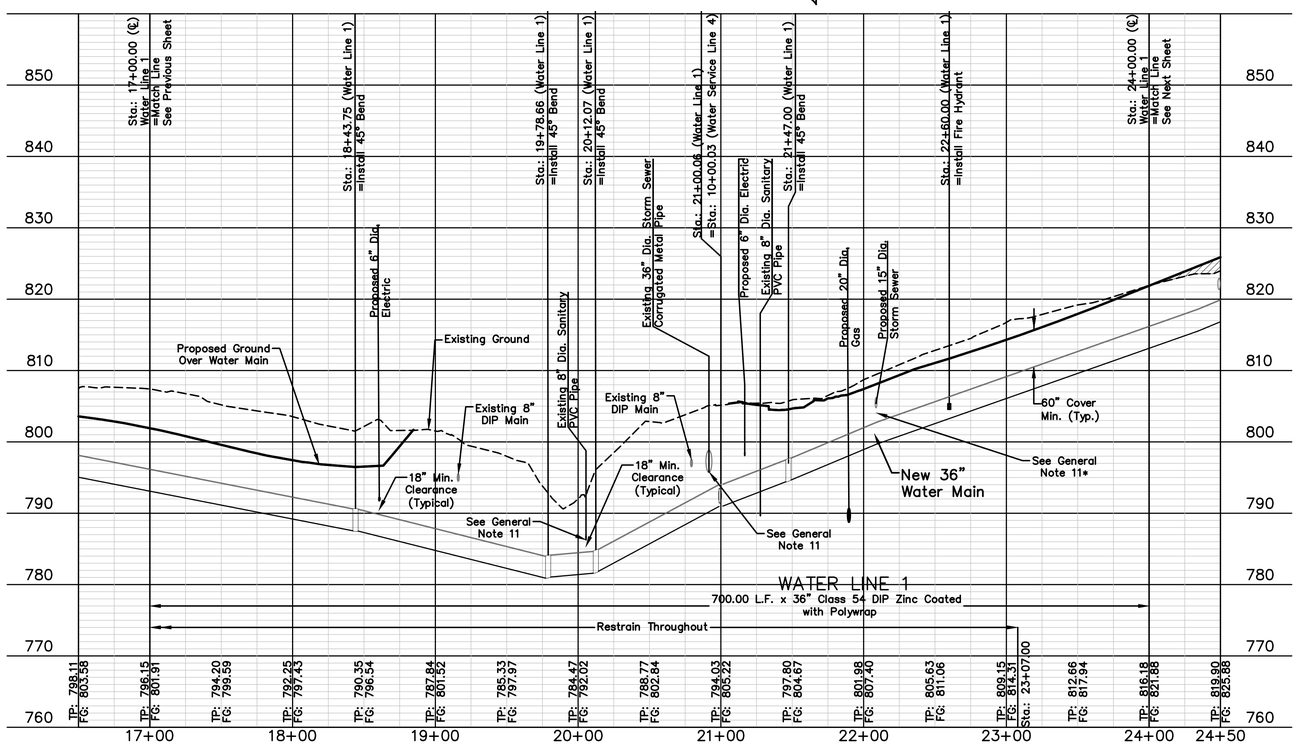
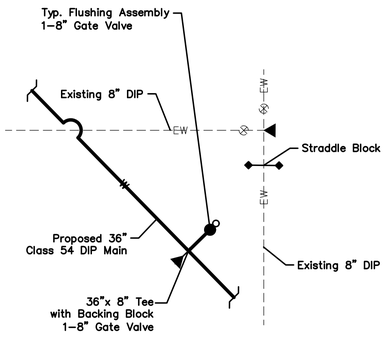
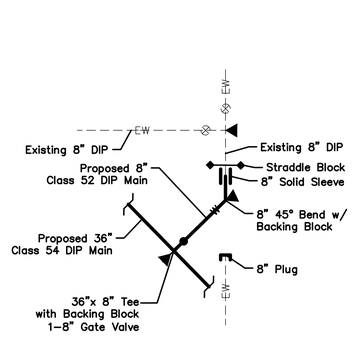
(K162) SHEET 007 OF 021







Temporary Connection Detail
Restrain Throughout
Not to Scale



Permanent Connection Detail
Restrain Throughout
Not to Scale

Detail D

NOTE 1: Contractor shall pothole location & elevation of existing 8" DIP restrained joint main from station 19+15 to 2+80. Adjust alignment of 36" main within easement (Min. 5' from permeter) to avoid conflict.

NOTE 2: Contractor shall fill and compact to 95% standard density to a point 42" Minimum above the top of pipe prior to excavation for the pipe.

Reviewed By:	DATE:	NO.:	REVISIONS/APPROVALS:
A.K.H.	03-07-2016		Prepared for City Permit Submittal
Designed By:	05-06-2016		Revised Per Comments & Resubmitted
A.K.H.	12-20-2016		Revised Per Comments & Resubmitted
Drawn By:	08-28-2017		Revised Per Comments & Resubmitted
G.S.			
Lutjen Project No.: 15013			

ADAM HILGEDICK P.E. MO# 2014016961

MO State Certificate of Authority #: 2007022824

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816.587.4223 fax
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surveying
planning
engineering
landscape architecture

Location: L:\Projects\12141-03\Plans\Construction Documents\Right of Way 36x24\WTR - 15013 - Water Plan and Profile.dwg

WATER MAIN PLAN & PROFILE

ENGLEWOOD BOULEVARD COMPLETE STREETS UPGRADE

STP 3311 (402) / KCMO 89008121

Kansas City, Clay & Platte Counties, MO

PROFESSIONAL ENGINEER SEAL

STATE OF MISSOURI — ADAM HILGEDICK — NUMBER PE-2014016961 — PROFESSIONAL ENGINEER — 11-7-17

ADAM HILGEDICK
Civil Engineer
MO# 2014016961

FOR WSD USE:

KANSAS CITY, MISSOURI, WATER SERVICES DEPARTMENT

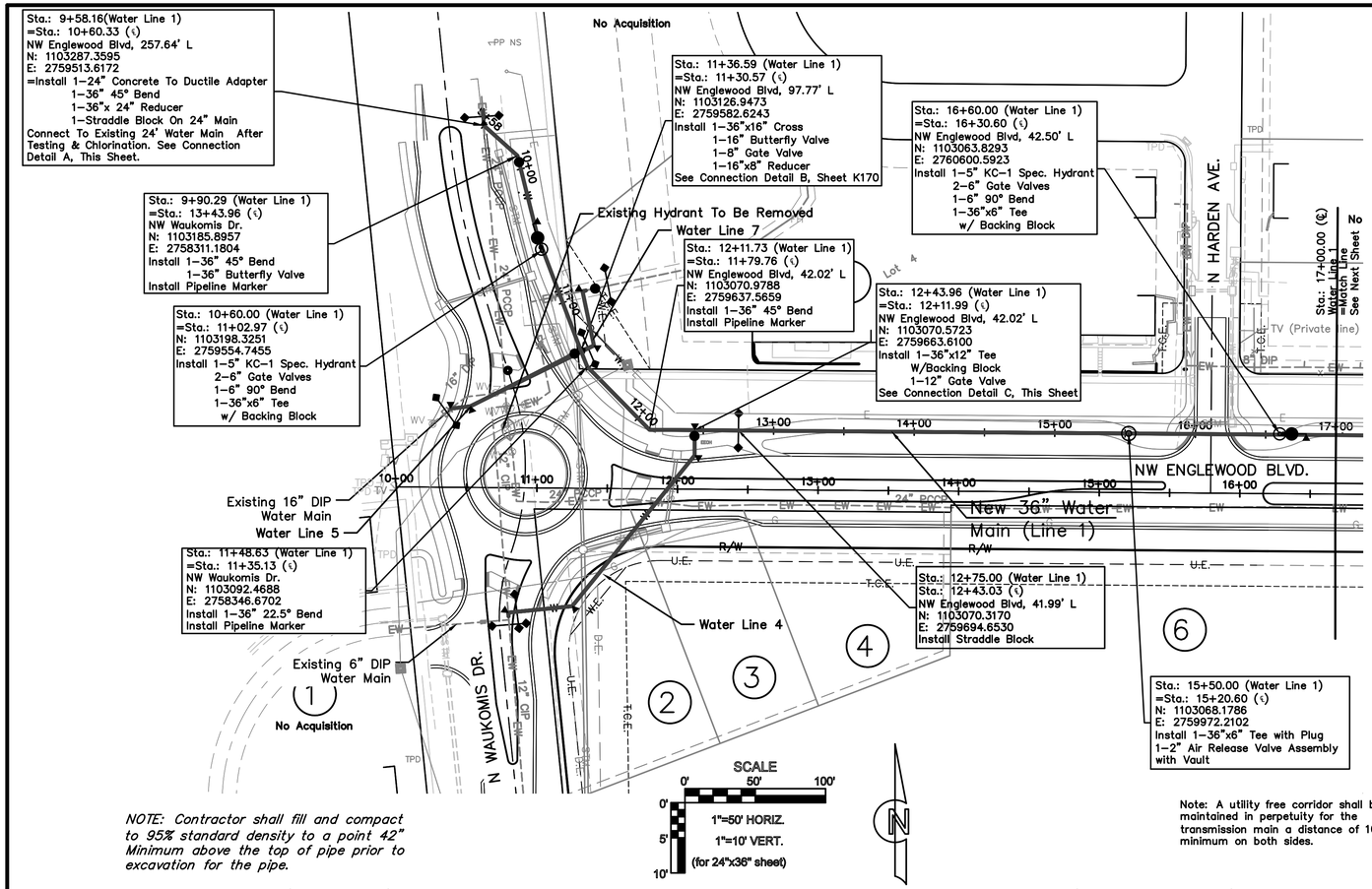
WATER MAIN EXTENSION

ENGLEWOOD BOULEVARD
NW WAUKOMIS DR. TO NW 55TH TER.
KANSAS CITY, CLAY & PLATTE COUNTIES, MISSOURI

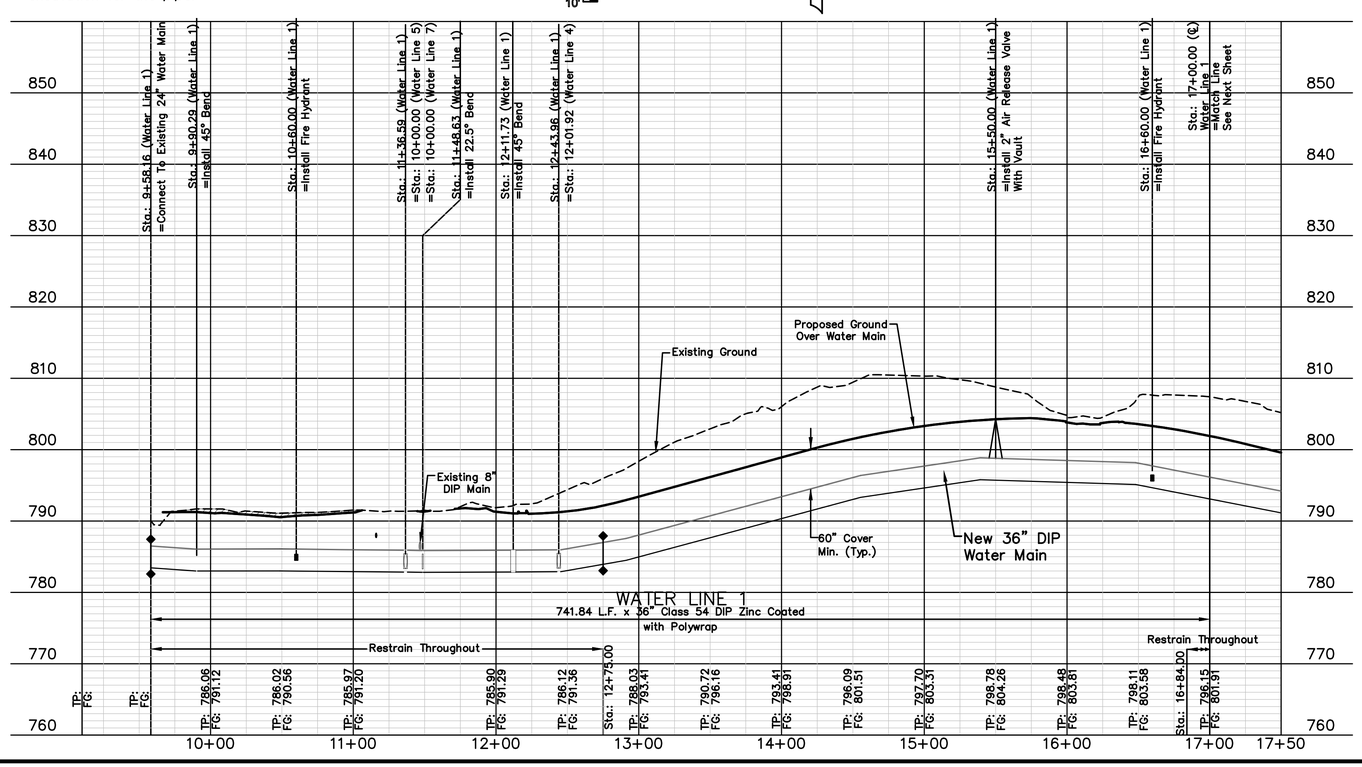
DRAWN BY	CHECKED BY				
A.K.H.	A.K.H.				
CONTRACTOR				DATE COMPLETED	
CONTRACT NO.	CONTRACT DATE	DATE	WSD PROJECT NO.	DRAWING NO.	
			80001953	20343	

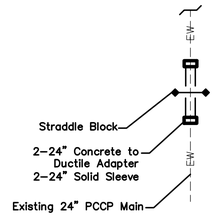
PROJECT NO.
STP 3311 (402)
PW-89008121

(K161) SHEET 006 OF 021

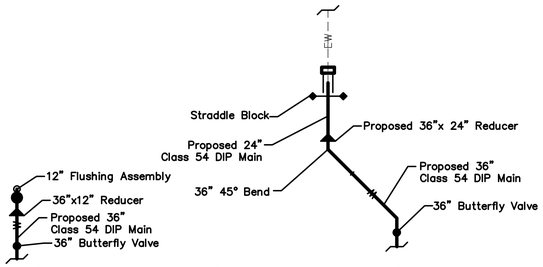


NOTE: Contractor shall fill and compact to 95% standard density to a point 42" Minimum above the top of pipe prior to excavation for the pipe.



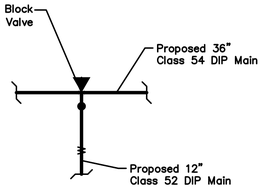


Temporary Connection Detail
Restrain Throughout
Not to Scale



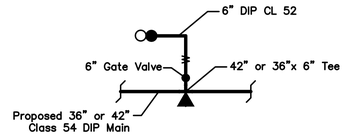
Permanent Connection Detail
Restrain Throughout
Not to Scale

Detail A



Permanent Connection Detail
Restrain Throughout
Not to Scale

Detail C



Typical 2 Valve Hydrant On Transmission Main (36"&42")
Restrain Throughout
Not to Scale

1. *Provide two isolation valves for each hydrant on 36" and 42" transmission mains.*
2. *Provide 5' bury hydrants & utilize restrained fittings to meet grade (anchoring "S" bends, locking 90° bends, 45° bends).*

Reviewed By:	DATE:	NO.:	REVISIONS/APPROVALS:
A.K.H.	03-07-2016		Prepared for City Permit Submittal
Designed By:	05-06-2016		Revised Per Comments & Resubmitted
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Drawn By:	08-28-2017		Revised Per Comments & Resubmitted
G.S.			
Lutjen Project No.: 15013			

ADAM HILGEDICK P.E.
MO# 2014016961

MO State Certificate of Authority #: 2007022824

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816.587.4330 fax
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Location: L:\Projects\12141-03\Plans\Construction Documents\Right of Way 36x24\WTR - 15013 - Water Plan and Profile.dwg

WATER MAIN PLAN & PROFILE
ENGLEWOOD BOULEVARD COMPLETE STREETS UPGRADE
STP 3311 (402) / KCMO 89008121
Kansas City, Clay & Platte Counties, MO

PROFESSIONAL ENGINEER SEAL

ADAM HILGEDICK
Civil Engineer
MO# 2014016961

FOR WSD USE:

KANSAS CITY, MISSOURI, WATER SERVICES DEPARTMENT

WATER MAIN EXTENSION

ENGLEWOOD BOULEVARD
NW WAUKOMIS DR. TO NW 55TH TER.
KANSAS CITY, CLAY & PLATTE COUNTIES, MISSOURI

DRAWN BY	CHECKED BY			
A.K.H.	A.K.H.			
CONTRACTOR				DATE COMPLETED
CONTRACT NO.	CONTRACT DATE	DATE	WSD PROJECT NO. 80001953	DRAWING NO. 20343

PROJECT NO.
STP 3311 (402)
PW-89008121

(K160) SHEET 005 OF 021

ANTI-COLLUSION STATEMENT

STATE OF MISSOURI

CITY/COUNTY OF_____

_____

_____ being first duly sworn, deposes and says that he is

_____
Title of Person Signing

of _____

_____
Name of Bidder

that all statements made and facts set out in the proposal for the above project are true and correct; and the bidder (The person, firm, association, or corporation making said bid) has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with said bid or any contract which may result from its acceptance.

Affiant further certifies that bidder is not financially interested in, or financially affiliated with, any other bidder for the above project.

BY_____

BY_____

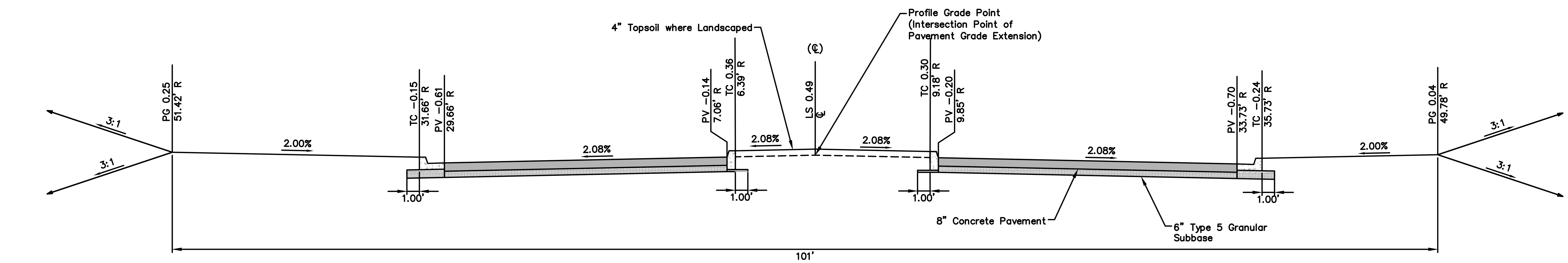
BY_____

SWORN to before me this _____ day of _____ 20 ___.

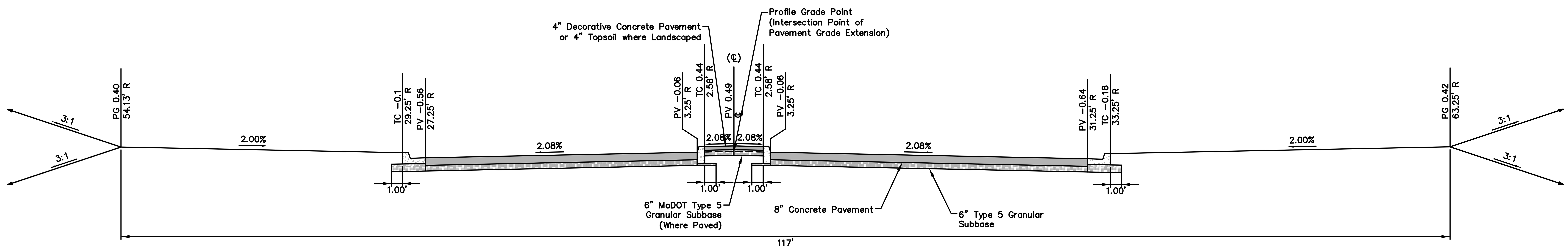
_____
Notary Public

My Commission Expires_____

Fig. 136.10.3 Anti-Collusion Statement Revised 01-01-09



1"=5'
1 N Liberty Ave
Sta. 9+00.00 to Sta. 9+61.56



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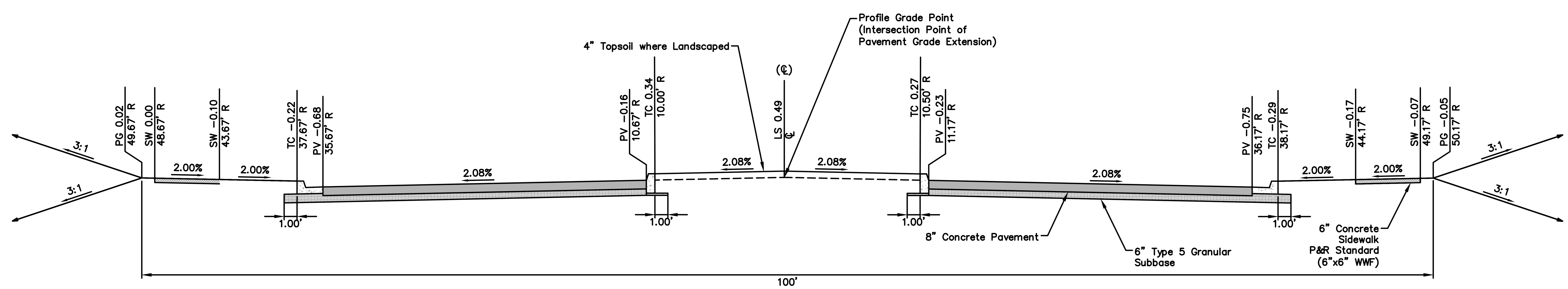
Sta. 10+27.99 to Sta. 10+60.36



1"=5'
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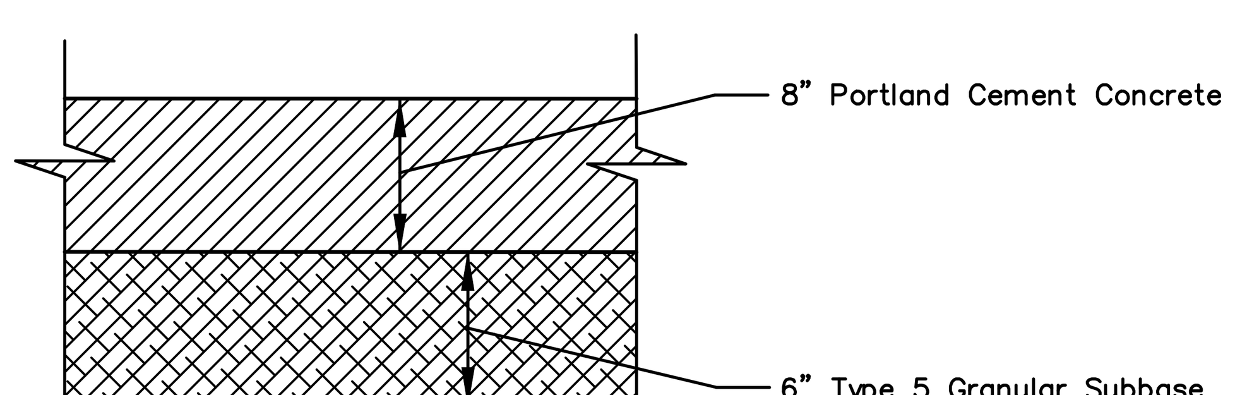
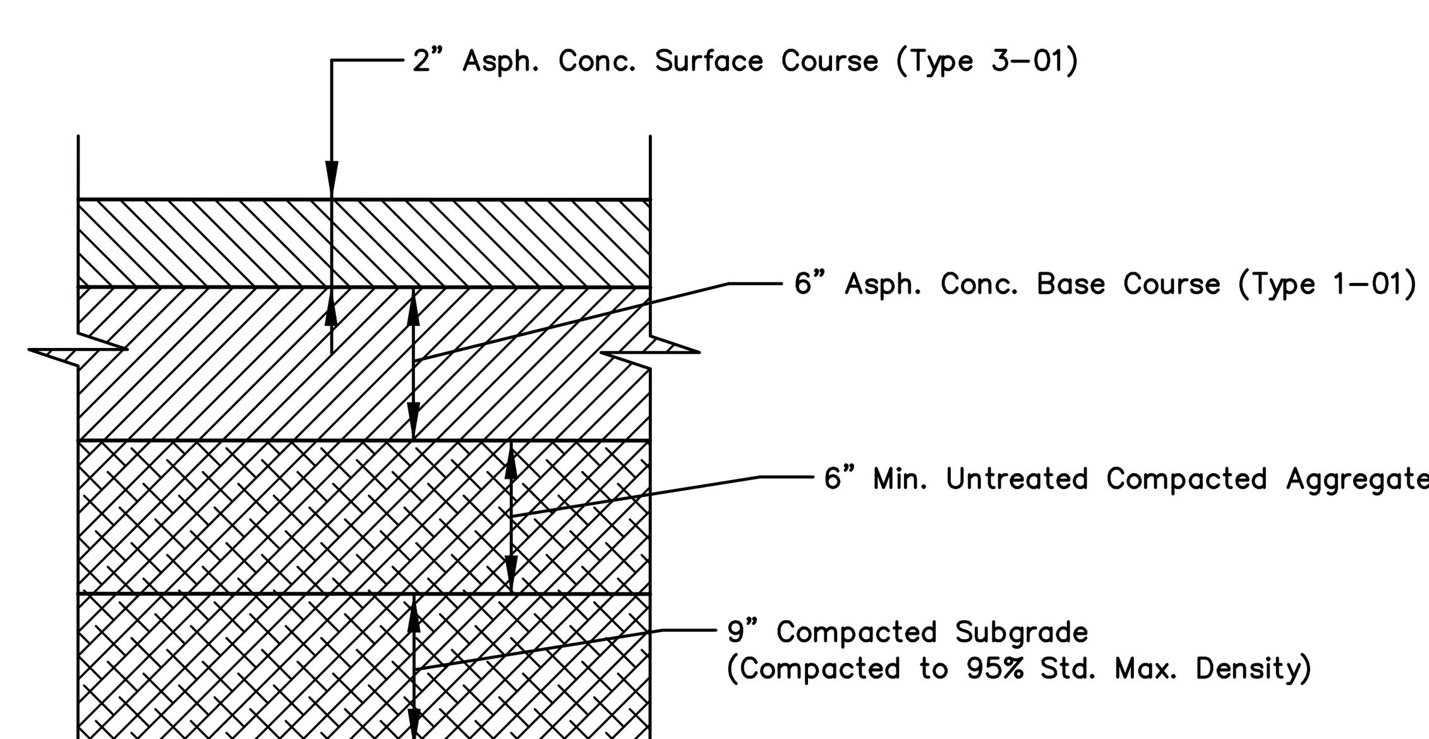
North Match Line



N.T.S.
1 UNREINFORCED CONCRETE PAVEMENT SECTION
NW WAUKOMIS DR (ROUNDABOUT)
N LIBERTY AVE, N SUMMIT ST



N.T.S.
1 ASPHALT PAVEMENT SECTION
N HARDEN AVE, N AMES AVE
N WYOMING AVE, N MERCIER DR

All Pavement Sections
Shall be Constructed
With 9" Fly Ash
Stabilized Subgrade
Under Granular Subbase.

DATE:	NO.:	REVISIONS/APPROVALS:
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10-27-2015		Revised per Agency Comments and Resubmitted.
11-30-2015		Revised per Agency Comments and Resubmitted.
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STATE OF MISSOURI
ADAM
HILGEDICK
NUMBER
PE-2014016961
11.7.17
PROFESSIONAL ENGINEER

Reviewed By:
A.K.H.
Designed By:
A.K.H.
Drafted By:
G.S.
Lutjen Project No.:
15013
Adam K. Hilgedick, P.E.
MO#: 2014016961

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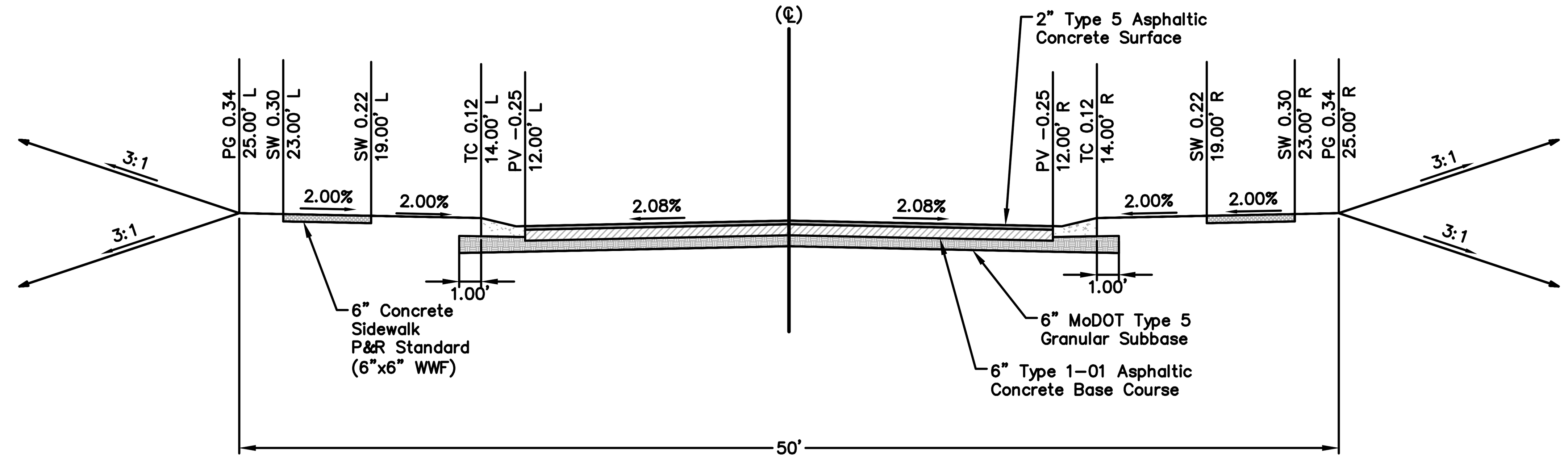
MO State Certificate of Authority #: 2007022824

Location: L:\Projects\12141-03\Plans\Construction Documents\Right of Way 36x24\TYP - 15013.dwg

TYPICAL SECTIONS

ENGLEWOOD BOULEVARD COMPLETE
STREETS UPGRADE
STP 3311 (402) / KCMO 89008121
Kansas City, Clay & Platte Counties, MO

Sheet No.:
K03



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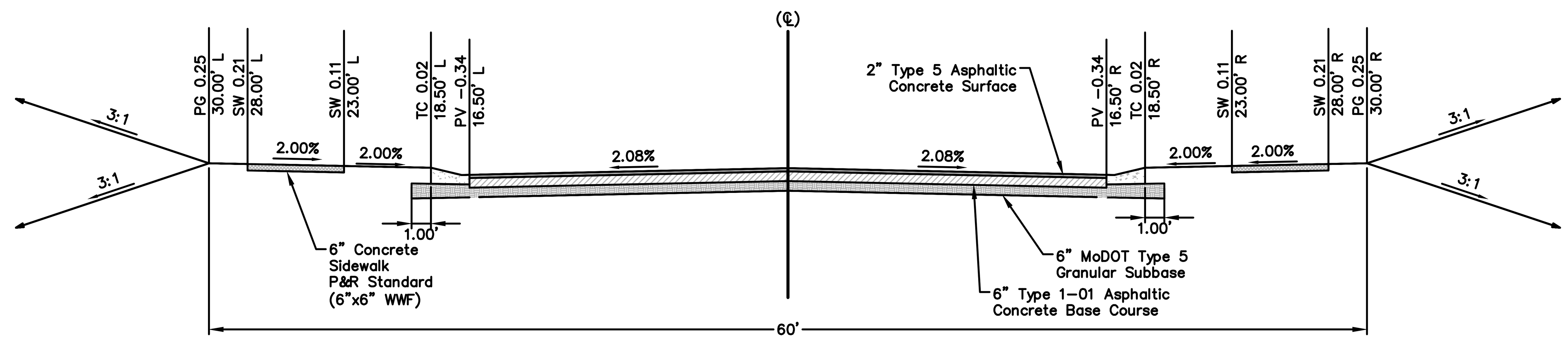
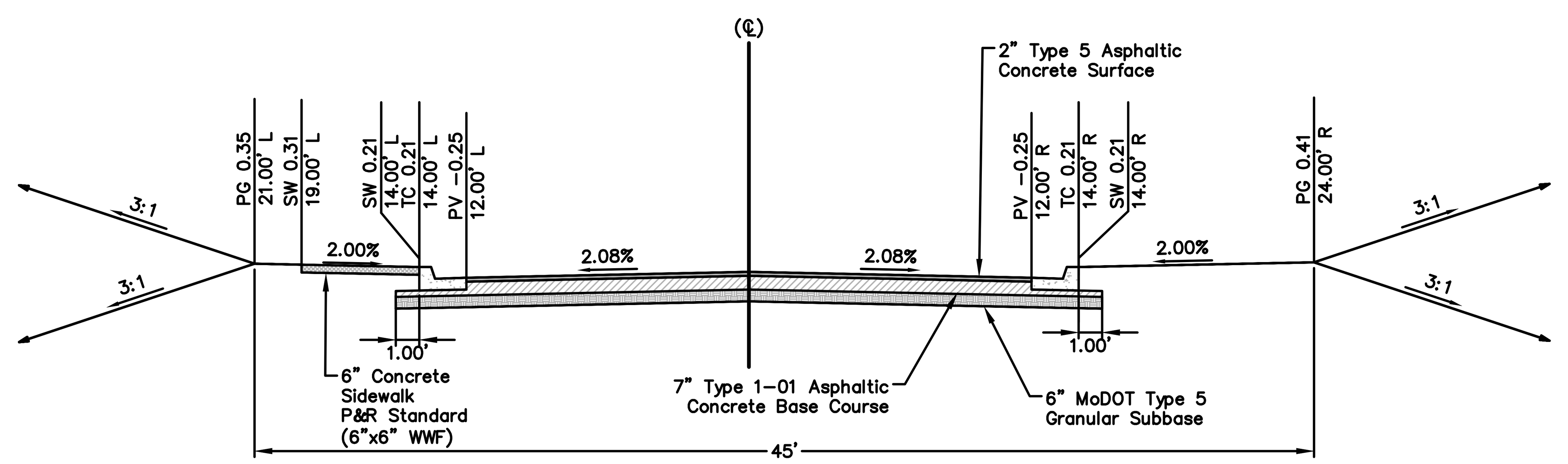
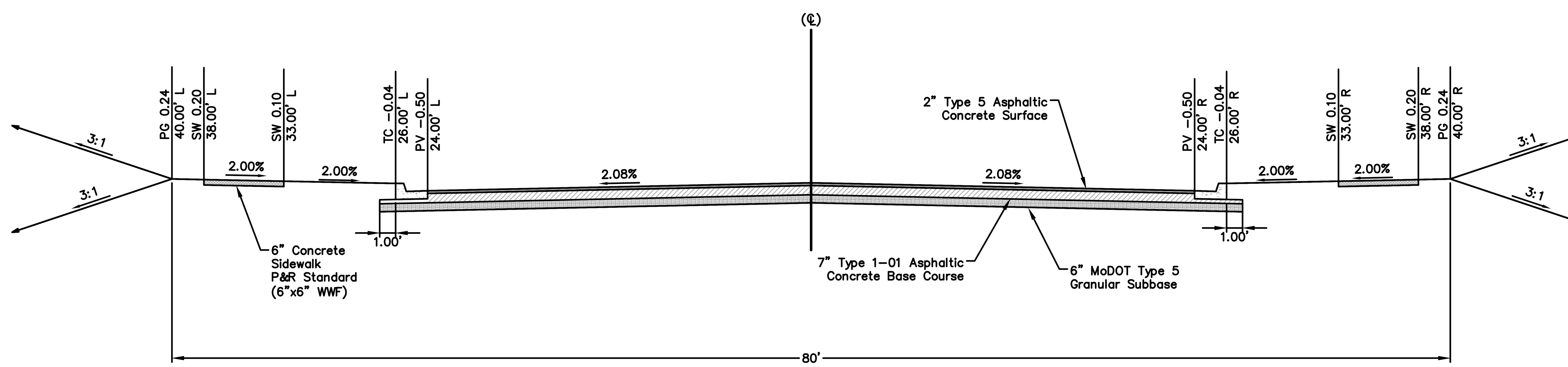


1 1"=5'
N Mercier Dr.
Sta. 10+42.00 to Sta. 12+00.00



1 1"=5'
N Summit St
Sta. 10+57.15 to Sta. 16+87.30



1 1"=5'
N Summit St
Sta. 4+85.90 to Sta. 9+41.00

All Pavement Sections Shall be Constructed With 9" Fly Ash Stabilized Subgrade Under Granular Subbase.

DATE:	NO.:	REVISIONS/APPROVALS:
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STATE OF MISSOURI
ADAM HILGEDICK
NUMBER PE-2014016961
PROFESSIONAL ENGINEER
[illegible]
11·7·17

Reviewed By: A.K.H.
Designed By: A.K.H.
Drafted By: G.S.
Lutjen Project No.: 15013
Adam K. Hilgedick, P.E.
MO#: 2014016961

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North Kansas City, MO 64116
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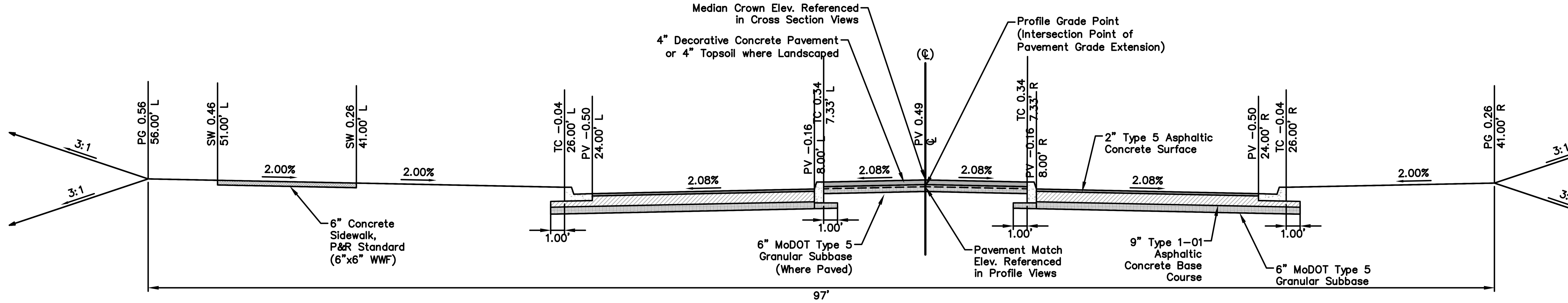
MO State Certificate of Authority #: 2007022824

Location: L:\Projects\12141-03\Plans\Construction Documents\Right of Way 36x24\TYP - 15013.dwg

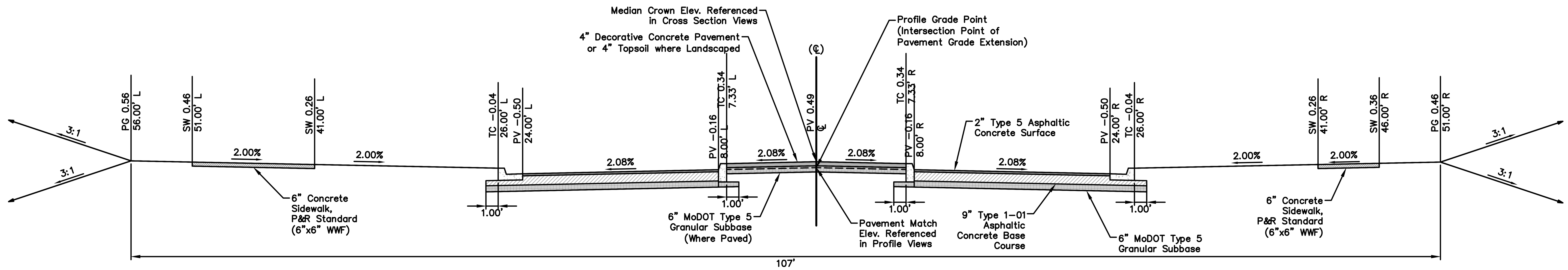
TYPICAL SECTIONS

ENGLEWOOD BOULEVARD COMPLETE STREETS UPGRADE
STP 3311 (402) / KCMO 89008121
Kansas City, Clay & Platte Counties, MO

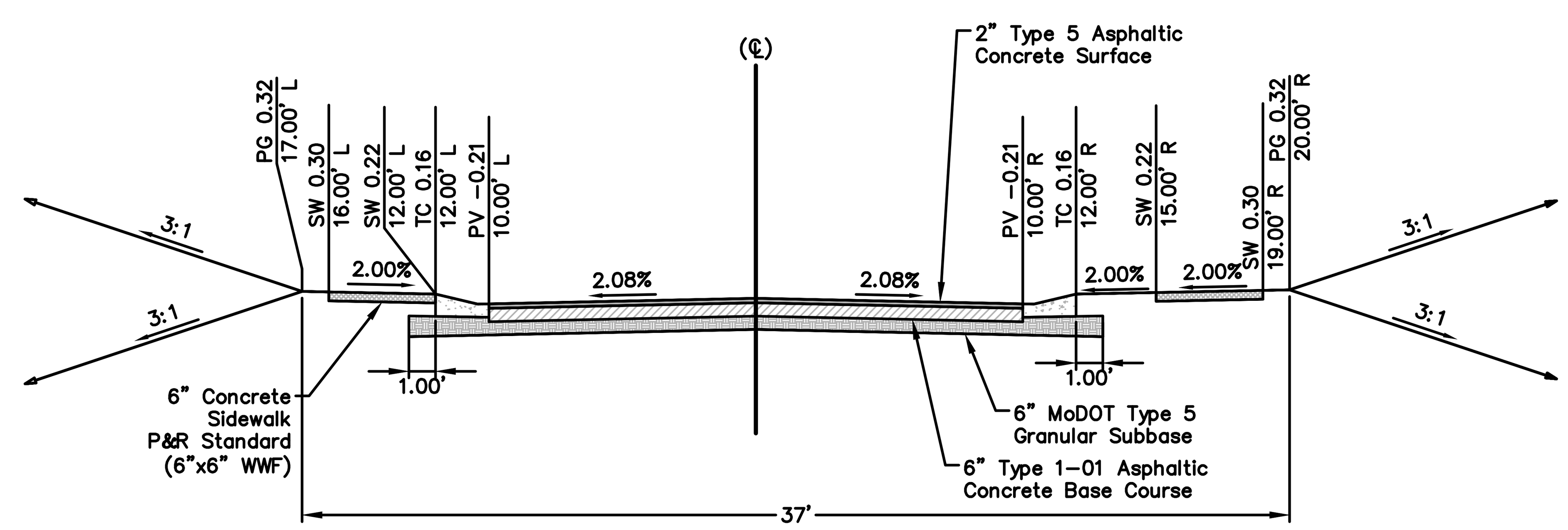
Sheet No.:
K02



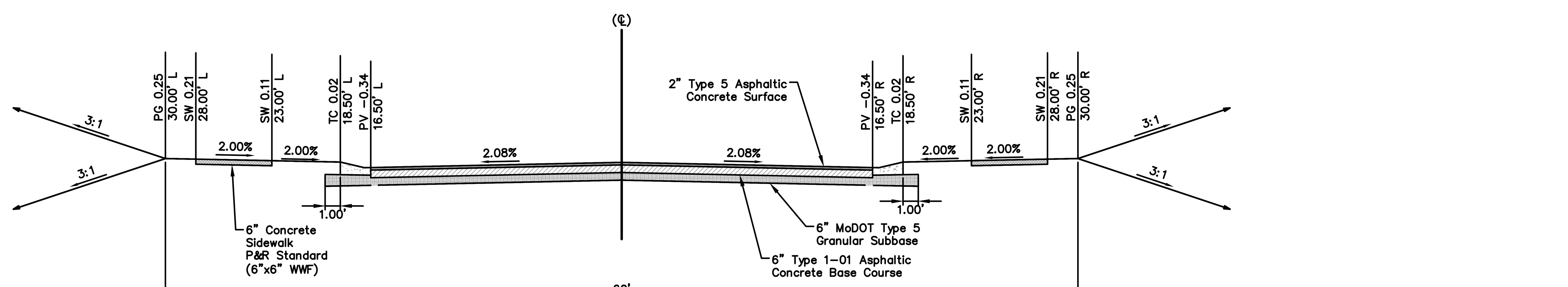
1"=5'
1 NW Englewood Blvd
Sta. 11+75.00 to Sta. 33+60.25



1"=5'
1 NW Englewood Blvd
Sta. 33+60.25 to Sta. 55+41.87



1"=5'
1 N Harden Ave
Sta. 10+41.00 to Sta. 11+25.00



1"=5'
1 N Ames Ave
Sta. 10+41.00 to Sta. 11+00.00

All Pavement Sections
Shall be Constructed
With 9" Fly Ash
Stabilized Subgrade
Under Granular Subbase.

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STATE OF MISSOURI
ADAM HILGEDICK
NUMBER PE-2014016961
PROFESSIONAL ENGINEER
11-7-17

Reviewed By: A.K.H.
Designed By: A.K.H.
Drafted By: G.S.
Lutjen Project No.: 15013

Adam K. Hilgedick, P.E.
MO#: 2014016961

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TYPICAL SECTIONS

ENGLEWOOD BOULEVARD COMPLETE STREETS UPGRADE
STP 3311 (402) / KCMO 89008121
Kansas City, Clay & Platte Counties, MO

Sheet No.:
K01

Item No.	Unit	Quantity	Item Description:
			KANSAS CITY MISSOURI STREET CONSTRUCTION
			Miscellaneous
1	L.S.	1	Mobilization
2	L.S.	1	Construction Staking
3	Ac.	13.48	Clearing & Grubbing
4	Ac.	6.51	Tree Removal (No Burning)
5	C.Y.	6,740	Pavement & Curb Removal
6	S.F.	503	Signing
7	Ea.	9	Type 3 Moveable Barricade
8	Ea.	1	Field Office
			Grading
9	Ac.	19.99	Topsoil Removal, Stockpile and Distribution
10	C.Y.	82,693	Unclassified Excavation
11	C.Y.	71,472	Embankment
12	S.Y.	36,897	Subgrade Stabilization (9" Flyash Treatment)
13	S.Y.	36,897	Rock Subbase (6" MoDOT Type 5)
14	S.Y.	36,897	Fine Grading (Subgrade)
15	S.F.	1,261	Modular Block Retaining Wall
			Erosion Control
16	L.F.	14000	Silt Fence
17	Ea.	91	Inlet Protection
18	Ea.	1	Vehicle Tracking Device
19	S.Y.	25730	Soil Stability Blanket
			Pavement
20	S.Y.	277	2" Mill and Overlay
21	S.Y.	21,384	2" Asphalt Surface
22	S.Y.	1,847	6" Asphalt Base
23	S.Y.	3,615	7" Asphalt Base
24	S.Y.	15,923	9" Asphalt Base
25	S.Y.	6,964	Asphalt Extension Under Curb
26	S.Y.	223	6" Concrete
27	S.Y.	6,786	8" Concrete
28	S.Y.	792	4" Concrete (Colored and Textured)
29	S.Y.	748	8" Concrete (Colored and Textured)
			Curbs & Sidewalks
30	L.F.	14,834	Curb & Gutter (Type CG-1)
31	L.F.	947	Curb & Gutter (Type CG-2)
32	L.F.	8,864	Curb (Type C-1)
33	L.F.	264	Mountable Curb & Gutter
34	L.F.	211	Concrete Sidewalks (4' Wide, 4" Thick)
35	L.F.	5,111	Concrete Sidewalks (5' Wide, 4" Thick)
36	L.F.	89	Concrete Sidewalks (6' Wide, 4" Thick)
37	L.F.	536	Concrete Sidewalks (8' Wide, 6" Thick)
38	L.F.	4,484	Concrete Sidewalks (10' Wide, 6" Thick)
39	S.F.	7,641	ADA Curb Ramps (6" Thick w/ Detectable Warning)
			Pavement Marking and Signage
40	Ea.	123	Street Sign (Includes Post & All Attached Signs)
41	Ea.	2	School Zone Flasher Sign
42	L.F.	56	4" Thermoplastic Solid White Pavement Marking
43	L.F.	19	4" Thermoplastic Solid Yellow Pavement Marking
44	L.F.	1,255	4" Thermoplastic Double Solid Yellow Pavement Marking
45	L.F.	74	4" Thermoplastic Double Dashed Yellow Pavement Marking
46	L.F.	7,620	6" Thermoplastic Solid White Pavement Marking
47	L.F.	944	6" Thermoplastic Dotted White Pavement Marking
48	L.F.	339	8" Thermoplastic Solid White Pavement Marking
49	L.F.	172	8" Thermoplastic Dotted White Pavement Marking
50	L.F.	74	24" Thermoplastic Solid White Stop Bar
51	L.F.	348	24" Thermoplastic Solid White Crosswalk Line
52	S.Y.	274	12" Thermoplastic Yellow Diagonal Hatch (12' O.C.)
53	Ea.	11	Thermoplastic White Turn Arrow Pavement Marking
54	Ea.	3	Thermoplastic White "ONLY" Pavement Marking
55	Ea.	12	Thermoplastic White Bike Lane Symbol & Arrow Pavement Marking
56	L.F.	60	4" Epoxy Dashed White Pavement Marking
57	L.F.	172	4" Epoxy Dotted White Pavement Marking
58	L.F.	93	4" Epoxy Solid Yellow Pavement Marking
59	L.F.	80	4" Epoxy Double Solid Yellow Pavement Marking
60	L.F.	593	6" Epoxy Solid White Pavement Marking
61	L.F.	598	6" Epoxy Dotted White Pavement Marking
62	L.F.	269	8" Epoxy Solid White Pavement Marking
63	L.F.	1,014	12" Epoxy Solid White Pavement Marking
64	L.F.	110	12" Epoxy Dotted White Pavement Marking
65	L.F.	180	24" Epoxy Solid White Stop Bar
66	Ea.	13	Epoxy White Turn Arrow Pavement Marking
67	Ea.	1	Epoxy White Bike Lane Symbol & Arrow Pavement Marking
			Storm Sewers
68	L.F.	351	15" HDPE
69	L.F.	71	18" HDPE
70	L.F.	560	24" HDPE
71	L.F.	99	30" HDPE
72	L.F.	169	36" HDPE
73	L.F.	65	42" HDPE
74	L.F.	2133	15" RCP
75	L.F.	314	18" RCP
76	L.F.	1204	24" RCP
77	L.F.	328	30" RCP
78	L.F.	101	36" RCP

79	L.F.	133	4'x5' RCB
80	L.F.	74	8'x8' RCB
81	L.F.	178	Dual 13'x15' RCB
82	Ea.	3	15"-18" HDPE End Section
83	Ea.	3	24"-36" HDPE End Section
84	Ea.	1	42"-48" HDPE End Section
85	Ea.	4	24"-36" RCP End Section
86	Ea.	1	4'x5' RCB End Section and Wing Walls
87	Ea.	1	8'x8' RCB End Section and Wing Walls
88	Ea.	1	Dual 13'x15' RCB End Section and Wing Walls
89	S.Y.	682	Type II Rock Blanket
90	S.Y.	2448	Type IV Rock Blanket
91	Ea.	22	4' Curb Cut Flume
92	Ea.	1	Std. Junction Box (4' x 4' Inside)
93	Ea.	1	Std. Junction Box (5' x 4' Inside)
94	Ea.	2	Std. Junction Box (5' x 5' Inside)
95	Ea.	1	Std. Junction Box (4' x 11' Inside)
96	Ea.	1	Doghouse Junction Box (4' x 4' Inside)
97	Ea.	2	Doghouse Junction Box (5' x 5' Inside)
98	Ea.	2	Std. Manhole (5' Dia.)
99	Ea.	3	Std. Curb Inlet (4' x 4' Inside)
100	Ea.	12	Std. Curb Inlet (5' x 3' Inside)
101	Ea.	26	Std. Curb Inlet (5' x 5' Inside)
102	Ea.	1	Std. Curb Inlet (6' x 6' Inside)
103	Ea.	3	Std. Curb Inlet (7' x 7' Inside)
104	Ea.	4	Std. Field Inlet (4' x 4' Inside)
105	Ea.	1	Connect to Existing Structure
106	Ea.	2	Connect to Existing Box Culvert
107	Ea.	2	Modify Existing Junction Box
108	C.Y.	510	BMP Engineered Soil Matrix
109	L.F.	625	BMP Drain Tile
			Sanitary Sewers
110	VF	36	Std. Manhole (4' dia.) Adjustment
111	L.F.	225	Cured In Place Pipe Lining (18" Pipe)
112	L.F.	272	Cured In Place Pipe Lining (21" Pipe)
113	VF	40	Std. Manhole (4' dia.) Lining
			Water Lines - Non-Participating
114	LF	979	36" DIP CL 54 waterline (Unrestrained Joint)
115	LF	1442	42" DIP CL 54 waterline (Unrestrained Joint)
116	LF	120	4" DIP CL 52 waterline (Restrained Joint)
117	LF	242	6" DIP CL 52 waterline (Restrained Joint)
118	LF	663	8" DIP CL 52 waterline (Restrained Joint)
119	LF	812	12" DIP CL 52 waterline (Restrained Joint)
120	LF	120	16" DIP CL 54 waterline (Restrained Joint)
121	LF	40	24" DIP CL 54 waterline (Restrained Joint)
122	LF	20	30" DIP CL 54 waterline (Restrained Joint)
123	LF	1262	36" DIP CL 54 waterline (Restrained Joint)
124	LF	2085	42" DIP CL 54 waterline (Restrained Joint)
125	LF	50	60" Steel Casing Pipe w/Spacers & End Seals
126	EA	1	42" CL 54 - 11.25 Degree Bend
127	EA	5	42" CL 54 - 45 Degree Bend
128	EA	1	42" CL 54 - 90 Degree Bend
129	EA	2	36" CL 54 - 11.25 Degree Bend
130	EA	1	36" CL 54 - 22.5 Degree Bend
131	EA	7	36" CL 54 - 45 Degree Bend
132	EA	2	16" CL 54 - 45 Degree Bend
133	EA	4	12" CL 52 - 45 Degree Bend
134	EA	4	12" CL 52 - 90 Degree Bend
135	EA	1	8" CL 52 - 11.25 Degree Bend
136	EA	1	8" CL 52 - 22.5 Degree Bend
137	EA	7	8" CL 52 - 45 Degree Bend
138	EA	5	8" CL 52 - 90 Degree Bend
139	EA	6	6" CL 52 - 45 Degree Bend
140	EA	4	4" CL 52 - 45 Degree Bend
141	EA	2	4" Solid Sleeve Coupling
142	EA	3	6" Solid Sleeve Coupling
143	EA	9	8" Solid Sleeve Coupling
144	EA	3	12" Solid Sleeve Coupling
145	EA	3	16" Solid Sleeve Coupling
146	EA	2	24" Solid Sleeve Coupling
147	EA	1	30" Solid Sleeve Coupling
148	EA	7	36" Solid Sleeve Coupling
149	EA	2	42" Solid Sleeve Coupling
150	EA	2	24" PCCP to DIP Adaptor
151	EA	2	36" PCCP to DIP Adaptor
152	EA	3	36"x12" Reducer
153	EA	1	36"x24" Reducer
154	EA	1	42"x36" Reducer
155	EA	2	42"x12" Reducer
156	EA	1	16"x8" Reducer
157	EA	1	12"x8" Reducer
158	EA	1	8"x6" Reducer
159	EA	1	6"x4" Reducer
160	EA	6	8"Plug
161	EA	1	12" Plug
162	EA	1	24" Plug
163	EA	2	36" Plug
164	EA	1	42" Plug
165	EA	1	Concrete Backing Block for 36" Plug

166	EA	26	6" Gate Valve
167	EA	13	8" Gate Valve
168	EA	5	12" Gate Valve
169	EA	1	16" Butterfly Valve
170	EA	5	36" Butterfly Valve
171	EA	1	42" Butterfly Valve
172	EA	3	2" Air Release Assembly & Vault
173	EA	1	3" Air Release Asssembly & Vault
174	EA	4	8"x6" DIP Tee
175	EA	2	8"x8" DIP Tee
176	EA	1	12"x8" DIP Tee
177	EA	3	12"x6" DIP Tee
178	EA	1	16"x6" DIP Tee
179	EA	2	36"x36" DIP Tee
180	EA	1	36"x12" DIP Tee
181	EA	5	36"x6" DIP Tee
182	EA	1	36"x8" DIP Tee
183	EA	7	42"x6" DIP Tee
184	EA	2	42"x8" DIP Tee
185	EA	1	42"x12" DIP Tee
186	EA	1	42"x8" DIP Cross
187	EA	1	36"x16" DIP Cross
188	EA	1	42"x42" DIP Wye
189	EA	2	Straddle Block on 4" Main
190	EA	4	Straddle Block on 6" Main
191	EA	10	Straddle Block on 8" Main
192	EA	6	Straddle Block on 12" Main
193	EA	1	Straddle Block on 16" Main
194	EA	1	Straddle Block on 24" Main
195	EA	1	Straddle Block on 36" Main
196	EA	1	Water Service Transfer (Reg 51506)
197	EA	14	Fire Hydrant Assembly
198	EA	1	Flushing Assembly for 16-inch Pipe
199	EA	6	Flushing Assembly for 12-inch Pipe
200	EA	7	Flushing Assembly for 8-inch Pipe
201	EA	3	Flushing Assembly for 6-inch Pipe
202	EA	1	Flushing Assembly for 4-inch Pipe
203	EA	13	Pipeline Markers
			MODOT STREET CONSTRUCTION
			Grading
204	C.Y.	1,776	Pavement, Curb, and Sidewalk Removal
205	C.Y.	4,281	MoDOT Class A Excavation
206	C.Y.	1,966	MoDOT Class C Excavation
207	C.Y.	2,317	MoDOT Compacting Embankment
208	S.Y.	2,818	Rock Subbase (4" MoDOT Type 5)
209	S.Y.	5,374	Rock Subbase (6" MoDOT Type 5)
			Pavement
210	S.Y.	512	5.75" MoDOT Type A Shoulder (CONC)
211	S.Y.	6,881	9" Concrete Pavement
212	TON	124	2" Asphalt Pavement (Englewood Overlay)
213	S.Y.	333	4" Concrete (Colored and Textured)
214	S.Y.	1,103	2" Milling
			Curbs, Sidewalks, & Drives
215	L.F.	1,129	Curb & Gutter (Type CG-1)
216	L.F.	1,357	Curb & Gutter (Edge Curb, Type DC-2)
217	S.Y.	108	Concrete Sidewalks (MoDOT Concrete Median Strip)
218	S.Y.	760	Concrete Sidewalks (5' Wide)
219	S.Y.	271	Concrete Shared Use Path (10' Wide)
220	S.Y.	118	ADA Curb Ramps
			Pavement Marking & Signage
221	Ea.	42	Street Signs (Includes Post & All Attached Signs)
222	Ea.	2	Relocate Existing Signs (Includes Posts and Footings)
223	L.F.	1,440	4" Solid White Thermoplastic
224	L.F.	302	4" Dashed White Thermoplastic
225	L.F.	188	4" Dotted White Thermoplastic
226	L.F.	780	4" Double Solid Yellow Thermoplastic
227	L.F.	1,038	6" Solid White Edge Line
228	L.F.	975	6" Solid White Lane Line
229	L.F.	1,133	6" Solid Yellow Edge Line
230	L.F.	376	12" Solid White Thermoplastic
231	L.F.	140	24" Solid White Thermoplastic
232	Ea.	31	16"x24" White Thermoplastic Yield Triangle
233	Ea.	26	White Thermoplastic Turn Arrow
234	Ea.	2	White Thermoplastic "ONLY"
			Storm Sewers
235	L.F.	25	15" RCP
236	L.F.	197	18" RCP
237	L.F.	48	21" RCP
238	L.F.	174	24" RCP
239	L.F.	15	30" RCP
240	Ea.	2	18" RCP End Section
241	Ea.	1	24" RCP End Section with Concrete Toe Wall
242	Ea.	6	Culvert Cleanout
243	Ea.	3	Std. Curb Inlet (5' x 3' Inside) (0' - 6' deep)
244	V.F.	3.2	Extra Depth on Curb Inlet (5' x 3')
245	Ea.	1	Std. Curb Inlet (5' x 4' Inside) (0' - 6' deep)
246	Ea.	1	Std. Curb Inlet (8' x 4' Inside) (0' - 6' deep)
247	Ea.	4	MODOT - Precast Drop Inlet (5' x 4') (Type S) (0'-6' deep)
248	Ea.	1	Std. Manhole (4' Inside Diameter) (0' - 6' deep)
249	Ea.	2	Adjust Existing Drainage Structure

			Miscellaneous
250	L.S.	1	Demolition
251	Ac.	0.3	Tree Clearing (no burning)
252	L.F.	445	Gutter (MoDOT Type B Gutter)
253	S.Y.	472	Slope Protection (MoDOT Concrete Slope Protection)
254	L.F.	575	MGS Guardrail, 8' Posts
255	Ea.	1	MASH Approved Crashworthy End Terminal
256	Ea.	2	MGS End Anchor Section
257	Ea.	1	MGS to Type A Guardrail Transition
			Temporary Traffic Control
258	S.F.	1018	Signing
259	Ea.	150	Channelizers
260	Ea.	30	Type 3 Moveable Barricade
261	Ea.	3	Flashing Arrow Panel
262	Ea.	20	Tubular Marker
263	L.F.	220	Traffic Barrier
264	Ea.	3	Changeable Message Sign
265	Ea.	2	Barrier Height Transition
266	L.F.	4860	4" Temp. Solid White
267	L.F.	5260	4" Temp. Solid Yellow
268	L.F.	60	24" Temp. Solid White
269	L.F.	9970	Pavement Marking Removal
270	L.S.	1	Traffic Signal No. 1 - Summit/Englewood
271	L.S.	1	Traffic Signal No. 2 - Western Ramps/Englewood
272	L.S.	1	Traffic Signal No. 3 - Eastern Ramps/Englewood
273	S.F.	11785	Retaining Wall beneath 169 Hwy
			Street Lighting
274	Ea.	52	LED Luminaire, 35' Mounting Height, w/ Pole
275	Ea.	4	400 Watt HPS Luminaire, 35' Mounting Height, 6' Bracket Arm, w/ Pole
276	Ea.	8	250 Watt HPS Luminaire, 35' Mounting Height, 6' Bracket Arm, w/ Pole
277	Ea.	1	150 Watt HPS Luminaire, 30' Mounting Height, 6' Bracket Arm, w/ Pole
278	Ea.	1	Screw In Base - Small
279	Ea.	64	Screw In Base - Large
280	Ea.	1	6" Anit-Theft Device
281	Ea.	64	8" Anit-Theft Device
282	Ea.	72	KCMO ID Labels
283	Ea.	4	Ground Rod
284	Ea.	6	Pull Box
285	Ea.	2	Lighting Controller, 1ckt
286	Ea.	2	Lighting Controller, 2ckt
287	Ea.	65	Breakaway, Set-Screw HEB Fuse Kits w/ 10A Fuses
288	Ea.	130	Unfused Breakaway Fuse Kits
289	L.F.	9740	2#4, 1#6 RHH/RHW/USE
290	L.F.	765	2#8, 1#8 RHH/RHW/USE
291	L.F.	2984	3#10 RHW/USE (Internal Pole Wiring)
292	L.F.	400	3#1, USE
293	L.F.	10505	2" PVC
294	L.F.	400	3" PVC
295	Ea.	4	KCPL Services
296	Ea.	7	Remove Existing Luminaries: NMF0612 - NMF 0618
297	Ea.	4	Remove Existing Luminaries: NLF0040 - NLF0043
298	Ea.	2	Remove Existing Luminaries: NLF0001 - NLF0002
299	Ea.	11	Remove Existing Luminaries: NMG1001 - NMG1011
300	Ea.	5	Remove Existing Luminaries: NMG1520 - NMG1524
			LANDSCAPING
			Trees
301	EA.	279	Street Trees - 2.5" caliper; B&B
302	EA.	110	RPM's
			Shrubs
303	EA.	1,877	Shrubs - 5 gallon
			Perennials
304	EA.	4,056	Perennials - 1 gallon
			Seeding / Sodding
305	AC.	6.70	Fescue Seeding
306	S.Y.	55,176	Bonded Fiber Matrix
307	S.Y.	21,900	Fescue Sodding
308	AC.	4.7	Native Seed Mix
309	AC.	4.7	Temporary Seeding
			Materials
310	EA.	10,505	Tree Gator Bags
311	L.F.	2,435	Steel Edging
312	S.Y.	4,366	Erosion Blanket
313	L.F.	3,850	Shovel Cut Edging
314	SF	925	Decorative Aggregate
315	C.Y.	8,452	Topsoil
316	EA.	2	Benches (KC Parks standard)
317	C.Y.	55.0	CIP Concrete (reinforced)
318	S.F.F.	797	Native Stone Veneer
			Entry Monuments and Landscaping
319	EA.	1	Landscaping at Harden Avenue (re-use existing rock)
320	EA.	1	Landscaping at North Ames Avenue
321	EA.	1	Landscaping at North Wyoming Avenue
322	EA.	1	Landscaping at West Englewood Elementary (remove, store and re-install existing sign)
323	EA.	1	Landscaping and stonework at North Mercier Drive

DATE:	NO.:	REVISIONS/APPROVALS:
09-04-2015		Submitted to the MoDOT for Review
10-27-2015		Revised per Agency Comments and Resubmitted.
11-30-2015		Revised per Agency Comments and Resubmitted.
01-12-2016		Switch format from Sta/Off to Bearing and Distance.
03-07-2016		Final Plan Submittal
05-06-2016		Revised per Agency Comments and Resubmitted.
09-07-2017		Revised per Agency Comments and Resubmitted.
09-12-2017		Revised per Agency Comments and Resubmitted.

STATE OF MISSOURI
ADAM HILGEDICK
NUMBER PE-2014016961
PROFESSIONAL ENGINEER
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11.7.17

Reviewed By: A.K.H.
Designed By: A.K.H.
Drafted By: G.S.
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CONSTRUCTION QUANTITIES
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STP 3311 (402) / KCMO 89008121
Kansas City, Clay & Platte Counties, MO

Sheet No.:
02

Location: L:\Projects\12141-03\Plans\Construction Documents\Right of Way 36x24\QTY – 15013.dwg