

BIDDING DOCUMENTS

UNION STREET IMPROVEMENTS

CITY OF CONCORD

CABARRUS COUNTY, NORTH CAROLINA





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1240 19th Street Lane, NW Hickory, North Carolina 28601 828.328.2024 Firm License No.: C-0459

JULY 2021

CITY OF CONCORD PROJECT #2020-009 MCGILL PROJECT #19.01726





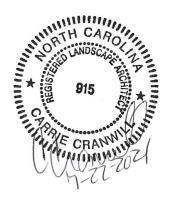


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SECTION I

BIDS, AGREEMENTS, AND NOTICES



BID ADVERTISEMENT

July 22, 2021

Project Title: Union Street Improvements

City of Concord Project No. 2020-09

Project Description:

The Union Street Improvements project consists of streetscape improvements from the intersection of Union Street and Killarney Avenue to the intersection of Union Street and Foard Ave and along Barbrick Ave. Work includes but is not limited to removal of existing asphalt, concrete, curbing, water line and sewer line improvements, storm drainage, the installation of concrete sidewalk with brick bands and accents, concrete curbing, seat walls, pavers, fencing, site furnishings, landscaping, street lighting, electrical, irrigation, soil cells, signage, and asphalt paving.

Pre-bid Conference:

A pre-bid conference will be held at 2:00 p.m. local time <u>August 17, 2021</u> in the Ready Room at the City of Concord Alfred M. Brown Operations Center located at 635 Alfred Brown Jr Court SW, Concord, NC 28026. Interested parties are encouraged to attend this meeting to receive bidding information, ask questions, and to visit the project site.

Bid Submittal:

Sealed Bids will be received by the City of Concord (Owner) at the address below. Please submit notarized bids in a sealed envelope by the bid opening time and date. All Bids must be in accordance with the Bidding Documents on file with the City of Concord Engineering Department. Bidders must be licensed contractors in the State of North Carolina. Bids will be received on a unit price basis. A Bid Bond must accompany each bid. The Successful Bidder will be required to furnish a Construction Performance Bond and a Construction Payment Bond as security for the faithful performance and the payment of all bills and obligations arising from the performance of the Contract. Contractor and all Subcontractors will be required to conform to the labor standards set forth in the Contract Documents. Owner reserves the right to reject any or all Bids, including without limitation the rights to reject any or all nonconforming, nonresponsive, unbalanced, or conditional Bids, and will award to lowest responsible Bidder taking into consideration quality, performance, and time specified in Bid Form for performance of Work. Owner also reserves the right to waive informalities.

Engineer: McGill Associates

1240 19th Street Lane, NW Hickory, North Carolina 28601

Contractor Registration:

Contractors wishing to bid on this project must register to bid by sending an email to Racquel Chestnut at chestnut@concordnc.gov. Registration for bidding requires the name of the company, physical address, email address, and telephone number. All communication regarding this bid will be done through email.

Technical questions: Contact Carrie Cranwill (carrie.cranwill@mcgillassociates.com) 828.328.2024

Bid Due Date: August 31, 2021 at 2:00 PM

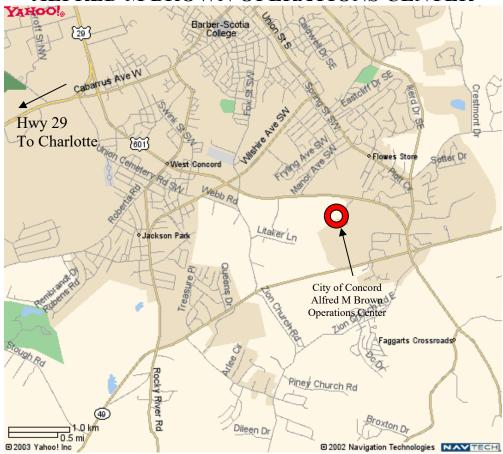
Location: City of Concord, Alfred M. Brown Operations Center

635 Alfred Brown Jr Court SW, Concord, NC 28026

The Ready Room

(See attached map/directions)

MAP AND DIRECTIONS TO CITY OF CONCORD ALFRED M BROWN OPERATIONS CENTER



Directions from Charlotte

- Take I-77 north to I-85 north from Charlotte to Concord.
- From I-85 north, take exit 49 to the right towards Lowe's Motor Speedway.
- At the Lowe's Motor Speedway, turn left onto Highway 29 (Concord Pkwy) north.
- Keep going north while you pass the Wal-Mart shopping center on your right.
- Turn right at the light at the Chevrolet dealership onto Cabarrus Avenue.
- Turn right at the next traffic light at the Walgreens onto Hwy 601 South (bypass). (Hwy 601 S is also Warren C. Coleman Boulevard).
- Go straight through two traffic lights at Old Charlotte Road and Wilshire Avenue.
- Pass the Bi-Lo shopping center on your left.
- Turn right at the next traffic light at Alfred Brown Jr Court SW (green & white sign on right for the City of Concord Alfred M. Brown Operations Center).
- You will be on the entrance road into our complex.
- Follow signs to the left to Visitor Parking.
- Proceed to the front desk at the Administration Building and sign in with the receptionist.

INSTRUCTIONS TO BIDDERS

1. <u>DEFINED TERMS</u>. Terms used in these Instructions to Bidders are meanings assigned to them in the General Conditions and the Supplementary Conditions. An additional term is defined as follows:

Successful Bidder - The lowest, qualified, responsible, and responsive Bidder to whom Owner (on the basis of Owner's evaluation as herein provided) makes an award.

2. <u>COPIES OF BID DOCUMENTS</u>. Bid Documents may be obtained from the Owner via the link below for the City of Concord's website.

Charge

Complete set of Bid Documents Free download

http://www.concordnc.gov/Departments/Finance/Purchasing/RFPs-and-Bids

Partial sets of Bid Documents will not be issued in response to requests by subject matter.

Contractors wishing to bid on this project must register to bid by sending an email to Racquel Chestnut at chestnut@concordnc.gov. Registration for bidding requires the name of the company, physical address, email address, and telephone number.

Complete sets of Bid Documents must be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misrepresentations resulting from the use of incomplete sets of Quoting Documents.

Owner and Engineer, in making copies of Quoting Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

- 3. <u>QUALIFICATIONS OF Bidders</u>. To demonstrate qualifications to perform the Work, Bidder may be required to submit written evidence on financial data, previous experience, present commitments, and other such data as may be requested by Owner or Engineer. Each Bid must contain evidence of Bidder's qualification to do business in the state where the Project is located, or Bidder must agree to obtain such qualification prior to award of the Contract.
- 4. EXAMINATION OF CONTRACT DOCUMENTS AND SITE. It is the responsibility of each Bidder, before submitting a Bid, to (a) thoroughly examine the Contract Documents, (b) visit the site to become familiar with local conditions that may affect cost, progress, performance, or furnishing of the Work, (c) consider federal, state, and local laws and regulations that may affect cost, progress, performance, or furnishing of the Work, (d) study and carefully correlate Bidder's observations with the Contract Documents, and (e) notify Engineer of all conflicts, errors, or discrepancies discovered by Bidder in the Contract Documents.
- 4.02. <u>Underground Facilities</u>. Information and data reflected in the Contract Documents with respect to underground facilities at or contiguous to the site are based upon information and data furnished to Owner and Engineer by owners of such underground facilities or others, and Owner and Engineer disclaim responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Supplementary Conditions.
- 4.03. <u>Additional Information</u>. Before submitting a Bid, each Bidder will, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests, and studies and obtain any additional information and data which pertain to the physical conditions (surface, subsurface, and underground facilities) at or contiguous to the site or otherwise which may affect cost, progress,

performance, or furnishing of the Work and which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price, and other terms and conditions of the Contract Documents.

On request 24 hours in advance, Owner will provide each Bidder access to the site to conduct such explorations and tests as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the site to its former condition upon completion of such explorations. Arrangements for site visits shall be made by calling the office of the Director of Engineering for the City of Concord at 704.920.5425.

- 4.04. <u>Easements</u>. The lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and other lands designated for use by Contractor in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by Contractor. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by Owner unless otherwise specified in the Contract Documents.
- 4.05. <u>Unit Price Contracts</u>. Bidders must satisfy themselves of the accuracy of the estimated quantities in the Bid schedule by examination of the site and a review of the drawings and the specifications, including the addenda. After Bids have been submitted, the Bidder shall not assert that there was a misunderstanding concerning the quantities of work or the nature of the work to be done.
- 4.06. <u>Bidder's Representation</u>. The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement concerning examination of the Contract Documents and the site, that without exception the Bid is premised upon performing and furnishing the Work required by the Contract Documents, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
- 5. <u>INTERPRETATIONS AND ADDENDA</u>. All questions about the meaning or intent of the Quoting Documents and the Contract Documents shall be submitted to Owner in writing. Interpretations or clarifications considered necessary by Owner in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Quoting Documents. Questions received less than 10 days prior to the date for opening of Bids may not be answered. Only answers issued by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
- 6. BID SECURITY. Each Proposal must be accompanied by a deposit equal to 5% of the net price bid. This deposit may consist of cash, or a Cashier's Check issued by, or a Certified Check drawn on a Bank or Trust Company authorized to do business in North Carolina, or on a Bank insured by the Federal Deposit Insurance Corporation, or a U.S. Money Order, payable to the City of Concord or 5% Bid Bond in the form required by G.S. 143-129 as amended, issued by an Insurance Company authorized to do business in North Carolina, said deposit to be retained in the event of failure of the successful bidder to execute a formal contract within ten (10) days after award or to give satisfactory surety required.

The Bid security of the Successful Bidder (if so required) will be retained until such Bidder has executed the Agreement, furnished the required contract security (if so required), and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Agreement and furnish the required contract security within the number of days set forth in the Bid Form, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security (if so required) of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of 7 days after the Effective Date of the Agreement or the day after the last day the Bid remain subject to acceptance as set forth in the Bid Form,

whereupon Bid security furnished by such Bidders will be returned. Bid security accompanying Bid which are deemed by Owner to be noncompetitive will be returned within 7 days after the designated Bid opening.

- 7. <u>CONTRACT TIMES</u>. The numbers of calendar days within which, or the dates by which, the Work is to be substantially completed and also completed and ready for final payment (the Contract Times) are set forth in the Bid Form.
- 8. <u>LIQUIDATED</u> <u>DAMAGES</u>. Provisions for liquidated damages, if any, are set forth in the Agreement.
- 9. <u>SUBSTITUTES OR "OR-EQUAL ITEMS</u>. Bidder's attention is directed to Article 6.5 of the General Conditions concerning substitutes and "or-equal" items. Where an item or material is specified by a proprietary name, it is done for the purpose of establishing a basis of quality and not for the purpose of limiting competition. The Engineer's intent is to consider alternative products which have the desired essential characteristics. The Engineer will consider any such products offered. Requests for acceptance of alternative products shall be made through Bidders quoting as prime Contractors. Acceptances for substitutions will not be granted directly to suppliers, distributors, or subcontractors. Pursuant to Section 133-3, General Statutes of North Carolina, the following procedures shall be used:

Bidders desiring to submit alternative product proposals for prior acceptance of the Engineers shall submit, in writing, such proposals from August 2, 2021, until August 18, 2021. Applications received after this time will not be reviewed. Each such request shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute, including drawings, cuts, performance and test data, and other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment, or other work that incorporation of the substitute would require shall be included. The Engineer shall consider and either accept or reject all alternative product proposals submitted.

If, by the close of the fifth day prior to the deadline for receiving Bid, the Engineer has accepted any alternative product proposals, the Quoting Documents shall be modified to include the alternative products. The Engineer shall publish the modification in an Addenda at least 5 days prior to the deadline for receiving Bids. The Engineer's decision of acceptance or rejection of a proposed substitute shall be final.

10. <u>SUBCONTRACTORS</u>, <u>SUPPLIERS</u>, <u>AND OTHERS</u>. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, and other persons and organizations (including those who are to furnish the principal items of material and equipment) to be submitted to Owner in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within 3 days after the opening submit to Owner the List of Subcontractors completed with all such Subcontractors, Suppliers, and other persons and organizations proposed for those portions of the Work for which such identification is required. The list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, person, or organization, if requested by Owner. If Owner or Engineer after due investigation has reasonable objection to any proposed Subcontractor, Supplier, or other person or organization, Owner may, before the Notice of Award is given, request the apparent Successful Bidder to submit an acceptable substitute without an increase in the Bid.

All Subcontractors shall be a licensed utility contractor in the State of North Carolina.

11. <u>BID FORM</u>. The Bid Form is bound in the Quoting Documents and shall not be removed therefrom. Bid Forms must be completed in ink.

Bids by corporations must be executed in the corporate name by the president or vice-president (or other corporate officer accompanied by evidence of authority to sign for the corporation). Bids by partnerships must be executed in the partnership name and signed by a partner. Bids by joint ventures shall be signed by

each participant in the joint venture or by a representative of the joint venture accompanied by evidence of authority to sign for the joint venture.

The names of all persons signing shall be legibly printed below the signature. A Bid by a person who affixes to his signature the word "president", "secretary", "agent", or other designation without disclosing his principal may be held to be the Bid of the individual signing. When requested by Owner, evidence of the authority of the person signing shall be furnished.

All blanks in the Bid Form shall be filled. A Bid price shall be indicated for each unit price item listed therein, or the words "No Bid", "No Charge", "No Change", or other appropriate phrase shall be entered.

The Bid shall contain an acknowledgment of receipt of all Addenda; the numbers and dates of which shall be filled in on the Bid Form.

No alterations in Bids, or in the printed forms therefore, by erasures, interpolations, or otherwise will be acceptable unless each such alteration is signed or initialed by the Bidder; if initialed, Owner may require the Bidder to identify any alteration so initialed.

11.01. <u>Bid Pricing</u>. The Bidder shall complete the schedule of unit prices included in the Bid Form and shall accept all fixed unit prices listed therein.

The total Bid will be determined as the sum of the products of the estimated quantity of each item and the unit price Bid. The final Contract Price will be subject to adjustment according to final measured, used, or delivered quantities as provided in Article 9.7 of the General Conditions, and the unit prices in the Bid will apply to such final quantities except that unit prices will be subject to change by Change Order as stipulated in the Supplementary Conditions.

- 11.02. <u>Contingency</u>. The Contingency is to be added to the Bid price and is to be used for minor change order items. If the Contingency is to be used, a scope of work and price would be negotiated. The Contingency is for the sole use of Owner. A change order will be issued to delete any unauthorized portion of the Contingency.
- 12. <u>SUBMISSION OF BIDS</u>. Bids shall be submitted at the time and place indicated in the Invitation to Bid, or the modified time and place indicated by Addendum. Bids shall be enclosed in a sealed envelope or wrapping, addressed to:

The City of Concord
Sue Hyde, Engineering Director
635 Alfred Brown Jr Court SW
Concord, North Carolina 28026-0308

Bids shall be marked with the name, license number, and address of the Bidder and shall be accompanied by the Bid security (if required) and other required documents. If the Bid is sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face of it.

Each Bid envelope shall be identified on the outside with the words:

"BID FOR UNION STREET IMPROVEMENTS"

Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

One copy of all pages of the BID FORM must be submitted with the Bid, as well as a Bid Bond and Debarred Firms Certification Form.

Oral, telephone, facsimile, or telegraph Bids are invalid and will not receive consideration.

No Bidder may submit more than one Bid. Multiple Bids under different names will not be accepted from one firm or association.

A conditional or qualified Bid will not be accepted.

13. <u>MODIFICATION AND WITHDRAWAL OF BIDS</u>. Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

If, within 24 hours after Bids are opened, any Bidder files a duly signed, written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid and the Bid security (if any) will be returned. Thereafter, that Bidder will be disqualified from further quoting on the Work to be provided under the Contract Documents.

14. <u>OPENING OF BIDS</u>. Bids will be opened at the office and at the discretion of the Director of Engineering and read aloud.

The procedure for opening Bids will follow guidelines issued by the State Building Commission dated December 10, 1990, and endorsed by the Consulting Engineers Council of North Carolina.

- 15. <u>BIDS TO REMAIN SUBJECT TO ACCEPTANCE</u>. All Bids will remain subject to acceptance for the number of days set forth in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the security (if any) prior to that date.
- 16. <u>AWARD OF CONTRACT</u>. Owner reserves the right to reject any or all Bids, including without limitation the rights to reject any or all nonconforming, nonresponsive, unbalanced, or conditional Bids, and will award to lowest responsible Bidder taking into consideration quality, performance, and time specified in Bid Form for performance of Work. Owner also reserves the right to waive informalities.

In evaluating Bids, Owner will consider the qualifications of the Bidders, whether or not the Bids comply with the prescribed requirements, and such alternatives, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.

Owner may consider the qualifications and experience of Subcontractors, Suppliers, and other persons and organizations proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other persons and organizations must be submitted as provided in the Supplementary Conditions. Owner also may consider the operating costs, maintenance requirements, performance data, and guarantees of major items of materials and equipment proposed for incorporation in the Work when such data is required to be submitted prior to the Notice of Award.

Owner may conduct such investigations as Owner deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.

If the Contract is to be awarded, it will be awarded to the lowest Bidder whose evaluation by Owner indicates to Owner that the award will be in the best interests of Owner. If the Contract is to be awarded,

Owner will give the Successful Bidder a Notice of Award within the number of days set forth in the Bid Form. The evaluation of Suppliers' or manufacturers' data submitted with the Bid, or submitted upon request prior to the Notice of Award, will include consideration of the following:

- Owner-required inventory of spare parts.
- Building design changes which would be required to accommodate the proposed materials and equipment.
- Installation requirements and related engineering, training, and operating costs.
- Experience and performance record of the Supplier or the manufacturer.
- Maintenance and frequency of inspections required to assure reliable performance of the equipment.
- Suppliers' or manufacturers' service facilities and availability of qualified field service personnel.
- Efficiency and related operating expense during the anticipated useful life of the equipment.
- 17. <u>CONTRACT SECURITY</u>. The General Conditions set forth Owner's requirements as to Performance and Payment Bonds (required). These Bonds shall be delivered to Owner with the executed Agreement.
- 18. <u>SIGNING OF AGREEMENT</u>. When Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by two unsigned counterparts of the Agreement with all other written Contract Documents attached. Within the number of days set forth in the Bid Form, the Successful Bidder shall sign, leaving the dates blank, and deliver the required number of counterparts of the Agreement and attached documents to Owner with the required Bonds and power of attorney. Within 30 days thereafter, Owner shall execute all copies of the Agreement and other Contract Documents submitted by Contractor (Successful Bidder); shall insert the date of contract on the Agreement, Bonds, and power of attorney; and shall distribute signed copies as stipulated in the Agreement.

Should the Owner not execute the Contract within the period specified, the Successful Bidder may, by written notice, withdraw his signed Contract. Such notice or withdrawal shall be effective upon receipt of the notice by the Owner.

- 19. <u>SALES AND USE TAXES</u>. Provisions for sales and use taxes, if any, are set forth in the Supplementary Conditions.
- 20. RETAINAGE. Provisions concerning retainage are set forth in the Agreement.
- 21. <u>LAWS AND REGULATIONS</u>. Modifications, if any, to the General Conditions concerning Laws and Regulations are set forth in the Supplementary Conditions. Additional provisions, if any, concerning Laws and Regulations are set forth in the Agreement.
- 21.01. Collusive Bidding. In accordance with Section 112(c) of Title 23 USC, and G.S. 75-5(b)(7) of the State of North Carolina, the Contractor (Bidder), by submission and execution of this bid or Bid, certifies that he has not entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding or quoting in connection with his Bid on this project.

End of Section

DEBARRED FIRMS CERTIFICATION FORM

Union Street Improvements Project No. 2020-009 (McGill Associates project #19.01726)

The undersigned hereby certifies that the firm of been suspended by the State of North Carolina or a or indictment or any of the offenses enumerated in tier to firms that have been suspended for con enumerated in G.S. 133-27.	G.S. 133-27 nor will aw	ard subcontracts of any
Name of Firm		
ATTEST	(SEAL)	
Signature of Authorized Official		
Title		
	Sworn and subscribed	before me this
	day of	, 20
	Notary Public	

EXHIBIT A – BID FORM

PROJECT IDENTIFICATION:

Union Street Improvements Project No. 2020-009 (McGill Associates project #19.01726)

THIS BID IS SUBMITTED TO:

Sue Hyde, Engineering Director
City of Concord
635 Alfred Brown Jr Court SW
P.O. Box 308
Concord, North Carolina 28026-0308

- The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an
 agreement with Owner in the form included in the Contract Documents to perform and furnish
 all Work as specified or indicated in the Contract Documents within the specified time and for
 the amount indicated in this Bid and in accordance with the other terms and conditions of the
 Contract Documents.
- 2. Bidder accepts all of the terms and conditions of the Invitation to Bid and the Instructions to Bid, including without limitation those dealing with the disposition of the Bid security is required for this project.
- 3. This Bid will remain subject to acceptance for 90 days after the day designated for reception of Bids. Bidder will sign and submit the Agreement with the Bonds and other documents required by the Quoting Documents within 10 days after the date of Owner's Notice of Award.
- 4. In submitting this Bid, Bidder represents that:
 - a. Bidder has examined copies of all the Quoting Documents and of the following Addenda (receipt of all which is hereby acknowledged):

No	Dated
No	Dated

- b. Bidder has visited the site and become familiar with and satisfied itself as to the general, local, and site conditions that may affect cost, progress, performance, and furnishing of the Work.
- c. Bidder is familiar with and has satisfied itself as to all Federal, State, and Local Laws and Regulations that may affect cost, progress, performance, and furnishing of Work.

- d. Bidder has carefully studied all reports of explorations and tests of subsurface conditions at or contiguous to the site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the site (except underground facilities) which have provided by the owner and under the conditions normally used and identified in the Supplementary Conditions and Special Conditions as provided in Paragraph 4.2.1 of the General Conditions. Bidder accepts the determination set forth in the Supplementary Conditions and Special Conditions of the extent of the "technical data" contained in such reports and drawings upon which Bidder is entitled to rely as provided in Paragraph 4.2 of the General Conditions. Bidder acknowledges that such reports and drawings are not Contract Documents and may not be complete for Bidder's purposes. Bidder acknowledges that Owner and Engineer do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Quoting Documents with respect to underground facilities at or contiguous to the site. Bidder has obtained and carefully studied (or assumes responsibility for having done so) all such additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and underground facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance, or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder and safety precautions and programs Bidder does not consider that any additional examinations, investigations, incident thereto. explorations, tests, studies, or data are necessary for the determination of this Bid for performance and furnishing of the Work in accordance with the time, price, and other terms and conditions of the Contract Documents.
- e. Bidder is aware of the general nature of Work to be performed by Owner and others at the site that relates to Work for which this Bid is submitted as indicated in the Contract Documents.
- f. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.
- g. Bidder has given Engineer written and verbal notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Contract Documents and the written resolution thereof by Engineer is acceptable to Bidder, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which this Bid is submitted.
- h. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm, or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid Bidder has not solicited or induced any person, firm, or corporation to refrain from quoting; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.
- 5. Bidder will complete the Work for the following unit prices. Quantities indicated are estimated and not guaranteed; they are solely for comparing Bids and establishing the initial Contract Price. Final payment will be based on actual quantities.

EXHIBIT A – BID FORM

Union Street Improvements City of Concord Project No. 2020-009 McGill Project No. 19.01726

No.	Item	Description	Qty.	Units	Unit Price (\$)	Item Total (\$)			
	Base Bid - General Work Items								
1	800	Mobilization (3.0%)	1	LS					
2	801	Construction Surveying	1	LS					
3	SP-01	Vehicular Traffic Control	1	LS					
4	SP-02	Pedestrian Access and Safety	1	LS					
5	SP-03	Comprehensive Grading	1	LS					
6	607	Variable Asphalt Mill	3,248	SY					
7	520	Aggregate Base Course	4,752	TN					
8	610	S9.5C surface course	950	TN					
9	610	I19.0C Intermediate Course	1,234	TN					
10	610	B25.OC Base Course	164	TN					
11	610	Variable Asphalt Overlay 1.5"-3"	531	TN					
12	SP-04	18" Concrete Grade Beam	46	LF					
13	SP-05	6" Concrete Drive Apron/Drive	239	SY					
14	SP-06	4" Concrete Sidewalk and HC Ramps	3,995	SY					
15	SP-07	Pavers - Light Duty on 4" Concrete Base	274	SY					
16	SP-08	Pavers - Heavy Duty on 6" Concrete Base	308	SY					
17	SP-09	Brick Band on 4" Concrete Base	3,500	LF					
18	SP-10	Plaza Pavers - Vehicular	225	SY					
19	SP-11	Brick Paver Crosswalk	78	SY					
20	SP-12	Stamped Asphalt Crosswalk	390	SY					
21	SP-13	2'-6" Concrete Curb and Gutter	130	LF					
22	SP-14	6" Concrete Stand-up Curb	480	LF					
23	SP-15	8" Concrete Stand-up Curb	2,900	LF					
24	SP-16	Concrete Landscape Edging	1,025	LF					
25	SP-17	6" Concrete Edge Restraint	1,350	LF					
26	SP-18	Concrete Edge Restraint to Match Plaza	33	LF					
27	SP-19	Granite Edge Restraint	315	LF					
28	SP-20	Bronze Sidewalk Trail Markers	1	LS					
29	SP-21	Detectable Warning Plate	580	SF					
30	SP-22	Metal Handrail at HC Ramps	67	LF					
31	SP-23	Sign Installation	18	EA					
32	SP-24	Salvaged Wayfinding Sign Installation	1	EA					

SP-25 Bench Installation (Owner Provided) 16 EA						
SP-26 (Owner Provided)	33	SP-25	Bench Installation (Owner Provided)	16	EA	
SP-27	34	SP-26	, , , , , , , , , , , , , , , , , , , ,	16	EA	
37 SP-29 Drinking Fountain 1 EA 38 SP-30 Bollards (Non-lighted) 5 EA 39 SP-31 Flag Holder 1 LS 40 SP-32 Horse Hook Art Installation 1 LS 41 SP-33 Granite Marker for Surveyor Stone 1 LS 42 SP-34 Metal Air Vent Replacement 1 LS 43 1087 4" Thermoplastic Paint - 120 mils 1,650 LF 44 1087 4" Thermoplastic Paint - 120 mils 3,530 LF 45 1087 7 Thermoplastic Paint - 120 mils 1,153 LF 46 1087 7 Thermoplastic Campas - 120 mils 39 EA 47 1087 Thermoplastic Compass - 120 mils 1 LS 48 1087 Thermoplastic Compass - 120 mils 1 LS 49 SP-35 Monolithic Retaining Wall 530 LF 50 SP-36 Stone Seat Wall 1 LS <td>35</td> <td>SP-27</td> <td>, ,</td> <td>1</td> <td>EA</td> <td></td>	35	SP-27	, ,	1	EA	
38 SP-30 Bollards (Non-lighted) 5 EA 39 SP-31 Flag Holder 1 LS 40 SP-32 Horse Hook Art Installation 1 LS 41 SP-33 Granite Marker for Surveyor Stone 1 LS 42 SP-34 Metal Air Vent Replacement 1 LS 43 1087 4" Thermoplastic Paint - 120 mils 1,650 LF 43 1087 4" Thermoplastic Paint - 120 mils 3,530 LF 45 1087 8" Thermoplastic Paint - 120 mils 1,153 LF 46 1087 Thermoplastic Traffic Arrows and Symbols - 120 mils 1 LS 47 1087 Thermoplastic Compass - 120 mils 1 LS 48 1087 Thermoplastic Retaining Wall 50 LF 50 SP-36 Stone Seat Wall 1 LS 51 SP-37 Concrete Stair w/ Handrails 1 LS 52 SP-38 Wood Fence Replacement w/Gate 1	36	SP-28	Reinstall Bike Rack	2	EA	
39 SP-31 Flag Holder 1 LS 40 SP-32 Horse Hook Art Installation 1 LS 41 SP-33 Granite Marker for Surveyor Stone 1 LS 42 SP-34 Metal Air Vent Replacement 1 LS 43 1087 4" Thermoplastic Paint - 90 mils 1,650 LF 44 1087 4" Thermoplastic Paint - 120 mils 3,530 LF 45 1087 8" Thermoplastic Paint - 120 mils 1,153 LF 46 1087 724" White Thermoplastic Arrows and Symbols - 120 mils 200 LF 47 1087 Thermoplastic Compass - 120 mils 1 LS 48 1087 Thermoplastic Compass - 120 mils 1 LS 49 SP-35 Monolithic Retaining Wall 530 LF 50 SP-36 Stone Seat Wall 1 LS 51 SP-37 Concrete Stair w/ Handrails 1 LS 52 SP-38 Wood Fence Replacement w/Gate	37	SP-29	Drinking Fountain	1	EA	
40 SP-32 Horse Hook Art Installation 1 LS 41 SP-34 Metal Air Vent Replacement 1 LS 42 SP-34 Metal Air Vent Replacement 1 LS 43 1087 4" Thermoplastic Paint - 90 mils 1,650 LF 44 1087 4" Thermoplastic Paint - 120 mils 3,530 LF 45 1087 8" Thermoplastic Paint - 120 mils 1,153 LF 46 1087 24" White Thermoplastic Paint - 120 mils 200 LF 47 1087 Thermoplastic Compass - 120 mils 1 LS 48 1087 Thermoplastic Compass - 120 mils 1 LS 49 SP-35 Monolithic Retaining Wall 530 LF 50 SP-36 Stone Seat Wall 1 LS 51 SP-37 Concrete Stair w/ Handrails 1 LS 52 SP-38 Hondrails 1 LS 53 SP-39 Wood Fence Replacement w/Gate 1	38	SP-30	Bollards (Non-lighted)	5	EA	
41 SP-33 Granite Marker for Surveyor Stone 1 LS 42 SP-34 Metal Air Vent Replacement 1 LS 43 1087 4" Thermoplastic Paint - 90 mils 1,650 LF 44 1087 4" Thermoplastic Paint - 120 mils 3,530 LF 45 1087 8" Thermoplastic Paint - 120 mils 200 LF 46 1087 24" White Thermoplastic Arrows and Symbols - 120 mils 200 LF 47 1087 Thermoplastic Compass - 120 mils 1 LS 48 1087 Thermoplastic Compass - 120 mils 1 LS 49 SP-36 Stone Seat Wall 1 LS 50 SP-36 Stone Seat Wall 1 LS 51 SP-36 Stone Seat Wall 1 LS 52 SP-38 Concrete Stair and HC Ramp w/ Handrails 1 LS 53 SP-39 Wood Fence Replacement w/Gate 1 LS 54 SP-40 Ornamental 18" Railing Tree Guard	39	SP-31	Flag Holder	1	LS	
42 SP-34 Metal Air Vent Replacement 1 LS 43 1087 4" Thermoplastic Paint - 90 mils 1,650 LF 44 1087 4" Thermoplastic Paint - 120 mils 3,530 LF 45 1087 8" Thermoplastic Paint - 120 mils 1,153 LF 46 1087 24" White Thermoplastic Paint - 120 mils 200 LF 47 1087 Thermoplastic Compass - 120 mils 200 LF 48 1087 Thermoplastic Compass - 120 mils 1 LS 49 SP-35 Monolithic Retaining Wall 530 LF 50 SP-36 Stone Seat Wall 1 LS 51 SP-37 Concrete Stair and HC Ramp w/ Handrails 1 LS 52 SP-38 Wood Fence Replacement w/Gate 1 LS 53 SP-39 Wood Fence Replacement w/Gate 1 LS 54 SP-40 Ornamental 18" Railing Tree Guard 440 LF 55 SP-41 4'x4' Tree Grate	40	SP-32	Horse Hook Art Installation	1	LS	
43 1087 4" Thermoplastic Paint - 90 mils 1,650 LF 44 1087 4" Thermoplastic Paint - 120 mils 3,530 LF 45 1087 8" Thermoplastic Paint - 120 mils 1,153 LF 46 1087 24" White Thermoplastic Paint - 120 mils 200 LF 47 1087 Thermoplastic Traffic Arrows and Symbols - 120 mils 39 EA 48 1087 Thermoplastic Compass - 120 mils 1 LS 49 SP-35 Monolithic Retaining Wall 530 LF 50 SP-36 Stone Seat Wall 1 LS 51 SP-37 Concrete Stair w/ Handrails 1 LS 52 SP-38 Concrete Stair and HC Ramp w/ Handrails 1 LS 53 SP-39 Wood Fence Replacement w/Gate 1 LS 54 SP-40 Ornamental 18" Railing Tree Guard 440 LF 55 SP-41 4'x4' Tree Grate 24 EA 56 SP-42 Planting Cells 1 LS 57 SP-33 Regal Prince Oak<	41	SP-33	Granite Marker for Surveyor Stone	1	LS	
44 1087 4" Thermoplastic Paint - 120 mils 3,530 LF 45 1087 8" Thermoplastic Paint - 120 mils 1,153 LF 46 1087 24" White Thermoplastic Paint - 120 mils 200 LF 47 1087 Thermoplastic Traffic Arrows and Symbols - 120 mils 39 EA 48 1087 Thermoplastic Compass - 120 mils 1 LS 49 SP-35 Monolithic Retaining Wall 530 LF 50 SP-36 Stone Seat Wall 1 LS 51 SP-37 Concrete Stair and HC Ramp w/Handrails 1 LS 52 SP-38 Concrete Stair and HC Ramp w/Handrails 1 LS 53 SP-39 Wood Fence Replacement w/Gate 1 LS 54 SP-40 Ornamental 18" Railing Tree Guard 440 LF 55 SP-41 4'x4' Tree Grate 24 EA 56 SP-42 Planting Cells 1 LS 57 SP-43 Regal Prince Oak	42	SP-34	Metal Air Vent Replacement	1	LS	
45 1087 8" Thermoplastic Paint - 120 mils 1,153 LF 46 1087 24" White Thermoplastic Paint - 120 mils 200 LF 47 1087 Thermoplastic Traffic Arrows and Symbols - 120 mils 39 EA 48 1087 Thermoplastic Compass - 120 mils 1 LS 49 SP-35 Monolithic Retaining Wall 530 LF 50 SP-36 Stone Seat Wall 1 LS 51 SP-37 Concrete Stair w/ Handrails 1 LS 52 SP-38 Concrete Stair and HC Ramp w/ Handrails 1 LS 53 SP-39 Wood Fence Replacement w/Gate 1 LS 54 SP-40 Ornamental 18" Railing Tree Guard 440 LF 55 SP-41 4'x4' Tree Grate 24 EA 56 SP-42 Planting Cells 1 LS 57 SP-43 Regal Prince Oak 11 EA 58 SP-44 Japanese Zelkova 8 E	43	1087	4" Thermoplastic Paint - 90 mils	1,650	LF	
46 1087 24" White Thermoplastic Paint - 120 mils 200 LF 47 1087 Thermoplastic Traffic Arrows and Symbols - 120 mils 39 EA 48 1087 Thermoplastic Compass - 120 mils 1 LS 49 SP-35 Monolithic Retaining Wall 530 LF 50 SP-36 Stone Seat Wall 1 LS 51 SP-37 Concrete Stair w/ Handrails 1 LS 52 SP-38 Concrete Stair and HC Ramp w/ Handrails 1 LS 53 SP-39 Wood Fence Replacement w/Gate 1 LS 54 SP-39 Wood Fence Replacement w/Gate 1 LS 54 SP-40 Ornamental 18" Railing Tree Guard 440 LF 55 SP-41 4'x4' Tree Grate 24 EA 56 SP-42 Planting Cells 1 LS 57 SP-43 Regal Prince Oak 11 EA 58 SP-44 Japanese Zelkova 8 EA	44	1087	4" Thermoplastic Paint - 120 mils	3,530	LF	
47 1087 Thermoplastic Traffic Arrows and Symbols - 120 mils 39 EA 48 1087 Thermoplastic Compass - 120 mils 1 LS 49 SP-35 Monolithic Retaining Wall 530 LF 50 SP-36 Stone Seat Wall 1 LS 51 SP-37 Concrete Stair w/ Handrails 1 LS 52 SP-38 Concrete Stair and HC Ramp w/ Handrails 1 LS 53 SP-39 Wood Fence Replacement w/Gate 1 LS 54 SP-40 Ornamental 18" Railing Tree Guard 440 LF 55 SP-41 4'x4' Tree Grate 24 EA 56 SP-42 Planting Cells 1 LS 57 SP-43 Regal Prince Oak 11 EA 58 SP-44 Japanese Zelkova 8 EA 59 SP-45 Dwarf Japanese Maple 2 EA 60 SP-46 Rising Sun Redbud 4 EA 61	45	1087	8" Thermoplastic Paint - 120 mils	1,153	LF	
44 1087 Symbols - 120 mils 39 EA 48 1087 Thermoplastic Compass - 120 mils 1 LS 49 SP-35 Monolithic Retaining Wall 530 LF 50 SP-36 Stone Seat Wall 1 LS 51 SP-37 Concrete Stair w/ Handrails 1 LS 52 SP-38 Concrete Stair and HC Ramp w/ Handrails 1 LS 53 SP-39 Wood Fence Replacement w/Gate 1 LS 54 SP-40 Ornamental 18" Railing Tree Guard 440 LF 55 SP-41 4'x4' Tree Grate 24 EA 56 SP-42 Planting Cells 1 LS 57 SP-43 Regal Prince Oak 11 EA 58 SP-44 Japanese Zelkova 8 EA 59 SP-45 Dwarf Japanese Maple 2 EA 60 SP-46 Rising Sun Redbud 4 EA 61 SP-47 Espresso Kentucky Coffee Tree 11 EA 62 SP-48	46	1087	24" White Thermoplastic Paint - 120 mils	200	LF	
49 SP-35 Monolithic Retaining Wall 530 LF 50 SP-36 Stone Seat Wall 1 LS 51 SP-37 Concrete Stair w/ Handrails 1 LS 52 SP-38 Concrete Stair and HC Ramp w/ Handrails 1 LS 53 SP-39 Wood Fence Replacement w/Gate 1 LS 54 SP-40 Ornamental 18" Railing Tree Guard 440 LF 55 SP-41 4'x4' Tree Grate 24 EA 56 SP-42 Planting Cells 1 LS 57 SP-43 Regal Prince Oak 11 EA 58 SP-44 Japanese Zelkova 8 EA 59 SP-45 Dwarf Japanese Maple 2 EA 60 SP-46 Rising Sun Redbud 4 EA 61 SP-47 Espresso Kentucky Coffee Tree 11 EA 62 SP-48 Wildfire Black Gum 9 EA 63 SP-50	47	1087	· ·	39	EA	
50 SP-36 Stone Seat Wall 1 LS 51 SP-37 Concrete Stair w/ Handrails 1 LS 52 SP-38 Concrete Stair and HC Ramp w/ Handrails 1 LS 53 SP-39 Wood Fence Replacement w/Gate 1 LS 54 SP-40 Ornamental 18" Railing Tree Guard 440 LF 55 SP-41 4'x4' Tree Grate 24 EA 56 SP-42 Planting Cells 1 LS 57 SP-43 Regal Prince Oak 11 EA 58 SP-44 Japanese Zelkova 8 EA 59 SP-45 Dwarf Japanese Maple 2 EA 60 SP-46 Rising Sun Redbud 4 EA 61 SP-47 Espresso Kentucky Coffee Tree 11 EA 62 SP-48 Wildfire Black Gum 9 EA 63 SP-49 Skyline Honeylocust 4 EA 64 SP-50 D	48	1087	Thermoplastic Compass - 120 mils	1	LS	
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52 SP-38 Concrete Stair and HC Ramp w/ Handrails 1 LS 53 SP-39 Wood Fence Replacement w/Gate 1 LS 54 SP-40 Ornamental 18" Railing Tree Guard 440 LF 55 SP-41 4'x4' Tree Grate 24 EA 56 SP-42 Planting Cells 1 LS 57 SP-43 Regal Prince Oak 11 EA 58 SP-44 Japanese Zelkova 8 EA 59 SP-45 Dwarf Japanese Maple 2 EA 60 SP-46 Rising Sun Redbud 4 EA 61 SP-47 Espresso Kentucky Coffee Tree 11 EA 62 SP-48 Wildfire Black Gum 9 EA 63 SP-49 Skyline Honeylocust 4 EA 64 SP-50 Dwarf Hinoki Cypress 17 EA 65 SP-51 Jewel Box Distylium 4 EA 66 SP-52 Treeform Limelight Hydrangea 9 EA 67 SP-53 Bi	50	SP-36	Stone Seat Wall	1	LS	
52 SP-38 Handrails 1 LS 53 SP-39 Wood Fence Replacement w/Gate 1 LS 54 SP-40 Ornamental 18" Railing Tree Guard 440 LF 55 SP-41 4'x4' Tree Grate 24 EA 56 SP-42 Planting Cells 1 LS 57 SP-43 Regal Prince Oak 11 EA 58 SP-44 Japanese Zelkova 8 EA 59 SP-45 Dwarf Japanese Maple 2 EA 60 SP-46 Rising Sun Redbud 4 EA 61 SP-47 Espresso Kentucky Coffee Tree 11 EA 62 SP-48 Wildfire Black Gum 9 EA 63 SP-49 Skyline Honeylocust 4 EA 64 SP-50 Dwarf Hinoki Cypress 17 EA 65 SP-51 Jewel Box Distylium 4 EA 66 SP-52 Treeform Limelight Hydrangea 9 EA 67 SP-53 Birchleaf Spirea	51	SP-37	Concrete Stair w/ Handrails	1	LS	
54 SP-40 Ornamental 18" Railing Tree Guard 440 LF 55 SP-41 4'x4' Tree Grate 24 EA 56 SP-42 Planting Cells 1 LS 57 SP-43 Regal Prince Oak 11 EA 58 SP-44 Japanese Zelkova 8 EA 59 SP-45 Dwarf Japanese Maple 2 EA 60 SP-46 Rising Sun Redbud 4 EA 61 SP-47 Espresso Kentucky Coffee Tree 11 EA 62 SP-48 Wildfire Black Gum 9 EA 63 SP-49 Skyline Honeylocust 4 EA 64 SP-50 Dwarf Hinoki Cypress 17 EA 65 SP-51 Jewel Box Distylium 4 EA 66 SP-52 Treeform Limelight Hydrangea 9 EA 67 SP-53 Birchleaf Spirea 14 EA 68 SP-54 Gem box Inkberry Holly <td>52</td> <td>SP-38</td> <td>· · ·</td> <td>1</td> <td>LS</td> <td></td>	52	SP-38	· · ·	1	LS	
55 SP-41 4'x4' Tree Grate 24 EA 56 SP-42 Planting Cells 1 LS 57 SP-43 Regal Prince Oak 11 EA 58 SP-44 Japanese Zelkova 8 EA 59 SP-45 Dwarf Japanese Maple 2 EA 60 SP-46 Rising Sun Redbud 4 EA 61 SP-47 Espresso Kentucky Coffee Tree 11 EA 62 SP-48 Wildfire Black Gum 9 EA 63 SP-49 Skyline Honeylocust 4 EA 64 SP-50 Dwarf Hinoki Cypress 17 EA 65 SP-51 Jewel Box Distylium 4 EA 66 SP-52 Treeform Limelight Hydrangea 9 EA 67 SP-53 Birchleaf Spirea 14 EA 68 SP-54 Gem box Inkberry Holly 36 EA 69 SP-55 Anna's Magic Ball Arborvitae	53	SP-39	Wood Fence Replacement w/Gate	1	LS	
56 SP-42 Planting Cells 1 LS 57 SP-43 Regal Prince Oak 11 EA 58 SP-44 Japanese Zelkova 8 EA 59 SP-45 Dwarf Japanese Maple 2 EA 60 SP-46 Rising Sun Redbud 4 EA 61 SP-47 Espresso Kentucky Coffee Tree 11 EA 62 SP-48 Wildfire Black Gum 9 EA 63 SP-49 Skyline Honeylocust 4 EA 64 SP-50 Dwarf Hinoki Cypress 17 EA 65 SP-51 Jewel Box Distylium 4 EA 66 SP-52 Treeform Limelight Hydrangea 9 EA 67 SP-53 Birchleaf Spirea 14 EA 68 SP-54 Gem box Inkberry Holly 36 EA 69 SP-55 Anna's Magic Ball Arborvitae 55 EA	54	SP-40	Ornamental 18" Railing Tree Guard	440	LF	
57 SP-43 Regal Prince Oak 11 EA 58 SP-44 Japanese Zelkova 8 EA 59 SP-45 Dwarf Japanese Maple 2 EA 60 SP-46 Rising Sun Redbud 4 EA 61 SP-47 Espresso Kentucky Coffee Tree 11 EA 62 SP-48 Wildfire Black Gum 9 EA 63 SP-49 Skyline Honeylocust 4 EA 64 SP-50 Dwarf Hinoki Cypress 17 EA 65 SP-51 Jewel Box Distylium 4 EA 66 SP-52 Treeform Limelight Hydrangea 9 EA 67 SP-53 Birchleaf Spirea 14 EA 68 SP-54 Gem box Inkberry Holly 36 EA 69 SP-55 Anna's Magic Ball Arborvitae 55 EA	55	SP-41	4'x4' Tree Grate	24	EA	
58SP-44Japanese Zelkova8EA59SP-45Dwarf Japanese Maple2EA60SP-46Rising Sun Redbud4EA61SP-47Espresso Kentucky Coffee Tree11EA62SP-48Wildfire Black Gum9EA63SP-49Skyline Honeylocust4EA64SP-50Dwarf Hinoki Cypress17EA65SP-51Jewel Box Distylium4EA66SP-52Treeform Limelight Hydrangea9EA67SP-53Birchleaf Spirea14EA68SP-54Gem box Inkberry Holly36EA69SP-55Anna's Magic Ball Arborvitae55EA	56	SP-42	Planting Cells	1	LS	
59SP-45Dwarf Japanese Maple2EA60SP-46Rising Sun Redbud4EA61SP-47Espresso Kentucky Coffee Tree11EA62SP-48Wildfire Black Gum9EA63SP-49Skyline Honeylocust4EA64SP-50Dwarf Hinoki Cypress17EA65SP-51Jewel Box Distylium4EA66SP-52Treeform Limelight Hydrangea9EA67SP-53Birchleaf Spirea14EA68SP-54Gem box Inkberry Holly36EA69SP-55Anna's Magic Ball Arborvitae55EA	57	SP-43	Regal Prince Oak	11	EA	
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67 SP-53 Birchleaf Spirea 14 EA 68 SP-54 Gem box Inkberry Holly 36 EA 69 SP-55 Anna's Magic Ball Arborvitae 55 EA	65	SP-51	Jewel Box Distylium	4	EA	
68 SP-54 Gem box Inkberry Holly 36 EA 69 SP-55 Anna's Magic Ball Arborvitae 55 EA	66	SP-52	Treeform Limelight Hydrangea	9	EA	
69 SP-55 Anna's Magic Ball Arborvitae 55 EA	67	SP-53	Birchleaf Spirea	14	EA	
	68	SP-54	Gem box Inkberry Holly	36	EA	
70 SP-56 Virginia Sweetspire 12 EA	69	SP-55	Anna's Magic Ball Arborvitae	55	EA	
<u> </u>	70	SP-56	Virginia Sweetspire	12	EA	

71	SP-57	Purple Pixie Loropetalum	6	EA	
72	SP-58	Chokeberry	72	EA	
73	SP-59	Witherod Viburnum	79	EA	
74	SP-60	Kelsey's Dwarf Red-Osier Dogwood	113	EA	
75	SP-61	Feather Reed Grass	71	EA	
76	SP-62	Dwarf Fountain Grass	114	EA	
77	SP-63	Palace Purple Heuchera	50	EA	
78	SP-64	Tickseed	75	EA	
79	SP-65	Firewitch Dianthus	123	EA	
80	SP-66	Variegated Liriope	109	EA	
81	SP-67	Liriope	727	EA	
82	SP-68	Littleleaf Periwinkle	293	EA	
83	SP-69	Creeping Lily Turf	115	EA	
84	SP-70	Annuals	61	SF	
85	SP-71	Irrigation	1	LS	
86	SP-72	Granite Stormwater Flume Installation	1	LS	
87	SP-73	Straw Wattle Protection	1	LS	
88	SP-74	Mud Mat Construction Entrance	1	LS	
89	SP-75	Silt Sak	1	LS	
90	SP-76	Stone Inlet Protection	28	EA	
91	840	Drop Inlet w/ Frame and Grate	2	EA	
92	840	Curb Inlet w/ Frame, Grate, and Hood	25	EA	
93	840	Stormwater Manhole	5	EA	
94	SP-77	6" Nyoplast Drains	5	EA	
95	SP-78	10" Nyoplast Drains	1	EA	
96	SP-79	3" Cleanouts	7	EA	
97	SP-80	6" Cleanouts	2	EA	
98	SP-81	8" Cleanouts	2	EA	
99	SP-82	3" SCH 40 PVC	210	LF	
100	SP-83	6" SCH 40 PVC	59	LF	
101	SP-84	8" SCH 40 PVC	45	LF	
102	310	15" RCP Class IV	599	LF	
103	310	18" RCP Class IV	153	LF	
104	310	24" RCP Class IV	373	LF	
105	310	30" RCP Class IV	623	LF	
106	310	36" RCP Class IV	32	LF	
107	310	42" RCP Class IV	479	LF	
108	WSACC	4' Dia. Sewer MH	1	EA	
109	SP-85	5' Dia. Doghouse Sewer MH - Flowable Fill Backfill	1	EA	
110	SP-86	8" DI Sewer	200	LF	
111	SP-87	8" DI Sewer - Flowable Fill Backfill	15	LF	

112	CD 00	Oll DVC Cover Comics	20		
112	SP-88	8" PVC Sewer Service	30	LF 	
113	SP-89	6" PVC Sewer Service	300	LF	
114	SP-90	4" PVC Sewer Service	700	LF	
115	SP-91	4" PVC Sewer Service - Flowable Fill Backfill	10	LF	
116	SP-92	4" PVC Sewer Service - Class A Arch Encasement	150	LF	
117	SP-93	8" Clean-Out with Mini Manhole	1	EA	
118	SP-94	6" Clean-Out with Mini Manhole	18	EA	
119	SP-95	4" Clean-Out with Mini Manhole	38	EA	
120	SP-96	Disconnect and Reconnect Exist Sewer Service	1	EA	
121	SP-97	Replace Exist. 12" VCP Sewer Main with 12" DIP Sewer Main	120	LF	
122	SP-98	Replace Exist. 8" VCP Sewer Main with 8" DIP Sewer Main	50	LF	
123	SP-99	Concrete Collar	3	EA	
124	SP-100	16" Ductile Iron Water Line	1600	LF	
125	SP-101	12" Ductile Iron Water Line	30	LF	
126	SP-102	8" Ductile Iron Water Line	70	LF	
127	SP-103	6" Ductile Iron Water Line	350	LF	
128	SP-104	4" Ductile Iron Water Line	120	LF	
129	SP-105	16" Ductile Iron Water Line - Flowable Fill Backfill	50	LF	
130	SP-106	12" Ductile Iron Water Line - Flowable Fill Backfill	55	LF	
131	SP-107	10" Ductile Iron Water Line - Flowable Fill Backfill	25	LF	
132	SP-108	16" Gate Valve	15	EA	
133	SP-109	12" Gate Valve	2	EA	
134	SP-110	8" Gate Valve	2	EA	
135	SP-111	6" Gate Valve	18	EA	
136	SP-112	4" Gate Valve	4	EA	
137	SP-113	12" Gate Valve - Flowable Fill Backfill	2	EA	
138	SP-114	Fire Hydrant Assembly	7	EA	
139	SP-115	Fire Hydrant Assembly with Tapping Sleeve and Valve	1	EA	
140	SP-116	Compact DI Fittings	25000	LB	
141	SP-117	16" Connection to Existing Water System	3	EA	
142	SP-118	12" Connection to Existing Water System	1	EA	
143	SP-119	10" Connection to Existing Water System	2	EA	
144	SP-120	8" Connection to Existing Water System	3	EA	

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145	SP-121	6" Connection to Existing Water System	1	EA		
146	SP-122	4" Meter Vault	2	EA		
147	SP-123	2" Water Service Tap	61	EA		
148	SP-124	3/4" Water Service Tap	1	EA		
149	SP-125	2" Copper Water Service Line	1500	LF		
150	SP-126	3/4" Copper Water Service Line	50	LF		
151	SP-127	2" Water Meter Box	61	EA		
152	SP-128	2" Pressure Reducing Valve in Meter Box	61	EA		
153	SP-129	3/4" Reduced Pressure Backflow Assembly	2	EA		
154	SP-130	Air Release Valve	2	EA		
155	SP-131	Temporary 2" Water Service	35	EA		
156	SP-132	Remove and Abate Exist. 8" AC Water Line	1500	LF		
157	SP-133	Remove and Abate Exist. 8" AC Water Line - Flowable Fill Backfill	50	LF		
158	SP-134	Demo - Concrete Pole Base	22	EA		
159	SP-135	Demo - Concrete Encased Ductbank	1	LS		
160	SP-136	Light Poles Type A	18	EA		
161	SP-137	Light Poles Type B	2	EA		
162	SP-138	Wiring Devices and Appliances	1	LS		
163	SP-139	Lighted Bollards	8	EA		
164	SP-140	Exothermic Weld	28	EA		
165	SP-141	Intelligent Panel	2	EA		
166	SP-142	Wiring 600V Copper #12	28000	LF		
167	SP-143	Wiring 600V Copper #10	14000	LF		
168	SP-144	Wiring 600V Copper #8	15000	LF		
169	SP-145	Wiring 600V Copper #6	36000	LF		
170	SP-146	Conduit RGS 1"	300	LF		
171	SP-147	PVC Schedule 40 1" Conduit	28000	LF		
172	SP-148	PVS Schedule 40 2" Conduit	2000	LF		
173	SP-149	PVS Schedule 40 4" Conduit	8000	LF		
174	SP-150	Electrical Trenching	15000	LF		
175	SP-151	Announcement Kiosk	1	EA		
176	SP-152	Light Pole Base	22	EA		
177	SP-153	Ground Rod 10' x 3/4"	30	EA		
178	SP-154	Electrical Hand Holes	18	EA		
179	SP-155	Communication Manholes	4	EA		
180	SP-156	Fiber Cable	2400	LF		

181	SP-157	Service Panel Enclosure and Concrete Pad		EA			
182	SP-158 Grounding Electrode Conductors			LS			
183	SP-159	Panelboard LP-B2	1	EA			
184	SP-160	Temporary Lighting	1	LS			
185	EC	Erosion Control Application Fee/Permit	1	LS			
	CONSTRUCTION SUBTOTAL						
	CONTINGENCY (10%)						
		TOTAL BASE BID SITE IMPROVEMENTS					
189	840	Add Alt #1 Curb Inlet w/ Frame, Grate, and Hood	1	EA			
190	310	Add Alt #1 15" RCP Class IV	50	LF			
191	SP-77	1	EA				
	Total ADD ALTERNATE #1						
	TOTAL PROJECT COST						

CONSTRUCTION SUBTOTAL	\$
(WORDS)	
10% CONTINGENCY	<u>\$</u>
(WORDS)	
TOTAL BASE BID SITE IMPROVEMENTS	\$
(WORDS)	
TOTAL ADD ALTERNATE #1	<u>\$</u>
(WORDS)	

TOTAL PROJECT COST		<u>\$</u>		
	(WORDS)			

- 6. Bidder agrees that all work will be completed and ready for final payment in accordance with Paragraph 14.13 of the General Conditions within 540 days from the date of notice to proceed.
- 7. Liquidated damages are \$250.00 per each day past the contract completion date.

8. (Communications conce	erning this Bid shall be sent to Bidde	er at the following address	:
	NAME:			
	ADDRESS:			
	P.O. BOX:			
	CITY:			
	STATE:			
	71D.			
	The terms used in t	this BID, which are defined in to them in the General Conditions	he General Conditions	(Section II), have the
SIG	NATURE OF BIDDE	R:		
		Contractor's License Number _		
		License Expiration Date		
<u>If an</u>	Individual			
	Ву			
		(signature of individua	al)	
	doing business as			
	Business address			
	Phone No.			
	Date		, 20	
	ATTEST	TITLE		
If a I	<u>Partnership</u>			
	By	(firm name)		
	Business address	(signature of general partner)		
	Phone No.			
	Date		, 20	
	ATTEST	TITLE		

Ву		
Bv	(corporation name)	
(sign	nature of authorized person) (title)	
Business addre	ess	
Phone No		
Date		, 20
ATTEST	TITLE	
Seal)		
nt Venture (C	Other party must sign below.)	
nt Venture (C	Other party must sign below.) By (name)	
nt Venture (C		
nt Venture (C	By (name)	
	By (name) Contractor's License Number License Expiration Date	
f an Individua	By (name) Contractor's License Number License Expiration Date	
f an Individua By	By (name) Contractor's License Number License Expiration Date	
f an Individua By doing bu	By (name) Contractor's License Number License Expiration Date [Signature of individual]	
f an Individua By doing bu Business	By (name) Contractor's License Number License Expiration Date [Signature of individual] Isiness as	
Ef an Individua By doing bu Business Phone N	By (name) Contractor's License Number License Expiration Date [signature of individual] standards as standards and standards standards	

(firm name) (signature of general partner) Business address Phone No.

Date		, 20
	TITLE	
If a Corporation		
Ву	(corporation name)	
D	(corporation name)	
By(s	signature of authorized person)(title)	· · · · · · · · · · · · · · · · · · ·
Business address	3	
Phone No.		
Date		, 20
ATTEST	TITLE	
(Seal)		

EXHIBIT B – STANDARD FORM OF PERFORMANCE BOND

Date of Execution of this Bond	
Name and Address of	
Principal (Contractor)	
Name and Address	
of Surety	
or Surety	
N 1 1 1 1 C	
Name and Address of Contracting Body	
Contracting Body	
Amount of Bond	
	-
Contract	That certain contract by and between the Principal and the
	Contracting Body above named dated
	for Union Street Improvements

KNOW ALL MEN BY THESE PRESENTS, that we, the PRINCIPAL and SURETY above named, are held and firmly bound unto the above-named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGAITON IS SUCH, that whereas the Principal entered into a certain contract with the Contracting Body, identified as shown above and hereto attached;

NOW THEREFORE, if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the Contracting Body, with or without notice to the Surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of the contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, then, this obligation to be void; otherwise, to remain in full force and virtue.

STANDARD FORM OF PERFORMANCE BOND: (Continued)

THIS PERFORMANCE BOND is made and given pursuant to the requirements and provisions of Section 129 of Chapter 143 of the General Statutes of North Carolina and pursuant to Article 3 of Chapter 44-A of the General Statutes of North Carolina, and each and every provision set forth and contained in Section 129 of Chapter 143 and in Article 3 of Chapter 44-A of the General Statutes of North Carolina is incorporated herein, made a part hereof, and deemed to be conclusively written into this Bond.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals as of the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned and representative, pursuant to authority of its governing body.

WIINESS:	
	Principal (Name of individual and trade name, partnership, corporation, or joint venture)
(Proprietorship or Partnership) Printed Name	BY(SEAL) Printed Name
	TITLE (Owner, Partner, Office held in corporation, joint venture)
ATTEST: (Corporation)	(Corporate Seal of Principal)
BYPrinted Name TITLE(Corporation Secretary or	
Assistant Secretary Only) WITNESS:	Surety (Name of Surety Company) BY Printed Name
	TITLE Attorney in Fact
COUNTERSIGNED:	(Corporate Seal of Surety)
N.C. Licensed Resident Agent	(Address of Attorney in Fact)
1 2111111000 11001101111 1150111	

EXHIBIT C – PROJECT SPECIAL PROVISIONS

Union Street Improvements
Project No. 2020-009 (Mcgill Associates Project #19.01726)

STANDARD PROVISIONS

- 1) Contractor shall utilize the 2018 NCDOT Standard Specifications & Standard Drawings for Roads and Structures, the City of Concord Technical Standards, and Water & Sewer Authority of Cabarrus County Technical specifications, the most restrictive requirement shall apply unless otherwise noted. WSACC items in the Bid Form and these Project Special Provisions reference the Water & Sewer Authority of Cabarrus County Technical specifications. NCDOT Article Numbers in the Bid Form and these Project Special Provisions reference the NCDOT Standard Specifications for Roadways and Structures.
- 2) The Geotechnical Report is available in Appendix A. It should be noted that the data provided does not reflect the variations in subsurface conditions which could exist between test locations and/or unexplored areas of the site.
- 3) This project is subject to an Encroachment Agreement with NCDOT (see Appendix B).
- 4) Hours of work within NCDOT's ROW are 9:00 am 4:00 pm Monday through Friday, or as required by the Encroachment Agreement. Hours of work outside NCDOT's ROW are 7:00 am 7:00 pm Monday through Friday. Contractor to obtain approval from the City for work to be performed outside of the standard hours and must provide a minimum of 48 hours notice.
- 5) Ingress and egress shall be maintained to all business and dwellings affected by the project. Contractor shall notify the adjacent property owners in writing a minimum of 72 hours in advance of construction at the work site. Driveway work shall be coordinated with the city inspector and the property owner(s).
- 6) Maintain water and sewer service to existing customers during construction. Minimize the duration of any service disruption. Notify the City of Concord Construction Manager at least 48 hours in advance of any scheduled service disruption. Provide notice on a City approved form to City of Concord customers specifying the day and duration of any scheduled disruption, including appropriate City contact numbers. Provide temporary potable water supplies to City of Concord customers when the duration of water service disruption exceeds 4 hours. This work is considered incidental to the project. No additional payment will be made.
- 7) The Contractor shall include the cost of any coordination and cooperation of utilities in his bid. No additional compensation shall be allowed for delays or inconvenience sustained by the Contractor due to utility relocation or adjustments. No additional payment will be made for remobilization required by the utility's failure to relocate a utility at the request of the Contractor.
- 8) <u>Financial Responsibility, Sedimentation Pollution Control Act</u>: If this project is subject to the "NC Department of Environmental Health and Natural Resources Sediment Pollution Control Act", the City has already acquired the Letter of Approval (see Appendix C). The Contractor, upon recommendation of award, shall complete Part B of the Financial Responsibility/Ownership form provided in Appendix D. The City will then transfer financial responsibility of the erosion control permit to the Contractor. The Contractor will be responsible for any fines levied for violation of the approved erosion control plan
- 9) Notice of Intent –The erosion and sedimentation control plan letter of approval in Appendix C requires that a Notice of Intent (NOI) form is submitted prior to the commencement of any land disturbing activity on the project. The Contractor shall complete and submit the NOI.

SPECIAL PROVISIONS

SP-01: VEHICULAR TRAFFIC CONTROL

1.0 DESCRIPTION

<u>Beginning Work and Street Closings:</u> The Contractor is responsible for notifying the Concord Department of Transportation and NCDOT for any work where the number of travel lanes is reduced from normal conditions.

The Contractor shall install advance warning signs for the Project. These signs shall be in place for one week before construction activity begins. The Contractor shall begin construction activity on a street on the scheduled date for the closing of the travel lane.

<u>Traffic Control Plan:</u> Traffic control will be provided by the Contractor to the City for approval prior to start of construction.

All traffic control devices and procedures shall conform to the requirements of the current edition of the Federal Highway Administration (FHWA) *Manual on Uniform Traffic Control Devices* (MUTCD), the current edition of the North Carolina Department of Transportation (NCDOT) Supplement to the *Manual on Uniform Traffic Control Devices for Streets and Highways*, the NCDOT Roadway Standard Drawings and the current edition of the NCDOT Standard Specifications for Roads and Structures.

The Contractor shall maintain the traffic control as described herein.

Traffic Control Phasing shall be in accordance with the construction sequence shown on the plans. Changes to the sequence shall be discussed and agreed upon by the City prior to the Contractor making changes. Additional signs, cones, drums, barricades and warning devices may be used, but at no time will less than what is specified on the plans or in the standards be acceptable.

<u>Maintenance of Traffic:</u> The Contractor shall maintain all travel lanes in accordance with the Traffic Control Plan sheets.

In areas of drop-offs and low shoulders, the Contractor shall backfill up to the edge and elevation of the existing pavement.

The Contractor will be required to maintain ingress and egress to all businesses and dwellings, and easy access to fire hydrants.

The Contractor shall provide adequate drainage under driveways and within the Project area for the duration of the Project.

The Contractor shall mark all hazards within the Project limits with well-maintained signs, barricades, warning and/or channelizing devices.

<u>Traffic Control Devices:</u> The Contractor shall furnish, install, operate, relocate, maintain and remove all temporary traffic control devices necessary for controlling traffic in accordance with the Traffic Control Plans and standards. All construction signs and

barricades shall remain in place until the appropriate permanent signs and pavement markings are installed.

<u>Equipment and Material Storage:</u> During periods of construction inactivity, all construction materials and equipment shall be stored by the Contractor. The right-of-way or temporary project easement may be used for this purpose, but equipment and materials must be placed safely 10 or more feet away from any open travel lane. It is recommended that all construction equipment and materials be stored on private property, which is posted against trespassing. It is the responsibility of the organization performing the work to obtain the permission to use a property for this purpose.

<u>Excavation and Trenches:</u> Excavations and trenches that cannot be properly backfilled and patched prior to the end of the workday shall be secured.

2.0 MEASUREMENT

There will be no separate measurement made for Traffic Control.

3.0 PAYMENT

Traffic Control will be paid at the lump sum price for "Traffic Control". This payment will be full compensation for all elements of work required to complete the Project as specified.

Partial payments will be made as follows:

- 25% of the lump sum price on the first partial payment estimate made after any work has been performed on the item of "Traffic Control".
- 25% of the lump sum price on the first partial payment after work is 25% complete.
- 25% of the lump sum price on the first partial payment after work is 50% complete.
- 25% of the lump sum price on the first partial payment after work is 100% complete.

Payment will be made under:

VEHICULAR TRAFFIC CONTROL	
VEHICIII AD I DAFEIC CONIDOI	 •
VEHICUEAN INALI IC CONTINCE	

SP-02: PEDESTRIAN ACCESS AND SAFETY

1.0 DESCRIPTION

Work associated with this line item shall include pedestrian access and safety measures during all phases of construction. Work associated with this line item shall include, but not be limited to providing signs, barricades, cones, and temporary construction fencing

to secure work areas from the general public as well as construction of temporary access ramps/drives to provide access to stores and businesses.

2.0 MEASUREMENT

There will be no separate measurement made for pedestrian access and safety.

3.0 PAYMENT

Traffic Control will be paid at the lump sum price for "Pedestrian Access and Safety". This payment will be full compensation for all elements of work required to complete the Project as specified.

Partial payments will be made as follows:

Payment will be made under:

- 25% of the lump sum price on the first partial payment after work is 25% complete.
- 25% of the lump sum price on the first partial payment after work is 50% complete.
- 25% of the lump sum price on the first partial payment after work is 75%% complete.
- 25% of the lump sum price on the first partial payment after work is 100% complete.

PEDESTRIAN ACCESS AND SAFETYLS

SP-03: COMPREHENSIVE GRADING

1.0 DESCRIPTION

This item shall include all elements of work covered by the referenced <u>NCDOT Specifications</u> and the numbered <u>Additional City Specifications</u> provided herein.

NCDOT Specifications

- 225, "Roadway Excavation"
- 250, "Removal of Existing Pavement"
- 260, "Proof Rolling"
- 340, "Pipe Removal"
- 412, "Unclassified Structure Excavation"
- 416, "Channel Excavation"
- 500, "Fine Grading, Sub-grade, Shoulders and Ditches"
- 545, "Incidental Stone Base"
- 560, "Shoulder Construction"
- 1530, "Abandon or Remove Utilities"

Additional City Specifications

- 1. <u>Traffic Bearing Road Plates</u>: The Contractor shall be responsible for all traffic bearing road plates needed in accordance with NCDOT Utility Cut Replacement Detail.
- 2. <u>Fence Removal and Disposal and or Fence Relocation</u>: as shown on the plans and any additional removal or relocation identified by the Contractor's means and methods shall be included in this item.
- 3. <u>Mailboxes and Site Amenities:</u> remove, protect, and reset mailboxes and site amenities. The Contractor shall keep mailboxes in service at all times and allow / provide for other services, including but not limited to trash pickup.
- 4. <u>Existing Road Signs:</u> remove, salvage, protect, reset and/or replace road signs as directed on the drawings and in accordance with the City of Concord transportation department and NCDOT Specifications 903 and 904.
- 5. Removal and Disposal of Existing Infrastructure: concrete curb, sidewalk, miscellaneous concrete, asphalt, driveways, pads, slabs, walls, culverts, structures, catch basins, manholes, etc. within the construction limits as shown on the plans and any additional infrastructure removal identified on the plans or by the Contractor's means and methods shall be included in this item.
- 6. <u>Shoring</u>: The Contractor shall be responsible for all shoring to include means, methods, materials and engineering needed to construct the project.
- 7. <u>Saw Cutting</u>: all saw cutting required to build the Project. Where asphalt or concrete (curb, sidewalk, roadway, driveways, parking lots, etc.) is to be removed, the Contractor shall provide a neat edge along the pavement being retained by sawing the pavement a minimum of 2" deep and 1' wide before breaking and removing adjacent pavement. When the Contractor proposes to saw pavement more than one foot from the proposed pavement (curb, sidewalk, structure, etc.), the Contractor shall obtain approval from the City prior to saw cutting and removing pavement. The cost of sawing asphalt or concrete shall be included in this item.
- 8. <u>Tree Protection</u>: The Contractor shall provide tree protection as shown on the plans, including any pruning which shall be performed by a certified arborist in accordance with proper arboricultural standards, and any additional Tree Protection identified by the Contractor's means and methods shall be in accordance with the City of Concord Landscaping Technical Standards and included in this item.
- 9. <u>Tree and/or Stump Removal and Disposal</u>: as shown on the plans and any additional tree and/or stump removal identified by the Contractor's means and methods shall be included in this item. Trees to be removed shall be approved by the City prior to removal.

- 10. Water Meter / Sewer Clean Out Protection: all labor and materials required to protect, and replace, if necessary, impacted water meters and sewer clean outs in the work area.
- 11. <u>Utility Pipe/Conduit Removal and Disposal</u>: existing public or private utility pipe / conduit, subsurface and shoulder drainpipe removal and disposal as shown on the plans and any additional utility pipe / conduit removal identified by the Contractor's means and methods shall be included in this item. Trench and excavation backfill shall consist of excavatable flowable fill according to NCDOT Specification Section 1000 within NCDOT (Cabarrus Avenue) Right of Way. Utility cut repair shall be performed according to the Utility Cut Replacement Detail for Pavement Surface Milling and Overlay Areas in areas where surface milling and overlay is to occur and areas of complete road reconstruction where utility trenches are excavated and backfilled prior to full pavement removal.
- 12. <u>Utility Pipe/Conduit Abandonment</u>: existing public or private utility pipe/conduit cutting, disconnection, plugging, and filling with excavatable flowable fill according to NCDOT specification Section 1000 as shown on the drawings and identified by the Contractor's means and methods shall be included in this item.
- 13. <u>Property Access</u>: all labor and materials required to maintain access to properties and businesses during construction.
- 14. <u>Miscellaneous items</u>: Items not shown but necessary for construction of the project shall be included in this item.

2.0 MEASUREMENT

There will be no separate measurement made for Comprehensive Grading.

3.0 PAYMENT

This payment will be full compensation for all elements of work required to complete the Project as specified.

Partial payments will be made as follows:

- 25% of the lump sum price on the first partial payment after work is 25% complete.
- 25% of the lump sum price on the first partial payment after work is 50% complete.
- 25% of the lump sum price on the first partial payment after work is 75%% complete.
- 25% of the lump sum price on the first partial payment after work is 100% complete.

Payment will be made under:

COMPREHENSIVE GRADINGLS

SP-04: 18" CONCRETE GRADE BEAM

1.0 DESCRIPTION

NCDOT SPECIFICATIONS:

848 "Concrete Sidewalks, Driveways and Curb Ramps"

Additional City Specifications:

1. Minimum Compressive Strength at 28 day – 4,000 psi

Work associated with this line item shall consist of the installation of concrete grade beams in accordance with the plans and specifications. The unit price will be the full compensation for all work including, but not limited to excavation, fine grading, concrete, rebar, installation, curing, and maintenance during the construction period.

2.0 MEASUREMENT

Measurement shall be made along the top surface of the beam.

3.0 PAYMENT

18" CONCRETE GRADE BEAMLF

SP-05: 6" CONCRETE DRIVE APRON/DRIVE

1.0 DESCRIPTION

NCDOT SPECIFICATIONS:

848 "Concrete Sidewalks, Driveways and Curb Ramps"

Additional City Specifications:

1. Minimum Compressive Strength at 28 day – 4,000 psi

Work associated with this line item shall consist of the actual number of square yards of concrete drive apron installed in accordance with the plans and specifications. The unit price will be the full compensation for all work including, but not limited to excavation, fine grading, concrete, and reinforcement as required in details, installation, curing, and maintenance during the construction period.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

6" CONCRETE DRIVE APRON/DRIVE...... SY

SP-06: 4" CONCRETE SIDEWALK AND HC RAMPS

1.0 DESCRIPTION

NCDOT SPECIFICATIONS:

848 "Concrete Sidewalks, Driveways and Curb Ramps"

Additional City Specifications:

- 1. Minimum Compressive Strength at 28 day 4,000 psi
- 2. HC ramps vary in size and layout. Ramps will not be a separate pay item but included in the sidewalk measurement. Tactile plates and handrails associated with ramps are a separate pay item.

Work associated with this line item shall consist of the installation of 4" concrete sidewalk and handicap ramp construction in accordance with the plans and specifications. The unit price will be the full compensation for all work including, but not limited to excavation, fine grading, concrete, reinforcement as required in details, installation, curing, and maintenance during the construction period.

2.0 MEASUREMENT

Measurement shall be made along the top surface. HC ramps will not be a separate pay item.

3.0 PAYMENT

4" CONCRETE SIDEWALK SY

SP-07: PAVERS-LIGHT DUTY ON 4" CONCRETE BASE

1.0 DESCRIPTION

NCDOT SPECIFICATIONS:

848 "Concrete Sidewalks, Driveways and Curb Ramps"

Additional City Specifications:

1. Minimum Compressive Strength at 28 day – 4,000 psi

Work associated with this line item shall consist of the installation of pavers including a 4" concrete base at locations and patterns shown in accordance with the plans and specifications. The unit price will be the full compensation for all work including, but not limited to excavation, fine grading, concrete, curing, pavers, sand and maintenance during the construction period.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

PAVERS - LIGHT DUTY ON 4" CONCRETE BASE SY

SP-08: PAVERS - HEAVY DUTY ON 6" CONCRETE BASE

1.0 DESCRIPTION

NCDOT SPECIFICATIONS:

848 "Concrete Sidewalks, Driveways and Curb Ramps"

Additional City Specifications:

1. Minimum Compressive Strength at 28 day – 4,000 psi

Work associated with this line item shall consist of the installation of pavers including a 6" concrete base at locations, colors and patterns shown in accordance with the plans and specifications. The unit price will be the full compensation for all work including, but not limited to excavation, fine grading, concrete, curing, pavers, sand and maintenance during the construction period.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

PAVERS - HEAVY DUTY ON 6" CONCRETE BASE SY

SP-09: BRICK BAND ON 4" CONCRETE BASE

1.0 DESCRIPTION

NCDOT SPECIFICATIONS:

848 "Concrete Sidewalks, Driveways and Curb Ramps"

Additional City Specifications:

1. Minimum Compressive Strength at 28 day – 4,000 psi

Work associated with this line item shall consist of the installation of pavers including a 4" concrete base at locations and patterns shown in accordance with the plans and specifications. The unit price will be the full compensation for all work including, but not limited to excavation, fine grading, concrete, curing, pavers, mortar and maintenance during the construction period.

2.0 MEASUREMENT

Measurement shall be made along the centerline top surface of the band.

3.0 PAYMENT

BRICK BAND ON 4" CONCRETE BASELF

SP-10: PLAZA PAVERS - VEHICULAR

1.0 DESCRIPTION

NCDOT SPECIFICATIONS:

848 "Concrete Sidewalks, Driveways and Curb Ramps"

Additional City Specifications:

1. Minimum Compressive Strength at 28 day – 4,000 psi

Work associated with this line item shall consist of the installation of pavers including a 6" reinforced concrete base at locations, colors and patterns shown in accordance with the plans and specifications. The unit price will be the full compensation for all work including, but not limited to excavation, fine grading, metal reinforcement, concrete, curing, pavers, mortar, sand and maintenance during the construction period.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

PLAZA PAVERS – VEHICULAR SY			
SP-11: BRICK PAVER CROSSWALK			
1.0 DESCRIPTION			
NCDOT SPECIFICATIONS:			
848 "Concrete Sidewalks, Driveways and Curb Ramps"			
Additional City Specifications:			
1. Minimum Compressive Strength at 28 day – 4,000 psi			
Work included in this line item shall consist of construction and installation of all required and necessary individual items to complete each crosswalk at the designated locations. The work at each crosswalk location shall include traffic control, layout, pedestrian crossing signs, excavation, fine grading, concrete, curing, pavers, concrete edge restraint, sand, protection of crosswalks and striping until cured for traffic.			
2.0 MEASUREMENT			
Measurement shall be made along the top surface.			
3.0 PAYMENT			
BRICK PAVER CROSSWALK SY			
SP-12: STAMPED ASPHALT CROSSWALK			
1.0 DESCRIPTION			
Work included in these line items of payment shall consist of construction and installation of all required and necessary individual items to complete each crosswalk at the designated locations. The work at each crosswalk location shall include traffic control, layout (with owner's approval prior to construction), pedestrian crossing signs, pavement repair, imprinting, protection of crosswalks and striping until cured for traffic.			
2.0 MEASUREMENT			
Measurement shall be made along the top surface.			
3.0 PAYMENT			
STAMPED ASPHALT CROSSWALK SY			

SP-13: 2'-6" CONCRETE CURB AND GUTTER

1.0 DESCRIPTION

NCDOT SPECIFICATIONS:

848 "Concrete Sidewalks, Driveways and Curb Ramps"

Additional City Specifications:

1. Minimum Compressive Strength at 28 day – 4,000 psi

Work associated with this line item shall consist of the installation of 6" concrete curb installed in accordance with the plans and specifications. The unit price will be the full compensation for all work including, but not limited to excavation, fine grading, concrete, installation, curing, and maintenance during the construction period. Measurement shall be made along the top surface of the curb.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

2'-6" CONCRETE CURB AND GUTTERLF

SP-14: 6" CONCRETE STAND-UP CURB

1.0 DESCRIPTION

NCDOT SPECIFICATIONS:

848 "Concrete Sidewalks, Driveways and Curb Ramps"

Additional City Specifications:

1. Minimum Compressive Strength at 28 day – 4,000 psi

Work associated with this line item shall consist of the installation of 6" concrete curb installed in accordance with the plans and specifications. The unit price will be the full compensation for all work including, but not limited to excavation, fine grading, concrete, installation, curing, and maintenance during the construction period. Measurement shall be made along the top surface of the curb.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

6" CONCRETE STAND-UP CURBLF

SP-15: 8" CONCRETE STAND-UP CURB

1.0 DESCRIPTION

NCDOT SPECIFICATIONS:

846 "Concrete Curb, Curb and Gutter, Concrete Cutter, Shoulder Berm Gutter, Concrete Expressway Gutter and Concrete Valley Gutter"

Additional City Specifications:

1. Minimum Compressive Strength at 28 day – 4,000 psi

Work associated with this line item shall consist of the installation of 8" concrete curb installed in accordance with the plans and specifications. The unit price will be the full compensation for all work including, but not limited to excavation, fine grading, concrete, installation, curing, and maintenance during the construction period. Measurement shall be made along the top surface of the curb.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

8" CONCRETE STAND-UP CURBLF

SP-16: CONCRETE LANDSCAPE EDGING

1.0 DESCRIPTION

NCDOT SPECIFICATIONS:

846 "Concrete Curb, Curb and Gutter, Concrete Cutter, Shoulder Berm Gutter, Concrete Expressway Gutter and Concrete Valley Gutter"

Additional City Specifications:

1. Minimum Compressive Strength at 28 day – 4,000 psi

Work associated with this line item shall consist of the installation of concrete landscape edge installed in accordance with the plans and specifications. The unit price will be the full compensation for all work including, but not limited to excavation, fine grading, concrete, installation, curing, and maintenance during the construction period. Measurement shall be made along the top surface of the curb.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

CONCRETE LANDSCAPE EDGINGLF

SP-17 & 18: CONCRETE EDGE RESTRAINT

1.0 DESCRIPTION

NCDOT SPECIFICATIONS:

846 "Concrete Curb, Curb and Gutter, Concrete Cutter, Shoulder Berm Gutter, Concrete Expressway Gutter and Concrete Valley Gutter"

Additional City Specifications:

1. Minimum Compressive Strength at 28 day – 4,000 psi

Work associated with these line items shall consist of the installation of concrete edge restraint in accordance with the plans and specifications. The unit price will be the full compensation for all work including, but not limited to excavation, fine grading, concrete, installation, curing, and maintenance during the construction period. Measurement shall be made along the top surface of the edge restraint.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

CONCRETE EDGE RESTRAINTLF

SP-19: GRANITE EDGE RESTRAINT

1.0 DESCRIPTION

Work associated with these line items shall consist of the installation of granite edge restraint in accordance with the plans and specifications. The unit price will be the full compensation for all work including, but not limited to excavation, fine grading, mortar, installation, curing, and maintenance during the construction period. Measurement shall be made along the top surface of the edge restraint.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

GRANITE EDGE RESTRAINTLF

SP-20: BRONZE SIDEWALK TRAIL MARKERS

1.0 DESCRIPTION

Work associated with this line item shall consist of the furnishing and installation of bronze sidewalk trail markers at locations shows on the plans.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

BRONZE SIDEWALK TRAIL MARKERSLS

SP-21: DETECTABLE WARNING PLATE

1.0 DESCRIPTION

Work associated with this line item shall consist of the installation of composite detectable warning plates in accordance with the plans and specifications.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

DETECTABLE WARNING PLATESF

SP-22: METAL HANDRAIL AT HC RAMPS

1.0 DESCRIPTION

Work associated with this line item shall consist of the furnishing and installation of the metal railing, posts, anchors, etc. as shown on the project plans. The price shall include rail, post, concrete, grout, hardware, and all related items.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

METAL HANDRAIL AT HC RAMPSLF

SP-23: SIGN INSTALLATION

1.0 DESCRIPTION

Work associated with this line item shall consist of the installation of furnishing and installation of decorative break away street signposts to match existing and installation of street signs provided by the City in accordance with the plans and specifications at locations shown on the plans. signs are to be reinstalled and shall conform to MUTCD and NCDOT requirements.

2.0 MEASUREMENT

Measurement shall be made based of the actual number of signs installed and accepted.

3.0 PAYMENT

SIGN INSTALLATION EA

SP-24: SALVAGED WAYFINDING SIGN INSTALLATION

1.0 DESCRIPTION

Work associated with this line item shall consist of the installation of the salvaged wayfinding signs and furnishing and installation of decorative break away pole systems to match existing. Contractor to provide signed and sealed structural drawings for footing design. Salvaged signs are to be reinstalled and shall conform to MUTCD and NCDOT requirements.

2.0 MEASUREMENT

Measurement shall be made based on the actual number of wayfinding signs installed and accepted.

3.0 PAYMENT

SP-25: BENCHES (OWNER PROVIDED, CONTRACTOR INSTALLED)

1.0 DESCRIPTION

This item of work includes the installation of benches at locations as shown on the project plans and in conformance with the details and specifications. Owner to provide benches and contractor to install.

2.0 MEASUREMENT

Measurement shall be made based of the actual number of benches installed and accepted.

3.0 PAYMENT

BENCHES EA

SP-26: TRASH/RECYCLING RECEPTACLE (OWNER PROVIDED, CONTRACTOR INSTALLED)

1.0 DESCRIPTION

This item of work includes the installation of trash/recycling receptacles and foundations at locations as shown on the project plans and in conformance with the details and specifications. The price shall include foundation and all related items as needed for installation. Owner to provide trash/recycling receptacles and contractor to install.

2.0 MEASUREMENT

Measurement shall be made based of the actual number of receptacles installed and accepted.

3.0 PAYMENT

TRASH/RECYCLING RECEPTACLE EA

SP-27: CIGARETTE RECEPTACLE (OWNER PROVIDED, CONTRACTOR INSTALLED)

1.0 DESCRIPTION

This item of work includes the installation of cigarette receptacles at locations as shown on the project plans and in conformance with the details and specifications. The price shall include all related items as needed for installation. Owner to provide benches and contractor to install.

2.0 MEASUREMENT

Measurement shall be made based of the actual number of receptacles installed and accepted.

3.0 PAYMENT

CIGARETTE RECEPTACLE...... EA

SP-28: BIKE RACK INSTALLATION

1.0 DESCRIPTION

This item of work includes the installation of salvaged bike racks and proposed concrete foundations as shown on the project plans and in conformance with the details and specifications. The price shall include the foundation, finishes, and all related items as needed for installation.

2.0 MEASUREMENT

Measurement shall be made based of the actual number of bike racks installed and accepted.

3.0 PAYMENT

BIKE RACK INSTALLATION EA

SP-29: DRINKING FOUNTAIN

1.0 DESCRIPTION

This item of work includes the installation of potable drinking fountain as shown on the project plans and in conformance with the details and specifications. The price shall include the foundation, fountain, and all related items as needed for installation.

2.0 MEASUREMENT

Measurement shall be made based of the actual number of drinking fountains installed and accepted.

3.0 PAYMENT

DRINKING FOUNTAIN EA

SP-30: BOLLARDS (NON-LIGHTED)

This item of work includes the furnishing and installation of bollards at locations as shown on the project plans and in conformance with the details and specifications. The price shall include all related items as needed for installation.

2.0 MEASUREMENT

Measurement shall be made based on the <u>actual number</u> of bollards installed and accepted.

3.0 PAYMENT

BOLLARDS (NON-LIGHTED) EA

SP-31: FLAG HOLDER

1.0 DESCRIPTION

This item of work includes the furnishing and installation of Sch 40 PVC flag holders at locations as shown on the project plans and in conformance with the details and specifications. The price shall include all related items as needed for installation.

2.0 MEASUREMENT

There will be no separate measurement made for Flag Holder Installation.

3.0 PAYMENT

FLAG HOLDER.....LS

SP-32: HORSE HOOKS ART INSTALLATION

1.0 DESCRIPTION

Work associated with this line item shall consist of the installation of the salvaged existing horse hooks, furnishing and installation of bronze horseshoes, and granite plaque as noted on the plans and specifications.

2.0 MEASUREMENT

There will be no separate measurement made for Horse Hooks Art Installation.

3.0 PAYMENT

HORSE HOOKS ART INSTALLATION.....LS

SP-33: GRANITE MARKER FOR SURVEYOR STONE

1.0 DESCRIPTION

Work associated with this line item shall consist of the furnishing and installation of a granite marker for the existing corner stone as shown on the plans.

2.0 MEASUREMENT

There will be no separate measurement made for granite marker surveyor stone.

3.0 PAYMENT

GRANITE MARKER FOR SURVEYOR STONELS

SP-34: METAL AIR VENT REPLACEMENT

1.0 DESCRIPTION

Work associated with this line item shall consist of the furnishing and installation of metal air vent grates to match existing vents.

2.0 MEASUREMENT

There will be no separate measurement made for Metal Air Vent Replacement.

3.0 PAYMENT

METAL AIR VENT REPLACEMENTLS

SP-35: MONOLITHIC RETAINING WALL

1.0 DESCRIPTION

Work associated with this line item shall include the construction of all monolithic retaining walls in accordance with the plans and specifications. The unit price shall be full compensation for all materials and installation including but not limited to concrete, footing, rebar, gravel, landscape edge where noted, and restoration of any surfaces. Measurement shall be made along the top surface of the wall and include a width of 14", height of wall varies. Areas of concrete/pavers installed past the 14" width shall be measure as 4" sidewalk or brick pavers as noted.

2.0 MEASUREMENT

Measurement shall be made at the unit bid price per <u>linear foot</u> (12" length x 14" width, height varies) of work installed and accepted.

3.0 PAYMENT

MONOLITHIC RETAINING WALLLF

SP-36: STONE SEAT WALL

1.0 DESCRIPTION

Work associated with this line item shall include the construction of all seat walls in accordance with the plans and specifications. The unit price shall be full compensation for all materials and installation including but not limited to concrete block, footing, rebar, grout, mortar, veneer, pre-cast concrete wall cap, drainage materials, and restoration of any surfaces.

2.0 MEASUREMENT

There will be no separate measurement made for Stone Seat Wall.

3.0 PAYMENT

STONE SEAT WALL.....LS

SP-37: CONCRETE STAIR WITH HANDRAILS

1.0 DESCRIPTION

Work associated with this line item shall include the construction of all stairs with handrails in accordance with the plans and specifications. The unit price shall be full compensation for all materials and installation including but not limited to concrete, footing, rebar, restoration of any surfaces, rail, post, hardware, and all related items.

2.0 MEASUREMENT

There will be no separate measurement made for Concrete Stair with Handrails.

3.0 PAYMENT

CONCRETE STAIR WITH HANDRAILSLS

SP-38: CONCRETE STAIR AND HC RAMP WITH HANDRAILS

1.0 DESCRIPTION

Work associated with this line item shall include the construction of the combined stair and ramp with handrails in accordance with the plans and specifications. The unit price shall be full compensation for all materials and installation including but not limited to brick, concrete, footing, rebar, restoration of any surfaces, rail, post, hardware, and all related items

2.0 MEASUREMENT

There will be no separate measurement made for Concrete Stair and HC Ramp with Handrails.

3.0 PAYMENT

CONCRETE STAIR AND HC RAMP WITH HANDRAILSLS

SP-39: WOOD FENCE REPLACEMENT WITH GATE

1.0 DESCRIPTION

Work associated with this line item shall consist of the furnishing and installation of the wood fence, posts, anchors, etc. as shown on the project plans. The price shall include wood fencing, access gate, posts, concrete, hardware, and all related items.

2.0 MEASUREMENT

There will be no separate measurement made for Wood Fence Replacement with Gate.

3.0 PAYMENT

WOOD FENCE REPLACEMENT WITH GATELS

SP-40: ORNAMENTAL 18" TREE GUARD RAILING

1.0 DESCRIPTION

Work associated with this line item shall consist of the installation of ornamental tree guard railing at locations shown on the plans. Railing to be provided by the City.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

ORNAMENTAL 18' TREE GUARD RAILINGLF

SP-41: 4'x4' TREE GRATE

1.0 DESCRIPTION

This item of work includes the furnishing and installation of tree grates at locations as shown on the project plans and in conformance with the details and specifications. The price shall include grate, finish, foundation and all related items.

2.0 MEASUREMENT

Measurement shall be made based of the <u>actual number</u> of tree grates installed and accepted.

3.0 PAYMENT

4'X4' TREE GRATE...... EA

SP-42: PLANTING CELLS

1.0 DESCRIPTION

Work associated with this line item shall consist of the furnishing and installation of planting cells in their entirety as shown on the plans and specifications. Work shall include, but not be limited to, the furnishing, installation and maintenance of devices during the project construction.

2.0 MEASUREMENT

There will be no separate measurement made for planting cells.

3.0 PAYMENT

PLANTING CELLS LS

SP-43 THRU 49: TREES

1.0 DESCRIPTION

Work associated with this line item shall consist of furnishing, installation and planting of trees in accordance with the plans and specifications. The work at each tree shall include layout, excavation, planting, staking, soil amendments, mulch, and all related construction.

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Measurement shall be made based of the <u>actual number</u> of trees installed and accepted.

3.0 PAYMENT

TREES EA

SP-50 THRU 64: SHRUBS AND PERENNIALS

1.0 DESCRIPTION

Work associated with this line item shall consist of furnishing, installation and planting of shrubs and perennials in accordance with the plans and specifications. The work at each plant shall include layout, excavation, planting, soil amendments, mulch, and all related construction.

2.0 MEASUREMENT

Measurement shall be made based of the <u>actual number</u> of shrubs and perennials installed and accepted.

3.0 PAYMENT

SHRUBS AND PERENNIALS......EA

SP-65 THRU 69: GROUNDCOVERS

1.0 DESCRIPTION

Work associated with this line item shall consist of furnishing, installation, and planting of groundcovers in accordance with the plans and specifications. The work associated with groundcover installation shall include layout, excavation, planting, soil amendments, mulch, and all related construction.

2.0 MEASUREMENT

Measurement shall be made based of the <u>actual number</u> of groundcovers installed and accepted.

3.0 PAYMENT

GROUNDCOVERS EA

SP-70: ANNUALS

1.0 DESCRIPTION

Work associated with this line item shall consist of furnishing, installation and planting of annuals in accordance with the plans and specifications. The work associated with annual installation shall include layout, planting, soil amendments, mulch, and all related construction.

2.0 MEASUREMENT

Measurement shall be made based of the square foot of annuals installed and accepted.

3.0 PAYMENT

ANNUALS SF

SP-71: IRRIGATION

1.0 DESCRIPTION

Work associated with this line item shall consist of furnishing and installing irrigation per the plans and specifications. The price will be full compensation for all labor, equipment, and materials necessary for work associated with irrigation, including but not limited to connection to water line, main line, irrigation lines to all valves, controllers, electrical connection, drip pipe, and all related items as needed for installation.

2.0 MEASUREMENT

There will be no separate measurement made for irrigation.

3.0 PAYMENT

IRRIGATION.....LS

SP-72: GRANITE STORMWATER FLUME INSTALLATION

1.0 DESCRIPTION

The work covered by this section consists of the installation of granite stormwater flumes, in accordance with the requirements shown on the plans and specifications. Granite used to be salvaged from the removal of existing curb lines with additional granite being provided by the City. The lump sum price will be the full compensation for all work including, but not limited to excavation, fine grading, mortar, concrete,

installation, curing, removal of any sharp edges, and maintenance during the construction period. This includes all special cuts as required for installation.

2.0 MEASUREMENT

There will be no separate measurement made for granite stormwater flume installation.

3.0 PAYMENT

GRANITE STORMWATER FLUME INSTALLATIONLS

SP-73: STRAW WATTLE PROTECTION

1.0 DESCRIPTION

Work associated with this line item shall consist of the furnishing and installation of straw wattles around the perimeter of the work area. Locations will vary based on active work areas. Lump sum price shall include but is not limited to materials, installation, maintenance, replacement, and removal.

2.0 MEASUREMENT

There will be no separate measurement made for straw wattle installation and maintenance.

3.0 PAYMENT

STRAW WATTLE PROTECTIONLS

SP-74: MUD MAT CONSTRUCTION ENTRANCE

1.0 DESCRIPTION

Work associated with this line item shall consist of the furnishing and installation of temporary construction entrance mud mat. Location will vary based on active work areas. Lump sum price shall include but is not limited to furnishing, installation, relocation as needed, replacement as needed, and removal.

2.0 MEASUREMENT

There will be no separate measurement made for mud mat installation and maintenance.

3.0 PAYMENT

MUD MAT CONSTRUCTION ENTRANCELS

SP-75: SILT SAK

1.0 DESCRIPTION

Work associated with this line item shall consist of the furnishing, installation and maintenance of silt saks storm inlets protection devices for proposed and existing structures as noted on the plans or as needed due to phasing of construction. The lump sum price shall include furnishing, installation, replacement, and maintenance of device while in active use and all associated items.

2.0 MEASUREMENT

There will be no separate measurement made for silt sak installation and maintenance.

3.0 PAYMENT

SILT SAK...... LS

SP-76: STONE INLET PROTECTION – STORM INLETS

1.0 DESCRIPTION

Work associated with this line item shall consist of the furnishing and installation of gravel storm inlet protection for proposed and existing structures in accordance with the plans and specifications. Unit bid price shall include but is not limited to excavation, installation, maintenance, gravel and all associated items.

2.0 MEASUREMENT

Measurement shall be made based on the <u>actual number</u> of storm inlets installed and accepted.

3.0 PAYMENT

STONE INLET PROTECTION - STORM INLETS..... EA

SP-77: 6" NYLOPLAST STORM DRAINS

1.0 DESCRIPTION

Work associated with this line item shall consist of the installation of Nyloplast drains associated with roof drain piping. Work includes furnishing all materials necessary for the installation in accordance with the plans and specifications. Unit bid price shall include but is not limited to excavation, installation, storm structures, and backfill.

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Measurement shall be made based on the actual number of drains installed and accepted.

3.0 PAYMENT

6" NYOPLAST STORM DRAINS EA

SP-78: 10" NYLOPLAST STORM DRAINS

1.0 DESCRIPTION

Work associated with this line item shall consist of the installation of Nyloplast drains associated with roof drain piping. Work includes furnishing all materials necessary for the installation in accordance with the plans and specifications. Unit bid price shall include but is not limited to excavation, installation, storm structures, and backfill.

2.0 MEASUREMENT

Measurement shall be made based on the <u>actual number</u> of drains installed and accepted.

3.0 PAYMENT

10" NYOPLAST STORM DRAINS EA

SP-79 THRU 81: PVC CLEANOUTS

1.0 DESCRIPTION

Work associated with this line item shall consist of the furnishing and installation of cleanouts in accordance with the plans and specifications, in sizes as shown on plans. The unit price bid shall include all excavation, installation, temporary and permanent connections to existing lines, backfill including washed stone around the pipe, compaction, testing, cleanup and removal and disposal of existing materials.

2.0 MEASUREMENT

Measurement shall be made based on the <u>actual number</u> of cleanouts installed and accepted.

3.0 PAYMENT

PVC CLEANOUTS.....EA

SP-82 THRU 84: SCH 40 PVC PIPE

1.0 DESCRIPTION

Work associated with this line item shall consist of the furnishing and installation of Schedule 40 PVC pipe in accordance with the plans and specifications, in sizes as specified on plans. The unit price bid shall include but is not limited to all excavation, pipe installation, temporary and permanent connections to existing lines, backfill including washed stone around the pipe, compaction, testing, cleanup and removal and disposal of existing materials.

2.0 MEASUREMENT

Measurement will be per linear foot from the starting point to the finish point of each section of line along the top of the pipe.

3.0 PAYMENT

SCHEDULE 40 PVC PIPE......LF

SP-85: 5' DIA. CONCRETE DOGHOUSE SEWER MANHOLE – FLOWABLE FILL BACKFILL

1.0 DESCRIPTION

Work associated with this line item shall consist of the complete installation of doghouse sewer manholes according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006 including but not limited to pavement cutting and removal, excavation, sheeting/shoring/bracing, excavation dewatering, foundation preparation, locating existing sewer line, installation, cutting of existing sewer line, flowable fill backfill, concrete, pipe connections (including drop connections and existing pipe connections where applicable), boots, construction of invert, installation of frame and lid (watertight or standard), adjustment rings, backfill, bypass pumping as required, testing, and all related construction to complete the work as specified. Paving is to be performed simultaneously with street paving and is not included under this bid item.

Additional City Specifications:

1. Backfill shall consist of excavatable flowable fill according to NCDOT Specification Section 1000.

2.0 MEASUREMENT

Measurement shall be made based on the <u>actual number</u> of Doghouse Manholes installed and accepted. Quantities shall be verified in the field by the Owner or the Engineer.

3.0 PAYMENT

5' DIA. CONCRETE DOGHOUSE SEWER MANHOLE - FLOWABLE FILL BACKFILL...... EA

SP-86: 8" DUCTILE IRON GRAVITY SEWER

1.0 DESCRIPTION

Work associated with this line item shall consist of the furnishing and installation of ductile iron slip joint pipe according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006. The unit price bid shall include but is not limited to location of existing utilities, pavement cutting and removal, excavation, excavation dewatering, bypass pumping as required, pipe bedding stone, pipe installation, service wyes, testing, temporary and permanent connections to existing lines, standard compacted backfill, testing, cleanup, removal and disposal of existing materials, and all related construction to complete the work as specified. Paving is to be performed simultaneously with street paving and is not included under this bid item.

2.0 MEASUREMENT

Measurement shall be made according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006 with no depth classification. Quantities shall be verified in the field by the Owner or the Engineer.

3.0 PAYMENT

8" DUCTILE IRON GRAVITY SEWER......LF

SP-87: 8" DUCTILE IRON GRAVITY SEWER - FLOWABLE FILL BACKFILL

1.0 DESCRIPTION

Work associated with this line item shall consist of the furnishing and installation of ductile iron slip joint pipe according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006. The unit price bid shall include but is not limited to location of existing utilities, pavement cutting and removal, excavation, excavation dewatering, bypass pumping as required, pipe bedding stone, pipe installation, service wyes, testing, temporary and permanent connections to existing lines, backfill, testing, cleanup, removal and disposal of existing materials, and all related construction to complete the work as specified. Paving is to be performed simultaneously with street paving and is not included under this bid item.

Additional City Specifications:

1. Backfill shall consist of excavatable flowable fill according to NCDOT Specification Section 1000.

2.0 MEASUREMENT

Measurement shall be made according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006 with no depth classification. Quantities shall be verified in the field by the Owner or the Engineer.

3.0 PAYMENT

8" DUCTILE IRON GRAVITY SEWER - FLOWABLE FILL BACKFILL......LF

SP-88 THRU 90: PVC SEWER SERVICE

1.0 DESCRIPTION

Work associated with this line item shall consist of the furnishing and installation of C-900 DR-14 PVC slip joint sewer service pipe according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006. The unit price bid shall include but is not limited to location of existing utilities, excavation, excavation dewatering, removal of existing sewer service line for replacement as shown on drawings, bypass pumping as required, pipe bedding stone, pipe installation, fittings, testing, temporary and permanent connections to existing lines, backfill, testing, cleanup, removal and disposal of existing materials, and all related construction to complete the work as specified. Paving is to be performed simultaneously with street paving and is not included under this bid item.

2.0 MEASUREMENT

Measurement will be per <u>linear foot</u> from the starting point to the finish point of each section of line along the top of the pipe. Quantities shall be verified in the field by the Owner or the Engineer.

3.0 PAYMENT

" PVC SEWER SERVICELF

SP-91: PVC SEWER SERVICE – FLOWABLE FILL BACKFILL

1.0 DESCRIPTION

Work associated with this line item shall consist of the furnishing and installation of C-900 DR-14 PVC slip joint sewer service pipe according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006. The unit price bid shall

include but is not limited to location of existing utilities, excavation, excavation dewatering, removal of existing sewer service line for replacement as shown on drawings, bypass pumping as required, pipe bedding stone, pipe installation, fittings, testing, temporary and permanent connections to existing lines, backfill, testing, cleanup, removal and disposal of existing materials, and all related construction to complete the work as specified. Paving is to be performed simultaneously with street paving and is not included under this bid item.

Additional City Specifications:

1. Backfill shall consist of excavatable flowable fill according to NCDOT Specification Section 1000.

2.0 MEASUREMENT

Measurement will be per linear foot from the starting point to the finish point of each section of line along the top of the pipe. Quantities shall be verified in the field by the Owner or the Engineer.

3.0 PAYMENT

" PVC SEWER SERVICE - FLOWABLE FILL BACKFILL.....LF

SP-92: PVC SEWER SERVICE-CLASS A ARCH ENCASEMENT

1.0 DESCRIPTION

Work associated with this line item shall consist of the furnishing and installation of C-900 DR-14 PVC slip joint sewer service pipe according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006. The unit price bid shall include but is not limited to location of existing utilities, excavation, excavation dewatering, removal of existing sewer service line for replacement as shown on drawings, bypass pumping as required, removal of existing sewer service line as shown on drawings, pipe bedding stone, pipe installation, fittings, excavatable concrete arch encasement according to NCDOT Specification Section 1000, testing, temporary and permanent connections to existing lines, standard compacted backfill, testing, cleanup, removal and disposal of existing materials, and all related construction to complete the work as specified. Paving is to be performed simultaneously with street paving and is not included under this bid item.

2.0 MEASUREMENT

Measurement will be per linear foot from the starting point to the finish point of each section of line along the top of the pipe. Quantities shall be verified in the field by the Owner or the Engineer.

3.0 PAYMENT

____" PVC SEWER SERVICE - CLASS A ARCH ENCASEMENT.....LF

SP-93 THRU 95: SEWER CLEAN-OUT WITH MINI MANHOLE

1.0 DESCRIPTION

Work associated with this line item shall consist of the furnishing and installation of sewer cleanouts according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006, in sizes as shown on plans. The unit price bid shall include but is not limited to location of existing utilities, excavation, excavation dewatering, bypass pumping as required, pipe bedding stone, installation, temporary and permanent connections to existing lines, standard compacted backfill, mini manhole frame and lid, testing, final adjustment, cleanup, removal and disposal of existing materials, and all related construction to complete the work as specified. Paving is to be performed simultaneously with street paving and is not included under this bid item.

2.0 MEASUREMENT

Measurement will be based on the actual number of cleanouts with mini-manhole installed and accepted. Quantities shall be verified in the field by the Owner or the Engineer.

3.0 PAYMENT

____ " SEWER CLEAN-OUT WITH MINI MANHOLE.....EA

SP-96: DISCONNECT AND RECONNECT EXIST. SEWER SERVICE

1.0 DESCRIPTION

Work associated with this line item shall consist of disconnecting existing sewer service from existing sewer main to be abandoned and re-connecting to sewer line to remain along Cabarrus Avenue according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006. The unit price bid shall include but is not limited to location of existing utilities, excavation, disconnection of existing sewer service, plugging abandoned end of sewer service with flowable fill plug, tapping saddle, reconnection of sewer service to live sewer main, flowable fill backfill, cleanup, and all related construction to complete the work as specified. Related pavement patching and restoration of areas outside of the Union Street/Cabarrus Avenue intersection that are otherwise not being reconstructed shall be included under this item.

Additional City Specifications:

1. Backfill shall consist of excavatable flowable fill according to NCDOT Specification Section 1000.

2.0 MEASUREMENT

Measurement shall be made at the unit bid price per each existing sewer service disconnected and reconnected. Quantities shall be verified in the field by the Owner or the Engineer.

3.0 PAYMENT

DISCONNECT AND RECONNECT EXIST. SEWER SERVICE.....EA

SP-97 THRU 98: REPLACE EXISTING VCP SEWER MAIN WITH DIP SEWER MAIN

1.0 DESCRIPTION

Work associated with this line item shall consist of replacement of VCP sewer main with ductile iron slip joint pipe according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006, in sizes as specified on plans. Ductile iron slip joint pipe shall be of the same nominal size as the existing VCP sewer and be installed along the same alignment and grade. Measurement will be from the starting point to the finish point of each section of line. The unit price bid shall include but is not limited to location of existing utilities, pavement cutting and removal, excavation, excavation dewatering, bypass pumping as required, removal of existing sewer, pipe bedding stone, pipe installation, transition couplings, testing, temporary and permanent connections to existing lines, standard compacted backfill, testing, cleanup, removal and disposal of existing materials, and all related construction to complete the work as specified. Paving is to be performed simultaneously with street paving and is not included under this bid item.

2.0 MEASUREMENT

Measurement will be per linear foot from the starting point to the finish point of each section of line along the top of the pipe. Quantities shall be verified in the field by the Owner or the Engineer.

3.0 PAYMENT

REPLACE EXIST. " VCP SEWER MAIN WITH " DIP SEWER MAIN......LF

SP-99: CONCRETE COLLAR

1.0 DESCRIPTION

Work associated with this line item shall consist of construction of concrete collars where new sewer lines connect to existing brick manholes as shown on the drawings

and according to the specifications. The unit price bid shall include connection of the sewer pipe to the existing manhole and installation of the concrete collar.

Additional City Specifications:

1. Concrete shall consist of excavatable flowable fill according to NCDOT Specification Section 1000.

2.0 MEASUREMENT

Measurement shall be made at the unit bid price per <u>each</u> concrete collar installed and accepted. Quantities shall be verified in the field by the Owner or the Engineer.

3.0 PAYMENT

CONCRETE COLLAR.....EA

SP-100 THRU 104: DUCTILE IRON WATER LINE

1.0 DESCRIPTION

Work associated with this line item shall consist of ductile iron water line according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006, in sizes as specified on plans. Price and payment shall constitute full compensation for furnishing all equipment, tools, labor and materials to complete the work as specified, including but not limited to the following items:

- a. Site Preparation
- b. Location of Existing Utilities
- c. Common Excavation, and Trench Backfilling with Standard Compacted Backfill
- d. Dewatering of Excavated Areas
- e. Rock Excavation, unless otherwise noted
- f. Waste Material Disposal
- g. Restraining gaskets or glands (as applicable)
- h. Pipe wrap
- i. Pipe Installation, disinfection, and Applicable Testing
- i. Trench cap surface restoration
- k. Installation of temporary fencing as needed, along with repair and/or replacement of fencing.

2.0 MEASUREMENT

Measurement of waterline shall be the actual number of linear feet of pipe water line installed by pipe joint type, and wrap type (if shown), which has been properly incorporated into the completed and accepted work. Quantities of pipe shall be verified in the field by the Owner or the Engineer. Pipe length shall be measured by horizontal

linear feet in place measured along the pipe center line with no deduction for fittings, valves, etc. Separate measurement items shall be made for each different size pipe.

3.0 PAYMENT

____" DUCTILE IRON WATER LINE.....LF

SP-105 THRU 107: DUCTILE IRON WATER LINE - FLOWABLE FILL BACKFILL

1.0 DESCRIPTION

Work associated with this line item shall consist of ductile iron water line according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006, in sizes as specified on plans. Price and payment shall constitute full compensation for furnishing all equipment, tools, labor and materials to complete the work as specified, including but not limited to the following items:

- a. Site Preparation
- b. Location of Existing Utilities
- c. Common Excavation, and Trench Backfilling with Backfill
- d. Dewatering of Excavated Areas
- e. Rock Excavation, unless otherwise noted
- f. Waste Material Disposal
- g. Restraining gaskets or glands (as applicable)
- h. Pipe wrap
- i. Pipe Installation, disinfection, and Applicable Testing
- j. Trench cap surface restoration
- k. Installation of temporary fencing as needed, along with repair and/or replacement of fencing.

Additional City Specifications:

1. Backfill shall consist of excavatable flowable fill according to NCDOT Specification Section 1000.

2.0 MEASUREMENT

Measurement of waterline shall be the actual number of linear feet of pipe water line installed by pipe joint type, and wrap type (if shown), which has been properly incorporated into the completed and accepted work. Quantities of pipe shall be verified in the field by the Owner or the Engineer. Pipe length shall be measured by horizontal linear feet in place measured along the pipe center line with no deduction for fittings, valves, etc. Separate measurement items shall be made for each different size pipe.

3.0 PAYMENT

" DUCTILE IRON WATER LINE – FLOWABLE FILL BACKFILL.....LF

SP-108 THRU 112: GATE VALVES AND BOXES:

1.0 DESCRIPTION

Work associated with this item shall include all costs related to construction of gate valves and boxes according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006, in sizes as specified on plans, including, but not limited to excavation, valve support pads, materials, valve box, installation, extension stems as directed by the Owner or Engineer, standard backfill and compaction, and site restoration.

2.0 MEASUREMENT

PAYMENT

Measurement will be made at the unit price bid for the actual number and size of valve installed and accepted. Quantities shall be verified in the field by the Owner or the Engineer.

" GATE VALVES AND BOXESEA

SP-113: GATE VALVES AND BOXES - FLOWBLE FILL BACKFILL

1.0 DESCRIPTION

3.0

Work associated with this item shall include all costs related to construction of gate valves and boxes according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006, in sizes as specified on plans, including, but not limited to excavation, valve support pads, materials, valve box, installation, extension stems as directed by the Owner or Engineer, backfill, and site restoration.

Additional City Specifications:

1. Backfill shall consist of excavatable flowable fill according to NCDOT Specification Section 1000.

2.0 MEASUREMENT

Measurement will be made at the unit price bid for the actual number and size of valve installed and accepted. Quantities shall be verified in the field by the Owner or the Engineer.

3.0	PAYMENT		
,,	GATE VALVES AND BOXES – F	FLOWABLE FILL	EA

SP-114: FIRE HYDRANT ASSEMBLY:

1.0 DESCRIPTION

Work associated with this item shall include all costs related to construction of fire hydrants according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006, including, but not limited to hydrant, hydrant extension, excavation, hydrant support pads, backfill and compaction, joint restraint, site restoration, and all related appurtenances.

2.0 MEASUREMENT

Measurement will be made based on the actual number of hydrants, complete with all appurtenances, installed and accepted. Quantities shall be verified in the field by the Owner or the Engineer.

3.0 PAYMENT

FIRE HYDRANT ASSEMBLY.....EA

SP-115: FIRE HYDRANT ASSEMBLY WITH TAPPING SLEEVE AND VALVE:

1.0 DESCRIPTION

Work associated with this item shall include all costs related to construction of fire hydrants according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006, including, but not limited to hydrant, hydrant extension, excavation, hydrant support pads, hydrant leg, valve box, precast concrete valve box protector, tapping sleeve and valve in lieu of hydrant tee, backfill and compaction, joint restraint and thrust blocking, site restoration, and all related appurtenances as shown on the Typical Fire Hydrant Assembly Detail.

2.0 MEASUREMENT

Measurement will be made based on the actual number of hydrants, complete with all appurtenances, installed and accepted. Quantities shall be verified in the field by the Owner or the Engineer.

3.0 PAYMENT

FIRE HYDRANT ASSEMBLY WITH TAPPING SLEEVE AND VALVE.....EA

SP-116: COMPACT DUCTILE IRON FITTINGS:

1.0 DESCRIPTION

Work associated with this item shall include all costs related to furnishing and installing compact ductile iron fittings of the type and size shown on the Plans according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006, including, but not limited to excavation, materials, installation including restrained retainer glands or deadmen as shown on the plans, backfill and compaction, and site restoration.

2.0 MEASUREMENT

Measurement will be made based on the actual number of pounds of compact ductile iron fittings installed and accepted. The contractor shall compute the number of pounds installed based upon the weight of each fitting. Weight basis shall be manufacturer's standard published information for weight of compact fittings. Weights shall be computed for each fitting excluding accessories, retainer glands and blocking.

3.0 PAYMENT

COMPACT DUCTILE IRON FITTINGS.....LB

SP-117 THRU 121: CONNECTION TO EXISTING WATER SYSTEM

1.0 DESCRIPTION

Work associated with this item shall include all costs related to furnishing and installing permanent connections to the existing water system according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006, including, but not limited to excavation, dewatering the existing water main between the connection and the nearest existing sectionalizing valves, removing the existing water main pipe plug, cutting and removing the section of existing water main piping, all pipe, fittings, adapters, connecting valve, and associated work in replacing the section of main which was removed or furnished, jointing materials including gaskets and bolts, temporary jumpers and appurtenances, and all other work required for installation of the connection complete, tested, and placed into satisfactory service, in accordance with the Contract Documents and plans.

This item shall also include any materials, labor, and costs associated with installation and removal of temporary connections to the existing water system required to maintain domestic and fire protection water service through various phases of project construction.

This item does not include connection of domestic or fire service lines.

2.0 MEASUREMENT

The quantity of permanent connections to existing water systems to be paid will be actual number and size of permanent connections installed as shown on the drawings,

with restrained sleeves and all appurtenances necessary to provide a complete and water tight connection to an existing water line as indicated on the drawings. Quantities shall be verified in the field by the Owner or the Engineer.

No separate measurement will be made for temporary connections to the existing water system in support of construction phasing.

3.0 PAYMENT

____ " CONNECTION TO EXISTING WATER SYSTEM......EA

SP-122: 4" METER VAULT:

1.0 DESCRIPTION

Work associated with this item shall include all costs related to furnishing and installing the vault, vault access doors, excavation, stone base, valves and piping inside the vault, pipe supports, drain piping, compacted backfill, and all related appurtenances as shown on the meter vault detail on the plans.

The meter shall be provided by the Owner.

2.0 MEASUREMENT

The quantity of 4" meter vaults to be paid will be the actual number of meter vaults, complete with all appurtenances, installed and accepted. Quantities shall be verified in the field by the Owner or the Engineer.

3.0 PAYMENT

4" METER VAULT.....EA

SP-123 & 124: WATER SERVICE TAP:

1.0 DESCRIPTION

Work associated with this item shall include all costs related to furnishing and installing permanent water service taps by tap size according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006 and includes water service taps and service gate valves where indicated on the drawings, excavation, tapping saddle, corporation stop, gate valve, valve box, and compacted backfill.

2.0 MEASUREMENT

Measurement of water service taps shall be the actual number and size of permanent water service taps installed which have been properly incorporated into the completed and accepted work. Separate measurement items shall be made for each different size. Quantities shall be verified in the field by the Owner or the Engineer.

3.0 PAYMENT

" WATER SERVICE TAP.....EA

SP-125 & 126: COPPER WATER SERVICE LINE:

1.0 DESCRIPTION

Work associated with this item shall include all costs related to furnishing and installing permanent Type K copper water service lines by size according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006 and includes all costs for excavation, Type K copper service line, fittings, transitions, connection to existing service line, removal of existing service line, and compacted backfill.

2.0 MEASUREMENT

Measurement of copper water service lines shall be the actual number of linear feet and size of permanent copper pipe water line installed which has been properly incorporated into the completed and accepted work. Pipe length shall be measured by horizontal linear feet in place measured along the pipe center line with no deduction for fittings, valves, etc. Separate measurement items shall be made for each different size pipe. Quantities shall be verified in the field by the Owner or the Engineer. No measurement will be made for temporary water service lines under this item.

3.0 PAYMENT

" COPPER WATER SERVICE LINE.....LF

SP-127: 2" WATER METER BOX

1.0 DESCRIPTION

Work associated with this item shall include all costs related to furnishing and installing water meter boxes according to Water and Sewer Authority of Cabarrus County Standard Specifications dated August 2006 and project drawings. This item includes all costs for the meter boxes, excavation, stone base, and all related appurtenances as shown on the meter box detail on the plans.

The meter and meter valve flange shall be provided by the Owner.

2.0 MEASUREMENT

The quantity of 2" water meter boxes to be paid will be the actual number of permanent meter boxes, complete with all appurtenances, installed and accepted. Quantities shall be verified in the field by the Owner or the Engineer. No measurement will be made for temporary water meter box installations under this item.

3.0 PAYMENT

2" WATER METER BOX.....EA

SP-128: 2" PRESSURE REDUCING VALVE IN METER BOX

1.0 DESCRIPTION

Work associated with this item shall include all costs related to furnishing and installing permanent 2" pressure reducing valves in meter boxes and includes meter boxes, excavation, stone base, pressure reducing valve, curb stop valve, and all related appurtenances as shown on the meter box detail on the plans.

2.0 MEASUREMENT

Measurement shall be made based on the actual number of permanent installations, complete with all appurtenances, installed and accepted. Quantities shall be verified in the field by the Owner or the Engineer. No measurement will be made for temporary pressure reducing valve installations under this item.

3.0 PAYMENT

2" PRESSURE REDUCING VALVE IN METER BOX.....EA

SP-129: 3/4" REDUCED PRESSURE BACKFLOW ASSEMBLY

1.0 DESCRIPTION

Work associated with this item shall include all costs related to furnishing and installing permanent 3/4" reduced pressure backflow assemblies, complete with all appurtenances and includes excavation, concrete base, fittings, supports, insulated enclosure, electrical wiring and conduit, heating source, and all related appurtenances as required by the drawings and specifications.

2.0 MEASUREMENT

Measurement shall be made based on the actual number of permanent installations, complete with all appurtenances, installed and accepted. Quantities shall be verified in the field by the Owner or the Engineer.

3.0 PAYMENT

3/4" REDUCED PRESSURE BACKFLOW ASSEMBLY.....EA

SP-130: AIR RELEASE VALVE

1.0 DESCRIPTION

Work associated with this item shall include all costs related to furnishing and installing permanent air release valve assemblies, complete with all appurtenances and includes excavation, corporation stop, tapping saddle, copper piping, meter box, gate valve, stone base, base, fittings, supports, backfill, and all related appurtenances as required by the drawings and specifications.

2.0 MEASUREMENT

Measurement shall be made based on the actual number of permanent installations, complete with all appurtenances, installed and accepted. Quantities shall be verified in the field by the Owner or the Engineer.

3.0 PAYMENT

AIR RELEASE VALVE.....EA

SP-131: TEMPORARY 2" WATER SERVICE

1.0 DESCRIPTION

Work associated with this item shall include all costs related to furnishing and installing temporary 2" water services including excavation, temporary Type K copper service line, tie-ins, fittings, transitions, meter boxes for temporary meter sets, compacted backfill, adjustments to previously installed temporary water services, and removal of previously installed temporary water services.

2.0 MEASUREMENT

Measurement shall be made based on the actual number of temporary services installed, complete with all appurtenances. The Contractor shall receive approval from the Owner prior to installing temporary water services. Quantities shall be verified in the field by the Owner or the Engineer.

3.0 PAYMENT

TEMPORARY 2" WATER SERVICE.....EA

SP-132 & 133: REMOVE AND ABATE EXISTING 8" ASBESTOS CEMENT WATER LINE:

1.0 DESCRIPTION

Work associated with this item shall include all costs related to removal, abatement, and disposal of existing asbestos cement water line, excavation, backfill by type (either

standard compacted backfill or flowable fill backfill), and all work and materials as required by the drawings and specifications.

Additional City Specifications:

1. Flowable fill backfill shall consist of excavatable flowable fill according to NCDOT Specification Section 1000.

Guidelines and Procedures

The Contractor shall follow the requirements in the "Abatement of Asbestos-Cement Piping Guidelines and Procedures" document included in the appendix.

The Contractor shall obtain approval from the Engineer prior to removing any section of AC pipe.

Final clearance testing (if needed) will be paid for by the City of Concord.

Additional Insurance Requirements for Asbestos Abatement Contractors/Subcontractors

In addition to the insurance requirements set forth in the Construction Contract, asbestos abatement contractors/subcontractors are required to provide additional insurance coverages as follows:

Asbestos Abatement Liability Insurance:

Asbestos abatement liability coverage including coverage for liability for bodily injury and property damage arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos containing materials with a limit of \$1,000,000 per accident; \$1,000,000 disease per employee; and \$1,000,000 disease policy limit, with a combined single limit of at least \$2,000,000 per occurrence.

The policy must be a claims-made policy and the coverage period shall be determined by the following formula: continuous coverage for life of the Contract, plus one (1) year (to provide coverage for the warranty period), with an extended discovery period for a minimum of five (5) years which shall not commence until the expiration of the longest warranty period(s).

Asbestos abatement liability insurance shall comply with the requirements in Section 8 of the Construction Contract, including listing the City as additional insured. Asbestos abatement liability insurance shall also include a Waiver of Subrogation in favor of the City of Concord.

2.0 MEASUREMENT

Measurement shall be made based on the actual number of linear feet removed and abated. Separate measurements will be made for standard compacted trench backfill

and flowable fill backfill. Quantities shall be verified in the field by the Owner or the Engineer.

3.0 PAYMENT

REMOVE AND ABATE EXIST. 8" AC WATER LINE.....LF

REMOVE AND ABATE EXIST. 8" AC WATER LINE – FLOWABLE FILL BACKFILL.....LF

SP-134: DEMO OF CONCRETE POLE BASES

1.0 DESCRIPTION

Work associated with this line item shall consist of the demolition of existing pole bases for light poles being replaced along Union Street, including any associated ground rods.

2.0 MEASUREMENT

Measurement shall be made based upon the actual number of pole bases demolished.

3.0 PAYMENT

DEMOLISHED LIGHT POLE BASES EA

SP-135: DEMO OF EXISTING CIRCUITS, HANDHOLES AND ELECTRICAL APPLIANCES

1.0 DESCRIPTION

Work associated with this line item shall consist of the demolition of all electrical circuits and electrical appliances located on Union Street and Barbrick Avenue as shown on the drawings. This shall include demolition of existing feeder and branch circuits including wiring and conduit; demolition of existing electrical handholes; demolition of existing wiring appliances, and tree lighting circuits, etc.

2.0 MEASUREMENT

There will be no separate measurement made for demolition of existing circuits, handholes, and electrical appliances.

3.0 PAYMENT

DEMOLISHED CIRCUITS, HANDHOLES AND ELECTRICAL APPLIANCES LS

SP-136: INSTALLATION OF LIGHT POLES, TYPE A

1.0 DESCRIPTION

Work associated with this line item shall include the installation of Type 'A' light poles (light poles provided by others). This scope shall include installation only and shall not include connecting power and communication circuits.

2.0 MEASUREMENT

Measurement shall be made based upon the actual number of Type A light poles installed.

3.0 PAYMENT

TYPE A LIGHT POLE INSTALLATION EA

SP-137: INSTALLATION OF LIGHT POLES, TYPE B

1.0 DESCRIPTION

Work associated with this line item shall include the installation of Type 'B' light poles (light poles provided by others). This scope shall include installation only and shall not include connecting power and communication circuits.

2.0 MEASUREMENT

Measurement shall be made based upon the actual number of Type B light poles installed.

3.0 PAYMENT

TYPE B LIGHT POLE INSTALLATION EA

SP-138: WIRING DEVICES AND APPLIANCES

1.0 DESCRIPTION

Work associated with this line item shall include the procurement and installation of all wiring devices including vendor receptacles, tree lighting receptacles, special outlets, up-light fixtures, and heat tracing shown on plans, including all appurtenances required for complete installation.

2.0 MEASUREMENT

There will be no separate measurement made for this line item.

3.0 PAYMENT

WIRING DEVICES INSTALLATIONLS

SP-139: LIGHTED BOLLARDS

1.0 DESCRIPTION

Work associated with this line item shall include the procurement and installation of lighted bollards, including all appurtenances required for complete installation.

2.0 MEASUREMENT

Measurement shall be made based upon the actual number of Lighted Bollards installed.

3.0 PAYMENT

LIGHTED BOLLARD INSTALLATION EA

SP-140: EXOTHERMIC WELD

1.0 DESCRIPTION

Work associated with this line item shall include the exothermic weld connections of all grounding electrode conductors to all grounding electrodes including all listed appurtenances and components required.

2.0 MEASUREMENT

Measurement shall be made based upon the actual number of ground rods welded to grounding electrode conductors.

3.0 PAYMENT

WELDED GROUND RODS EA

SP-141: INTELLIGENT LIGHTING PANELS

1.0 DESCRIPTION

Work associated with this line item shall include the procurement and installation of intelligent lighting panels including service feeder conductors and conduit from the utility transformer or meter base to the panel. This scope shall also include all branch circuit

breakers and all appurtenances required for the installation and operation of the panel. This scope shall also include the procurement and installation of surge protective devices (SPD) for each panel.

2.0 MEASUREMENT

Measurement shall be made based upon the actual number of Intelligent Lighting Panels installed.

3.0 PAYMENT

INTELLIGENT LIGHTING PANELS EA

SP-142: NO. 12 AWG COPPER WIRING

1.0 DESCRIPTION

Work associated with this line item shall include the procurement and installation in conduit of all No. 12 AWG copper wire for designated branch circuits as shown on plans. This shall include all required terminations at electrical components for a complete and working electrical circuit.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

NO. 12 AWG WIRE INSTALLATIONLF

SP-143: NO. 10 AWG COPPER WIRING

1.0 DESCRIPTION

Work associated with this line item shall include the procurement and installation in conduit of all No. 10 AWG copper wire for designated branch circuits as shown on plans. This shall include all required terminations at electrical components for a complete and working electrical circuit.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

NO.10 AWG WIRE INSTALLATIONLF

SP-144: NO. 8 AWG COPPER WIRING

1.0 DESCRIPTION

Work associated with this line item shall include the procurement and installation in conduit of all No. 8 AWG copper wire for designated branch circuits as shown on plans. This shall include all required terminations at electrical components for a complete and working electrical circuit.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

NO. 8 AWG WIRE INSTALLATIONLF

SP-145: NO. 6 AWG COPPER WIRING

1.0 DESCRIPTION

Work associated with this line item shall include the procurement and installation in conduit of all No. 6 AWG copper wire for designated branch circuits as shown on plans. This shall include all required terminations at electrical components for a complete and working electrical circuit.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

NO. 6 AWG WIRE INSTALLATIONLF

SP-146: RGS CONDUIT 1" TRADE SIZE

1.0 DESCRIPTION

Work associated with this line item shall include the procurement and installation of 1" RGS conduit as shown on the plans. This shall include all conduit fixtures, supports, and appliances required for the installation of conduit per plans and specifications. This shall include nylon pull cable in all installed conduit.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

RGS CONDUIT 1" INSTALLATIONLF

SP-147: PVC SCHEDULE 40 CONDUIT 1" TRADE SIZE

1.0 DESCRIPTION

Work associated with this line item shall include the procurement and installation of 1" PVC Schedule 40 conduit as shown on the plans. This shall include all conduit fixtures, supports, and appliances required for the installation of conduit per plans and specifications. This shall include nylon pull cable in all installed conduit.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

PVC SCHEDULE 40 1" INSTALLATIONLF

SP-148: PVC SCHEDULE 40 CONDUIT 2" TRADE SIZE

1.0 DESCRIPTION

Work associated with this line item shall include the procurement and installation of 2" PVC Schedule 40 conduit as shown on the plans. This shall include all conduit fixtures, supports, and appliances required for the installation of conduit per plans and specifications. This shall include nylon pull cable in all installed conduit.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

PVC SCHEDULE 40 2" INSTALLATIONLF

SP-149: PVC SCHEDULE 40 CONDUIT 4" TRADE SIZE

1.0 DESCRIPTION

Work associated with this line item shall include the procurement and installation of 4" PVC Schedule 40 conduit as shown on the plans. This shall include all conduit fixtures, supports, and appliances required for the installation of conduit per plans and specifications. This shall include nylon pull cable in all installed conduit.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

PVC SCHEDULE 40 4" INSTALLATIONLF

SP-150: TRENCHING

1.0 DESCRIPTION

Work associated with this line item shall include all required trenching for the installation of ductbanks including ductbanks located beneath sidewalks and ductbanks located within roadways. This scope of work shall also include the procurement of all required equipment and the backfill of all trenches. Repair of all roadway crossings shall be repaired all the way back to the current top asphalt surface at the time of trenching including but not limited to suitable compacted backfill and base and surface asphalt as applicable.

2.0 MEASUREMENT

Measurement shall be made along the top surface.

3.0 PAYMENT

ELECTRICAL TRENCHINGLF

SP-151: ANNOUNCEMENT KIOSK

1.0 DESCRIPTION

Work associated with this line item shall include the procurement and installation of the announcement kiosk together with all required supports, anchors, and appurtenances required for complete installation.

2.0 MEASUREMENT

Measurement shall be made based upon the complete installation of the Announcement Kiosk.

3.0 PAYMENT

ANNOUNCEMENT KIOSK INSTALLATION EA

SP-152: LIGHT POLE BASE

1.0 DESCRIPTION

Work associated with this line item shall include the procurement and installation of all light pole bases, including all appurtenances required for complete installation.

2.0 MEASUREMENT

Measurement shall be made based upon the actual number of light pole bases installed.

3.0 PAYMENT

LIGHT POLE BASE INSTALLATION EA

SP-153: GROUND RODS

1.0 DESCRIPTION

Work associated with this line item shall include the procurement and installation of grounding electrode rods for service entrance grounding, light pole grounding, and grounding of manholes, including all appurtenances and equipment required for complete installation.

2.0 MEASUREMENT

Measurement shall be made based upon the actual number of ground rods installed.

3.0 PAYMENT

GROUND ROD INSTALLATION EA

SP-154: ELECTRICAL HAND HOLES

1.0 DESCRIPTION

Work associated with this line item shall include the procurement and installation of all electrical hand holes as shown on plans, including all appurtenances required for complete installation.

2.0 MEASUREMENT

Measurement shall be made based upon the actual number of hand holes installed. 3.0 **PAYMENT** HAND HOLE INSTALLATION EA SP-155: COMMUNICATION MANHOLES 1.0 **DESCRIPTION** Work associated with this line item shall include the procurement and installation of communication manholes as shown on the plans, including all appurtenances required for complete installation. 2.0 **MEASUREMENT** Measurement shall be made based upon the actual number of manholes installed. 3.0 **PAYMENT** MANHOLE INSTALLATION EA **SP-156: FIBEROPTIC CABLE** 1.0 DESCRIPTION Work associated with this line item shall include the procurement and installation of all fiberoptic cable in conduit, including termination, and including all appurtenances and appliances required for complete installation. 2.0 MEASUREMENT Measurement shall be made along the top surface. 3.0 **PAYMENT** FIBEROPTIC CABLE INSTALLATIONLF SP-157: SERVICE PANEL ENCLOSURE AND CONCRETE PAD

1.0

DESCRIPTION

Work associated with this line item shall include the procurement and installation of the NEMA rated enclosure for housing service entrance panel LP-A, concrete housekeeping pad and all appurtenances required for complete installation.

2.0 MEASUREMENT

Measurement shall be made based upon the complete installation of Service Panel Enclosure.

3.0 PAYMENT

SERVICE PANEL ENCLOSURE INSTALLATION EA

SP-158: GROUNDING ELECTRODE CONDUCTORS

1.0 DESCRIPTION

Work associated with this line item shall include the procurement and installation of all grounding electrode conductors or jumpers for grounding of the service entrance, light poles, and manholes, including all appurtenances required for complete installation.

2.0 MEASUREMENT

There will be no separate measurement made for this line item.

3.0 PAYMENT

GROUNDING ELECTRODE CONDUCTORS INSTALLATIONLS

SP-159: PANELBOARD LP-B2

1.0 DESCRIPTION

Work associated with this line item shall include the procurement and installation of panel LP-B2, including all appurtenances required for complete installation. Also included are all integral circuit breakers and electrical components as well as the connection of all branch or feeder circuits within the panel.

2.0 MEASUREMENT

Measurement shall be made based upon the complete installation of Panel LP-B2.

3.0 PAYMENT

PANEL LP-B2 INSTALLATION EA

SP-160: TEMPORARY LIGHTING

1.0 DESCRIPTION

Work associated with this line item shall include the procurement and operation of temporary lighting fixtures for use on Union Street. This scope shall also include the cost of generators and fuel, when necessary, for the recharging of battery stations. This scope shall also include the relocation of said lighting fixtures when required to meet the temporary lighting needs of the city whenever permanent light fixtures along Union Street are out of service. This scope covers temporary lighting requirements for the duration of the project. The scope of work in this line item shall be considered complete when temporary lighting is no longer required as agreed upon by the owner and engineer.

2.0 MEASUREMENT

There will be no separate measurement made for this line item.

3.0 PAYMENT

TEMPORARY LIGHTINGL	LS
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END OF SECTION

NOTICE OF AWARD

TO:				
FROM:	City of Concord City Co P.O. Box 308 35 Cabarrus Ave. W Concord, North Carolina			
PROJECT:	Union Street Improve Project No. 2020-00		ociates P	Project #19.01726)
	reby notified that the bid su 's Invitation to Bid dated			bove-named project in response to the City nount of
and	d ZERO /100 DOLLARS			
(\$) has been accepted.			
You are her to furnish a	reby required to execute the	nd(s), Certificate	of Insur	with the City of Concord City Council and rance and Power of Attorney(s) along with ty of Concord.
to the work be entitled to to award the	within ten (10) days from to consider all your rights a	the date of deliver rising out of the	ery of thi Owner's	ad any other required documents pertaining is NOTICE OF AWARD, said Owner will sacceptance of your bid as abandoned and e-bid the work or otherwise dispose thereof
Dated this	the day of	, 2021		
City of Con	cord, North Carolina		CONT	TRACTOR
By:		_	By:	
Title: De	puty City Engineer			Title:
			ACCEP	PTANCE OF NOTICE OF AWARD
Receipt of t	he above NOTICE OF AW	'ARD is hereby	acknowle	edged this the day of,

NOTICE TO PROCEED

TO:	
FROM:	City of Concord City Council (OWNER) P.O. Box 308
	35 Cabarrus Ave. W
	Concord, North Carolina 28026-0308
PROJECT:	Union Street Improvements Project No. 2020-009 (Mcgill Associates Project #19.01726)
Contract Am	ount:and/100 DOLLARS
(\$).
of your Cert	by notified to commence work on or before the day of, 20, pending acceptance ificate of Insurance and any other required documents, and are to fully complete the work by of, 20
set forth in	final completion date is therefore the day of, 20, and as the above named project's schedule unless an extension is granted by the City of Concording in writing.
	City of Concord, North Carolina
	By:
	Title: City Manager
	Dated this the day of . 20 .

STANDARD FORM CONSTRUCTION CONTRACT

This contract (together with	all exhibits and valid amendme	nts, the "Agreement" or the "Contract") is made
and entered into as of the day	of, 20_	, by the City of CONCORD ("City") and
("Co	entractor"), () a corporation, () a professional corporation, () a professional
association, () a limited partnership,	() a sole proprietorship, or () a general partnership; organized and existing
under the laws of the State of		

Sec. 1. Background and Purpose.

The **Union Street Improvements** project consists of streetscape improvements from the intersection of Union Street and Killarney Avenue to the intersection of Union Street and Foard Ave and along Barbrick Ave. Work includes but is not limited to removal of existing asphalt, concrete, curbing, water line and sewer line improvements, storm drainage, the installation of concrete sidewalk with brick bands and accents, concrete curbing, seat walls, pavers, fencing, site furnishings, landscaping, street lighting, electrical, irrigation, soil cells, signage, and asphalt paving.

Sec. 2. <u>Services and Scope to be Performed.</u> The Contractor shall provide the services at the charges set forth either in this paragraph or in Exhibit "A". Additional exhibits may be used to further define this Agreement when the Contractor and City so agree. Any additional exhibits shall be designated as exhibits to the Agreement with capitalized, sequential letters of the alphabet, shall be attached hereto and incorporated herein by reference as if the same were fully recited, and shall become terms of this Agreement upon execution by both parties.

In this Contract, "services" means the services that the Contractor is required to perform pursuant to this Contract and all of the Contractor's duties to the City that arise out of this Contract. Any amendments, corrections, or change orders by either party must be made in writing signed in the same manner as the original. (This form may be used for amendments and change orders.) The City reserves the right to refuse payment for any work outside that authorized herein or pursuant to a duly approved amendment or change order.

- **Sec. 3.** <u>Complete Work without Extra Cost</u>. Unless otherwise provided, the Contractor shall obtain and provide, without additional cost to the City, all labor, materials, equipment, transportation, facilities, services, permits, and licenses necessary to perform the Work.
- **Sec. 4.** Compensation. The City shall pay the Contractor for the Work as described in this paragraph below OR as described in Exhibit "A" attached. In the event of a conflict, the provisions of this paragraph shall control. Any additional expenses or charges shall only be paid after both the City and the Contractor agree to and execute a written change order. The City shall not be obligated to pay the Contractor any fees, payments, expenses or compensation other than those authorized in this Contract or in a duly-approved change order. All payments shall be deemed inclusive of tax and other obligations.
- **Sec. 4a.** Retainage. The City shall withhold no retainage on Contracts having a "total project cost" of less than \$100,000.00. The City may withhold retainage on contracts having a total project cost between \$100,000 and \$200,000. The City shall withhold retainage on contracts whose total project cost exceeds \$300,000. When withheld, retainage shall equal no more than five percent of each progress payment. When the project is fifty per cent complete, the City shall not retain anything from future project payments provided that (i) the surety concurs in writing, (ii) the Contractor continues to perform satisfactorily, (iii) any non-conforming work identified in writing by the architect, engineer(s) or City has been corrected by the Contractor and accepted by the architect, engineer(s) or City. However, if the City determines that the Contractor's performance is unsatisfactory, the City may withhold up to five percent retainage from each project payment. The City may withhold additional amounts above five percent for unsatisfactory job progress, defective construction not remedied, disputed work, third party claims filed against the owner or reasonable evidence that a third-party claim will be filed.

Definitions:

"Total Project Cost": Total value of the Contract and any approved change orders or amendments.

"<u>Project is Fifty Percent Complete</u>": When the Contractor's validly-issued gross project invoices (excluding the value of the materials stored off-site) equal or exceed fifty percent of the value of the Contract, except that the value of materials stored on-site shall not exceed twenty percent of the Contractor's gross project invoices for the purpose of determining whether the project is fifty percent complete.

Sec. 5. Term. The Contractor shall commence work within ten (10) days of the date of its receipt of written Notice to Proceed from the City. The date that is ten (10) days from the date of the Contractor's receipt of the Notice to Proceed shall be the "Commencement Date." All work as set forth in the Scope of Services in Exhibit "A" shall be completed within five hundred (540) calendar days of the Commencement Date. The date that is five hundred (540) calendar days from the Commencement Date shall be the "Completion Date." Time is of the essence with regard to this Project. If Contractor's obligations are not completed by the Completion Date, the City reserves the right to nullify this Agreement, order the Contractor to immediately cease all work under this Agreement and vacate the premises, and to seek professional services equivalent to those outlined in Exhibit "A." The Contractor shall be held accountable for all damages incurred by the City as a consequence of the missed Completion Date. The exercise of any of these rights by the City shall not be interpreted to prejudice any other rights the City may have under this Agreement or in law or equity. This Contract shall not be automatically extended unless agreed to in writing by the City or as provided in Exhibit "A".

Sec. 6. Contractor's Billings to City. Payments will be made in accordance with the schedule found in this section below OR attached at Exhibit "A". Contractor shall submit an original pay request (invoice) to the City Purchasing Agent by the first of each month in order to expedite payment. Upon receipt of the request the City Purchasing Agent shall verify the amounts and if correct forward the request to the Accounts Receivable Division of the Finance Dept. Final payment on the Contract shall be made in 45 days, except in the case of retainage. Within 60 days after the submission of the final pay request, the City (with the written consent of the surety) shall release to the Contractor all retainage payments IF the City receives a certificate of substantial completion from the architect, engineer or designer-in-charge of the project OR the City receives beneficial occupancy and use of the project. In either case, the City may retain up to 2.5 times the estimated value of the work to be completed or corrected.

Sec. 7. <u>Insurance</u>. Contractor shall maintain and cause all sub-contractors to maintain insurance policies at all times with minimum limits as follows:

<u>Coverage</u> Workers' Compensation	\$500,0	Minimum Limits \$500,000 each accident, \$500,000 bodily injury by disease each employee, \$500,000 bodily injury by disease policy limit		
General Liability	\$1,000	\$1,000,000 per occurrence regardless of the contract size		
Automobile Liability	\$1,000,000 per occurrence regardless of the contract size			
Umbrella		\$1,000,000 per occurrence if contract does not exceed 180 days; otherwise,		
	\boxtimes	\$2,000,000 per occurrence		

Contractor shall provide a Certificate of Insurance to the City listing the City as an additional insured. Such Certificate shall be in a form acceptable to the City.

Sec. 8. Documentation Requirements:

A. Contractor shall provide the City with a **Certificate of Insurance** for review prior to the issuance of any contract or Purchase Order. Certificates of insurance must be submitted on an Acord Form (revised 2010/05), and the City must be named as additional insured on all lines of coverage, except for Professional liability and Workers' Compensation. Contractor shall provide a Certificate of Insurance to the City listing the City as additional insured as required by written contract. The General Liability, Automobile Liability and Workers Compensation policies include a Waiver of Subrogation in favor of the City of Concord. The Umbrella Policy shall follow the form of the

General Liability and Automobile Liability Policies. All Certificates of Insurance will require written notice by the insurer or Contractor's agent in the event of cancellation, reduction or other modifications of coverage by the insurer. Such notice shall be not less than 30 days for nonrenewal by the insurer, not less than 10 days for cancellation due to nonpayment of the premium and as soon as possible for all other types of modifications. In addition to the notice requirement above, Contractor shall provide the City with written notice of cancellation, reduction, or other modification of coverage of insurance whether instigated by the insurer or by the Contractor immediately upon Contractor's receipt of knowledge of such modifications. Upon failure of the Contractor to provide such notice, Contractor assumes sole responsibility for all loses incurred by the City for which insurance would have provided coverage. The insurance certificate shall be for the insured period in which the initial contract period begins and shall be renewed by the Contractor for each subsequent renewal period of the insurance for so long as the contract remains in effect.

The City shall be named as an **additional insured** on all policies except Workers' Compensation and professional liability and it is required that coverage be placed with "A" rated insurance companies acceptable to the City. Statement should read, "City of Concord is added as an additional insured as evidenced by an endorsement attached to this certificate." Failure to maintain the required insurance in force may be cause for termination of this Agreement. In the event that the Contractor fails to maintain and keep in force the insurance herein required, the City has the right to cancel and terminate the Agreement without notice.

Without limiting the coverage required pursuant to this Agreement, Contractor shall provide Workers' Compensation insurance if it employs three or more employees. The Worker's Compensation insurance shall have the North Carolina mandated statutory limits. Contractor shall fully comply with all applicable laws including, but not limited to, North Carolina's Workers' Compensation Act (Chapter 97 of the NC General Statutes).

B. Contractor shall provide a completed W-9 form to the City prior to execution by the City of this Agreement.

Sec. 9. Performance of Work by Contractor.

- (a) The Contractor warrants that all work performed under this Contract conforms to the Contract requirements and is free of any defect in equipment, material, or design furnished, or workmanship performed by the Contractor or any subcontractor or supplier at any tier. This warranty shall continue for a period of 1 year from the date of issuance by the City of written final completion of the work.
- (b) The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to City owned or controlled real or personal property, when that damage is the result of--
 - (1) The Contractor's failure to conform to contract requirements; or
 - (2) Any defect of equipment, material, workmanship, or design furnished.
- (c) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.
- (d) The City shall notify the Contractor, in writing, within a reasonable time, not to exceed 30 days, after the discovery of any failure, defect, or damage.
- (e) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time, not to exceed 30 days unless otherwise agreed in writing and signed by the City Manager or his designee, after receipt of notice, the City shall have the right to replace repair, or otherwise remedy the failure, defect, or damage at the Contractor s expense.

- (f) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this Contract, the Contractor shall--
 - (1) Obtain all warranties that would be given in normal commercial practice,
 - (2) Require all warranties to be executed, in writing, for the benefit of the City, if directed to do so by the City; and
 - (3) Enforce all warranties for the benefit of the City, if directed to do so by the City
- (g) In the event the Contractor's warranty has expired, the City may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.
- (h) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the City nor for the repair of any damage that results from any defect in City-furnished material or design.
- Sec. 10. Performance of Work by City. If the Contractor fails to perform the Work in accordance with the schedule referred to in Exhibit "A", the City may, in its discretion, perform or cause to be performed some or all of the Work, and doing so shall not waive any of the City's rights and remedies. Before doing so, the City shall give the Contractor reasonable notice of its intention. The Contractor shall reimburse the City for all costs incurred by the City in exercising its right to perform or cause to be performed some or all of the Work pursuant to this section.
- **Sec. 11.** Attachments. Additional exhibits may be used to further define this Agreement when the Contractor and City so agree. Any additional exhibits shall be designated as exhibits to the Agreement with capitalized, sequential letters of the alphabet, shall be attached hereto and incorporated herein by reference as if the same were fully recited, and shall become terms of this Agreement upon execution by both parties.

The following attachments are made a part of this Contract and incorporated herein by reference:

- (a) Exhibit "A" Bid Form
- (b) Exhibit "B" Standard Form of Performance Bond
- (c) Exhibit "C" Special Provisions
- (d) Exhibit "D" Contractor must execute the Affidavit attached as Exhibit "D", attesting to compliance with state and federal laws related to E-Verify. *This requirement only applies to contracts that fall within the formal bidding range.
- (e) Exhibit "E" Tax Form(s).
- (f) Exhibit "F" Certificate of Insurance.
- (g) Exhibit "G" Drawings

In case of conflict between an attachment and the text of this contract excluding the attachment, the text of this contract shall control. Any attachment that materially alters the standard terms contained herein must be reviewed by the City Attorney and approved by the City in writing.

Sec. 12. <u>Notice.</u> (a) All notices and other communications required or permitted by this Contract shall be in writing and shall be given either by personal delivery, fax, or certified United States mail, return receipt requested, addressed as follows:

To the City: To the Contractor:

Sue Hyde, Director of Engineering VaLerie Kolczynski, Esq.

City of Concord City Attorney
P.O. Box 308 PO Box 308
Concord, NC 28026 Concord, NC 28026

Fax Number: (704) 786-4521 Fax Number: (704) 784-1791

(b) <u>Change of Address, Date Notice Deemed Given:</u> A change of address, fax number, or person to receive notice may be made by either party by notice given to the other party. Any notice or

other communication under this Contract shall be deemed given at the time of actual delivery, if it is personally delivered or sent by fax. If the notice or other communication is sent by US Mail, it shall be deemed given upon the third calendar day following the day on which such notice or other communication is deposited with the US Postal Service or upon actual delivery, whichever first occurs.

Sec. 13. <u>Indemnification.</u> To the maximum extent allowed by law, the Contractor shall defend, indemnify, and save harmless the City of Concord, its agents, officers, and employees, from and against all charges that arise in any manner from, in connection with, or out of this Contract as a result of the acts or omissions of the Contractor or subcontractors or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable except for damage or injury caused solely by the negligence of the City its agents, officers, or employees. In performing its duties under this section, the Contractor shall at its sole expense defend the City of Concord, its agents, officers, and employees with legal counsel reasonably acceptable to City. As used in this subsection – "Charges" means claims, judgments, costs, damages, losses, demands, liabilities, duties, obligations, fines, penalties, royalties, settlements, expenses, interest, reasonable attorney's fees, and amounts for alleged violations of sedimentation pollution, erosion control, pollution, or other environmental laws, regulations, ordinances, rules, or orders. Nothing in this section shall affect any warranties in favor of the City that are otherwise provided in or arise out of this Contract. This section is in addition to and shall be construed separately from any other indemnification provisions that may be in this Contract. This section shall remain in force despite termination of this Contract (whether by expiration of the term or otherwise) and termination of the services of the Contract under this Contract.

Sec. 14. Corporate Status. If the Contractor is dissolved or suspended and the Contractor does not notify the City of such dissolution within three (3) business days from date of dissolution or suspension, and/or the corporate status is not reinstated within thirty (30) days, this Contract, at the sole option of the City and without prejudice to City's other remedies, shall be declared null and void or the Contractor shall execute a new contract showing the Contractor's correct legal entity.

Sec. 15. Miscellaneous.

- (a) <u>Choice of Law and Forum</u>. This Contract shall be deemed made in Cabarrus County, North Carolina. This Contract shall be governed by and construed in accordance with the laws of North Carolina. The exclusive forum and venue for all actions arising out of this Contract shall be the appropriate division of the North Carolina General Court of Justice, in Cabarrus County. Such actions shall neither be commenced in nor removed to federal court. This section shall not apply to subsequent actions to enforce a judgment entered in actions heard pursuant to this section.
- (b) <u>Waiver</u>. No action or failure to act by the City shall constitute a waiver of any of its rights or remedies that arise out this Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.
- (c) <u>Performance of Government Functions.</u> Nothing contained in this Contract shall be deemed or construed so as to in any way estop, limit, or impair the City from exercising or performing any regulatory, policing, legislative, governmental, or other powers or functions.
- (d) <u>Severability.</u> If any provision of this Contract shall be unenforceable, the remainder of this Contract shall be enforceable to the extent permitted by law.
- (e) <u>Assignment, Successors and Assigns.</u> Without the City's written consent, the Contractor shall not assign (which includes to delegate) any of its rights (including the right to payment) or duties that arise out this Contract. Unless the City otherwise agrees in writing, the Contractor and all assigns shall be subject to all of the City's defenses and shall be liable for all of the Contractor's duties that arise out of this Contract and all of the City's claims that arise out of this Contract. Without granting the Contractor the right to assign, it is agreed that the duties of the Contractor that arise out of this Contract shall be binding upon it and its heirs, personal representatives, successors, and assigns.
- (f) Compliance with Law. In performing all of the Work, the Contractor shall comply with all applicable law. Without limitation, Contractor shall comply with the requirements of Article 2, Chapter 64 (Verification of Work Authorization) of the North Carolina General Statutes relating to E-Verify. Further, if Contractor utilizes a subcontractor, Contractor shall require the subcontractor to comply with the requirements of Article 2 of Chapter 64 of the General Statutes. Pursuant to the requirements of the Iran Divestment Act, N.C.G.S. § 143C-6A-1, et. seq., Contractor certifies that that as of the Effective Date of this Agreement, Contractor is not on the Final Divestment List as created by the State Treasurer in compliance with N.C.G.S. § 143-6A-4 and located at www.nctreasurer.com/Iran. Furthermore, Contractor agrees that it will not enter into any subcontracts for the performance of this Agreement with any entity on the Final Divestment List.
- (g) <u>City Policy.</u> THE CITY OPPOSES DISCRIMINATION ON THE BASIS OF RACE AND SEX AND URGES ALL OF ITS CONTRACTORS TO PROVIDE A FAIR OPPORTUNITY FOR MINORITIES AND

WOMEN TO PARTICIPATE IN THEIR WORK FORCE AND AS SUBCONTRACTORS AND VENDORS UNDER CITY CONTRACTS.

- (h) <u>EEO Provisions.</u> During the performance of this Contract the Contractor agrees as follows: (1) The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, political affiliation or belief, age, or disability. The Contractor shall take affirmative action to insure that applicants are employed and that employees are treated equally during employment, without regard to race, color, religion, sex, national origin, political affiliation or belief, age, or disability. The Contractor shall post in conspicuous places available to employees and applicants for employment, notices setting forth these EEO provisions. (2) The Contractor in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, political affiliation or belief, age, or disability.
- (i) No Third Party Right Created. This Contract is intended for the benefit of the City and the Contractor and not any other person.
- (j) <u>Principles of Interpretation.</u> In this Contract, unless the context requires otherwise the singular includes the plural and the plural the singular. The pronouns "it" and "its" include the masculine and feminine. Reference to statutes or regulations include all statutory or regulatory provisions consolidating, amending, or replacing the statute or regulation. References to contracts and agreements shall be deemed to include all amendments to them. The word "person" includes natural persons, firms, companies associations, partnerships, trusts, corporations, governmental agencies and units, and any other legal entities.
- (k) <u>Modifications, Entire Agreement.</u> A modification of this Contract is not valid unless signed by both parties and otherwise in accordance with requirements of law. Further, a modification is not enforceable against the City unless the City Manager or other duly authorized official signs it for the City. This Contract contains the entire agreement between the parties pertaining to the subject matter of this Contract. With respect to that subject matter, there are no promises, agreements, conditions, inducements, warranties, or understandings, written or oral, expressed or implied, between the parties, other than as set forth or referenced in this Contract.
- (l) <u>Corporate Seal.</u> If a corporate seal is included by any party to this Contract, it is only for authentication purposes. This Contract is not signed under seal.
- (m) <u>No Employment Relationship</u>. For all matters relating to this Agreement, Contractor shall be deemed an Independent Contractor. Nothing in this Agreement shall be construed in such a manner as to create an employee-employer relationship between City and Contractor.

(The following section applies to construction contracts only if amount is over \$50,000)

- **Sec. 16. Bonding.** Both performance and payment bonds for the full amount of this Contract are required to be attached. Instead of bonds, you may submit a deposit of money, certified check or government securities for the full amount of the Contract. The performance bond shall have a value equal to 100% of this Contract. This bond shall be conditioned upon faithful performance of the Contract in accordance with the plans, specifications and conditions of the Contract. The performance bond shall be solely for the protection of the City. The payment bond shall be in an amount equal to 100% of the Contract, and conditioned upon the prompt payment for all labor or materials for which a contractor or subcontractor is liable. The payment bond shall be solely for the protection of the persons furnishing materials or performance labor for which a contractor or subcontractor is liable.
- Sec. 17. <u>Dispute Resolution</u>. It is understood and agreed that NCGS 143-128(f1-g) requires that disputes arising under an agreement for the erection, construction, alteration or repair of a building be subject to a dispute resolution process specified by the City. The amount in controversy shall be at least \$15,000.00 before this dispute resolution procedure may be used. In compliance with this statutory provision, the City specifies this Section as the dispute resolution process to be used on this Project. It is further understood and agreed that this dispute resolution process is based on non-binding mediation and will only be effective to the extent that the Parties to any mediated dispute participate in the mediation in good faith. It is also understood and agreed that the City is under no obligation under any circumstance to secure or enforce the participation of any other Party in the mediation of any dispute subject to this Section and NCGS 143-128(f1-g).

This Section 17 does not apply to:

- (a) The purchase and erection of prefabricated or relocatable buildings or portions of such buildings, except that portion of the work that must be performed at the construction site: or
- (b) The erection, construction alteration or repair of a building when the cost of such

building is \$300,000 or less.

- 17.1 Any dispute arising between or among the Parties listed in Section 17.3 that arises from an agreement to construct the Project, including without limitation a breach of such agreement, shall be subject to non-binding mediation administered by the American Arbitration Association under its Construction Industry Mediation Rules ("Rules"), except as otherwise expressly set forth in this Section. To the extent any provision of the Rules is inconsistent with the provisions of this Section, the provisions of this Section shall control. The mediation provided in this Section shall be used pursuant to this Agreement and NCGS 143-128(f1-g) and is in lieu of any dispute resolution process adopted by the North Carolina State Building Commission, which process shall not apply to this Project.
 - 17.2 For purposes of this Section the following definitions shall apply:
 - a. Agreement to construct the Project means an agreement to construct the Project that is subject to the requirements of NCGS 143-128 and does not include any agreement related to the Project that is not subject to said statute.
 - b. Construct or construction refers to and includes the erection, construction, alteration or repair of the Project.
 - c. *Party* or *Parties* refers to the parties listed in Section 16.4.
 - d. *Project* means the building to be erected, constructed, altered or repaired pursuant to this Agreement.
 - 17.3 The City and any Party contracting with the City or with any first-tier or lower-tier subcontractor for the construction of the Project agree to participate in good faith in any mediation of a dispute subject to this Section and NCGS 143-128(f1-g), including without limitation the following Parties (if any): architect(s), engineer(s), surveyor(s), construction manager, construction manager at risk, prime contractor(s), surety(ies), subcontractor(s), and supplier(s).
 - 17.4 In order to facilitate compliance with NCGS 143-128(f1-g), the Contractor and all other Parties shall include this Section 17 in every agreement to which it (any of them) is a Party for the construction of the Project without variation or exception. Failure to do so will constitute a breach of this Agreement, and the Contractor or other Party failing to include this Section in any agreement required by this Section shall indemnify and hold harmless the remaining Parties from and against any and all claims, including without limitation reasonable attorney fees and other costs of litigation, arising in any manner from such breach. Notwithstanding the foregoing provisions of this Section, it is expressly understood and agreed that the Parties are intended to be and shall be third-party beneficiaries of the provisions of this Section and can enforce the provisions hereof.
 - 17.5 The following disputes are not subject to mediation: (i) a dispute seeking a non-monetary recovery; and (ii) a dispute seeking a monetary recovery of \$15,000 or less.
 - 17.6 A dispute seeking the extension of any time limit set forth in an agreement to construct the Project shall be subject to mediation pursuant to this Section and NCGS 143-128(f1-g), but only if the damages which would be suffered by the Party seeking the extension would exceed \$15,000 if the disputed extension is denied. To the extent that liquidated damages are set forth in such agreement as the measurement of damages for failure by such Party to meet such time limit, such liquidated damages shall be the exclusive standard for determining the amount of damages associated with such dispute.
 - 17.7 For purposes of this Section, a dispute is limited to the recovery of monetary damages from the same transaction or occurrence against a single Party or two or more Parties alleged to be liable jointly, severally or in the alternative. Two or more disputes may not be consolidated or otherwise combined without the consent of all Parties to such disputes.
 - 17.8 In addition to such matters as are required by the Rules, a request for mediation shall include the amount of the monetary relief requested.

- Prior to requesting mediation, a Party must form a good faith belief that it is entitled under applicable law to recover the monetary amount to be included in the request from one or more of the remaining Parties. Such belief must be based on a reasonable and prudent investigation into the dispute that is the subject of the request. The request for mediation must be based on such investigation and may not include any amount or the name of any remaining Party, unless supported by such investigation and good faith belief by the Party requesting the mediation.
- 17.10 If a Party breaches any provision of Section 17.9, it shall indemnify and hold harmless all other Parties from any costs, including reasonable attorney fees and other costs of litigation, and damages incurred by such other Parties that arise from such breach.
- 17.11 All expenses incurred by a Party to a dispute in preparing and presenting any claim or defense at the mediation shall be paid by the Party. Such expenses include without limitation preparation and production of witnesses and exhibits and attorney fees. All other expenses of the mediation, including filing fees and required traveling and other expenses of the mediator, shall be borne as follows: one half by the Party requesting the mediation, with the remaining parties paying equal shares of the remaining expenses and costs; provided that, if the City is named as a party to the mediation, the City shall pay at least one-third of the mediation, the mediation expenses and costs divided among the Parties. If more than one Party to a dispute requests a mediation, the mediation expenses and costs to be divided among the Parties shall be borne equally by the Parties to the dispute; provided that, if the City is named as a Party to the mediation, the City shall pay at least one-third of the mediation expenses and costs divided among the Parties.
- 17.12 The mediation shall be held at a location agreeable to the mediator and all of the Parties; provided that, if no agreement can be reached, the mediation will be held at such location in Cabarrus County as the mediator shall determine.
- 17.13 The provisions of this Section are subject to any other provision of this Agreement concerning the submission, documentation and/or proof of any claim or dispute. Such other provisions shall apply in full force and shall be satisfied as a condition precedent to mediation pursuant to this Section.
- 17.14 The Parties understand and agree that mediation in accordance with this Section shall be a condition precedent to institution of any legal or equitable proceeding seeking monetary recovery based on any dispute that is subject to mediation pursuant to this Section.
- Sec. 18. Breach. In the event of a violation of any material term of this Agreement, the non-violating party may terminate the Agreement upon written notice. Such notice shall state the violation with specificity and shall give ten (10) days to cure the violation. The cure period shall be measured as ten (10) days from the date of receipt of notice by the violating party, or, if the date is not known, then thirteen (13) days from the date the notice is placed in the United States Post. If the violation remains uncorrected at the end of the cure period, the Agreement shall be terminated without any further action by the non-violating party. Any remaining disputes shall be subject to the dispute resolution procedure set forth above, if applicable.

[Signature Page to Follow]

IN WITNESS WHEREOF, the City of Concord and the Contractor have caused this Contract to be executed by their respective duly authorized agents or officers.

CITY OF CONCORD:	(Typed or Printed Legal Name of Contractor)
By:City Manager	By:
Date:	Printed Name:
	Title:
ATTEST BY:	Date:
City Clerk	ATTEST:
	BY: Signature of Vice President, Secretary, or other officer
	Printed Name:
APPROVED AS TO FORM:	Title
Attorney for the City of Concord	SEAL
	VAL BY CITY FINANCE OFFICER ited in the manner required by the Local Government Budget and Fiscal
	Signature

EXHIBIT "D"

STATE OF NORTH CAROLINA

AFFIDAVIT

COUNTY OF CABARRUS

I,(the individual signing below), being duly authorized by and on behalf o
(the legal name of the entity entering the contract, "Employer") after
first being duly sworn hereby swears or affirms as follows:
1. Employer understands that <u>E-Verify</u> is the federal E-Verify program operated by the United State
Department of Homeland Security and other federal agencies, or any successor or equivalent program used to verify
the work authorization of newly hired employees pursuant to federal law in accordance with NCGS §64-25(5).
2. Employer understands that Employers Must Use E-Verify. Each employer, after hiring an employee to worl
in the United States, shall verify the work authorization of the employee through E-Verify in accordance with
NCGS§64-26(a). Employer attests that Employer is in compliance with the requirements of the federal and state law
relevant to E-verify.
3. <u>Employer</u> is a person, business entity, or other organization that transacts business in the State of North
Carolina. Employer employs 25 or more employees in this State. (mark Yes or No)
a. YES, or b. NO
4. Employer attests that all subcontractors employed by it as part of this contract comply with the requirement
of E-Verify, and Employer will ensure compliance with E-Verify by any subcontractors subsequently hired by
Employer as part of any contract with the City of Concord.
5. Employer shall have a continuing duty to inform the City of Concord of any changes to this sworn
information.
This day of
Signature of Affiant Print or Type Name:
State of North Carolina County of Cabarrus
Signed and sworn to (or affirmed) before me, this the
day of, 20
State of North Carolina County of Cabarrus Signed and sworn to (or affirmed) before me, this the day of, 20 My Commission Expires:
Notary Public

EXHIBIT "E"

TAX FORM(S)

EXHIBIT "F"

CERTIFICATE OF INSURANCE

4824-4465-9749, v. 1

City of Concord Post Office Box 308 Concord, North Carolina 28026-0308



For City Use Only Charge to PO#

Project Name				
Date Notice to Proceed				
Final Completion Date				
Days Remaining in Contract				
Percent Work Complete				
Percent Time Complete				
Percent Payment Complete				
	·			_
APPLICATION FOR PAYMENT	NO.			
PERIOD FROM:	TO:			
CERTIFICATE OF THE CONTR	PACTOR			
		at this periodical estimate is corre	et and all work has been no	orformed and
materials supplied in full accord	ance with the terms	and condtions of the contract do	cuments between the unde	ersigned contractor
and the City of Concord.				3
GROSS AMOUNT OF PARTIA	L PAYMENT			\$
RETAINAGE AT 5.0000%			\$	
PREVIOUS PAYMENTS			\$	
LIQUIDATION DAMAGES 0.00	DAYS AT \$0.00 PE	R DAY, \$0.00 this period.	\$	
OTHER DEDUCTIONS \$0.00 to	nis period.	•	\$	
TOTAL DEDUCTIONS	-			\$
NET AMOUNT DUE THIS EST	IMATE			\$
Name of Contractor:		Address	.	
		7.00.000	•	
Cianad:		Title	Data	
Signed:		Title:	Date:	
CERTIFICATE OF CONSTRUC				
I certify that I have verified this	periodical estimate a	and that to best of my knowledge	and belief, it is a true and o	correct statement
of work performed and material	s supplied under the	contract.		
Consultant Engineer:			Date:	
<u> </u>				
Engineering Construction Man	ager:		Date:	
APPROVED AND PAYMENT	RECOMMENDED:	CITY OF CONCORD		
Signed:		Title	Date:	
olyneu.		nue	Date:	

Engineering's Application For Payment Form

Project Title:	Union Street Improvements
	Project No. 2020-09 (McGill Project # 19.01726)

	Project No. 2020-09	(McGill Project #	19.0172	6)								
ITEM	DESCRIPTION	QUANTITY	UNIT	TOTAL	QUANT.	TOTAL	QUANT.	TOTAL	QUANT.	TOTAL	QUANT.	TOTAL
_			PRICE	PRICE	THIS EST.	THIS EST.	PREV. EST.	PREVIOUS	TO DATE	TO DATE	DIFF.	DIFF.
1		LF		\$ -		\$ -		\$ -	0.00	\$ -	0.00	\$0.00
2		LF		\$ -		\$ -		\$ -	0.00	\$ -	0.00	\$0.00
3		LF		\$ -		\$ -		\$ -	0.00	\$ -	0.00	\$0.00
4		LF		\$ -		\$ -		\$ -	0.00	\$ -	0.00	\$0.00
5		LF		\$ -		\$ -		\$ -	0.00	\$ -	0.00	\$0.00
6		LF		\$ -		\$ -		\$ -	0.00	\$ -	0.00	\$0.00
7				\$ -		\$ -		\$ -	0.00	\$ -	0.00	\$0.00
8		EA		\$ -		\$ -		\$ -	0.00	\$ -	0.00	\$0.00
9		LBS	3	\$ -		\$ -		\$ -	0.00	\$ -	0.00	\$0.00
10		SF		\$ -		\$ -		\$ -	0.00	\$ -	0.00	\$0.00
11		SF		\$ -		\$ -		\$ -	0.00	\$ -	0.00	\$0.00
12		LF		\$ -		\$ -		\$ -	0.00	\$ -	0.00	\$0.00
13												
a		EA		\$ -		\$ -		\$ -	0.00	\$ -	0.00	\$0.00
b		EA		\$ -		\$ -		\$ -	0.00	\$ -	0.00	\$0.00
с		EA		\$ -		\$ -		\$ -	0.00	\$ -	0.00	\$0.00
Add 1		EA				\$ -		\$ -	0.00	\$ -	0.00	\$0.00
Add 2		LS				\$ -		\$ -	0.00	\$ -	0.00	\$0.00
Add 3		LF				\$ -		\$ -	0.00	\$ -	0.00	\$0.00
Add 4		SY				\$ -		\$ -	0.00	\$ -	0.00	\$0.00
Add 5		SY				\$ -		\$ -	0.00	\$ -	0.00	\$0.00
	Base Bid \$			\$ -		\$ -		\$ -		\$ -		\$0.00
	10 % Contingency \$			\$ -								\$ -
	Total Base Bid \$			\$ -								\$0.00

CITY OF CONCORD

CONCORD, NORTH CAROLINA CONTRACT CHANGE ORDER

		Date:	
Project T	itle: Union Street Improvements	-	#: 2020-009 l Project # 19.01726)
Owner:	City of Concord	Change Order N	No.
То:	(CONTRACTOR) Account No.		
	Purchase Order No.		
	ereby requested to make the following changes in the contract Design of the attached and/or the original Contract Design of the Origin	= -	h
Item No.	Description of Changes	Additions	Deductions
		\$0.00	\$0.00
Original C	Contract Amount		
Net Chang	ges by Previous Change Orders		
Net Chang	ges this Change Order		\$0.00
New Cor	ntract Amount		\$0.00
	act Time will be by detion Date as of this Change Order is:	calendar days.	
Accepted: By:	(Contractor)	Date:	
Accepted: By:	CITY OF CONCORD	Date:	
	ument has been pre-audited in the manner required d Fiscal Control Act.	l by Local Government	
By:	Finance Director	Date:	



Certificate of Infrastructure Completion

Project Name & Number: Union Street Improvem	ents
	(McGill Project # 19.01726)
Contractor Name & Address:	Owner Name & Address:
Miscellaneous Information:	
Inspector:	Signature:

The following items have been inspected, reviewed and found to be complete in substantial accordance with the approved plans and specifications. The dates of completion are those agreed upon by the City of Concord when all construction Work and testing was completed. These dates DO NOT initiate the start of any Warranty periods of said item(s). Warranty periods shall begin as specified on the CERTIFICATION OF FINAL COMPLETION.

Sanitary Sewer:	Approved:
	Initial: Date:
Potable Water:	Approved:
	Initial: Date:
Storm Water:	Approved:
	Initial: Date:
Asphalt Base Course:	Approved:
	Initial: Date:
Asphalt Surface Course:	Approved:
	Initial: Date:
Curb & Gutter	Approved:
	Initial: Date:
Sidewalks:	Approved:
	Initial: Date:
Street Trees:	Approved:
	Initial: Date:
Other:	Approved:
	Initial: Date:

Engineering

Phone (704) 920-5425 • Fax (704) 786-4521

FIELD ORDER

CITY OF CONCORD ENGINEERING DEPARTMENT

Post Office Box 308 Concord, North Carolina 28026-0308

Pro	oject Title:	Union	Street Improv	ements			Project #: 2020-009 (McGill Project # 19.01726)
FIEL	LD ORDER N	o	_ CONTRAC	CT	I	DATE _	
PRO	DJECT						
	b)	TO					
							TERATIONS AND/OR
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NORTH CAROLINA SALES TAX REPORT

North Carolina One Call Center, Inc.

North Carolina One Call Center, Inc., a non-profit organization funded by participating utility companies and municipalities in the interest of community and job safety and improved service through damage reduction to the utilities.

A ONE CALL TOLL FREE TELEPHONE NUMBER, 811 or 1-800-632-4949, PROVIDES AN AVENUE TO ALL OF THE PARTICIPATING MEMBERS FROM ANY POINT WITHIN THE STATE OF NORTH CAROLINA.

Anyone proposing to excavate, dig, bore, tunnel, blast or disturb the earth in any manner in which buried utilities may be damaged is requested to call the toll-free number between the hours of 6:00 a.m. and 10:00 p.m., Monday through Friday, forty-eight hours before starting the proposed work.

Within minutes of your telephone call, the participating members will be made aware of your plans and will be given pertinent information that has been provided by you about your planned work. You will be told the names of the participating members from whom you can expect a response - if there are buried facilities in the path of your activity, the route of the utilities will be staked and/or marked at no expense to you. If there are no facilities in the area of the planned work, you will be called or notified by a representative of a participating company accordingly.

Should a non-participating utility operator be serving your area, we recommend that you call them on an individual basis. All utility operators, whether company or municipality, will be provided an opportunity to become a member of North Carolina One Call Center, Inc.

Naturally, knowing the route of utilities, the excavator is expected to exercise caution and to avoid damage as the project progresses.

Damage prevention does not just happen – it is a planned and orderly process through which each of us can participate - YES, WE CAN AND WE WILL DRAMATICALLY REDUCE DAMAGES TO THE UTILITIES IN THE STATE OF NORTH CAROLINA!! THANKS FOR YOUR HELP.

BEFORE YOU DIG

IN THE INTEREST OF COMMUNITY AND JOB SAFETY AND IMPROVED SERVICE

CALL NORTH CAROLINA ONE CALL CENTER, INC. 811 or 1-800-632-4949

North Carolina One Call Center, Inc 2300 West Meadowview Rd., Suite 227 Greensboro, NC 27407 www.nc811.org

SECTION II

GENERAL CONDITIONS

PART A - SECTION II (concordnc.gov)

SECTION III

TECHNICAL SPECIFICATIONS

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MARCH 2021 TOC-1 PROJECT # 16.01705

SECTION 011000 SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

- 1. Project information.
- 2. Work covered by Contract Documents.
- 3. Phased construction.
- 4. Work by Owner.
- 5. Work under separate contracts.
- 6. Future work.
- 7. Purchase contracts.
- 8. Owner-furnished products.
- 9. Contractor-furnished, Owner-installed products.
- 10. Access to site.
- 11. Coordination with occupants.
- 12. Work restrictions.
- 13. Specification and drawing conventions.

B. Related Section:

1. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

- A. Project Identification: Union Street Improvements. City of Concord Project Number 2020-009 and McGill Project number 19.01726.
- B. Project Location: Union Street from Killarney Avenue NE to Foard Avenue SW.
- C. Owner: City of Concord., 35 Cabarrus Avenue West, Concord, North Carolina 28025.

- 1. Owner's Representative: Kaylee Caton, RA Design Manager Planning and Neighborhood Development.
- D. Engineer: McGill Associates, PA, 1240 19th Street Lane NW, Hickory, NC 28601

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of the Project is defined by the Contract Documents and consists of the following:

The **Union Street Improvements** project consists of streetscape improvements from the intersection of Union Street and Killarney Avenue to the intersection of Union Street and Foard Ave and along Barbrick Ave. Work includes but is not limited to removal of existing asphalt, concrete, curbing, water line and sewer line improvements, storm drainage, the installation of concrete sidewalk with brick bands and accents, concrete curbing, seat walls, pavers, site furnishings, landscaping, street lighting, electrical, irrigation, soil cells, signage, and asphalt paving.

B. Type of Contract

1. Project will be constructed under a single prime contract.

1.5 PHASED CONSTRUCTION

A. The Work shall be conducted in multiple phases, with each phase substantially complete as indicated – see construction sequencing plan.

1.6 WORK BY OWNER

- A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.
- B. Preceding Work: Owner will perform the following construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.
 - 1. Partial installation of proposed mast arm poles.

- C. Concurrent Work: Installation of Mast Are Pole for signals, Owner will perform the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.
 - 1. Partial installation of proposed mast arm poles.
 - 2. Repair of existing retaining wall
- D. Subsequent Work: Owner will perform the following additional work at site after Substantial Completion. Completion of that work will depend on successful completion of preparatory work under this Contract.
 - 1. Final road paving and grade adjustment, soil cells, sidewalk, ramps, and landscaping immediately in front of the Courthouse as noted and shown on the drawings.

1.7 WORK UNDER SEPARATE CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate public and private contracts.
- B. Preceding Work: Owner will award separate contract(s) for the following construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.
 - 1. Repair of existing wall at 4 Union Street S. Contractor to work with wall repair contractor for installation of wood fence and gate at same time wall repairs are in progress.
- C. Concurrent Work: Please note that there are multiple construction projects in progress in Downtown Concord NC. Those operations will be conducted simultaneously with work under this Contract.
 - 1. Private Development Novi Lofts Project on Union Street, Novi Flats on Barbrick, Courthouse Renovation on Union, and 66 Union Building Renovations. Contractor to coordinated with the other projects for installation of streetscape improvements.
- D. Subsequent Work: Owner will award separate contract(s) for the following additional work to be performed at site following Substantial Completion. Completion of that work will depend on successful completion of preparatory work under this Contract.

1. Final road paving and grade adjustment, soil cells, all site work, sidewalk, ramps, and landscaping immediately in front of the Courthouse as noted and shown on the drawings.

1.8 **FUTURE WORK - Omitted**

1.9 PURCHASE CONTRACTS - Omitted

1.10 OWNER-FURNISHED PRODUCTS

A. Owner will furnish products indicated. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products and any necessary utility connections.

B. Owner-Furnished Products:

1. Benches, Street Lights, Mosaic Lights at Plaza area, Waste Receptacles, Cigarette Receptacles, Ornamental Tree Guard Fence and Refurbished Bike Racks.

1.11 <u>CONTRACTOR-FURNISHED, OWNER-INSTALLED PRODUCTS - Omitted</u>

1.12 ACCESS TO SITE

- A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
- B. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- C. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Limits: Limit site disturbance to limits shown on the drawings.
 - 2. Driveways, Walkways and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to City of Concord and Business Owners, employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.

- b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- D. Condition of Existing Building: Maintain portions of existing buildings affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.13 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Business Owners will occupy site and adjacent building(s) during entire construction period. Cooperate with Business Owners during construction operations to minimize conflicts and facilitate Business Owner usage. Perform the Work so as not to interfere with Business Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
 - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
 - 2. Notify the Owner not less than three (3) business days in advance of activities that will affect Owner's operations.

1.14 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work in any existing building to the facility's normal business working hours, except as otherwise indicated or approved by the Owner. All other work on site shall be conducted in accordance with the requirements of the General Conditions.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Business Owners or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 - 1. Notify City Representative not less than three (3) business days in advance of proposed utility interruptions.
 - 2. Obtain City Representative's written permission before proceeding with utility interruptions.

- D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with City Representative.
 - 1. Notify City Representative not less than 3 business days in advance of proposed disruptive operations.
 - 2. Obtain City Representative's written permission before proceeding with disruptive operations.
- E. Nonsmoking Building: Smoking is not permitted within any building or within 25 feet of entrances, operable windows, or outdoor air intakes.
- F. Controlled Substances: Use of tobacco products and other controlled substances within any building (existing or constructed as part of this project) is not permitted.

1.15 SPECIFICATION AND DRAWING CONVENTIONS

- A. <u>Specification Format</u>: The Specifications are organized into Divisions and Sections using the 33-division format and CSI/CSC's "Master Format" numbering system.
 - 1. <u>Section Identification</u>: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
 - 2. <u>Division 1</u>: Sections in Division 1 govern the execution of the Work of all Sections in the Specifications.
- B. <u>Specification Content</u>: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 - 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

- a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
- C. Drawing Coordination: Requirements for materials and products identified on the Drawings are described in detail in the Specifications. One or more of the following are used on the Drawings to identify materials and products:
 - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 - 2. Abbreviations: Materials and products are identified by common industry abbreviations.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.3 <u>DEFINITIONS</u>

- A. Alternate: An amount stated on the Bid Form and proposed by bidders for certain work defined in the Bidding Requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, or at a time when applicable by the Owner, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

ALTERNATES:

Alternate #1: Installation of 1 additional catch basin, stone inelt protection, and 50 linear feet of 15" class IV RCP.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012300

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Preconstruction photographs.
 - 2. Periodic construction photographs.
 - 3. Final completion construction photographs.
 - 4. Preconstruction video recordings.
 - Periodic construction video recordings.

B. Related Sections:

- 1. Division 01 Section "Submittal Procedures" for submitting photographic documentation.
- 2. Division 01 Section "Closeout Procedures" for submitting photographic documentation as project record documents at Project closeout.
- 3. Division 01 Section "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.
- 4. Division 02 Section "Demolition" for photographic documentation before building demolition operations commence.
- 5. Division 31 Section "Site Clearing" for photographic documentation before site clearing operations commence.

1.3 COSTS

A. The cost for photographic documentation services shall be considered incidental to the work and shall be included in the bid. No separate payment will be made for photographic documentation.

1.4 INFORMATIONAL SUBMITTALS

- A. Construction Photographs: Submit two (2) copies of each photographic view within seven (7) days of taking photographs.
 - 1. Format: Submit all photographs in a digital format acceptable to the City.
 - 2. The digital file for each photograph shall include the following:
 - a. Date stamp by camera.
 - b. File names indicative of the description of the photographs.
 - c. Unique sequential identifier (as necessary).
- B. Video Recordings: Submit video recordings within seven (7) days of recording.
 - 1. Submit video recordings in digital video disc format acceptable to Engineer.
 - 2. Identification: With each submittal, provide the following information:
 - a. Name of Project.
 - b. Name of Contractor.
 - c. Date video recording was recorded.
 - d. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - e. Weather conditions at time of recording.
 - 3. The digital file for each video shall include the following:
 - a. Date stamp by video camera.
 - b. File names indicative of the description of the videos.
 - c. Unique sequential identifier (as necessary).

1.5 **USAGE RIGHTS**

A. Contractor shall transfer copyright usage rights to Owner for unlimited reproduction of photographic documentation.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of 8 megapixels, and at an image resolution of not less than 1600 by 1200 pixels and 300 dpi.

B. Digital Video Recordings: Provide high-resolution, digital video disc in format acceptable to Engineer.

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
 - 1. Date and Time: Include date and time in file name for each image.
 - 2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Engineer.
- C. Preconstruction Photographs: Before starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Engineer.
 - 1. Flag construction limits before taking construction photographs.
 - 2. Take photographs necessary to show existing conditions adjacent to property before starting the Work.
 - 3. Take photographs of existing buildings either on or adjoining property as necessary to accurately record physical conditions at start of construction.
 - 4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- D. Periodic Construction Photographs: Take photographs monthly, coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- E. Engineer-Directed Construction Photographs: From time to time, Engineer will instruct Contractor about number and frequency of photographs and general directions on vantage points. Select actual vantage points and take photographs to show the status of construction and progress since last photographs were taken.

- F. Final Completion Construction Photographs: Take photographs after date of Substantial Completion for submission as project record documents. Engineer will inform Contractor of desired vantage points.
- G. Additional Photographs: Engineer may request photographs in addition to periodic photographs specified.
 - 1. Three days' notice will be given, where feasible.
 - 2. In emergency situations, take additional photographs within 24 hours of request.
 - 3. Circumstances that could require additional photographs include, but are not limited to, the following:
 - a. Special events planned at Project site.
 - b. Immediate follow-up when on-site events result in construction damage or losses.
 - c. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
 - d. Substantial Completion of a major phase or component of the Work.
 - e. Extra record photographs at time of final acceptance.
 - f. Owner's request for special publicity photographs.

3.2 CONSTRUCTION VIDEO RECORDINGS

- A. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of construction. Display continuous running time and date. At start of each video recording, record weather conditions from local newspaper or television and the actual temperature reading at Project site.
- B. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed, recent events, and planned activities. At each change in location, describe vantage point, location, direction (by compass point), and elevation or story of construction.
 - 1. Confirm date and time at beginning and end of recording.
 - 2. Begin each video recording with name of Project, Contractor's name, and Project location.
- C. Preconstruction Video Recording: Before starting construction, record video recording of Project site and surrounding properties from different vantage points, as directed by Engineer.
 - 1. Flag construction limits before recording construction video recordings.
 - 2. Show existing conditions adjacent to Project site before starting the Work.

- 3. Show existing buildings either on or adjoining Project site to accurately record physical conditions at the start of construction.
- 4. Show protection efforts by Contractor.
- D. Periodic Construction Video Recordings: Record video recording monthly, coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last video recordings were recorded.

END OF SECTION 013233

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - Specific quality-assurance and control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality assurance and control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and control services required by Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

C. Related Sections:

- 1. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
- 2. Divisions 02 through 33 Sections for specific test and inspection requirements.

1.3 **DEFINITIONS**

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Engineer.
- C. Product Testing: Tests and inspections that are performed by a Nationally Recognized Testing Laboratory (NRTL), an National Voluntary Laboratory Accreditation Program (NVLAP), or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- D. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- E. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- F. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- G. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade or trades.
- H. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainty and requirements that are different, but apparently equal, to Engineer for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation

may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.

1.5 SUBMITTALS

- A. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.
 - 4. Identification of applicable standards.
 - 5. Identification of test and inspection methods.
 - 6. Number of tests and inspections required.
 - 7. Time schedule or time span for tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.

1.6 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

- 1. Name, address, and telephone number of technical representative making report.
- 2. Statement on field condition of substrates and their acceptability for installation of product.
- 3. Statement that products at Project site comply with requirements.
- 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
- 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
- 6. Statement whether conditions, products, and installation will affect warranty.
- 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
 - 1. Name, address, and telephone number of factory-authorized service representative making report.
 - 2. Statement that equipment complies with requirements.
 - 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 - 4. Statement whether conditions, products, and installation will affect warranty.
 - 5. Other required items indicated in individual Specification Sections.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.7 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful inservice performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- F. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- G. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

1.8 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 - 2. Payment for these services will be made either directly by the Owner or from testing and inspecting allowances, as authorized by the Contract documents, if such allowances are include in the Contractor's construction contract.
 - Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are the Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
 - 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control

- services required of Contractor by authorities having jurisdiction, whether specified or not.
- 2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
- 3. Notify testing agencies at least 96 hours in advance of time when Work that requires testing or inspecting will be performed.
- 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
- 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
- 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."
- D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, Contractor shall provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- F. Testing Agency Responsibilities: Cooperate with Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 - 1. Notify Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 - 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.

- 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
- 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
- 6. Do not perform any duties of Contractor.
- G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - 1. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 - 4. Facilities for storage and field curing of test samples.
 - 5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - 6. Security and protection for samples and for testing and inspecting equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's Construction Schedule. Update as the Work progresses.
 - 1. Distribution: Distribute schedule to Owner, Engineer, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Prepare a record of tests and inspections. Include the following:

- 1. Date test or inspection was conducted.
- 2. Description of the Work tested or inspected.
- 3. Date test or inspection results were transmitted to Engineer.
- 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Engineer's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution Requirements."
- B. Protect construction exposed by or for quality control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality control services.

END OF SECTION 014000

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Sections:

- 1. Division 1 Section "Summary" for limitations on utility interruptions and other work restrictions.
- 2. Division 1 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
- 3. Division 1 Section "Execution Requirements" for progress cleaning requirements.

1.3 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Price unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to Owner, Engineer, occupants of Project, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Pay sewer service use charges for sewer usage by all entities for construction operations.
- C. Water Service: Pay water service use charges for water used by all entities for construction operations.
- D. Electric Power Service: Pay electric power service use charges for electricity used by all entities for construction operations.

1.4 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Construction Surveying: All work shall be constructed in accordance with the lines, grades and elevations shown on the plans or as given by the Engineer in the field. The Contractor shall be fully responsible for maintaining alignment and grade. All principal controlling points and base lines for locating the principal components of the work together with a suitable number of benchmarks adjacent to the work will be provided by the Engineer. From this information, the Contractor shall verify benchmarks and develop and make all detail surveys needed for construction. The Contractor shall protect and safeguard all points, stakes, grade marks, monuments, and benchmarks at the site of the work and shall reestablish, at his own expense, any marks which are removed or destroyed due to his construction operations.
 - 1. It is imperative that the Contractor work within the shown rights of way or easements at all times, unless approved otherwise by the property owner and the Engineer.
 - 2. The Contractor shall, at his expense, provide competent engineering survey services and shall provide and maintain accurate, detailed, survey work.
 - 3. The plans and supplementary drawings shall not be scaled and the Contractor must verify all dimensions and elevations at the site prior to proceeding with the work. The Contractor shall also verify existing utility locations prior to purchasing materials affected by these locations.

1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch, 0.148-inch thick, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts;

- minimum 2-3/8-inch OD line posts and 2-7/8-inch OD corner and pull posts with 1-5/8-inch OD top rails with galvanized barbed-wire top strand.
- B. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch, thick, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch OD line posts and 2-7/8-inch OD corner and pull posts, with 1-5/8-inch OD top and bottom rails. Provide concrete or galvanized steel bases for supporting posts.
- C. Wood Enclosure Fence: Plywood, 6 feet high, framed with four 2-by-4-inch rails, with preservative-treated wood posts spaced not more than 8 feet apart.
- D. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10 mils minimum thickness, with flame-spread rating of 15 or less per ASTM E 84.

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Engineer, and construction personnel office activities and to accommodate project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
 - 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
 - 2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with not less than 1 receptacle on each wall. Furnish room with conference table, chairs, and 4-foot square tack and marker boards.
 - 3. Drinking water and private toilet.
 - 4. Coffee machine and supplies.
 - 5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 degrees F.
 - 6. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 - 1. Store combustible materials apart from building.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return air grille in system and remove at end of construction and clean HVAC system as required in Division 01 Section "Closeout Procedures".
- C. Air Filtration Units: HEPA primary and secondary filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - Locate facilities to limit site disturbance as specified in Division 01 Section "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. Water Service: If available at the site and if authorized by the Owner, connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use or as required for project

- completion. Otherwise, Contractor shall provide non-potable water form sources acceptable to authorities having jurisdiction by installing water service and distribution piping in sizes and pressures adequate for construction. If temporary utilities require connection to municipal systems, Contractor shall provide these connections as directed by authorities having jurisdiction and install metering devices as required.
- B. Sanitary Facilities: Contractor shall provide temporary toilets, wash facilities, drinking water and associated piping and appurtenances for use of Owner, Engineer, and construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities. If temporary utilities require connection to municipal systems, Contractor shall provide these connections as directed by authorities having jurisdiction.
- C. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- D. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed in accordance with approved coordination drawings.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within work area using HEPAequipped air filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 - 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust containment devices.
 - 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- E. Ventilation and Humidity Control: If necessary, provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

- Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- F. Electric Power Service: Contractor shall provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations. Comply with all requirements of authorities having jurisdiction.
- G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 - 1. Provide construction for temporary offices, shops, and sheds located within construction area. All work shall comply with NFPA 241.
 - 2. Maintain support facilities until Substantial Completion inspection is scheduled. Remove before Final Completion.
- B. Temporary Roads and Paved Areas: As necessary, construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.
 - 1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- C. Temporary Use of Permanent Roads and Paved Areas: As necessary, locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
 - 1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
 - 2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to other specification sections.
 - 3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.

4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to other specification sections.

D. Traffic Maintenance:

- 1. The Contractor shall provide, erect, and maintain all necessary barricades, suitable and sufficient warning lights, danger signals, and signs, shall provide a sufficient number of flagmen to direct the traffic and shall take all necessary precautions for the protection of the work and the safety of the public
- 2. All barricades and obstructions or hazardous conditions shall be illuminated as necessary to provide for safe traffic conditions.
- 3. Warning and caution signs shall be posted throughout the length of any portion of the project where traffic flow is restricted.
- 4. Protect existing site improvements to remain including curbs, pavement, and utilities.
- 5. Maintain access for fire-fighting equipment and access to fire hydrants.

E. Special Provisions: North Carolina Department of Transportation (NCDOT):

- 1. All Contractors doing work within the NCDOT right of way are to have a copy of the approved encroachment agreement plans, and special provisions on the job site.
- 2. The travelling public shall be warned of the construction with signing that is in accordance with the latest Manual on Uniform Traffic Control Devices.
- 3. Contact the appropriate utility company(ies) involved and make satisfactory arrangements to adjust utilities in conflict with the proposed work prior to construction.
- 4. Materials and workmanship shall conform to the NCDOT's Standards and Specifications Manual.
- 5. Strict compliance with the Policies and Procedures for Accommodating Utilities on Highway Rights of Way Manual shall be required.
- 6. All earth areas disturbed shall be regraded and seeded in accordance with the NCDOT standards and specifications.
- 7. Complete restoration including reestablishing ditch line, fertilizing, seeding, mulching, tacking of straw and all areas disturbed during construction will follow within a maximum of thirty (30) working days of the initial disturbing activity.
- 8. All open cuts shall conform to the NCDOT Policies and Procedures for Accommodating Utilities on Highway Rights of Way Manual.
- 9. All roadway signs which are removed due to installation will be reinstalled on the same day or as soon as possible.
- 10. The Contractor shall notify the local NCDOT office at least 24 hours prior to construction.

- F. Parking: Provide temporary parking areas for construction personnel.
- G. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
 - Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
 - 2. Remove snow and ice as required to minimize accumulations.
- H. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 - 1. Identification Signs: Provide Project identification signs as indicated within the Contract Documents.
 - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. As necessary, provide temporary, directional signs for construction personnel and visitors.
 - 3. Maintain and touchup signs so they are easily legible at all times.
- I. Waste Disposal Facilities: Comply with requirements specified in Division 01 Section "Construction Waste Management."
- J. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 01 Section "Execution Requirements" for progress cleaning requirements.
- K. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- L. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- M. Existing Stair Usage: Where and when approved by the Owner, use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
 - 1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become

damaged, restore damaged areas so no evidence remains of correction work.

N. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 - 1. Comply with work restrictions specified in Division 01 Section "Summary."
- B. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties, according to requirements of authorities having jurisdiction.
 - 1. Install erosion control measures as shown on the Drawings and as specified in the Contract Documents as necessary to prevent erosion and prevent soil-bearing water runoff from reaching nearby waterways, and storm water conveyance systems.
 - 2. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - 3. Clean, repair, and restore adjoining properties, roads, storm water systems and other areas affected by erosion and sedimentation from the project site during the course of the project.
 - 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- C. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- D. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- E. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.

- 1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
- 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
- F. Security Enclosure and Lockup: As necessary, install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- H. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- I. Covered Walkway: As necessary, erect protective, covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction.
 - 1. Construct covered walkways using scaffold or shoring framing.
 - 2. Provide overhead decking, protective enclosure walls, handrails, barricades, warning signs, exit signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
 - 3. Paint and maintain appearance of walkway for duration of the Work.
- J. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
 - 1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.
- K. Temporary Partitions: When necessary, provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
 - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant plywood on construction operations side.
 - 2. Construct dustproof partitions with two layers of 6-mil polyethylene sheet on each side. Cover floor with two layers of 6-mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant treated plywood.

- a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.
- 3. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
- 4. Insulate partitions to control noise transmission to occupied areas.
- 5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
- 6. Protect air-handling equipment.
- 7. Provide walk-off mats at each entrance through temporary partition.
- L. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
 - 1. Prohibit smoking in construction areas.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 - 1. Protect porous materials from water damage.
 - 2. Protect stored and installed material from flowing or standing water.
 - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 - 4. Remove standing water from all surfaces.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of appropriate construction area, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

- 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed areas.
- 2. Keep interior spaces reasonably clean and protected from water damage.
- 3. Periodically collect and remove waste containing cellulose or other organic matter.
- 4. Discard or replace water-damaged material.
- 5. Do not install material that is wet.
- 6. Discard, replace or clean stored or installed material that begins to grow mold.
- 7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- D. Controlled Construction Phase of Construction: After completing and sealing of the construction areas but prior to the full operation of permanent HVAC systems, maintain as follows:
 - 1. Control moisture and humidity inside area by maintaining effective dry-in conditions.
 - 2. Use permanent HVAC system to control humidity.
 - 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.
 - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record daily readings over a forty-eight hour period. Identify materials containing moisture levels higher than allowed. Report findings in writing to Engineer.
 - c. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor.
 - 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 - 3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION 015000

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Sections:

- 1. Division 01 Section "Alternates" for products selected under an alternate.
- 2. Division 01 Section "Substitution Procedures" for requests for substitutions.
- 3. Division 01 Section "References" for applicable industry standards for products specified.

1.3 **DEFINITIONS**

- A. Products: Items obtained for incorporating into the Work. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where approved as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named, including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 SUBMITTALS

- A. <u>Product List</u>: Submit a list, in tabular from, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
 - 1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
 - 2. <u>Form</u>: Tabulate information for each product under the following column headings:
 - a. Specification Section number and title.
 - b. Generic name used in the Contract Documents.
 - c. Proprietary name, model number, and similar designations.
 - d. Manufacturer's name and address.
 - e. Supplier's name and address.
 - f. Installer's name and address.
 - g. Projected delivery date or time span of delivery period.
 - h. Identification of items that require early submittal approval for scheduled delivery date.
 - 3. <u>Completed List</u>: Within 30 days after date of commencement of the Work, submit copies of completed product list in accordance with Section 013300. Include a written explanation for omissions of data and for variations from Contract requirements.
 - 4. <u>Engineer's Action</u>: Engineer will respond in writing to Contractor as indicated in Section 013300. Engineer's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Engineer's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.

- B. <u>Substitution Requests</u>: Submit copies of each request for consideration in accordance with Section 013300. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. <u>Documentation</u>: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of Engineers and owners.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - I. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
 - 2. <u>Engineer's Action</u>: If necessary, Engineer will request additional information or documentation for evaluation and notify Contractor of acceptance or rejection of proposed substitution in accordance with Section 013300.

- C. <u>Comparable Product Requests</u>: Submit copies of each request for consideration in accordance with Section 013300. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. <u>Engineer's Action</u>: If necessary, Engineer will request additional information or documentation for evaluation and notify Contractor of acceptance or rejection of proposed comparable product in accordance with Section 013300.
- D. <u>Basis-of-Design Product Specification Submittal</u>: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products upon delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

- 1. Store products to allow for inspection and measurement of quantity or counting of units.
- 2. Store materials in a manner that will not endanger Project structure.

- 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
- 4. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, exposure to sunlight, and weather-protection requirements for storage.
- 5. Protect stored products from damage and liquids from freezing.
- 6. Provide a secure location and enclosure at Project site for storage of materials and equipment. Coordinate location with Owner.
- 7. Provide periodic rotation or movement of equipment as required by manufacturer

1.7 **PRODUCT WARRANTIES**

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 - 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 - 2. Special Warranty: Written warranty required by, or incorporated into, the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution
 - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 - 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 - 3. Refer to Divisions 02 through 33. Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
 - Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 - 4. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 - 5. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article below to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

- 1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
- 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
- 3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
- 4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
- Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
- 6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with

- provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
- 7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
- 8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article below for consideration of an unnamed product by the other named manufacturers.

2.2 PRODUCT SUBSTITUTIONS

A. All product substitutions shall be made in accordance with Division 01 Section "Substitution Procedures".

2.3 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Engineer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Engineer may return requests without action, except to record noncompliance with these requirements:
 - 1. Evidence that the proposed product does not require revisions to the Contract Documents that it is consistent with the Contract Documents, and will produce the indicated results, and that it is compatible with other portions of the Work.
 - 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - 3. Evidence that proposed product provides specified warranty.
 - 4. List of similar installations for completed projects with project names and addresses and names and addresses of Engineers and owners, if requested.
 - 5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. Installation of the Work.
 - 4. Cutting and patching.
 - 5. Coordination of Owner-installed products.
 - 6. Progress cleaning.
 - 7. Starting and adjusting.
 - 8. Protection of installed construction.
 - 9. Correction of the Work.

B. Related Sections:

- 1. Division 01 Section "Submittal Procedures".
- Division 01 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
- 3. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.3 **DEFINITIONS**

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 SUBMITTALS

- A. Qualification Data: For professional land surveyor.
- B. Certificates: Submit certificate signed by professional land surveyor certifying that location and elevation of improvements comply with requirements.
- C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- D. Certified Surveys: Submit two copies signed by professional land surveyor.

1.5 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 - Structural Elements: When cutting and patching structural elements, notify Engineer of locations and details of cutting and await directions from the Engineer before proceeding. Shore, brace, and support structural element during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
 - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety. Operational elements include, but are not limited to the following:
 - a. Primary operational systems and equipment.
 - b. Fire-suppression systems.
 - c. Mechanical systems piping and ducts.
 - d. Control systems.
 - e. Communication systems.
 - f. Conveying systems.
 - g. Electrical wiring systems.
 - h. Operating systems of special construction.
 - 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity that results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or

safety. Other construction elements include but are not limited to the following:

- a. Water, moisture, or vapor barriers.
- b. Membranes and flashings.
- c. Equipment supports.
- d. Piping, ductwork, vessels, and equipment.
- e. Noise- and vibration-control elements and systems.
- 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Engineer's opinion, reduce the structure's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

1.6 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to the Engineer for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 **EXAMINATION**

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before

beginning work, investigate and verify the existence and location of all structures, underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility and/or Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately upon discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of the Contractor, submit a request for information to Engineer according to requirements in Division 01 Section "Project Management and Coordination." Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Engineer promptly.
- B. General: Engage a professional land surveyor to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines as needed to locate each element of Project.
 - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 3. Inform installers of lines and levels to which they must comply.

- 4. Check the location, level and plumb, of every major element as the Work progresses.
- 5. Notify Engineer when deviations from required lines and levels exceed allowable tolerances.
- 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Engineer.

3.4 <u>FIELD ENGINEERING</u>

- A. Identification: Contractor shall identify existing or establish benchmarks, control points, and property corners as necessary.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Engineer. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Engineer before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.

- 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D. Certified Survey: Upon completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Attachment: Provide blocking, attachment plates, anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Engineer.

- 2. Allow for structure movement, including thermal expansion and contraction.
- Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Temporary Support: Provide temporary support of work to be cut.
- C. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- D. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements of Division 01 Section "Summary."
- E. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption of services.
- F. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

- 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
- 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
- 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
- 4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
- 5. Mechanical and Electrical Services: Cut off pipe or conduit to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
- 6. Proceed with patching after construction operations requiring cutting are complete.
- G. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 - 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

- 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.
- H. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: When required, coordinate construction and operations of the Work with work performed by Owner's construction personnel.
 - Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 - 2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.8 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 degrees F.
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Utilize containers intended for holding waste materials of type to be stored.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

- 1. Remove liquid spills promptly.
- 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Division 01 Section "Construction Waste Management".
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.9 **STARTING AND ADJUSTING**

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Division 01 Section "General Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.11 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017000

PART 1 - GENERAL

1.1

RELATED DOCUMENTS

Α. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 **SUMMARY**

- Α. Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous demolition and construction waste.
 - 2. Recycling nonhazardous demolition and construction waste.
 - Disposing of nonhazardous demolition and construction waste. 3.

B. Related Sections:

- Division 01 Section "Temporary Facilities and Controls" for environmentalprotection measures during construction, and location of waste containers at Project site.
- 2. Division 02 Section "Demolition" for disposition of waste resulting from demolition of buildings, structures, and site improvements, and for disposition of hazardous waste.
- 3. Division 04 Section "Unit Masonry" for disposal requirements for masonry
- 4. Division 31 Section "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.3 **DEFINITIONS**

- Construction Waste: Building and site improvement materials and other solid Α. waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- Removal off-site of demolition and construction waste and C. Disposal: subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 PERFORMANCE REQUIREMENTS (Not Used)

1.5 <u>SUBMITTALS</u> (Not Used)

1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Waste Management Conference: Conduct conference at Project site. Review methods and procedures related to waste management including, but not limited to, the following:
 - 1. Review and discuss waste management plan including responsibilities of Contractor's waste management coordinator.
 - 2. Review requirements for documenting each type of waste and its disposition.
 - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 - 5. Review waste management requirements for each trade.

1.7 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing, and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of

waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

- 1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
- 2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
- 3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
- 4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
- 5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
- 6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.
- D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include the following:
 - 1. Total quantity of waste.
 - 2. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers for each type of waste.
 - 3. Total cost of disposal (with no waste management).
 - 4. Revenue from salvaged materials.
 - 5. Revenue from recycled materials.
 - 6. Savings in hauling and tipping fees by donating materials.
 - 7. Savings in hauling and tipping fees that are avoided.
 - 8. Handling and transportation costs. Include cost of collection containers for each type of waste.
 - 9. Net additional cost or net savings from waste management plan.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 - 1. Comply with Division 01 Section "Temporary Facilities and Controls" for operation, termination, and removal requirements.
- B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
 - 1. Distribute waste management plan to everyone concerned within three days of submittal return.
 - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 - 2. Comply with Division 01 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until installation.
 - 4. Protect items from damage during transport and storage.
 - Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

- B. Salvaged Items for Sale and Donation: Not permitted on Project site.
- C. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area as designated by Owner.
 - 5. Protect items from damage during transport and storage.
- D. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.
- E. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
- F. Plumbing Fixtures: Separate by type and size.
- G. Lighting Fixtures: Separate lamps by type and protect from breakage.
- H. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.
 - 1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.

- 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
- 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
- 4. Store components off the ground and protect from the weather.
- 5. Remove recyclable waste off Owner's property and transport to recycling receiver or processor.

3.4 RECYCLING DEMOLITION WASTE

- A. Asphaltic Concrete Paving: Grind asphalt to maximum 1-1/2-inch size.
 - 1. Crush asphaltic concrete paving and screen to comply with requirements in Division 31 Section "Earth Moving" for use as general fill.
- B. Asphaltic Concrete Paving: Break up and transport paving to asphalt-recycling facility.
- C. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
 - 1. Pulverize concrete to maximum 1-1/2-inch size.
 - Crush concrete and screen to comply with requirements in Division 31 Section "Earth Moving" for use as satisfactory soil for fill or subbase.
- D. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
 - 1. Pulverize masonry to maximum 1-1/2-inch size.
 - a. Crush masonry and screen to comply with requirements in Division 31 Section "Earth Moving" for use as satisfactory soil for fill or subbase.
 - 2. Clean and stack undamaged, whole masonry units on wood pallets.
- E. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- F. Metals: Separate metals by type.
 - 1. Structural Steel: Stack members according to size, type of member, and length.
 - 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

- G. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.
- H. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- I. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.
- J. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.
- K. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
- L. <u>Electrical Devices</u>: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.
- M. Conduit: Reduce conduit to straight lengths and store by type and size.

3.5 <u>RECYCLING CONSTRUCTION WASTE</u>

A. Packaging:

- 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
- 2. Polystyrene Packaging: Separate and bag materials.
- Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
- 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Site-Clearing Wastes: Chip brush, branches, and trees on-site, if permitted by Owner, or at landfill facility.
 - 1. Comply with requirements in other specification sections for use of chipped organic waste as organic mulch.

C. Wood Materials:

- 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
- 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

- a. Comply with requirements in other specification sections for use of clean sawdust as organic mulch.
- D. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.
 - 1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.
 - a. Comply with requirements in other specification sections for use of clean ground gypsum board as inorganic soil amendment.

3.6 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 017419

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Miscellaneous record submittals.

B. Related Sections:

- 1. Division 01 Section "Closeout Procedures" for general closeout procedures.
- 2. Divisions 2 through 33 Sections for specific requirements for project record documents of the Work in those Sections.

1.3 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set of marked-up record prints and one digital copy as described below.
- B. Miscellaneous Record Submittals: Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one paper copy and one digital copy of each submittal as described below.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings.
 - Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below grade.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Changes made by Change Order or Work Change Directive.
 - i. Changes made following Engineer's written orders.
 - j. Details not on the original Contract Drawings.
 - k. Field records for variable and concealed conditions.
 - I. Record information on the Work that is shown only schematically.
 - 3. Mark the Contract Drawings completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
 - 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 - 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 6. Note Change Order or Work Change Directive numbers, alternate numbers, and similar identification, where applicable.

- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Engineer. When authorized, prepare a digital copy of those Contract Drawings.
- C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Provide information in the following formats:
 - 1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 - 2. Record Digital Data Files on a disk: Organize digital data information into separate PDF electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 - 3. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Contractor.

2.2 <u>MISCELLANEOUS RECORD SUBM</u>ITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit three (3) paper copies and two (2) digital copies of all miscellaneous records.
 - Include a miscellaneous record submittals directory organized by specification section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and modifications to project record documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents: Store record documents in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Engineer's reference during normal working hours.

END OF SECTION 017839

SECTION 019113 GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general requirements that apply to implementation of commissioning without regard to specific systems, assemblies, or components.

B. Related Sections:

1. Divisions 2 through 33 Sections for specific commissioning requirements for the Work in those Sections.

1.3 **DEFINITIONS**

- A. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.
- B. Manufacturer: Generally the equipment manufacturer and/or their authorized representative.
- C. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

1.4 COMMISSIONING TEAM

A. Members Appointed by Contractor: Individuals, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated action. The commissioning team shall consist of, but not be limited to, representatives of Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate including the manufacturer. 1. Manufacturer: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Contractor will engage the manufacturer under this contract.

B. Members Appointed by Owner:

- 1. Representatives of the Owner that will operate and maintain the facility.
- 2. Engineer.

1.5 OWNER'S RESPONSIBILITIES

A. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities.

1.6 CONTRACTOR'S RESPONSIBILITIES

- A. Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:
 - 1. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
 - 2. Cooperate with the manufacturer for resolution of issues recorded in the Issues Log.
 - 3. Attend commissioning team meetings held during applicable monthly progress meetings and other specially called meetings.
 - 4. Integrate and coordinate commissioning process activities with construction schedule.
 - 5. Review and accept construction checklists provided by the manufacturer.
 - 6. Review and accept commissioning process test procedures provided by the manufacturer.
 - 7. Complete commissioning process test procedures.

1.7 MANUFACTURER'S RESPONSIBILITIES

- A. Organize and lead the commissioning team.
- B. Provide commissioning plan.
- C. Convene commissioning team meetings.
- D. Provide Project-specific construction checklists and commissioning process test procedures.

- E. Verify the execution of commissioning process activities. Verification will include, but is not limited to, equipment submittals, construction checklists, training, operating and maintenance data, tests, and test reports to verify compliance with requirements. Report any failures in the Issues Log.
- F. Prepare and maintain the Issues Log.
- G. Prepare and maintain completed construction checklist log.
- H. Witness systems, assemblies, equipment, and component startup.
- I. Compile test data, inspection reports, and certificates; include them in the systems manual and commissioning process report.
- J. Complete the "Equipment Start-Up Form" at the end of this section.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 019113

(Standard Form Attached)



EQUIPMENT START-UP FORM	Proj. #
NO.	Date:

PRO	JECT DATA				
NAME:		NUMBER:			
	ation:	DATE:			
OWN		DRAWING NO.:			
OTHE		SPEC. SECTION:			
NAME	OF EQUIPMENT CHECKED:				
NAME	OF MANUFACTURER OF EQUIPMENT				
1.	The equipment furnished by us has been checked on the job by us. We have reviewed (where applicable) the performance verification information submitted to us by the Contractor.				
2.	The equipment is properly installed, except for the items noted below.*				
3. 4.	The equipment is operating satisfactorily, except for the items noted below.* The written operating and maintenance (O&M) information (where applicable) has been presented to the Owner, and gone over with the Owner in detail. Three (3) copies of applicable O&M documents and parts lists have been furnished to Owner.				
CHE	CKED BY:				
Name	of Manufacturer's Representative	Name of General Contractor			
Addre	ss & Phone No. of Representative	Authorized Signature/Title/Date			
Signat	ture and Title of Person Making Check	Name of Subcontractor			
Date 0	Checked	Authorized Signature/Title/Date			
MAN	UFACTURER'S REPRESENTATIVE Notation	ns: Exceptions noted at the time of check were:			
	acturer's Representative to note adequacy of related equipment ed. (No comment presented herein will indicate adequacy of rela	that directly affects operation, performance or function of equipment ated systems or equipment.)			
COPI	ES TO:				
	OWNER:	CONTRACTOR:			
	☐ ENGINEER:				
	☐ ARCHITECT:	☐ OTHER:			

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section

1.02 **SUMMARY**

- A. Section Includes:
 - 1. Copper building wire rated 600 V or less.
 - 2. Connectors, splices, and terminations rated 600 V and less.

B. Related Requirements:

1. Section 260523 "Control-Voltage Electrical Power Cables" for control systems communications cables and Classes 1, 2, and 3 control cables.

1.03 <u>ACTION SUBMITTALS</u>

A. Product Data: For each type of product.

1.04 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

PART 2 - PRODUCTS

2.01 COPPER WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- B. Standards:

- 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- 2. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- C. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.
- D. Conductor Insulation:
 - 1. Type THHN and Type THWN-2: Comply with UL 83.

2.02 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
 - 1. Material: Copper.
 - 2. Type: One hole with standard barrels.
 - 3. Termination: Compression.

PART 3 - EXECUTION

3.01 CONDUCTOR MATERIAL APPLICATIONS

A. Branch Circuits: Copper. Solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.

3.02 <u>CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE</u> APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type THHN/THWN-2, single conductors in raceway.
- B. Exposed Branch Circuits: Type THHN/THWN-2, single conductors in raceway.
- C. Branch Circuits Concealed in Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway.
- D. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

3.03 <u>INSTALLATION OF CONDUCTORS AND CABLES</u>

- A. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.
- E. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

3.04 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.05 <u>IDENTIFICATION</u>

A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."

3.06 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
 - 2. Perform each of the following visual and electrical tests:

- a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
- b. Test bolted connections for high resistance using one of the following:
 - 1) A low-resistance ohmmeter.
 - 2) Calibrated torque wrench.
 - 3) Thermographic survey.
- c. Inspect compression-applied connectors for correct cable match and indentation.
- d. Inspect for correct identification.
- e. Inspect cable jacket and condition.
- f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable for a one-minute duration.
- g. Continuity test on each conductor and cable.
- h. Uniform resistance of parallel conductors.
- 3. Initial Infrared Scanning: After Substantial Completion, but before Final Acceptance, perform an infrared scan of each splice in conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner. Correct deficiencies determined during the scan.
 - a. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - b. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
- 4. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.
- B. Cables will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports to record the following:
 - 1. Procedures used.
 - 2. Results that comply with requirements.
 - 3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION

SECTION 260523 - CONTROL-VOLTAGE ELECTRICAL POWER CABLES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 **SUMMARY**

- A. Section Includes:
 - 1. Category 6 balanced twisted pair cable.
 - 2. Balanced twisted pair cabling hardware.
 - 3. RS-485 cabling.
 - 4. Low-voltage control cabling.
 - 5. Control-circuit conductors.
 - 6. Optical fiber cable.
 - 7. Identification products.

1.03 **DEFINITIONS**

- A. EMI: Electromagnetic interference.
- B. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.
- C. Plenum: A space forming part of the air distribution system to which one or more air ducts are connected. An air duct is a passageway, other than a plenum, for transporting air to or from heating, ventilating, or air-conditioning equipment.
- D. RCDD: Registered Communications Distribution Designer.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.05 <u>INFORMATIONAL SUBMITTALS</u>

- A. Qualification Data: For testing agency, RCDD, layout technician, installation supervisor, and field inspector.
- B. Source quality-control reports.
- C. Field quality-control reports.

1.06 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Accredited by NETA.
 - 1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. RoHS compliant.

2.02 <u>CATEGORY 6 BALANCED TWISTED PAIR CABLE</u>

- A. Description: Four-pair, balanced-twisted pair cable, with internal spline, certified to meet transmission characteristics of Category 6 cable at frequencies up to 250MHz.
- B. Standard: Comply with NEMA WC 66/ICEA S-116-732 and TIA-568-C.2 for Category 6 cables.
- C. Conductors: 100-ohm, 23 AWG solid copper.
- D. Shielding/Screening: Shielded twisted pairs (FTP) Screened twisted pairs (F/UTP) Screened and shielded twisted pairs (F/FTP).
- E. Cable Rating: Plenum.
- F. Jacket: Gray thermoplastic.

2.03 BALANCED TWISTED PAIR CABLE HARDWARE

- A. Description: Hardware designed to connect, splice, and terminate balanced twisted pair copper communications cable.
- B. General Requirements for Balanced Twisted Pair Cable Hardware:
 - 1. Comply with the performance requirements of Category 6a.
 - 2. Comply with TIA-568-C.2, IDC type, with modules designed for punch-down caps or tools.
 - 3. Cables shall be terminated with connecting hardware of same category or higher.
- C. Source Limitations: Obtain balanced twisted pair cable hardware from same manufacturer as balanced twisted pair cable, from single source.
- D. Connecting Blocks: 110-style IDC for Category 6. Provide blocks for the number of cables terminated on the block, plus 25 percent spare, integral with connector bodies, including plugs and jacks where indicated.
- E. Cross-Connect: Modular array of connecting blocks arranged to terminate building cables and permit interconnection between cables.
 - 1. Number of Terminals per Field: One for each conductor in assigned cables.
- F. Patch Panel: Modular panels housing numbered jack units with IDC-type connectors at each jack location for permanent termination of pair groups of installed cables.
 - 1. Features:
 - a. Universal T568A and T568B wiring labels.
 - b. Labeling areas adjacent to conductors.
 - c. Replaceable connectors.
 - d. 24 or 48 ports.
 - 2. Construction: 16-gauge steel and mountable on 19-inch equipment racks.
 - 3. Number of Jacks per Field: One for each four-pair conductor group of indicated cables, plus spares and blank positions adequate to suit specified expansion criteria.
- G. Patch Cords: Factory-made, four-pair cables in 36-inchlengths; terminated with an eight-position modular plug at each end.
 - 1. Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure performance. Patch cords shall have latch guards to protect against snagging.

H. Plugs and Plug Assemblies:

- 1. Male; eight position; color-coded modular telecommunications connector designed for termination of a single four-pair 100-ohm unshielded or shielded balanced twisted pair cable.
- 2. Comply with IEC 60603-7-1, IEC 60603-7-2, IEC 60603-7-3, IEC 60603-7-4, and IEC 60603-7.5.

I. Jacks and Jack Assemblies:

- 1. Female; eight position; modular; fixed telecommunications connector designed for termination of a single four-pair 100-ohm unshielded or shielded balanced twisted pair cable.
- 2. Designed to snap-in to a patch panel or faceplate.
- 3. Standards:
 - a. Category 6, unshielded balanced twisted pair cable shall comply with IEC 60603-7-4.

J. Faceplate:

- 1. Four port, vertical single-gang faceplates designed to mount to single-gang wall boxes.
- 2. Eight port, vertical double-gang faceplates designed to mount to double-gang wall boxes.
- 3. Plastic Faceplate: High-impact plastic. Coordinate color with Section 262726 "Wiring Devices."
- 4. Metal Faceplate: Stainless steel, complying with requirements in Section 262726 "Wiring Devices."
- 5. For use with snap-in jacks accommodating any combination of balanced twisted pair, optical fiber, and coaxial work area cords.
 - a. Flush mounting jacks, positioning the cord at a 45-degree angle.

K. Legend:

- 1. Machine printed, in the field, using adhesive-tape label.
- 2. Snap-in, clear-label covers and machine-printed paper inserts.

2.04 CONTROL-CIRCUIT CONDUCTORS

- A. Class 1 Control Circuits: Stranded copper, Type THHN/THWN-2, complying with UL 83 in raceway.
- B. Class 2 Control Circuits: Stranded copper, Type THHN/THWN-2, complying with UL 83 in raceway.

- C. Class 3 Remote-Control and Signal Circuits: Stranded copper, Type THHN/THWN-2, complying with UL 83 in raceway.
- D. Class 2 Control Circuits and Class 3 Remote-Control and Signal Circuits That Supply Critical Circuits: Circuit Integrity (CI) cable.
 - 1. Smoke control signaling and control circuits.

2.05 OPTICAL FIBER CABLE

- A. Description: Single mode, 9/125-micrometer, 12 fibers, tight buffered, non-conductive optical fiber cable.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. 3M.
 - 2. Belden, Inc.
 - 3. Corning Optical Communications; Corning Incorporated.
- C. Maximum Attenuation: 0.5 dB/km at 1310nm.
- D. Jacket:
 - 1. Jacket Color: Yellow.
 - 2. Cable cordage jacket, fiber, unit and group color shall be according to TIA-598-D.
 - 3. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches.

E. Standards:

- 1. Comply with TIA-492CAAAA for detailed specifications.
- 2. Comply with TIA-568-C.3 for performance specifications.
- 3. Comply with ICEA S-104-696 for mechanical properties.
- F. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following type:
 - 1. Plenum Rated, Non-Conductive: Type OFNP, complying with NFPA 262.
- G. Strength Member: The center of the core shall contain a non-metallic strength member optimized so as to limit the application of maximum recommended installation tension.

2.06 SOURCE QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to evaluate cables.
- B. Factory test twisted pair cables according to TIA-568-C.2.

- C. Cable will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.01 **EXAMINATION**

- A. Test cables on receipt at Project site.
 - 1. Test each pair of twisted pair cable for open and short circuits.

3.02 INSTALLATION OF RACEWAYS AND BOXES

- A. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems" for raceway selection and installation requirements for boxes, conduits, and wireways as supplemented or modified in this Section.
 - 1. Outlet boxes shall be no smaller than 2 inches wide, 3 inches high, and 2-1/2 inches deep.
 - 2. Outlet boxes for cables shall be no smaller than 4 inches square by 2-1/8 inches deep with extension ring sized to bring edge of ring to within 1/8 inch of the finished wall surface.
 - 3. Flexible metal conduit shall not be used.
- B. Comply with TIA-569-D for pull-box sizing and length of conduit and number of bends between pull points.
- C. Install manufactured conduit sweeps and long-radius elbows if possible.
- D. Raceway Installation in Equipment Rooms:
 - 1. Position conduit ends adjacent to a corner on backboard if a single piece of plywood is installed, or in the corner of the room if multiple sheets of plywood are installed around perimeter walls of the room.
 - 2. Install cable trays to route cables if conduits cannot be located in these positions.
 - 3. Secure conduits to backboard if entering the room from overhead.
 - Extend conduits 3 inches above finished floor.
 - 5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.
- E. Backboards: Install backboards with 96-inch dimension vertical. Butt adjacent sheets tightly and form smooth gap-free corners and joints.

3.03 <u>INSTALLATION OF CONDUCTORS AND CABLES</u>

- A. Comply with NECA 1.
- B. General Requirements for Cabling:
 - 1. Comply with TIA-568-C Series of standards.
 - 2. Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems."
 - 3. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
 - 4. Cables may not be spliced and shall be continuous from terminal to terminal. Do not splice cable between termination, tap, or junction points.
 - 5. Cables serving a common system may be grouped in a common raceway. Install network cabling and control wiring and cable in separate raceway from power wiring. Do not group conductors from different systems or different voltages.
 - 6. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
 - 7. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems." Install lacing bars and distribution spools.
 - 8. Do not install bruised, kinked, scored, deformed, or abraded cable. Remove and discard cable if damaged during installation and replace it with new cable.
 - 9. Cold-Weather Installation: Bring cable to room temperature before dereeling. Do not use heat lamps for heating.
 - 10. Pulling Cable: Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems." Monitor cable pull tensions.
 - 11. Support: Do not allow cables to lie on removable ceiling tiles.
 - 12. Secure: Fasten securely in place with hardware specifically designed and installed so as to not damage cables.
 - 13. Provide strain relief.
 - 14. Keep runs short. Allow extra length for connecting to terminals. Do not bend cables in a radius less than 10 times the cable OD. Use sleeves or grommets to protect cables from vibration at points where they pass around sharp corners and through penetrations.
 - 15. Ground wire shall be copper, and grounding methods shall comply with IEEE C2. Demonstrate ground resistance.
- C. Balanced Twisted Pair Cable Installation:
 - 1. Comply with TIA-568-C.2.
 - 2. Install termination hardware as specified in Section 271513 "Communications Copper Horizontal Cabling" unless otherwise indicated.

3. Do not untwist balanced twisted pair cables more than 1/2 inch at the point of termination to maintain cable geometry.

D. Installation of Control-Circuit Conductors:

- 1. Install wiring in raceways.
- 2. Use insulated spade lugs for wire and cable connection to screw terminals.
- 3. Comply with requirements specified in Section 260533 "Raceways and Boxes for Electrical Systems."

E. Open-Cable Installation:

- 1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
- 2. Suspend copper cable not in a wireway or pathway a minimum of 8 inches above ceilings by cable supports not more than 30 inches apart.
- 3. Cable shall not be run through or on structural members or in contact with pipes, ducts, or other potentially damaging items. Do not run cables between structural members and corrugated panels.

F. Installation of Cable Routed Exposed under Raised Floors:

- 1. Install plenum-rated cable only.
- 2. Install cabling after the flooring system has been installed in raised floor areas.
- 3. Below each feed point, neatly coil a minimum of 72 inches of cable in a coil not less than 12 inches in diameter.

G. Separation from EMI Sources:

- 1. Comply with BICSI TDMM and TIA-569-D recommendations for separating unshielded copper voice and data communications cable from potential EMI sources including electrical power lines and equipment.
- 2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
 - Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 5 inches.
 - b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 12 inches.
 - c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 24 inches.

- 3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
 - a. Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
 - b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 6 inches.
 - c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 12 inches.
- 4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
 - a. Electrical Equipment or Circuit Rating Less Than 2 kVA: No requirement.
 - b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 3 inches.
 - c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 6 inches.
- 5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or 5 HP and Larger: A minimum of 48 inches.
- 6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches.

3.04 REMOVAL OF CONDUCTORS AND CABLES

A. Remove abandoned conductors and cables. Abandoned conductors and cables are those installed that are not terminated at equipment and are not identified with a tag for future use.

3.05 CONTROL-CIRCUIT CONDUCTORS

- A. Minimum Conductor Sizes:
 - 1. Class 1 remote-control and signal circuits; No 14 AWG.
 - 2. Class 2 low-energy, remote-control, and signal circuits; No. 16 AWG.
 - 3. Class 3 low-energy, remote-control, alarm, and signal circuits; No 12 AWG.

3.06 GROUNDING

- A. For data communication wiring, comply with TIA-607-B and with BICSI TDMM, "Bonding and Grounding (Earthing)" Chapter.
- B. For low-voltage control wiring and cabling, comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

3.07 <u>IDENTIFICATION</u>

- A. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- B. Identify data and communications system components, wiring, and cabling according to TIA-606-B; label printers shall use label stocks, laminating adhesives, and inks complying with UL 969.
- C. Identify each wire on each end and at each terminal with a number-coded identification tag. Each wire shall have a unique tag.

3.08 FIELD QUALITY CONTROL

- A. Perform tests and inspections with the assistance of a factory-authorized service representative.
- B. Tests and Inspections:
 - 1. Visually inspect cable jacket materials for UL or third-party certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA-568-C.1.
 - 2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
 - 3. Test cabling for direct-current loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination, but not after cross-connection.
 - a. Test instruments shall meet or exceed applicable requirements in TIA-568-C.2. Perform tests with a tester that complies with performance requirements in its "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in its "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.

- C. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.
- D. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

END OF SECTION

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<u>SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS</u>

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section

1.02 **SUMMARY**

- A. Section includes grounding and bonding systems and equipment.
- B. Section includes grounding and bonding systems and equipment, plus the following special applications:
 - 1. Underground distribution grounding.
 - 2. Ground bonding common with lightning protection system.
 - 3. Foundation steel electrodes.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.04 <u>INFORMATIONAL SUBMITTALS</u>

- A. Coordination Drawings: Plans showing dimensioned locations of grounding features specified in "Field Quality Control" Article, including the following:
 - 1. Ground rods.
- B. Field quality-control reports.

1.05 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals.
 - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

- a. Plans showing as-built, dimensioned locations of system described in "Field Quality Control" Article, including the following:
 - 1) Ground rods.

1.06 QUALITY ASSURANCE

A. Testing Agency Qualifications: Certified by NETA.

PART 2 - PRODUCTS

2.01 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

2.02 CONDUCTORS

- A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - Solid Conductors: ASTM B3.
 - 2. Stranded Conductors: ASTM B8.
 - Tinned Conductors: ASTM B33.
- C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches in cross section, with 9/32-inch holes spaced 1-1/8 inches apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V and shall be Lexan or PVC, impulse tested at 5000 V.

2.03 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

- C. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.
- D. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.
- E. Cable-to-Cable Connectors: Compression type, copper or copper alloy.
- F. Conduit Hubs: Mechanical type, terminal with threaded hub.
- G. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.
- H. Lay-in Lug Connector: Mechanical type, copper rated for direct burial terminal with set screw.
- I. Service Post Connectors: Mechanical type, bronze alloy terminal, in short- and long-stud lengths, capable of single and double conductor connections.
- J. Signal Reference Grid Clamp: Mechanical type, stamped-steel terminal with hex head screw.
- K. Straps: Solid copper, copper lugs. Rated for 600 A.
- L. Tower Ground Clamps: Mechanical type, copper or copper alloy, terminal two-piece clamp.
- M. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.

2.04 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet.

PART 3 - EXECUTION

3.01 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Main Bonding Jumper: #1/0 AWG green-colored insulation.
- C. Equipment Grounding Conductors: Green-colored insulation sized per drawings.

- D. Grounding Electrode Conductor: #1/0 AWG continuous bare copper wire. Above ground portions of grounding electrode conductor shall be installed in rigid galvanized steel conduit. Underground portions of grounding electrode conductor shall be direct buried a minimum of 12" below finished grade.
- E. Grounding Electrode Bonding Jumpers: #1/0 AWG continuous bare copper wire. Connections between grounding electrode bonding jumpers and grounding electrodes shall be exothermic weld except for in test wells. Install grounding electrode bonding jumpers a minimum of 12" below finished grade.
- F. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - Connections to Ground Rods:
 - a. At Test Wells: Bolted connectors.
 - b. All Others: Exothermic weld.
 - 3. Connections to Structural Steel: Exothermic weld.

3.02 **GROUNDING AT THE SERVICE**

A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.03 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

- A. Comply with IEEE C2 grounding requirements.
- B. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below concrete. Seal floor opening with waterproof, nonshrink grout.
- C. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields according to written instructions by manufacturer of splicing and termination kits.

D. Pad-Mounted Transformers and Switches: Install two ground rods around the pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with substations by connecting them to underground cable and grounding electrodes. Install tinned-copper conductor #1/0 AWG for grounding electrode bonding jumpers and for taps to equipment grounding terminals.

3.04 **EQUIPMENT GROUNDING**

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.
- C. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.
- D. Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.05 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.
- C. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.

- Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
- 2. For grounding electrode system, install number of rods as indicated on drawings, spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
- D. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Section 260543 "Underground Ducts and Raceways for Electrical Systems," and shall be at least 12 inches deep, with cover.
 - Install at least one test well for each service unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.
- E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
 - 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- F. Grounding and Bonding for Piping:
 - Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 - 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 - 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- G. Concrete-Encased Grounding Electrode (Ufer Ground): Fabricate according to NFPA 70; using electrically conductive coated steel reinforcing bars or rods, at least 20 feet long. If reinforcing is in multiple pieces, connect together by the usual steel tie wires or exothermic welding to create the required length.

- H. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 - 4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
 - 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

3.06 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 - 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
 - 3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells, and at individual ground rods. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.
 - 4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
- C. Grounding system will be considered defective if it does not pass tests and inspections.

- D. Prepare test and inspection reports.
- E. Report measured ground resistances that exceed the following values:
 - 1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
 - 2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
 - 3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
 - 4. Power Distribution Units or Panelboards Serving Electronic Equipment: 1 ohm(s).
 - 5. Substations and Pad-Mounted Equipment: 5 ohms.
 - 6. Manhole Grounds: 10 ohms.
- F. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION

<u>SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS</u>

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section

1.02 **SUMMARY**

- A. Section Includes:
 - 1. Steel slotted support systems.
 - 2. Conduit and cable support devices.
 - 3. Support for conductors in vertical conduit.
 - 4. Structural steel for fabricated supports and restraints.
 - 5. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
 - 6. Fabricated metal equipment support assemblies.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - a. Slotted support systems, hardware, and accessories.
 - b. Clamps.
 - c. Hangers.
 - d. Sockets.
 - e. Eye nuts.
 - f. Fasteners.
 - g. Anchors.
 - h. Saddles.
 - i. Brackets.
 - 2. Include rated capacities and furnished specialties and accessories.

- B. Shop Drawings: For fabrication and installation details for electrical hangers and support systems.
 - 1. Hangers. Include product data for components.
 - 2. Slotted support systems.
 - 3. Equipment supports.
 - 4. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

1.04 **QUALITY ASSURANCE**

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M.
 - 2. AWS D1.2/D1.2M.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Hangers and supports shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the supported equipment and systems will remain in place without separation of any parts when subjected to the seismic forces specified and the supported equipment and systems will be fully operational after the seismic event."
 - 2. Component Importance Factor: 1.0.

2.02 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch-diameter holes at a maximum of 8 inches o.c. in at least one surface.
 - 1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 - 2. Material for Channel, Fittings, and Accessories: Stainless steel, Type 304.
 - 3. Channel Width: Selected for applicable load criteria.
 - 4. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

- B. Conduit and Cable Support Devices: Stainless-steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be made of malleable iron.
- D. Structural Steel for Fabricated Supports and Restraints: ASTM A36/A36M steel plates, shapes, and bars; black and galvanized.

2.03 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

PART 3 - EXECUTION

3.01 APPLICATION

- A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
 - 1. NECA 1.
 - 2. NECA 101
- B. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- C. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- D. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slottedsupport system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with two-bolt conduit clamps.

3.02 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT IMC and RMC may be supported by openings through structure members, according to NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To New Concrete: Bolt to concrete inserts.
 - 2. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 3. To Existing Concrete: Expansion anchor fasteners.
 - 4. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
 - 5. To Light Steel: Sheet metal screws.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.03 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- B. Field Welding: Comply with AWS D1.1/D1.1M.

3.04 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000-psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Section 033000 "Cast-in-Place Concrete."

- C. Anchor equipment to concrete base as follows:
 - 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.05 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touchup: Comply with requirements in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting" for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A780.

END OF SECTION

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<u>SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS</u>

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section

1.02 **SUMMARY**

- A. Section Includes:
 - 1. Metal conduits and fittings.
 - 2. Nonmetallic conduits and fittings.
 - 3. Surface raceways.
 - 4. Boxes and enclosures.

B. Related Requirements:

1. Section 260543 "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks, manholes, and underground utility construction.

1.03 **DEFINITIONS**

- A. ARC: Aluminum rigid conduit.
- B. GRC: Galvanized rigid steel conduit.
- C. IMC: Intermediate metal conduit.
- D. RNC: Rigid non-metallic conduit.

1.04 ACTION SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Sustainable Design Submittals:

C. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

1.05 <u>INFORMATIONAL SUBMITTALS</u>

- A. Seismic Qualification Data: Certificates, for enclosures, cabinets, and conduit racks and their mounting provisions, including those for internal components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
 - 4. Detailed description of conduit support devices and interconnections on which the certification is based and their installation requirements.
- B. Source quality-control reports.

PART 2 - PRODUCTS

2.01 METAL CONDUITS AND FITTINGS

A. Metal Conduit:

- 1. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- 2. GRC: Comply with ANSI C80.1 and UL 6.
- 3. ARC: Comply with ANSI C80.5 and UL 6A.
- 4. IMC: Comply with ANSI C80.6 and UL 1242.
- 5. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
 - a. Comply with NEMA RN 1.
 - b. Coating Thickness: 0.040 inch, minimum.
- 6. FMC: Comply with UL 1; zinc-coated steel.
- 7. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

B. Metal Fittings:

- 1. Comply with NEMA FB 1 and UL 514B.
- 2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- 3. Fittings, General: Listed and labeled for type of conduit, location, and use.

- 4. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.
- 5. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
- 6. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.
- C. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.02 NONMETALLIC CONDUITS AND FITTINGS

A. Nonmetallic Conduit:

- 1. Listing and Labeling: Nonmetallic conduit shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- 2. RNC: Type EPC-80-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
- 3. LFNC: Comply with UL 1660.

B. Nonmetallic Fittings:

- 1. Fittings, General: Listed and labeled for type of conduit, location, and use.
- 2. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
 - a. Fittings for LFNC: Comply with UL 514B.
- 3. Solvents and Adhesives: As recommended by conduit manufacturer.

2.03 SURFACE RACEWAYS

- A. Listing and Labeling: Surface raceways and tele-power poles shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Surface Metal Raceways: Galvanized steel with snap-on covers complying with UL 5. Manufacturer's standard enamel finish in color selected by Architect.
- C. Surface Nonmetallic Raceways: Two- or three-piece construction, complying with UL 5A, and manufactured of rigid PVC with texture and color selected by

Architect from manufacturer's standard colors. Product shall comply with UL 94 V-0 requirements for self-extinguishing characteristics.

2.04 BOXES AND ENCLOSURES

- A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- B. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, aluminum, Type FD, with gasketed cover.
- D. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.
- E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- F. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.
- G. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- H. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.
- I. Gangable boxes are prohibited.
- J. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 3R with continuous-hinge cover with flush latch unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - Nonmetallic Enclosures: Plastic.
 - 3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

PART 3 - EXECUTION

3.01 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
 - 1. Exposed Conduit: GRC.
 - Concealed Conduit, Aboveground: RNC, Type EPC-40-PVC.

- 3. Underground Conduit: RNC, Type EPC-80-PVC, concrete encased under pavement, direct buried for runs not under pavement.
- 4. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R unless otherwise stated on drawings.
- B. Minimum Raceway Size: 1-inch trade size.
- C. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 - 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
- D. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

3.02 <u>INSTALLATION</u>

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- B. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- C. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- D. Complete raceway installation before starting conductor installation.
- E. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- G. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- H. Install conduits parallel or perpendicular to building lines.

- I. Support conduit within 12 inches of enclosures to which attached.
- J. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.
 - 2. Arrange raceways to keep a minimum of 1 inch of concrete cover in all directions.
 - 3. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
- K. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- L. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
- M. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- N. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- O. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- P. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- Q. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- R. Surface Raceways:
 - 1. Install surface raceway with a minimum 2-inch radius control at bend points.
 - 2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per

- straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.
- S. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.
- T. Install devices to seal raceway interiors at accessible locations. Seal the interior of all raceways at the following points:
 - 1. Where required by NFPA 70.
- U. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- V. Expansion-Joint Fittings:
 - 1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F and that has straight-run length that exceeds 25 feet. Install in each run of aboveground RMC conduit that is located where environmental temperature change may exceed 100 deg F and that has straight-run length that exceeds 100 feet
 - 2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
 - c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.
 - 3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
 - 4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 - 5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

- W. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- X. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
- Y. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- Z. Locate boxes so that cover or plate will not span different building finishes.
- AA. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- BB. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- CC. Set metal floor boxes level and flush with finished floor surface.
- DD. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.03 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

<u>SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR</u> ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section

1.02 **SUMMARY**

- A. Section Includes:
 - 1. Metal conduits and fittings, including GRC and PVC-coated steel conduit.
 - 2. Rigid nonmetallic duct.
 - 3. Duct accessories.
 - 4. Polymer concrete handholes and boxes with polymer concrete cover.
 - 5. Precast manholes.
 - 6. Utility structure accessories.

1.03 **DEFINITIONS**

- A. Direct Buried: Duct or a duct bank that is buried in the ground, without any additional casing materials such as concrete.
- B. Duct: A single duct or multiple ducts. Duct may be either installed singly or as component of a duct bank.
- C. Duct Bank:
 - 1. Two or more ducts installed in parallel, with or without additional casing materials.
 - 2. Multiple duct banks.
- D. GRC: Galvanized rigid (steel) conduit.
- E. Trafficways: Locations where vehicular or pedestrian traffic is a normal course of events.

1.04 <u>ACTION SUBMITTALS</u>

- A. Product Data: For each type of product.
 - 1. Include duct-bank materials, including spacers and miscellaneous components.
 - 2. Include duct, conduits, and their accessories, including elbows, end bells, bends, fittings, and solvent cement.
 - 3. Include accessories for manholes, handholes, boxes, and other utility structures.
 - 4. Include underground-line warning tape.
 - 5. Include warning planks.

B. Shop Drawings:

- 1. Precast or Factory-Fabricated Underground Utility Structures:
 - a. Include plans, elevations, sections, details, attachments to other work, and accessories.
 - b. Include duct entry provisions, including locations and duct sizes.
 - c. Include reinforcement details.
 - d. Include frame and cover design and manhole chimneys.
 - e. Include ladder details.
 - f. Include grounding details.
 - g. Include dimensioned locations of cable rack inserts, pulling-in and lifting irons, and sumps.
 - h. Include joint details.
- 2. Factory-Fabricated Handholes and Boxes Other Than Precast Concrete:
 - a. Include dimensioned plans, sections, and elevations, and fabrication and installation details.
 - b. Include duct entry provisions, including locations and duct sizes.
 - c. Include cover design.
 - d. Include grounding details.
 - e. Include dimensioned locations of cable rack inserts, and pulling-in and lifting irons.

1.05 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: For duct and duct bank. Show duct profiles and coordination with other utilities and underground structures.
 - 1. Include plans and sections, drawn to scale, and show bends and locations of expansion fittings.

- B. Qualification Data: For testing agency responsible for testing nonconcrete handholes and boxes.
- C. Product Certificates: For concrete and steel used in precast concrete manholes and handholes, as required by ASTM C858.
- D. Source quality-control reports.
- E. Field quality-control reports.

1.06 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated.

1.07 FIELD CONDITIONS

A. Ground Water: Assume ground-water level is 36 inches below ground surface unless a higher water table is noted on Drawings.

PART 2 - PRODUCTS

2.01 METAL CONDUIT AND FITTINGS

- A. GRC: Comply with ANSI C80.1 and UL 6.
- B. Coated Steel Conduit: PVC-coated GRC.
 - 1. Comply with NEMA RN 1.
 - 2. Coating Thickness: 0.040 inch, minimum.
- C. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.

2.02 RIGID NONMETALLIC DUCT

- A. Underground Plastic Utilities Duct: Type EPC-80-PVC RNC, complying with NEMA TC 2 and UL 651, with matching fittings complying with NEMA TC 3 by same manufacturer as duct.
- B. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.
- C. Solvents and Adhesives: As recommended by conduit manufacturer.

2.03 DUCT ACCESSORIES

- A. Duct Spacers: Factory-fabricated, rigid, PVC interlocking spacers; sized for type and size of duct with which used, and selected to provide minimum duct spacing indicated while supporting duct during concreting or backfilling.
- B. Underground-Line Warning Tape: Comply with requirements for underground-line warning tape specified in Section 260553 "Identification for Electrical Systems."
- C. Concrete Warning Planks: Nominal 12 by 24 by 3 inches in size, manufactured from 6000-psi concrete.
 - 1. Color: Red dye added to concrete during batching.
 - 2. Mark each plank with "ELECTRIC" in 2-inch-high, 3/8-inch-deep letters.

2.04 POLYMER CONCRETE HANDHOLES AND BOXES WITH POLYMER CONCRETE COVER

- A. Description: Molded of sand and aggregate, bound together with a polymer resin, and reinforced with steel or fiberglass or a combination of the two.
- B. < Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Armorcast Products Company.
 - 2. MacLean Highline.
 - 3. NewBasis.
 - 4. Oldcastle Infrastructure Inc.; CRH Americas.
 - 5. Quazite; Hubbell Incorporated, Power Systems.
- C. Standard: Comply with SCTE 77. Comply with tier requirements in "Underground Enclosure Application" Article.
- D. Color: Gray.
- E. Configuration: Units shall be designed for flush burial and have closed bottom unless otherwise indicated.
- F. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
- G. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
- H. Cover Legend: Molded lettering, "ELECTRIC."

- I. Direct-Buried Wiring Entrance Provisions: Knockouts equipped with insulated bushings or end-bell fittings, selected to suit box material, sized for wiring indicated, and arranged for secure, fixed installation in enclosure wall.
- J. Duct Entrance Provisions: Duct-terminating fittings shall mate with entering duct for secure, fixed installation in enclosure wall.
- K. Handholes 12 inches wide by 24 inches long and larger shall have factory-installed inserts for cable racks and pulling-in irons.

2.05 PRECAST MANHOLES

- A. Description: One-piece units and units with interlocking mating sections, complete with accessories, hardware, and features.
- B. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
 - 1. <u>Elmhurst-Chicago Stone Co</u>.
 - 2. Oldcastle Infrastructure Inc.; CRH Americas.
 - 3. Riverton Concrete Products.
 - 4. Utility Concrete Products, LLC.
 - 5. Utility Vault Co.
- C. Comply with ASTM C858.
- D. Structural Design Loading: Comply with requirements in "Underground Enclosure Application" Article.
- E. Knockout Panels: Precast openings in walls, arranged to match dimensions and elevations of approaching duct, plus an additional 12 inches vertically and horizontally to accommodate alignment variations.
 - 1. Center window location.
 - 2. Knockout panels shall be located no less than 6 inches from interior surfaces of walls, floors, or roofs of manholes, but close enough to corners to facilitate racking of cables on walls.
 - 3. Knockout panel opening shall have cast-in-place, welded-wire fabric reinforcement for field cutting and bending to tie-in to concrete envelopes of duct.
 - 4. Knockout panel shall be framed with at least two additional No. 3 steel reinforcing bars in concrete around each opening.
 - 5. Knockout panels shall be 1-1/2 to 2 inches thick.
- F. Duct Entrances in Manhole Walls: Cast end-bell or duct-terminating fitting in wall for each entering duct.

- 1. Type and size shall match fittings to duct to be terminated.
- 2. Fittings shall align with elevations of approaching duct and be located near interior corners of manholes to facilitate racking of cable.
- G. Ground Rod Sleeve: Provide a 3-inch PVC sleeve in manhole floors 2 inches from the wall adjacent to, but not underneath, the duct entering the structure.
- H. Joint Sealant: Asphaltic-butyl material with adhesion, cohesion, flexibility, and durability properties necessary to withstand maximum hydrostatic pressures at the installation location with the ground-water level at grade.

2.06 <u>UTILITY STRUCTURE ACCESSORIES</u>

- A. Accessories for Utility Structures: Utility equipment and accessory items used for utility structure access and utility support, listed and labeled for intended use and application.
- B. Manhole Frames, Covers, and Chimney Components: Comply with structural design loading specified for manhole.
 - Frame and Cover: Weatherproof, gray cast iron complying with ASTM A48/A48M, Class 30B with milled cover-to-frame bearing surfaces; diameter, 29 inches.
 - a. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 - b. Special Covers: Recess in face of cover designed to accept finish material in paved areas.
 - 2. Cover Legend: Cast in. Selected to suit system.
 - a. Legend: "ELECTRIC-LV" for duct systems with power wires and cables for systems operating at 600 V and less.
 - b. Legend: "ELECTRIC-HV" for duct systems with medium-voltage cables.
 - Legend: "Fiber Communications" for duct systems with fiber or future fiber networks.
 - 3. Manhole Chimney Components: Precast concrete rings with dimensions matched to those of roof opening.
 - a. Mortar for Chimney Ring and Frame and Cover Joints: Comply with ASTM C270, Type M, except for quantities less than 2.0 cu. ft. where packaged mix complying with ASTM C387, Type M, may be used.
 - b. Seal joints watertight using preformed plastic or rubber complying with ASTM C990. Install sealing material according to sealant manufacturers' written instructions.

- C. Manhole Sump Frame and Grate: ASTM A48/A48M, Class 30B, gray cast iron.
- D. Pulling Eyes in Concrete Walls: Eyebolt with reinforcing-bar fastening insert, 2-inch-diameter eye, and 1-by-4-inch bolt.
 - 1. Working Load Embedded in 6-Inch, 4000-psi Concrete: 13,000-lbf minimum tension.
- E. Pulling-in and Lifting Irons in Concrete Floors: 7/8-inch-diameter, hot-dip galvanized, bent steel rod; stress relieved after forming; and fastened to reinforcing rod. Exposed triangular opening.
 - 1. Ultimate Yield Strength: 40,000-lbf shear and 60,000-lbf tension.
- F. Bolting Inserts for Concrete Utility Structure Cable Racks and Other Attachments: Flared, threaded inserts of noncorrosive, chemical-resistant, nonconductive thermoplastic material; 1/2-inch ID by 2-3/4 inches deep, flared to 1-1/4 inches minimum at base.
 - 1. Tested Ultimate Pullout Strength: 12,000 lbf minimum.
- G. Ground Rod Sleeve: 3-inch PVC sleeve in manhole floors 2 inches from the wall adjacent to, but not underneath, the ducts routed from the facility.
- H. Cable Rack Assembly: Steel, hot-dip galvanized, except insulators.
 - 1. Stanchions: T-section or channel with provisions to connect to other sections or channels to form a continuous unit; 1-1/2 inches in width by nominal 24 inches long; punched with 14 hook holes on 1-1/2-inch centers for cable-arm attachment.
 - 2. Arms: 1-1/2 inches wide, lengths ranging from 3 inches with 450-lb minimum capacity to 18 inches with 250-lb minimum capacity. Arms shall have slots along full length for cable ties and be arranged for secure mounting in horizontal position at any vertical location on stanchions.
 - 3. Insulators: High-glaze, wet-process porcelain arranged for mounting on cable arms.
- I. Duct-Sealing Compound: Nonhardening, safe for contact with human skin, not deleterious to cable insulation, and workable at temperatures as low as 35 deg F. Capable of withstanding temperature of 300 deg F without slump and adhering to clean surfaces of plastic ducts, metallic conduit, conduit and duct coatings, concrete, masonry, lead, cable sheaths, cable jackets, insulation materials, and common metals.
- J. Fixed Manhole Ladders: Arranged for attachment to wall and floor of manhole. Ladder and mounting brackets and braces shall be fabricated from nonconductive, structural-grade, fiberglass-reinforced resin.

K. Cover Hooks: Heavy duty, designed for lifts 60 lbf and greater. Two required.

2.07 SOURCE QUALITY CONTROL

- A. Test and inspect precast concrete utility structures according to ASTM C1037.
- B. Nonconcrete Handhole and Pull-Box Prototype Test: Test prototypes of manholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.
 - 1. Tests of materials shall be performed by an independent testing agency.
 - 2. Strength tests of complete boxes and covers shall be by an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
 - 3. Testing machine pressure gages shall have current calibration certification, complying with ISO 9000 and ISO 10012, and traceable to NIST standards.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Coordinate layout and installation of duct, duct bank, manholes, handholes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in the field. Notify Engineer if there is a conflict between areas of excavation and existing structures or archaeological sites to remain.
- B. Coordinate elevations of duct and duct-bank entrances into manholes, handholes, and boxes with final locations and profiles of duct and duct banks, as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations as required to suit field conditions and to ensure that duct and duct bank will drain to manholes and handholes, and as approved by Engineer.
- C. Clear and grub vegetation to be removed, and protect vegetation to remain according to Section 311000 "Site Clearing." Remove and stockpile topsoil for reapplication according to Section 311000 "Site Clearing."

3.02 <u>UNDERGROUND DUCT APPLICATION</u>

- A. Duct for Electrical Branch Circuits: Type EPC-80-PVC RNC, direct-buried unless otherwise indicated.
- B. Underground Ducts Crossing Driveways and Roadways: Type EPC-80 PVC RNC, encased in reinforced concrete.

C. Stub-ups: Concrete-encased GRC.

3.03 <u>UNDERGROUND ENCLOSURE APPLICATION</u>

- A. Handholes and Boxes for 600 V and Less:
 - 1. Units in Roadways and Other Deliberate Traffic Paths: Precast concrete. AASHTO HB 17, H-20 structural load rating.
 - 2. Units in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Polymer concrete, SCTE 77, Tier 15 structural load rating.
 - 3. Units in Sidewalk and Similar Applications with a Safety Factor for Nondeliberate Loading by Vehicles: Polymer concrete units, SCTE 77, Tier 8 structural load rating.
 - 4. Cover design load shall not exceed the design load of the handhole or box.
- B. Manholes: Precast concrete.
 - 1. Units Located in Roadways and Other Deliberate Traffic Paths by Heavy or Medium Vehicles: H-20 structural load rating according to AASHTO HB 17.

3.04 EARTHWORK

- A. Excavation and Backfill: Comply with Section 312000 "Earth Moving," but do not use heavy-duty, hydraulic-operated, compaction equipment.
- B. Restoration: Replace area immediately after backfilling is completed.
- C. Restore surface features at areas disturbed by excavation, and re-establish original grades unless otherwise indicated. Replace removed sod immediately after backfilling is completed.
- D. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging, and mulching. Comply with Section 329200 "Turf and Grasses" and Section 329300 "Plants."
- E. Cut and patch existing pavement in the path of underground duct, duct bank, and underground structures according to "Cutting and Patching" Article in Section 017300 "Execution."

3.05 DUCT AND DUCT-BANK INSTALLATION

- A. Where indicated on Drawings, install duct, spacers, and accessories into the duct-bank configuration shown. Duct installation requirements in this Section also apply to duct bank.
- B. Install duct according to NEMA TCB 2.
- C. Slope: Pitch duct a minimum slope of 1:300 down toward manholes and handholes and away from buildings and equipment. Slope duct from a high point between two manholes, to drain in both directions.
- D. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with a minimum radius of 12.5 feet, both horizontally and vertically, at other locations unless otherwise indicated.
 - 1. Duct shall have maximum of two 90 degree bends or the total of all bends shall be no more 180 degrees between pull points.
- E. Joints: Use solvent-cemented joints in duct and fittings and make watertight according to manufacturer's written instructions. Stagger couplings so those of adjacent duct do not lie in same plane.
- F. Installation Adjacent to High-Temperature Steam Lines: Where duct is installed parallel to underground steam lines, perform calculations showing the duct will not be subject to environmental temperatures above 40 deg C. Where environmental temperatures are calculated to rise above 40 deg C, and anywhere the duct crosses above an underground steam line, install insulation blankets listed for direct burial to isolate the duct bank from the steam line.
- G. End Bell Entrances to Manholes and Concrete and Polymer Concrete Handholes: Use end bells, spaced approximately 10 inches o.c. for 5-inch duct, and vary proportionately for other duct sizes.
 - 1. Begin change from regular spacing to end-bell spacing 10 feet from the end bell, without reducing duct slope and without forming a trap in the line.
 - 2. Expansion and Deflection Fittings: Install an expansion and deflection fitting in each duct in the area of disturbed earth adjacent to manhole or handhole. Install an expansion fitting near the center of all straight line direct-buried duct with calculated expansion of more than 3/4 inch.
 - 3. Grout end bells into structure walls from both sides to provide watertight entrances.
- H. Terminator Entrances to Manholes and Concrete and Polymer Concrete Handholes: Use manufactured, cast-in-place duct terminators, with entrances into structure spaced approximately 6 inches o.c. for 4-inch duct, and vary proportionately for other duct sizes.

- 1. Begin change from regular spacing to terminator spacing 10 feet from the terminator, without reducing duct line slope and without forming a trap in the line.
- 2. Expansion and Deflection Fittings: Install an expansion and deflection fitting in each duct in the area of disturbed earth adjacent to manhole or handhole. Install an expansion fitting near the center of all straight line duct with calculated expansion of more than 3/4 inch.
- I. Sealing: Provide temporary closure at terminations of duct with pulled cables. Seal spare duct at terminations. Use sealing compound and plugs to withstand at least 15-psig hydrostatic pressure.
- J. Pulling Cord: Install 200-lbf-test nylon cord in empty ducts.
- K. Concrete-Encased Ducts and Duct Bank:
 - 1. Excavate trench bottom to provide firm and uniform support for duct. Prepare trench bottoms as specified in Section 312000 "Earth Moving" for pipes less than 6 inches in nominal diameter.
 - 2. Width: Excavate trench 12 inches wider than duct on each side.
 - 3. Depth: Install so top of duct envelope is at least 24 inches below finished grade in areas not subject to deliberate traffic, and at least 30 inches below finished grade in deliberate traffic paths for vehicles unless otherwise indicated.
 - 4. Support duct on duct spacers coordinated with duct size, duct spacing, and outdoor temperature.
 - 5. Spacer Installation: Place spacers close enough to prevent sagging and deforming of duct, with not less than five spacers per 20 feet of duct. Place spacers within 24 inches of duct ends. Stagger spacers approximately 6 inches between tiers. Secure spacers to earth and to duct to prevent floating during concreting. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
 - 6. Minimum Space between Duct: 3 inches between edge of duct and exterior envelope wall, 2 inches between ducts for like services, and 4 inches between power and communications ducts.
 - 7. Elbows: Use manufactured duct elbows for stub-ups, at building entrances, and at changes of direction in duct unless otherwise indicated. Extend encasement throughout length of elbow.
 - 8. Elbows: Use manufactured GRC elbows for stub-ups at changes of direction in duct run.
 - a. Couple RNC duct to GRC with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
 - b. Stub-ups to Outdoor Equipment: Extend concrete-encased GRC horizontally a minimum of 60 inches from edge of base. Install insulated grounding bushings on terminations at equipment.

- 1) Stub-ups shall be minimum 4 inchesabove finished floor and minimum 3 inchesfrom conduit side to edge of slab.
- 9. Reinforcement: Reinforce concrete-encased duct where crossing disturbed earth and where indicated. Arrange reinforcing rods and ties without forming conductive or magnetic loops around ducts or duct groups.
- 10. Forms: Use walls of trench to form side walls of duct bank where soil is self-supporting and concrete envelope can be poured without soil inclusions; otherwise, use forms.
- 11. Concrete Cover: Install a minimum of 3 inches of concrete cover between edge of duct to exterior envelope wall, 2 inches between duct of like services, and 4 inches between power and communications ducts.
- 12. Concreting Sequence: Pour each run of envelope between manholes or other terminations in one continuous operation.
 - a. Start at one end and finish at the other, allowing for expansion and contraction of duct as its temperature changes during and after the pour. Use expansion fittings installed according to manufacturer's written instructions, or use other specific measures to prevent expansion-contraction damage.
 - b. If more than one pour is necessary, terminate each pour in a vertical plane and install 3/4-inch reinforcing-rod dowels extending a minimum of 18 inches into concrete on both sides of joint near corners of envelope.
- 13. Pouring Concrete: Comply with requirements in "Concrete Placement" Article in Section 033000 "Cast-in-Place Concrete." Place concrete carefully during pours to prevent voids under and between duct and at exterior surface of envelope. Do not allow a heavy mass of concrete to fall directly onto ducts. Allow concrete to flow around duct and rise up in middle, uniformly filling all open spaces. Do not use power-driven agitating equipment unless specifically designed for duct-installation application.

L. Direct-Buried Duct and Duct Bank:

- 1. Excavate trench bottom to provide firm and uniform support for duct. Comply with requirements in Section 312000 "Earth Moving" for preparation of trench bottoms for pipes less than 6 inches in nominal diameter
- 2. Width: Excavate trench 12 inches wider than duct on each side.
- 3. Depth: Install top of duct at least 36 inches below finished grade unless otherwise indicated.
- 4. Set elevation of bottom of duct bank below frost line.
- 5. Support ducts on duct spacers coordinated with duct size, duct spacing, and outdoor temperature.

- 6. Spacer Installation: Place spacers close enough to prevent sagging and deforming of duct, with not less than five spacers per 20 feet of duct. Place spacers within 24 inches of duct ends. Stagger spacers approximately 6 inches between tiers. Secure spacers to earth and to ducts to prevent floating during concreting. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
- 7. Install duct with a minimum of 3 inches between ducts for like services and 6 inches between power and communications duct.
- 8. Elbows: Install manufactured duct elbows for stub-ups, at building entrances, and at changes of direction in duct direction unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
- 9. Install manufactured GRC elbows for stub-ups at changes of direction in duct.
 - a. Couple RNC duct to GRC with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
 - b. Stub-ups to Outdoor Equipment: Extend concrete-encased GRC horizontally a minimum of 60 inches from edge of base. Install insulated grounding bushings on terminations at equipment.
 - 1) Stub-ups shall be minimum 4 inchesabove finished floor and minimum 3 inchesfrom conduit side to edge of slab.
- 10. After installing first tier of duct, backfill and compact. Start at tie-in point and work toward end of duct run, leaving ducts at end of run free to move with expansion and contraction as temperature changes during this process. Repeat procedure after placing each tier. After placing last tier, hand place backfill to 4 inches over duct and hand tamp. Firmly tamp backfill around ducts to provide maximum supporting strength. Use hand tamper only. After placing controlled backfill over final tier, make final duct connections at end of run and complete backfilling with normal compaction. Comply with requirements in Section 312000 "Earth Moving" for installation of backfill materials.
 - a. Place minimum 3 inches of sand as a bed for duct. Place sand to a minimum of 6 inches above top level of duct.
- M. Warning Planks: Bury warning planks approximately 12 inches above direct-buried duct, placing them 24 inches o.c. Align planks along the width and along the centerline of duct or duct bank. Provide an additional plank for each 12-inch increment of duct-bank width over a nominal 18 inches. Space additional planks 12 inches apart, horizontally.

3.06 INSTALLATION OF CONCRETE MANHOLES, HANDHOLES, AND BOXES

A. Precast Concrete Manhole Installation:

- 1. Comply with ASTM C891 unless otherwise indicated.
- 2. Install units level and plumb and with orientation and depth coordinated with connecting duct, to minimize bends and deflections required for proper entrances.
- 3. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

B. Elevations:

- 1. Manhole Roof: Install with rooftop at least 15 inches below finished grade.
- 2. Manhole Frame: In paved areas and trafficways, set frames flush with finished grade. Set other manhole frames 1 inch above finished grade.
- 3. Install handholes with bottom below frost line, below grade.
- 4. Handhole Covers: In paved areas and trafficways, set surface flush with finished grade. Set covers of other handholes 1 inch above finished grade.
- 5. Where indicated, cast handhole cover frame integrally with handhole structure.
- C. Drainage: Install drains in bottom of manholes where indicated. Coordinate with drainage provisions indicated.
- D. Manhole Access: Circular opening in manhole roof; sized to match cover size.
 - Manholes with Fixed Ladders: Offset access opening from manhole centerlines to align with ladder.
 - 2. Install chimney, constructed of precast concrete collars and rings, to support cast-iron frame to connect cover with manhole roof opening. Provide moisture-tight masonry joints and waterproof grouting for frame to chimney.
- E. Waterproofing: Apply waterproofing to exterior surfaces of manholes and handholes after concrete has cured at least three days. After duct has been connected and grouted, and before backfilling, waterproof joints and connections, and touch up abrasions and scars. Waterproof exterior of manhole chimneys after mortar has cured at least three days.
- F. Hardware: Install removable hardware, including pulling eyes, cable stanchions, and cable arms, and insulators, as required for installation and support of cables and conductors and as indicated.
- G. Fixed Manhole Ladders: Arrange to provide for safe entry with maximum clearance from cables and other items in manholes.
- H. Field-Installed Bolting Anchors in Manholes and Concrete Handholes: Do not drill deeper than 3-7/8 inches for manholes and 2 inches for handholes, for anchor bolts installed in the field. Use a minimum of two anchors for each cable stanchion.

3.07 GROUNDING

A. Ground underground ducts and utility structures according to Section 260526 "Grounding and Bonding for Electrical Systems."

3.08 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - Demonstrate capability and compliance with requirements on completion of installation of underground duct, duct bank, and utility structures.
 - 2. Pull solid aluminum or wood test mandrel through duct to prove joint integrity and adequate bend radii, and test for out-of-round duct. Provide a minimum 12-inch-long mandrel equal to duct size minus 1/4 inch. If obstructions are indicated, remove obstructions and retest.
 - Test manhole and handhole grounding to ensure electrical continuity of grounding and bonding connections. Measure and report ground resistance as specified in Section 260526 "Grounding and Bonding for Electrical Systems."
- B. Correct deficiencies and retest as specified above to demonstrate compliance.
- C. Prepare test and inspection reports.

3.09 CLEANING

- A. Pull leather-washer-type duct cleaner, with graduated washer sizes, through full length of duct until duct cleaner indicates that duct is clear of dirt and debris. Follow with rubber duct swab for final cleaning and to assist in spreading lubricant throughout ducts.
- B. Clean internal surfaces of manholes, including sump.
 - 1. Sweep floor, removing dirt and debris.
 - 2. Remove foreign material.

END OF SECTION

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<u>SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS</u>

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - Labels.
 - 2. Bands and tubes.
 - 3. Signs.
 - 4. Cable ties.
 - 5. Miscellaneous identification products.

1.03 <u>ACTION SUBMITTALS</u>

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.
- B. Identification Schedule: For each piece of electrical equipment and electrical system components to be an index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Comply with ASME A13.1.
- B. Comply with NFPA 70.
- C. Comply with ANSI Z535.4 for safety signs and labels.

- D. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.02 COLOR AND LEGEND REQUIREMENTS

- A. Raceways and Cables Carrying Circuits at 600 V or Less:
 - 1. Black letters on an orange field.
 - 2. Legend: Indicate voltage.
- B. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder and branch-circuit conductors.
 - 1. Color shall be factory applied or field applied for sizes larger than No. 8 AWG if authorities having jurisdiction permit.
 - 2. Colors for 240-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - 3. Color for Neutral: White.
 - 4. Color for Equipment Grounds: Green.
- C. Warning Label Colors:
 - Identify system voltage with black letters on an orange background.
- D. Equipment Identification Labels:
 - 1. Black letters on a white field.

2.03 LABELS

- A. Self-Adhesive Labels: Vinyl, thermal, transfer-printed, 3-mil-thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.
 - 1. Minimum Nominal Size:
 - a. 1-1/2 by 6 inches for raceway and conductors.
 - b. 3-1/2 by 5 inches for equipment.

c. As required by authorities having jurisdiction.

2.04 BANDS AND TUBES

A. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tubes with machineprinted identification labels, sized to suit diameter and shrunk to fit firmly. Full shrink recovery occurs at a maximum of 200 deg F. Comply with UL 224.

2.05 **SIGNS**

- A. Laminated Acrylic or Melamine Plastic Signs:
 - 1. Engraved legend.
 - 2. Thickness:
 - a. For signs up to 20 sq. in., minimum 1/16 inch thick.
 - b. For signs larger than 20 sq. in., 1/8 inch thick.
 - c. Engraved legend with black letters on white face.
 - d. Punched or drilled for mechanical fasteners with 1/4-inch grommets in corners for mounting.
 - e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.06 CABLE TIES

- A. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
 - 1. Minimum Width: 3/16 inch.
 - 2. Tensile Strength at 73 Deg F according to ASTM D638: 12,000 psi.
 - 3. Temperature Range: Minus 40 to plus 185 deg F.
 - 4. Color: Black, except where used for color-coding.

2.07 <u>MISCELLANEOUS IDENTIFICATION PRODUCTS</u>

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.01 PREPARATION

A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.02 <u>INSTALLATION</u>

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Install identifying devices before installing acoustical ceilings and similar concealment.
- C. Verify identity of each item before installing identification products.
- D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- E. Apply identification devices to surfaces that require finish after completing finish work
- F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- G. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.
 - 1. Secure tight to surface of conductor, cable, or raceway.
- H. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- I. Accessible Fittings for Raceways: Identify the covers of each junction and pull box of the following systems with the wiring system legend and system voltage. System legends shall be as follows:
 - 1. "POWER."
- J. Self-Adhesive Wraparound Labels: Secure tight to surface at a location with high visibility and accessibility.

K. Self-Adhesive Labels:

- 1. On each item, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
- 2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high label; where two lines of text are required, use labels 2 inches high.
- L. Heat-Shrink, Preprinted Tubes: Secure tight to surface at a location with high visibility and accessibility.
- M. Laminated Acrylic or Melamine Plastic Signs:
 - 1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
 - 2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high sign; where two lines of text are required, use labels 2 inches high.
- N. Cable Ties: General purpose, for attaching tags, except as listed below:
 - 1. Outdoors: UV-stabilized nylon.
 - 2. In Spaces Handling Environmental Air: Plenum rated.

3.03 <u>IDENTIFICATION SCHEDULE</u>

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- C. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits, More Than 30 A and 120 V to Ground: Identify with self-adhesive raceway labels.
 - 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- D. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use vinyl wraparound labels to identify the phase.

- 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- E. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive labels with the conductor or cable designation, origin, and destination.
- F. Control-Circuit Conductor Termination Identification: For identification at terminations, provide heat-shrink preprinted tubes with the conductor designation.
- G. Auxiliary Electrical Systems Conductor Identification: Self-adhesive vinyl tape that is uniform and consistent with system used by manufacturer for factory-installed connections
 - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
- H. Instructional Signs: Self-adhesive labels, including the color code for grounded and ungrounded conductors.
- I. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive labels.
 - 1. Apply to exterior of door, cover, or other access.
 - 2. For equipment with multiple power or control sources, apply to door or cover of equipment, including, but not limited to, the following:
 - a. Power-transfer switches.
 - b. Controls with external control power connections.
- J. Operating Instruction Signs: Self-adhesive labels.
- K. Equipment Identification Labels:
 - 1. Outdoor Equipment: Laminated acrylic or melamine sign.
 - 2. Equipment to Be Labeled:
 - a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be in the form of a engraved, laminated acrylic or melamine label.
 - b. Enclosures and electrical cabinets.
 - c. Access doors and panels for concealed electrical items.

END OF SECTION

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Distribution panelboards.
 - 2. Lighting and appliance branch-circuit panelboards.
 - 3. Load centers.

1.03 <u>DEFINITIONS</u>

- A. ATS: Acceptance testing specification.
- B. GFCI: Ground-fault circuit interrupter.
- C. GFEP: Ground-fault equipment protection.
- D. HID: High-intensity discharge.
- E. MCCB: Molded-case circuit breaker.
- F. SPD: Surge protective device.
- G. VPR: Voltage protection rating.

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of panelboard.
 - 1. Include materials, switching and overcurrent protective devices, SPDs, accessories, and components indicated.
 - 2. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

- B. Shop Drawings: For each panelboard and related equipment.
 - 1. Include dimensioned plans, elevations, sections, and details.
 - 2. Show tabulations of installed devices with nameplates, conductor termination sizes, equipment features, and ratings.
 - 3. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
 - 4. Detail bus configuration, current, and voltage ratings.
 - 5. Short-circuit current rating of panelboards and overcurrent protective devices.
 - 6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 - 7. Include wiring diagrams for power, signal, and control wiring.
 - 8. Key interlock scheme drawing and sequence of operations.

1.05 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Panelboard Schedules: For installation in panelboards.

1.06 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - 1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
 - 2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

1.07 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Keys: Two spares for each type of panelboard cabinet lock.
 - 2. Circuit Breakers: Spares as indicated in drawings schedules.

1.08 QUALITY ASSURANCE

A. Manufacturer Qualifications: ISO 9001 or ISO 9002 certified.

1.09 <u>DELIVERY, STORAGE, AND HANDLING</u>

- A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.
- B. Handle and prepare panelboards for installation according to NECA 407.

1.10 FIELD CONDITIONS

- A. Environmental Limitations:
 - 1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
 - 2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - a. Ambient Temperature: Not exceeding 23 deg F to plus 104 deg F.
 - b. Altitude: Not exceeding 6600 feet.
- B. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
 - 1. Notify Engineer and Owner no fewer than two days in advance of proposed interruption of electric service.
 - 2. Do not proceed with interruption of electric service without Owner's written permission.
 - 3. Comply with NFPA 70E.

1.11 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.
 - 1. Panelboard Warranty Period: 18 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PANELBOARDS AND LOAD CENTERS COMMON REQUIREMENTS

- A. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NEMA PB 1.
- D. Comply with NFPA 70.
- E. Enclosures: Surface-mounted, dead-front cabinets.
 - 1. Rated for environmental conditions at installed location.
 - a. NEMA Type 3R.
 - 2. Height: 64 inches maximum.
 - Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Trims shall cover all live parts and shall have no exposed hardware.
 - 4. Finishes:
 - a. Panels and Trim: Steel and galvanized steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
 - b. Back Boxes: Same finish as panels and trim.

F. Incoming Mains:

- 1. Location: Convertible between top and bottom.
- 2. Main Breaker: Main lug interiors up to 400 amperes shall be field convertible to main breaker.
- G. Phase, Neutral, and Ground Buses:
 - 1. Material: Hard-drawn copper, 98 percent conductivity.
 - a. Plating shall run entire length of bus.
 - b. Bus shall be fully rated the entire length.

- 2. Interiors shall be factory assembled into a unit. Replacing switching and protective devices shall not disturb adjacent units or require removing the main bus connectors.
- 3. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
- 4. Full-Sized Neutral: Equipped with full-capacity bonding strap for service entrance applications. Mount electrically isolated from enclosure. Do not mount neutral bus in gutter.
- H. Conductor Connectors: Suitable for use with conductor material and sizes.
 - 1. Material: Hard-drawn copper, 98 percent conductivity.
 - 2. Terminations shall allow use of 75 deg C rated conductors without derating.
 - 3. Size: Lugs suitable for indicated conductor sizes, with additional gutter space, if required, for larger conductors.
 - 4. Main and Neutral Lugs: Mechanical type, with a lug on the neutral bar for each pole in the panelboard.
 - 5. Ground Lugs and Bus-Configured Terminators: Mechanical type, with a lug on the bar for each pole in the panelboard.
- I. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed by an NRTL for 100 percent interrupting capacity.
 - 1. Minimum 22,000 A rms symmetrical.

2.02 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Panelboards shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

2.03 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. <u>Manufacturers:</u> Panelboards supplied under this specification shall be provided from one of the following manufacturers and shall be the same manufacturer of the panelboards supplied under specification 262416.16 Electronically Operated Circuit-Breaker Panelboards.
 - 1. ABB (Electrification Products Division).
 - 2. Eaton.
 - 3. Schneider Electric USA (Square D).

- 4. Siemens Industry, Inc., Energy Management Division.
- B. Branch Circuit Panelboards designated on drawings with prefix LP.
- C. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.
- D. Mains: Circuit breaker.
- E. Branch Overcurrent Protective Devices: Plug-in circuit breakers, replaceable without disturbing adjacent units.
- F. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.04 <u>DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES</u>

A. <u>Manufacturers:</u> Manufacturer of disconnecting and overcurrent protective devices shall be the manufacturer of the panelboard provided under this specification.

2.05 <u>IDENTIFICATION</u>

- A. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on the interior of the panelboard door.
- B. Circuit Directory: Computer-generated circuit directory mounted inside panelboard door with transparent plastic protective cover.
 - 1. Circuit directory shall identify specific purpose with detail sufficient to distinguish it from all other circuits.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify actual conditions with field measurements prior to ordering panelboards to verify that equipment fits in allocated space in, and comply with, minimum required clearances specified in NFPA 70.
- B. Receive, inspect, handle, and store panelboards according to NECA 407.
- C. Examine panelboards before installation. Reject panelboards that are damaged, rusted, or have been subjected to water saturation.

- D. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Comply with NECA 1.
- C. Install panelboards and accessories according to NECA 407.
- D. Equipment Mounting:
 - 1. Attach panelboard to the vertical finished or structural surface behind the panelboard.
- E. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.
- F. Mount panelboards so that operating handle of top-most switch or circuit breaker, in on position, is not higher than 75 inches AFF.
- G. Mount panelboard cabinet plumb and rigid without distortion of box.
- H. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- I. Install overcurrent protective devices not already factory installed.
 - 1. Set field-adjustable, circuit-breaker trip ranges.
 - 2. Tighten bolted connections and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer's written instructions.
- J. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.
- K. Install filler plates in unused spaces.

3.03 <u>IDENTIFICATION</u>

- A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems."
- B. Create a directory to indicate installed circuit loads; incorporate Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.
- C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- D. Device Nameplates: Label each branch circuit device in power panelboards with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- E. Install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems" identifying source of remote circuit.

3.04 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- C. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test for low-voltage air circuit breakers stated in NETA ATS, Paragraph 7.6 Circuit Breakers. Perform optional tests. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - 3. Perform the following infrared scan tests and inspections and prepare reports:
 - a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of

- each panelboard. Remove front panels so joints and connections are accessible to portable scanner.
- b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.
- c. Instruments and Equipment:
 - Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
- D. Panelboards will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results, with comparisons of the two scans. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.05 **ADJUSTING**

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as indicated.

3.06 PROTECTION

A. Temporary Heating: Prior to energizing panelboards, apply temporary heat to maintain temperature according to manufacturer's written instructions.

END OF SECTION

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<u>SECTION 262416.16 - ELECTRONICALLY OPERATED CIRCUIT-</u> BREAKER PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes: Panelboards using electronically controlled, electrically operated circuit breakers.

1.3 **DEFINITIONS**

- A. DDC: Direct digital control.
- B. IP: Internet protocol.
- C. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.
- D. Monitoring: Acquisition, processing, communication, and display of equipment status data, metered electrical parameter values, power quality evaluation data, event and alarm signals, tabulated reports, and event logs.
- E. PC: Personal computer; sometimes plural as "PCs."
- F. RS-485: A serial network protocol, similar to RS-232, complying with TIA-485-A.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for control modules, power distribution components, manual switches and plates, and conductors and cables.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

- B. Shop Drawings: For each electronically operated, circuit-breaker panelboard and related equipment.
 - 1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
 - 2. Detail enclosure types and details for types other than NEMA 250, Type 1.
 - 3. Detail bus configuration, current, and voltage ratings.
 - 4. Short-circuit current rating of panelboards and overcurrent protective devices.
 - 5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 - 6. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards. Submit on translucent log-log graph paper; include selectable ranges for each type of overcurrent protective device.
 - 7. Include diagrams for power, signal, and control wiring.
 - 8. Block Diagram: Show interconnections between components specified in this Section and devices furnished with power distribution system components. Indicate data communication paths and identify networks, data buses, data gateways, concentrators, and other devices to be used. Describe characteristics of network and other data communication lines.

1.5 <u>INFORMATIONAL SUBMITTALS</u>

- A. Coordination Drawings: Submit evidence that electronic controls are compatible with connected monitoring and control devices and systems specified in other Sections.
 - 1. Show interconnecting signal and control wiring and interfacing devices that prove compatibility of inputs and outputs.
 - 2. For networked controls, list network protocols and provide statements from manufacturers that input and output devices comply with interoperability requirements of the network protocol.
- B. Qualification Data: For testing agency.
- C. Seismic Qualification Certificates: For panelboards, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- D. Field quality-control reports.

- E. Software licenses and upgrades required by and installed for operation and programming of digital and analog devices.
- F. Sample Warranty: For manufacturer's special warranty.

1.6 **CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For electronic controls to include in emergency, operation, and maintenance manuals.
- B. Software and Firmware Operational Documentation:
 - 1. Software operating and upgrade manuals.
 - 2. Program Software Backup: On magnetic media or compact disk, complete with data files.
 - 3. Device address list.
 - 4. Printout of software application and graphic screens.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Electrically Operated, Molded-Case Circuit Breakers: Two.

1.8 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA or an NRTL.
 - 1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.
- B. The manufacturer shall have a valid ISO 9001 certification and an applicable quality assurance system that is regularly reviewed and audited by a third-party registrar.
- C. The manufacturer or their representative shall have service, repair and technical services available 24 hours a day, seven days a week.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Handle and prepare panelboards for installation according to NEMA PB 1.1.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS: Provide products by one of the following:

- A. ABB, Electrical Products Division
- B. Eaton
- C. Siemens Industry Inc
- D. Square D; Schneider Electric USA

2.2 SYSTEM DESCRIPTION

- A. Input signal from field-mounted or on-board signal source shall open or close one or more electrically operated circuit breakers in the electronically operated, circuit-breaker panelboards. Any combination of inputs shall be programmable to any combination outputs.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with 47 CFR, Subpart A and Subpart B, for Class A digital devices.

2.3 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Panelboards shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
 - 2. Component Importance Factor: 1.0.
- B. Expansion Requirements: Capacity for future expansion of number of control functions by 25 percent of current capacity; to include equipment ratings,

housing capacities, spare spaces for circuit breakers, terminals, number of conductors in control cables, and control software.

2.4 PANELBOARDS

- A. Panelboards LP-A, and LP-B1 shall meet the requirements of this specification.
- B. Electronically operated, circuit-breaker panelboards shall contain only remotely operated circuit breakers.
- C. Assemblies: Comply with UL 67 and NEMA PB 1.
- D. Surge Protective Device: Field mounted, complying with Section 264313 "Surge Protection for Low-Voltage Electrical Power Circuits."
- E. Enclosures: Comply with UL 50 and NEMA 250.
- F. Panelboard Short-Circuit Current Rating: Fully rated to interrupt 22kA symmetrical short-circuit current available at terminals.
- G. System Power Supply: The system power supply shall mount on the panelboard interior and be fed directly from the panelboard bus without external wiring or fuses. The power supply shall provide isolated Class 1 and Class 2 sources.

2.5 CIRCUIT BREAKERS

- A. Remotely operated branch circuit breakers shall provide branch circuit overcurrent protection.
- B. Switching Endurance Rating: Not less than 200,000 full-load open/close/open remote operations.
- C. Remotely Operated Circuit Breakers: Manual override switch or handle position shall enable or disable the remote operation of the device and allow breaker handle to manually control the breaker's on-off status.
- D. Circuit Breaker Status Indicator: Visible flag that clearly indicates the status of the circuit breaker contacts with the panel trim installed. Flag shall indicate ON, OFF, and TRIPPED circuit breaker states. The visible flag shall be mechanical in nature, directly tied to the circuit breaker mechanism, and shall be provided in addition to any status indicator supplied by the system electronics.
- E. Voltage status signal to indicate the presence or absence of voltage at the load terminal.

2.6 PANELBOARD CONTROLLER

- Α. Programmable input timers to permit timed override periods.
- B. Adjustable blink notice.
- C. Event logging to track circuit breaker, input, and zone state; schedule periods; bus operational status; and circuit breaker on time.
- D. Capability of accepting downloadable firmware without removing controller.
- E. Time scheduling including, but not limited to the following:
 - Sixty-four (64) independent schedules, each configurable into 100 distinct 1. periods.
 - 2. Clock configurable for 12-hour (AM/PM) or 24-hour format. Clock shall retain time for at least 7 days in the absence of power.
 - Schedule periods settable to the minute. 3.
 - 365-day calendar, with automatic daylight savings and leap year 4. adjustments.
 - 5. Day-of-week, day-of-month, day-of-year with one-time or repeated capability.
 - 6. Ninety-six (96) special event periods with 14 pre-programmed holidays.
 - 7. Astronomical tracker to automatically adjust sunrise and sunset times throughout the year.
- F. Two-hundred fifty-six (256) communication inputs available for network connections.
- G. **Ethernet Communications:**
 - Each panel controller shall support three (3) Ethernet ports communicating using Modbus TCP/IP and/or BACnet/IP protocols.
- H. Embedded Web Server: Each panel controller shall incorporate a web-enabled server for displaying information over a standard web browser. Web-accessible information shall include:
 - A secure, password protected login screen for modifying operational parameters to ensure only authorized access. Password administration shall be accessible to authorized users via web page interface.
 - Separate web pages for each panel with the arrangement of circuit 2. breakers on the page matching the physical appearance of the panel. Panel status pages shall also include, but shall not be limited to, circuit breaker nametags, pole configuration, location in panel, and actual contact state (on/off/tripped/manual). The web page shall also provide the ability to observe circuit breaker on-time and blink information in real time.
 - 3. Controller summary showing controller diagnostic information.
 - Panel mimic screens for setting up controller parameters, input types, zones, and operating schedules. Mimic screens shall also allow direct circuit breaker control and zone overrides.

- 5. Alarm and Email Notification: Each controller shall incorporate an alarm and automated email notification service. These services shall be capable of automatically initiating alarms based on preconfigured conditions and routing alarm alerts as directed by the owner.
- I. Alarm shall be configurable for the following parameters:
 - Global alarms (power loss, non-responding circuit breakers, loss and restoration of sub-net communications, loss and restoration of serial port communications, and loss and restoration of Modbus TCP Ethernet commands).
 - 2. Specific alarms (input status, zone status, circuit breaker status on-time (0 to 99,999 hours), and strike counter).
 - 3. Email notification service shall include, but shall not be limited to, the ability to automatically route an email message to five individual email addresses. Within the body text of the email, provide a link that shall automatically redirect the user to the associated panelboard's status web page.

2.7 CONTROL NETWORK

A. Panel Controllers: Networked with other in a peer-to-peer configuration using Ethernet 100Base-T network.

2.8 <u>CONDUCTORS AND CABLES</u>

- A. Power Wiring to Supply Side of Class 2 Power Source: Not smaller than No. 12 AWG. Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Class 2 and Class 3 Control Cables: Multiconductor cable with copper conductors not smaller than No. 18 AWG. Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- C. Class 1 Control Cables: Multiconductor cable with copper conductors not smaller than No. 14 AWG. Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- D. Twisted-Pair Data Cable: Category 6. Comply with requirements for twisted pair cabling in Section 260523 "Control-Voltage Electrical Power Cables."

PART 3 - EXECUTION

3.1 **EXAMINATION**

- A. Receive, inspect, handle, and store panelboards according to NEMA PB 1.1.
- B. Examine panelboards before installation. Reject panelboards that are damaged or rusted or have been subjected to water saturation.
- C. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 <u>WIRING INSTALLATION</u>

- A. Comply with NECA 1.
- B. Wiring Method: Install cables in raceways.
 - 1. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

3.3 PANELBOARD INSTALLATION

- A. Comply with NECA 1.
- B. Install panelboards and accessories according to NEMA PB 1.1.
- C. Comply with mounting and anchoring requirements specified in Section 260548.16 "Seismic Controls for Electrical Systems."
- D. Mounting Height: 80 inches to top of trim above finished grade unless otherwise indicated.
- E. Mount panelboard cabinet plumb and rigid without distortion of box.

3.4 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- B. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Section 260553 "Identification for Electrical Systems."
- C. Create a directory to indicate loads served by each circuit; Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are unacceptable.
- D. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections with the assistance of a factoryauthorized service representative:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - 3. Perform the following infrared scan tests and inspections and prepare reports:
 - a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each panelboard. Remove front panels so joints and connections are accessible to portable scanner.
 - b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.
 - c. Instruments and Equipment:
 - 1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
- B. Acceptance Testing Preparation:

- 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
- 2. Test continuity of each circuit.
- C. Panelboard will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports, including a certified report that identifies panelboards included and describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations made after remedial action.

3.6 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.
 - 2. Confirm correct communication wiring, initiate communications between panels, and program the control system according to approved time-of-day schedules and input override assignments.

3.7 SOFTWARE SERVICE AGREEMENT

- A. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for two years.
- B. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.
 - 1. Upgrade Notice: At least 30 days to allow Owner to schedule and access the system and to upgrade computer equipment if necessary.

3.8 **DEMONSTRATION**

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain control modules.

END OF SECTION

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. GFCI receptacles, 125 V, 20 A.
 - 2. Wall plates.

1.03 **DEFINITIONS**

- A. GFCI: Ground-fault circuit interrupter.
- B. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

1.05 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.06 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

PART 2 - PRODUCTS

2.01 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Comply with NFPA 70.
- C. RoHS compliant.
- D. Comply with NEMA WD 1.
- E. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:
 - 1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
 - 2. Devices shall comply with requirements in this Section.
- F. Devices for Owner-Furnished Equipment:
 - 1. Receptacles: Match plug configurations.
 - 2. Cord and Plug Sets: Match equipment requirements.
- G. Device Color:
 - 1. Wiring Devices Connected to Normal Power System: Ivory unless otherwise indicated or required by NFPA 70 or device listing.
- H. Wall Plate Color: For plastic covers, match device color.
- I. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.02 **GFCI RECEPTACLES**, 125 V, 20 A

- A. Duplex GFCI Receptacles, 125 V, 20 A:
 - 1. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two pole, three wire, and self-grounding.
 - 2. Configuration: NEMA WD 6, Configuration 5-20R.
 - 3. Type: Feed through.
 - 4. Standards: Comply with UL 498, UL 943 Class A, and FS W-C-596.

2.03 SINGLE SPECIAL PURPOSE RECEPTACLES

- A. Single Receptacle, 240V, 50A:
 - 1. Standard RV type power outlet with NEMA 3R enclosure.

2.04 WALL PLATES

- A. Single Source: Obtain wall plates from same manufacturer of wiring devices.
- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum with lockable cover.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
- B. Coordination with Other Trades:
 - 1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes, and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
 - 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
 - 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
 - 4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

- 1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
- 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
- 3. The length of free conductors at outlets for devices shall comply with NFPA 70, Article 300, without pigtails.
- 4. Existing Conductors:
 - a. Cut back and pigtail, or replace all damaged conductors.

- b. Straighten conductors that remain and remove corrosion and foreign matter.
- c. Pigtailing existing conductors is permitted, provided the outlet box is large enough.

D. Device Installation:

- 1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
- 2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
- 3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
- 4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
- 5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
- 6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
- 7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
- 8. Tighten unused terminal screws on the device.
- 9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

- 1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.
- F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

3.02 **GFCI RECEPTACLES**

A. Install non-feed-through GFCI receptacles where protection of downstream receptacles is not required.

3.03 IDENTIFICATION

A. Comply with Section 260553 "Identification for Electrical Systems."

3.04 FIELD QUALITY CONTROL

- A. Test Instruments: Use instruments that comply with UL 1436.
- B. Test Instrument for Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
- C. Perform the following tests and inspections:
 - 1. Test Instruments: Use instruments that comply with UL 1436.
 - 2. Test Instrument for Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.

D. Tests for Receptacles:

- 1. Line Voltage: Acceptable range is 105 to 132 V.
- 2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
- 3. Ground Impedance: Values of up to 2 ohms are acceptable.
- 4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
- 5. Using the test plug, verify that the device and its outlet box are securely mounted.
- Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault-current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.
- E. Wiring device will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.

END OF SECTION

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SECTION 264313 - SURGE PROTECTION FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 **SUMMARY**

- A. Section includes:
 - 1. Type 2 surge protective devices.
 - 2. Enclosures.
 - Conductors and cables.

1.03 **DEFINITIONS**

- A. Inominal: Nominal discharge current.
- B. MCOV: Maximum continuous operating voltage.
- C. Mode(s), also Modes of Protection: air of electrical connections where the VPR applies.
- D. MOV: Metal-oxide varistor; an electronic component with a significant non-ohmic current-voltage characteristic.
- E. NRTL: Nationally recognized testing laboratory.
- F. OCPD: Overcurrent protective device.
- G. SCCR: Short-circuit current rating.
- H. SPD: Surge protective device.
- I. Type 2 SPDs: Permanently connected SPDs intended for installation on the load side of the service disconnect overcurrent device, including SPDs located at the branch panel.
- J. VPR: Voltage protection rating.

1.04 <u>ACTION SUBMITTALS</u>

- A. Product Data: For each type of product.
 - 1. Include electrical characteristics, specialties, and accessories for SPDs.
 - 2. NRTL certification of compliance with UL 1449.
 - a. Tested values for VPRs.
 - b. Inominal ratings.
 - c. MCOV, type designations.
 - d. OCPD requirements.
 - e. Manufacturer's model number.
 - f. System voltage.
 - g. Modes of protection.

1.05 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Sample Warranty: For manufacturer's special warranty.

1.06 CLOSEOUT SUBMITTALS

A. Maintenance Data: For SPDs to include in maintenance manuals.

1.07 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace SPDs that fail in materials or workmanship within five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 TYPE 2 SURGE PROTECTIVE DEVICES (SPDs)

- A. <u>Manufacturers:</u> Subject to compliance with requirements, provide products by one of the following:
 - 1. ABB, Electrification Products Division.
 - 2. Eaton.
 - 3. Schneider Electric USA, Inc.
 - 4. Siemens Industry, Inc., Energy Management Division.

B. Source Limitations: Obtain devices from single source from single manufacturer.

C. Standards:

- 1. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 1449, Type 2.
- 2. Comply with UL 1283.

D. Product Options:

- 1. Include LED indicator lights for power and protection status.
- 2. Include internal thermal protection that disconnects the SPD before damaging internal suppressor components.
- 3. Include NEMA ICS 5, dry Form C contacts rated at 2 A and 24 V ac for remote monitoring of protection status.
- 4. Include surge counter.

E. Performance Criteria:

- 1. MCOV: Not less than 125 percent of nominal system voltage for 208Y/120 V and 120/240 V power systems.
- 2. Peak Surge Current Rating: Minimum single-pulse surge current withstand rating per phase must not be less than 150 kA. Peak surge current rating must be arithmetic sum of the ratings of individual MOVs in a given mode.
- 3. Protection modes and UL 1449 VPR for 240/120 V, single-phase, three-wire circuits must not exceed the following:
 - a. Line to Neutral: 700 V.
 - b. Line to Ground: 700 V.
 - c. Neutral to Ground: 700 V.
 - d. Line to Line: 1200 V.
- 4. SCCR: Equal or exceed 200 kA.
- 5. Inominal Rating: 20 kA.

2.02 ENCLOSURES

A. Outdoor Enclosures: NEMA 250, Type 3R.

2.03 CONDUCTORS AND CABLES

A. Power Wiring: Same size as SPD leads, complying with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.01 <u>INSTALLATION</u>

- A. Comply with NECA 1.
- B. Provide OCPD and disconnect for installation of SPD in accordance with UL 1449 and manufacturer's written instructions.
- C. Install leads between disconnects and SPDs short, straight, twisted, and in accordance with manufacturer's written instructions. Comply with wiring methods in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
 - 1. Do not splice and extend SPD leads unless specifically permitted by manufacturer.
 - 2. Do not exceed manufacturer's recommended lead length.
 - 3. Do not bond neutral and ground.
- D. Use crimped connectors and splices only. Wire nuts are unacceptable.

3.02 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections with the assistance of a factoryauthorized service representative:
 - 1. Compare equipment nameplate data for compliance with Drawings and the Specifications.
 - 2. Inspect anchorage, alignment, grounding, and clearances.
 - 3. Verify that electrical wiring installation complies with manufacturer's written installation requirements.
- B. SPDs that do not pass tests and inspections will be considered defective.
- C. Prepare test and inspection reports.

3.03 STARTUP SERVICE

- A. Complete startup checks in accordance with manufacturer's written instructions.
- B. Do not perform insulation-resistance tests of the distribution wiring equipment with SPDs installed. Disconnect SPDs before conducting insulation-resistance tests; reconnect them immediately after the testing is over.
- C. Energize SPDs after power system has been energized, stabilized, and tested.

3.04 **DEMONSTRATION**

A. Train Owner's maintenance personnel to operate and maintain SPDs.

END OF SECTION

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GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 Summary

- A. Section Includes:
 - 1. Furnishing and installation of Geomembrane
- B. Related Sections:
 - 1. Division 32 Exterior Improvements

1.3 Definitions

- A. Geomembrane: Thin, smooth plastic sheet material used as a mechanical barrier in a variety of applications:
 - 1. Root block for utilities or other structures.
 - 2. Bamboo barrier for invasive species, to prevent root growth in undesired locations.
 - 3. Water barrier for controlling water flow, prevention of lateral water migration into hardscapes.

1.4 Submittals

- A. Product data: Manufacturers standard literature defining materials for use on the Project.
- B. Samples, if required by Architect:
 - 1. Geomembrane: One linear foot.
- C. Quality control: Complete installation instructions specified, may be combined with product data.

1.5 Quality Assurance

- A. Manufacturer's qualifications:
 - 1. Minimum twenty-five (25) years experience in tree and plant protection.

1.6 Delivery, Storage and Handling

- A. Packing and Shipping
 - 1. Provide materials in original, unopened packaging with manufacturer's labels intact and legible.
- B. Acceptance at Site
 - 1. Damaged materials will not be accepted, as determined by visual inspection.
 - 2. Rejected materials shall be removed from project site immediately.
- C. Storage and Protection

1. Store materials in dry area in manufacturer's protective packaging, in original containers with labels and instructions intact.

PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers:
 - Products specified as standard of quality are manufactured by DeepRoot Green Infrastructure, LLC. (DeepRoot), 101 Montgomery St. Suite 2850, San Francisco, CA 94104; 800.458.7668; fax 800.277.7668; www.deeproot.com
 - 2. Products meeting standards listed within this specification may be acceptable for use subject to approval of product list and samples.

2.2 MANUFACTURED UNITS

- A. Geomembrane 0.030" (0.76 mm) thick
 - 1. Material: 100% post-consumer high density polyethylene (HDPE)
 - 2. Dimensions: 0.030"(0.76 mm) thick, available in 18"(460 mm), 24"(610 mm), 30"(760 mm), 36"(910 mm) or 48"(1220 mm) wide rolls of 100'(30.48m) or 300'(91.44m) lengths.
 - 3. Accessories:
 - a. Manufacturer's standard sealing tape
 - b. Silicone sealant, depending on application.
- B. Geomembrane 0.040" (1.02 mm) thick
 - 1. Material: 100% post-consumer high density polyethylene (HDPE)
 - 2. Dimensions: 0.040" (1.02 mm) thick, available in 24"(610 mm) or 30"(760 mm) wide rolls of 100'(30.48m) or 300'(91.44m) lengths.
 - 3. Accessories:
 - a. Manufacturer's standard sealing tape
 - b. Silicone sealant, depending on application.
- C. Geomembrane 0.060" (1.52 mm) thick
 - 1. Material: 100% post-consumer high density polyethylene (HDPE)
 - 2. Dimensions: 0.060" (1.52 mm) thick, available in 30"(760 mm) or 36"(910 mm) wide rolls of 100'(30.48m) or 300'(91.44m) lengths.
 - 3. Accessories:
 - a. Manufacturer's standard sealing tape
 - b. Silicone sealant, depending on application.
- D. Geomembrane 0.080" (2.03 mm) thick
 - 1. Material: 100% post-consumer high density polyethylene (HDPE)

- 2. Dimensions: 0.080" (2.03 mm) thick, available in 30"(760 mm) or 36"(910 mm) wide rolls of 100'(30.48m) or 200'(60.96m) lengths.
- 3. Accessories:
 - a. Manufacturer's standard sealing tape
 - b. Silicone sealant, depending on application.

INSTALLATION

3.1 General

- A. For all applications:
 - 1. Install as indicated on shop drawings in accordance with manufacturer's installation instructions.
 - 2. Use specified material widths required for project conditions.
 - 3. Where applicable, seal to hardscape surfaces with specified sealant.

B. Seaming

- 1. Where material requires seaming at the end of the roll, overlap geomembrane at minimum two widths of sealing tape, approximately 6" (150mm), using manufacturer's standard sealing tape.
- 2. Where material requires seaming to create a larger sheet-like material, overlap geomembrane at minimum two widths of sealing tape, approximately 6"(150mm).
- 3. Ensure consistent seal across entire seam.

3.2 Utility Applications

- A. For installation as utility separation device.
 - 1. Ensure utility company is aware of and approves of proposed application.
 - 2. Verify any utility requirements for depth, distance, compaction or other requirements they may have in regard to geomembrane installation.
 - 3. Install geomembrane as close to utility as allowed.
 - a. Generally, geomembrane should be installed vertically in order to adequately compact backfill on both sides of the membrane. Where necessary, geomembrane may also be laid across the top of a compacted utility trench. See manufacturer's product information for details.

3.3 Bamboo Barrier Applications

- A. Geomembrane may be used as a root barrier for Bamboo or other aggressive plant species.
 - 1. Install geomembrane vertically in desired perimeter around bamboo planting area, or as shown on project drawings.
 - 2. Overlap ends of barrier by 4' (1219.2mm) and apply sealant tape within the seam. Ensure a tight seal.
 - 3. Top of root barrier should be 2" (50.8mm) above finish grade of planting soil.

3.4 Water Barrier Applications

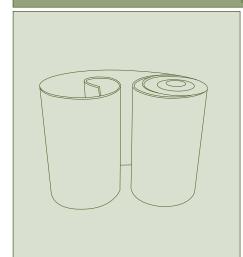
- A. For installation to control water flow.
 - 1. Geomembrane may be used to direct water to specific locations.
 - 2. Install in locations shown on project drawings.
 - 3. Install geomembrane vertically wherever possible.
 - 4. When used to direct water, installation of drainage systems at the end of flow route is recommended. Install per project specifications.
- B. For prevention of lateral water migration into hardscapes.
 - 1. Install in locations shown on project drawings.
 - 2. Install geomembrane vertically, immediately adjacent to structure that requires protection from lateral water migration.
 - a. Where installation occurs at the surface of planters or pavements, top of geomembrane shall be installed $\frac{1}{2}$ " (12.7mm) above grade of planting soil.

Geomembranes

Block roots, control invasive species and bamboo, protect foundations and manage water with DeepRoot geomembranes.

Geomembrane

SPECIFICATIONS + FEATURES



APPLICATIONS

Flexible, tough, and lightweight, DeepRoot Geomembranes serve two specific purposes:

- 1. Blocking roots and controlling invasive species.
- 2. Managing underground water movement.
 Applications include medians, roads, golf green liners, bamboo and invasive species control and foundation protection.

MATERIALS

Polyethylene (HDPE) recyclable sheet material

FEATURES

- Cuts at any measured length
- Up to 300 linear feet (91.44 m) without the need for a seam
- Joins vertically or horizontally with sealant tape
- Additional depths with vertical use or horizontal overlapping
- Made in the USA

SPECIFICATIONS

All Geomembrane rolls are 300' (91.44 m) long.

0.030" (0.76 mm) Thickness Rolls:					
WB 18/30	18" x 300' (46 cm x 91.44 m)				
WB 24/30	24" x 300' (61 cm x 91.44 m)				
WB 30/30	30" x 300' (76 cm x 91.44 m)				
WB 36/30	36" x 300' (91 cm x 91.44 m)				
WB 48/30	48" x 300' (122 cm x 91.44 m)				
0.040" (1.02 mm) Thickness Rolls:					
WB 24/40	24" x 300' (61 cm x 91.44 m)				
WB 30/40	30" x 300' (76 cm x 91.44 m)				
0.060" (1.524 mm) Thickness Rolls:					
WB 30/60	30" x 300' (76 cm x 91.44 m)				
WB 36/60	36" x 300' (91 cm x 91.44 m)				

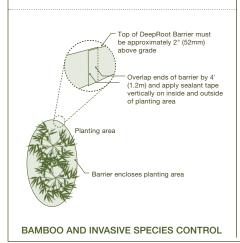
USE AS BAMBOOBARRIER®

USE AS WATER BARRIER AND ROOT BLOCK

Bamboo makes an ideal garden plant and grows quickly to provide privacy and beauty. However, if left unchecked it can grow throughout the yard and become a major nuisance. Using DeepRoot Geomembranes as a bamboo barrier is an effective way to prevent the unwanted spread of bamboo and other invasive species. The smooth surface of the BambooBarrier acts as a root stop, diverting the rhizome and prevent rampant growth. The rhizome will not penetrate the barrier, and instead will turn and continue to grow along the surface of the barrier. This contains the bamboo and prevents unwanted spreading.

TYPICAL APPLICATIONS:

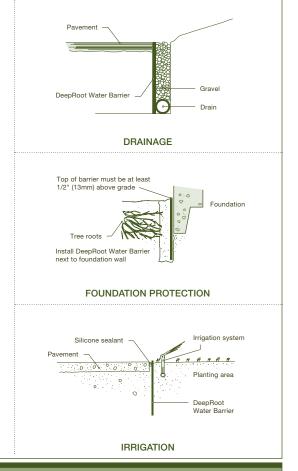
- Bamboo and invasive species control.



Versatile Water Barriers protect hardscapes and landscapes from subterranean water movement. When used around building foundations Water Barriers prevent root intrusion and maintain water equilibrium. The impermeable Geomembrane is also ideal for golf course construction to separate the greens from invasive grass and clay soils.

TYPICAL APPLICATIONS:

- Golf green liners
- Irrigated median plantings
- Drainage
- New foundation protection



Deep Root Partners, L.P.

Corporate Offices: 530 Washington Street, San Francisco, CA 94111
Tel: 800 ILV ROOT (458.7668) Fax: 800.277.7668 www.deeproot.con



PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section covers the furnishing of all labor, equipment and materials necessary for the proper restoration of existing surfaces disturbed or damaged as a result of construction operations which are not specifically scheduled or specified for topsoil and seeding, paving, landscaping or other surfacing.
- B. In general, the types of replacement included in this section are seeding along pipelines, concrete sidewalks, driveways, roadways, ditches, lawns and landscaped areas, and curb and gutter.
- C. Any damage to existing structures shall be repaired using materials and workmanship equal to, or better than, those of the original construction.

1.3 **DEFINITIONS**

- A. CABC Crushed aggregate base course.
- B. NCDOT North Carolina Department of Transportation.
- C. PSI Pounds per square inch.

1.4 SUBMITTALS

- A. All submittals shall be in accordance with the requirements of the pertinent specification sections referenced herein.
- B. An appropriate concrete mix design shall be submitted for all concrete sidewalks, driveways, roadways, and curb and gutter restored as part of this project.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SEEDING DISTURBED AREAS

- A. All ground surfaces disturbed by construction activity, which are not classified as lawns, landscaped areas, or pavement areas, but would be classified as open fields, shall be raked smooth and seeded in accordance with the appropriate paragraph(s) within Section 329200 entitled Turf and Grasses. Large rocks, clumps of earth and excessive spoil material shall be removed from the area prior to seeding.
- B. Shoulders of all roads shall be restored as specified for lawns and landscaped areas.
- C. Wooded areas not classified as lawns shall be restored to as near their original condition as possible.

3.2 **CONCRETE SIDEWALKS**

- A. Concrete walks removed in connection with, or damaged as a result of, construction operations under the Contract shall be replaced with new construction. Such walks shall be constructed of 4,000 PSI concrete on a thoroughly compacted subgrade, shall have a vertical thickness, unless otherwise noted, of not less than 4 inches or the thickness of the replaced walk where greater than 4 inches.
- B. Walks shall be float finished, edged with an edging tool, and grooved at intermediate intervals not in excess of the width of the walk, uniform throughout the length of the walk in any one direction.

3.3 DRIVEWAYS

- A. Unless otherwise noted, unpaved driveways shall be surfaced with not less than 4 inches of CABC, topped with 4 inches of stone, gravel, or other materials equal to that found in the original driveway. Driveways shall be left in a condition better than their original condition.
- B. Concrete drives shall be replaced with 4,000 PSI concrete and shall have equal thickness and reinforcing steel to that of the original drive. Prior to placing the concrete a 6-inch aggregate base course shall be placed in the drive area.
- C. Unless otherwise noted, bituminous or asphaltic concrete drives shall be restored to original base and asphalt thicknesses or a minimum of 6 inches of

aggregate base course and a 2-inch surface course, whichever is greater. Base material shall be compacted in 3-inch lifts and Type SF 9.5A or S 9.5B asphalt compacted in 2-inch lifts to match existing pavement section. All work shall be in accordance with the appropriate paragraph(s) of Section 321216 entitled Bituminous Paving.

3.4 ROADWAY REPLACEMENT

- A. Bituminous or Asphaltic pavements shall include all areas paved with blacktop, built up pavements or oil and stone, tar and stone and similar pavements constructed with a bituminous or asphalt and stone materials.
- B. Immediately upon completion of installation of underground piping and structures, the trench shall be backfilled and the roadway shall be repaired. Provide materials as specified in the Contract Drawings. If, in the opinion of the Engineer, the area adjacent to the excavation has not been damaged to the extent that the base course need to be replaced, restoration may consist of a surface course of sufficient thickness to meet the existing pavement.
- C. Unless otherwise noted, bituminous or asphaltic concrete roadways shall be restored to original base and asphalt thicknesses or a minimum of 6 inches of aggregate base course and a 2-inch surface course, whichever is greater. Base material shall be compacted in 3-inch lifts and Type SF 9.5A or S 9.5B asphalt compacted in 2-inch lifts to match existing pavement section. All work shall be in accordance with the appropriate paragraph(s) of Section 321216 entitled Bituminous Paving.
- D. Portland cement concrete roadways shall be replaced with 4,000 PSI concrete and shall have equal thickness and reinforcing steel as the original roadway. An aggregate base course with a thickness of 6 inches shall be placed prior to the placing of concrete.
- E. Differential settlement of restored pavements shall be corrected immediately.
- F. The Contractor shall repair and restripe any traffic markings that were damaged, removed or covered during construction. All work shall be done in accordance with NCDOT requirements and specifications.
- G. All existing manhole and valve covers shall be raised, as required, by the Contractor prior to paving. The cost of this work shall be included in the unit bid prices for other related work and no additional payment shall be made.

3.5 DITCHES

A. Ditches shall be regraded to the original grade and line. The surface of all ditches shall be returned to the same condition as found before commencing work.

3.6 LAWNS AND LANDSCAPED AREAS

- A. Lawns and landscaped areas shall be regraded and replaced as follows:
 - 1. Grading shall be to the grade existing before construction of the work under this Contract.
 - 2. Lawn replacement shall be in accordance with the appropriate paragraph(s) within Section 329200 entitled Turf and Grasses. Topsoiled areas shall be replaced with topsoil of equal quality and quantity.
- B. Landscaped areas shall be replaced with shrubs, hedges, ornamental trees, flowers, or other items to original condition.

3.7 CURB AND GUTTER

- A. Curb and gutter removed with or damaged as a result of construction operations, injured or disturbed by the Contractor, his agents, or employees, shall be replaced with new construction to a condition similar and equal to that existing before damage was incurred. 4,000 PSI concrete shall be used in curb and gutter replacement.
- B. All work associated with curb and gutter replacement shall be in accordance with Section 846-3 of the NCDOT Standard Specifications for Roads and Structures (latest edition). Horizontal and vertical alignment of the curb and gutter shall match that of the existing to the greatest extent practical, unless directed otherwise by the Engineer.

3.8 DAMAGE TO STRUCTURES

A. Any damage to existing structures shall be repaired of materials and workmanship equal to those of original construction. Extensively damaged structures, where the structural stability has been affected or which cannot be repaired in a suitable fashion shall be replaced entirely. Replacement shall not commence until approval of the plan of replacement has been given by the Engineer. Replacement costs shall be responsibility of the Contractor.

END OF SECTION 322905

SECTION 329300 PLANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section covers the furnishing of all labor, equipment and materials necessary for the installation of all trees, shrubs, ground covers, herbaceous plants and bulbs. Also included is the sodding of lawn areas.

B. Section Includes:

- 1. Plants.
- 2. Planting soils.
- 3. Tree stabilization.
- 4. Landscape edgings.
- 5. Tree grates.

C. Related Sections:

- 1. Division 01 Section "Temporary Tree and Plant Protection" for protecting, trimming, pruning, repairing, and replacing existing trees to remain that interfere with, or are affected by, execution of the Work.
- 2. Division 31 Section "Site Clearing" for protection of existing trees and plantings, topsoil stripping and stockpiling, and site clearing.
- 3. Division 31 Section "Earth Moving" for excavation, filling, and rough grading and for subsurface aggregate drainage and drainage backfill materials.

1.3 **DEFINITIONS**

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with ball size not less than sizes indicated; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.

- C. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required.
- D. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than minimum root spread according to ANSI Z60.1 for type and size of plant required.
- E. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.
- F. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.
- G. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of plant.
- H. Finish Grade: Elevation of finished surface of planting soil.
- I. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- J. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- K. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- L. Planting Area: Areas to be planted.
- M. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, inplace surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

- N. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- O. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
- P. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.
- Q. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- R. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- S. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated, including soils.
 - 1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
 - 2. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to the Project.
- B. Samples for Verification: For each of the following:
 - 1. Source of mulch for approval and five (5) gallon bucketful physical sample.
- C. Qualification Data: For qualified landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.
- D. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:
 - 1. Certificates of Inspection as required by law or governing authorities to accompany shipments.
 - 2. Vendor certified analysis for soil amendments, fertilizer materials, and grass seed.
 - 3. Evidence of State certification for sod.

- 4. Certificates indicating nursery source of each plant.
- E. Material Test Reports: Soil analysis report for existing soil and proposed supply of soil, if needed. Also indicate location of source.
- F. Proposed planting schedule, indicating dates for each type of landscape work during normal seasons for such work. Once accepted, revise dates only as approved in writing, after documentation of reasons for delays.
- G. Maintenance Instructions: Written instructions for the Owner's maintenance of landscaping. Include initial, 12-month, and long-term maintenance recommendations. Submit prior to acceptance of landscaping.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: In addition to the requirements in Division 01 Section "Quality Requirements", the landscape installer shall have at least five (5) years of satisfactory experience in successful establishment of plants including at least two (2) completed jobs of dollar value and scope similar to this work.
 - 1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
 - 2. Installer's Field Supervision: Installer to shall maintain an experienced full-time supervisor on Project site when work is in progress.
 - Chemical Applicator: Applicator must be properly trained to use all chemicals and must be licensed to purchase and use restricted chemicals, if any.
- B. Soil-Testing Laboratory Qualifications: An independent or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
- C. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of the soil.
 - 1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
 - 2. The soil-testing laboratory shall oversee soil sampling; with depth, location, and number of samples to be taken per instructions from Engineer. A minimum of three (3) representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
 - 3. Report suitability of tested soil for plant growth.

- a. Based upon the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1,000 sq. ft. or volume per cu. yd. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
- b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.
- D. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1. Tagging of plants prior to digging at the nursery is recommended.
- E. Substitutions will be permitted only with the prior written approval of the Engineer and may be granted if the installer can demonstrate that plants of a specific type, size or quality are not available within a 200-mile radius of the site.
- F. The landscape installer should be familiar with the quality of materials available from suppliers in order to minimize the likelihood that unacceptable products will be rejected.
- G. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
 - Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
 - 2. Other Plants: Measure with stems, petioles, and foliage in their normal position.
- H. Plant Material Observation: Engineer may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Engineer retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
 - 1. Notify Engineer of sources of planting materials seven (7) days in advance of delivery to site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. All products shall be packed and shipped in a manner which will not damage them.
- B. Damaged products shall be rejected upon delivery and promptly removed from the site.
- C. Products which must be stored prior to installation shall be protected from damage and theft.
- D. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.

E. Bulk Materials:

- 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
- 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
- 3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.
- F. Deliver bare-root stock plants freshly dug. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting.
- G. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.
- H. Handle planting stock by root ball.
- I. Store bulbs, corms, and tubers in a dry place at 60 to 65 degrees F until planting.
- J. Time delivery of sod so that it will be placed within 36 hours after harvesting. Protect sod against drying and breaking of rolled strips.
- K. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

- 1. Heel-in bare-root stock. Soak roots that are in dry condition in water for two hours. Reject dried-out plants.
- 2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
- 3. Do not remove container-grown stock from containers before time of planting.
- 4. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-wet condition.

1.7 PROJECT CONDITIONS

- A. Schedule and coordinate work with all trades involved.
- B. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.
- C. Consult Record Drawings and installers to determine actual underground utility and drainage system locations in the vicinity of this work. Damage to known or unrecorded utilities will be repaired at the Contractor's expense.
- D. Interruption of Existing Services or Utilities: Do not interrupt services or utilities to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated:
 - 1. Notify Engineer no fewer than three (3) days in advance of proposed interruption of each service or utility.
 - 2. Do not proceed with interruption of services or utilities without Engineer's written permission.
- E. Notify the Engineer immediately of any unforeseen conditions which will affect plant installation or growth.
- F. Test internal drainage of soils at representative planting locations by digging a hole 12 inches deep and approximately 12 inches in diameter, then filling the hole with water. If the water drains away within 24 hours, the drainage should be adequate.
- G. The results of the soil tests may indicate recommendations which will affect the type and analysis of soil amendments.
- H. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather

- conditions according to manufacturer's written instructions and warranty requirements.
- I. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.
 - 1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.8 WARRANTY

- A. Following the date of acceptance by the Owner, plants shall be warranted for one (1) year excluding conditions of vandalism, theft, accident, acts of God and Owner's negligent maintenance.
- B. Replace each unacceptable plant as soon as season requirements permit.
- C. Only one (1) replacement per plant will be required, except for losses due to failure to comply with specifications.
- D. Provide extended warranty for period equal to original warranty period, for replaced plant material.

1.9 MAINTENANCE SERVICE

A. Maintenance Service: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until Final Acceptance of the project by the Owner.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

- A. General: Furnish only nursery-grown plants under climatic conditions similar to the location of this project, for at least one growing season prior to this work which are true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1 and any more stringent requirements which may be stated herein or on the Drawings.
- B. Furnish only plants with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely

foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

- 1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots will be rejected.
- 2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.
- 3. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Engineer, with a proportionate increase in size of roots or balls, but use of such plants shall not increase the contract price.
- C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.
- D. Labeling: Label at least 10 percent of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.
- E. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.
- F. Bulbs: Bulb quality will be approved by the Engineer prior to planting. Bulb quality will be judged by the following characteristics:
 - 1. Firm and free from deep blemishes, cuts or soft spots.
 - 2. Heavy for their size.
 - 3. Have a solid and firm basal plate.
- G. Annuals, Biennials, and Perennials: Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery.
- H. Plant Quantity: The greater quantity shall take precedence if discrepancies occur between the quantities designated on the materials list and those indicated on the drawings.
- I. Nomenclature shall conform to "Hortus III".

2.2 INORGANIC SOIL AMENDMENTS

- A. Lime: The quality of lime and all operations in connection with the furnishing of this material shall comply with the requirements of ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
 - 1. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.
 - 2. Provide lime in the form of free-flowing ground dolomitic limestone.
- B. During the handling and storing, the lime shall be cared for in such a manner that it will be protected against hardening and caking. Any hardened or caked lime shall be pulverized to its original condition before being used.

2.3 ORGANIC SOIL AMENDMENTS

- A. Sawdust: Well-rotted sawdust, free of chips, stones, sticks, soil or toxic substances and with 7.5 lbs. nitrogen uniformly mixed into each cubic yard.
- B. Manure: Well-rotted, unleached, stable or cattle manure not less than 8 months or more than 2 years old, containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.
- C. Commercial Bagged Manure Such as "Black Cow", "Baa Baa Doo", or equal.

2.4 FERTILIZERS

- A. The quality of fertilizer and all operations in connection with the furnishing of this material shall comply with the requirements of the North Carolina Fertilizer Law and regulations adopted by the North Carolina Board of Agriculture.
- B. Planting Tablets: Tightly compressed chip type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.
 - 1. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.
 - 2. Manufacturer: Agriform Planting Tablets as manufactured by Scotts-Sierra Horticultural Products, or equal, may be used at installer's option.
- C. Encapsulated Fertilizers: Fertilizer made up of nutrient granules embedded in a synthetic resin which dissolves slowly, releasing the nutrients over an extended period of time. It is also called a slow-release fertilizer.

- 1. Nutrient Composition: 19 percent nitrogen, 6 percent phosphorous, and 12 percent potassium, by weight plus micronutrients.
- 2. Manufacturer: Osmocote as manufactured by Scotts-Miracle Gro, or equal, may be used at installer's option.
- D. During handling and storing, the fertilizer shall be cared for in such a manner that it will be protected against hardening, caking, or loss of plant food values. Any hardened or caked fertilizer shall be pulverized to its original conditions before being used.

2.5 PLANTING SOILS

- A. Planting Soil: Existing, native surface topsoil formed under natural conditions with the duff layer retained during excavation process and stockpiled on-site. Verify suitability of native surface topsoil to produce viable planting soil. Clean soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
 - 1. Supplement with another specified planting soil when quantities are insufficient.
 - 2. Mix existing, native surface topsoil with soil amendments of the type and quantity directed by the Engineer to produce planting soil:
- B. Planting Soil: Existing, in-place surface soil. Verify suitability of existing surface soil to produce viable planting soil. Remove stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Mix surface soil with soil amendments of the type and quantity directed by the Engineer to produce planting soil:
- C. Planting Soil: Imported topsoil or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from bogs, or marshes.
 - 1. Additional Properties of Imported Topsoil or Manufactured Topsoil: Screened and free of stones 1 inch or larger in any dimension; free of roots, plants, sod, clods, clay lumps, pockets of coarse sand, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth; free of obnoxious weeds and invasive plants including quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and bromegrass; not infested with nematodes; grubs; or other pests, pest eggs, or other undesirable organisms and disease-causing plant pathogens; friable and with sufficient structure to give good tilth and

- aeration. Continuous, air-filled pore space content on a volume/volume basis shall be at least 15 percent when moisture is present at field capacity. Soil shall have a field capacity of at least 15 percent on a dry weight basis.
- 2. Top soil shall not be delivered in a muddy or frozen condition.

2.6 MULCHES

- A. Mulch Materials for Plants
 - 1. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:
 - a. Type: Double shredded hardwood.
 - b. Size Range: 3 inches maximum, 1/2 inch minimum.
 - c. Color: Natural.

2.7 <u>WATER</u>

A. Water shall be clean, clear water free from any objectionable or harmful chemical qualities or organisms and shall be furnished by the Contractor.

2.8 WEED-CONTROL BARRIERS

- A. Nonwoven Geotextile Filter Fabric: Polypropylene or polyester fabric, 3 oz./sq. yd. minimum, composed of fibers formed into a stable network so that fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally-encountered chemicals, alkalis, and acids.
- B. Composite Fabric: Woven, needle-punched polypropylene substrate bonded to a nonwoven polypropylene fabric, 4.8 oz./sq. yd.

2.9 PESTICIDES

- A. General: Pesticide registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.10 TREE STABILIZATION MATERIALS

A. Stakes and Guys:

- 1. Upright and Guy Stakes: Rough-sawn, sound, new lumber, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by 8'-0" length, pointed at one end.
- 2. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes or compression springs.
- 3. Guys and Tie Wires: ASTM A 641, Class 1, galvanized-steel wire, two-strand, twisted, 12-guage minimum.
- 4. Tree-Tie Webbing: UV-resistant polypropylene or nylon webbing with brass grommets.
- 5. Guy Cables: Five-strand, 3/16-inch-diameter, galvanized-steel cable, with zinc-coated compression springs, a minimum of 3 inches long, with two 3/8-inch galvanized eyebolts.
- 6. Flags: Standard surveyor's plastic flagging tape, white, 6 inches long.

B. Root-Ball Stabilization Materials:

- 1. Upright Stakes and Horizontal Hold-Down: Rough-sawn, sound, new lumber, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by lengths necessary for proper support; stakes pointed at one end.
- 2. Wood Screws: ASME B18.6.1.
- 3. Battens or Blocks and Struts: Rough-sawn, sound, new lumber, free of knots, holes, cross grain, and other defects, 2-by-4-inch nominal by lengths necessary for proper support.
- 4. Straps: Adjustable steel or plastic package banding straps.
- 5. Padding: Burlap.

2.11 <u>MISCELLANEOUS PRODUCTS</u>

- A. Wood Pressure-Preservative Treatment: AWPA C2, with waterborne preservative for soil and freshwater use, acceptable to authorities having jurisdiction, and containing no arsenic; including ammoniacal copper arsenate, ammoniacal copper zinc arsenate, and chromated copper arsenate.
- B. Root Barrier: Black, molded, modular panels manufactured with 50 percent recycled polyethylene plastic with ultraviolet inhibitors, 85 mils thick, with vertical root deflecting ribs protruding 3/4 inch out from panel, and each panel 24 inches wide.

- C. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.
- D. Burlap: Non-synthetic, biodegradable.
- E. Planter Drainage Gravel: Washed, sound crushed stone or gravel complying with ASTM D 448 for Size No. 8.
- F. Planter Filter Fabric Nonwoven geotextile manufactured for separation applications and made of polypropylene, polyolefin, or polyester fibers or combination of them.

PART 3 - EXECUTION

3.1 **EXAMINATION**

- A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.
 - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 - 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
 - Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 - 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Engineer and replace with new planting soil.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Lay out individual tree and shrub locations with stakes or flags. Flag outlines of planting beds and secure landscape architect's approval prior to beginning soil preparation. Make adjustments as directed.
- D. Apply antidesiccant to trees and shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.
 - 1. If deciduous trees or shrubs are moved in full leaf, spray with antidesiccant at nursery before moving and again two weeks after planting.
- E. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

3.3 PLANTING AREA ESTABLISHMENT

- A. Loosen and excavate subgrade of all planting areas to a minimum depth of 12 inches. Remove stones larger than I inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Apply superphosphate fertilizer directly to subgrade before loosening.
 - 2. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.
 - a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
 - b. Mix lime with dry soil before mixing fertilizer.
 - 3. Spread planting soil to a depth of 8 inches but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
 - a. Spread approximately one-half the thickness of planting soil over loosened subgrade. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil.
- B. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

- C. Before planting, obtain Engineer's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.
- D. Application of Mycorrhizal Fungi: At time directed by Engineer, broadcast dry product uniformly over prepared soil as recommended by manufacturer.

3.4 EXCAVATION FOR TREES AND SHRUBS

- A. Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
 - 1. Excavate approximately three times as wide as ball diameter for balled and burlapped and container-grown stock.
 - 2. Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
 - 3. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
 - 4. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
 - 5. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
 - 6. Maintain supervision of excavations during working hours.
 - 7. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
 - 8. If drain tile is shown on Drawings or required under planting areas, excavate to top of porous backfill over tile.
- B. Subsoil and topsoil removed from excavations may be used as planting soil.
- C. Obstructions: Notify Engineer if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
 - 1. Hardpan Layer: Drill 6-inch-diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.
- D. Drainage: Notify Engineer if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.
- E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.5 TREE, SHRUB, AND VINE PLANTING

- A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.
- B. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- C. Set balled and burlapped stock plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.
 - 1. Use planting soil for backfill.
 - 2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 - 4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
 - 5. Continue backfilling process. Water again after placing and tamping final layer of soil.
- D. Set container-grown stock plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.
 - 1. Use planting soil for backfill.
 - 2. Carefully remove root ball from container without damaging root ball or plant.
 - Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 - 4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
 - 5. Continue backfilling process. Water again after placing and tamping final layer of soil.

- E. Set fabric bag-grown stock plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.
 - 1. Use planting soil for backfill.
 - 2. Carefully remove root ball from fabric bag without damaging root ball or plant. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 - 4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
 - 5. Continue backfilling process. Water again after placing and tamping final layer of soil.
- F. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.6 MECHANIZED TREE SPADE PLANTING

- A. Trees shall be planted with an approved mechanized tree spade at the designated locations. Do not use tree spade to move trees larger than the maximum size allowed for a similar field-grown, balled-and-burlapped root-ball diameter according to ANSI Z60.1, or larger than the manufacturer's maximum size recommendation for the tree spade being used, whichever is smaller.
- B. When extracting the tree, center the trunk within the tree spade and move tree with a solid ball of earth.
- C. Cut exposed roots cleanly during transplanting operations.
- D. Use the same tree spade to excavate the planting hole as was used to extract and transport the tree.
- E. Plant trees as shown on Drawings, following procedures in "Tree, Shrub, and Vine Planting" Article.
- F. Where possible, orient the tree in the same direction as in its original location.

3.7 TREE, SHRUB, AND VINE PRUNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.
- B. Prune, thin, and shape trees, shrubs, and vines as directed by Engineer.
- C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Engineer, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.
- D. Do not apply pruning paint to wounds.

3.8 TREE STABILIZATION

- A. 14 feet in height and more than 3 inches in caliper unless otherwise indicated. Securely attach no fewer than three guys to stakes 30 inches long, driven to grade.
 - 1. Site-Fabricated Staking-and-Guying Method:
 - a. For trees more than 6 inches in caliper, anchor guys to wood deadmen buried at least 36 inches below grade. Provide compression spring for each guy wire and tighten securely.
 - b. Support trees with bands of flexible ties at contact points with tree trunk and reaching to compression spring. Allow enough slack to avoid rigid restraint of tree.
 - c. Support trees with strands of cable or multiple strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk and reaching to compression spring. Allow enough slack to avoid rigid restraint of tree.
 - d. Attach flags to each guy wire, 30 inches above finish grade.
 - e. Paint compression springs with luminescent white paint.
 - 2. Proprietary Staking and Guying Device: Install staking and guying system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.
- B. Root-Ball Stabilization: Install at- or below-grade stabilization system to secure each new planting by the root ball unless otherwise indicated.
 - 1. Wood Hold-Down Method: Place vertical stakes against side of root ball and drive them into subsoil; place horizontal wood hold-down stake across top of root ball and screw at each end to one of the vertical stakes.
 - a. Install stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation. Saw stakes off at horizontal stake.

- Install screws through horizontal hold-down and penetrating at least
 inch into stakes. Predrill holes if necessary to prevent splitting
- c. Install second set of stakes on other side of root trunk for larger trees as indicated
- 2. Proprietary Root-Ball Stabilization Device: Install root-ball stabilization system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

3.9 GROUND COVER AND PLANT PLANTING

- A. Dig holes large enough to allow spreading of roots.
- B. For rooted cutting plants supplied in flats, plant each in a manner that will minimally disturb the root system but to a depth not less than two nodes.
- C. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
- D. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
- E. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.10 PLANTING AREA MULCHING

- A. Install weed-control barriers before mulching according to manufacturer's written instructions. Completely cover area to be mulched, overlapping edges a minimum of 12 inches and secure seams with galvanized pins.
- B. Mulch backfilled surfaces of planting areas and other areas indicated.
 - 1. Trees and Tree-like Shrubs in Turf Areas: Apply organic mulch ring of 3-inch average thickness, with 36 inch radius around trunks or stems. Do not place mulch within 6 inches of trunks or stems.
 - 2. Organic Mulch in Planting Areas: Apply 3 inch average thickness of organic mulch over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 6 inches of trunks or stems.

3.11 PLANT MAINTENANCE

A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization

- devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.
- B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated past management practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.12 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
 - 1. Use herbicides to eradicate vegetation before tilling plant seed and sod beds
 - 2. Use herbicides to control emerging weeds in shrub and ground cover beds and around trees.
- B. Pre-Emergent Herbicides (Selective and Non-Selective): Apply to tree, shrub, and ground-cover areas in accordance with manufacturer's written recommendations. Do not apply to seeded areas.
- C. Post-Emergent Herbicides (Selective and Non-Selective):
 - 1. Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.
 - 2. In buffer planting areas apply a minimum of three (3) applications of approved herbicide at two (2) week intervals.
 - 3. Protect adjacent property and vegetation to remain.

3.13 CLEANUP AND PROTECTION

- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.
- B. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

C. After installation and before Final Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

3.14 DISPOSAL

A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

SECTION 32 94 51 SOIL CELLS ("SILVA CELL SYSTEM")

PART 1 - GENERAL

1.01 SUMMARY

Section Includes:

- 1. Silva Cell system for planting and paving, including Silva Cell assemblies and related accessories.
- 2. Other materials including, but not limited to, geotextile, geogrid, aggregate, subbase material, backfill, root barrier, Water + Air System, and planting soil.

Related Requirements:

- Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.
- Section 6.17.4 Submittal Procedures: For administrative and procedural requirements for 2. processing of submittals during the construction phase.
- 3. Article 14.0 - Closeout Procedures: For administrative and procedural requirements for completion of the Work.

1.02 **REFERENCES**

Definitions:

- AGGREGATE BASE COURSE: Aggregate material between the paving and the top of the 1. Silva Cell deck below, designed to distribute loads across the top of the deck.
- AGGREGATE SETTING BED FOR PAVERS: Aggregate material between the aggregate 2. base course and unit surface pavers, designed to act as a setting bed for the pavers.
- AGGREGATE SUBBASE: Aggregate material between the bottom of the Silva Cell base 3. and the compacted subgrade below, designed to distribute loads from the Silva Cell bases to the subgrade.
- 4. BACKFILL: The earth used to replace or the act of replacing earth in an excavation beside the Silva Cell system to the excavation extents.
- 5. FINISH GRADE: Elevation of finished surface of planting soil or paving.
- PLANTING SOIL: Soil as defined in Division 32, Section 32 94 56 Planting Soil for Silva 6. Cells, intended to fill the Silva Cell system and other planting spaces.
- SILVA CELL SYSTEM: 7.
 - Silva Cell: One assembled unit made up of 1 base, 6 post assemblies, and 1 Silva Cell deck.
 - Silva Cell System: Two or more Silva Cells used in combination with each other and b. with required accessories.
- 8. SUBGRADE: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill.
- 9. WALK-THROUGH COMPACTION: A process for light compaction of soils by walking through the soil following placement.
 - Walk through compaction shall result in 75-85 percent of maximum dry density in accordance with ASTM D698, Standard Proctor Method. Do not exceed root limiting compaction for the given soil type.

Reference Standards:

- 1. American Association of State Highway and Transportation Officials (AASHTO):
 - AASHTO H-20

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- 2. ASTM International (ASTM):
 - ASTM D448-12, Standard Classification for Sizes of Aggregate for Road and Bridge Construction
 - b. ASTM D698-12e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft³ [600 kN-m/m³])
 - c. ASTM D1241-07, Standard Specification for Materials for Soil-Aggregate Subbase, Base, and Surface Courses
 - d. ASTM D3786/D3786M-13, Standard Test Method for Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method
 - e. ASTM D4491-99a(2014)e1, Standard Test Methods for Water Permeability of Geotextiles by Permittivity
 - f. ASTM D4533-D4533M-15, Standard Test Method for Trapezoid Tearing Strength of Geotextiles
 - g. ASTM D4632-D4632M-15, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
 - h. ASTM D4751-12, Standard Test Method for Determining Apparent Opening Size of a Geotextile
 - ASTM D4833/D4833M-07(2013)e1, Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products
 - j. ASTM D5262-07(2012), Standard Test Method for Evaluating the Unconfined Tension Creep and Creep Rupture Behavior of Geosynthetics
 - k. ASTM D6241-14, Standard Test Method for Static Puncture Strength of Geotextile and Geotextile-Related Products Using a 50mm Probe
 - ASTM D6637-11, Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Conference: Prior to installation of the Silva Cell system and associated Work, meet with the Contractor, Silva Cell system installer and their field supervisor, manufacturer's technical representative, the Owner at the Owner's discretion, and other entities concerned with the Silva Cell system performance.
 - 1. Provide at least 72 hours advance notice to participants prior to convening preinstallation conference.
 - 2. Introduce and provide a roster of individuals in attendance with contact information.
 - 3. The preinstallation conference agenda will include, but is not limited to the review of:
 - a. Required submittals both completed and yet to be completed.
 - b. The sequence of installation and the construction schedule.
 - c. Coordination with other trades.
 - d. Details, materials and methods of installation.
 - 1) Review requirements for substrate conditions, special details, if any, installation procedures.
 - 2) Installation layout, procedures, means and methods.
 - e. Mock-up requirements.
- Sequencing and Scheduling:
 - 1. General: Prior to beginning Work of this Section, prepare a detailed schedule of the Work involved for coordination with other trades.
 - 2. Schedule utility installations prior to beginning Work of this Section.
 - Where possible, schedule the installation of the Silva Cell system after the area is no longer required for use by other trades and Work. Where necessary to prevent damage, protect installed system if Work must occur over or adjacent to the installed Silva Cell system.

1.04 SUBMITTALS

A. Action Submittals: Submit in accordance with Section 6.17.4:

- A. Action Submittals: Submit these to the City Representative for review and acceptance not less than 45 days prior to start of installation of materials and products specified in this Section.
 - Product Data: For each type of product, submit manufacturer's product literature with technical data sufficient to demonstrate that the product meets these specifications.
 - 2. Test and Evaluation Reports:
 - Submit results of compaction testing required by the Specifications for approval.
 - Include analysis of bulk materials including soils and aggregates, by a recognized b. laboratory that demonstrates that the materials meet the Specification requirements.

3. Samples:

- One full size sample of an assembled Silva Cell (copy of manufacturers brochure a. with images of product may be accepted in lieu of product sample).
- Manufacturer's product data/specification sheet for geogrid. b.
- Manufacturer's product data/specification sheet for geotextile. C.
- Manufacturer's product data/specification sheet for Water+Air System components (when specified as part of the system)
- Manufacturer's Report: Submit Silva Cell system manufacturer's letter of review and approval of the Project, including Drawings and Specifications, Addenda, Clarifications and Modifications, and for compliance with product installation requirements.
- 5. Qualification Statements:
 - Manufacturer:
 - 1) Submit list of completed projects demonstrating durability and longevity of inplace systems.
 - Include project name, location, and date of completion.
- B. Closeout Submittals: Submit these to the City Representative at completion of installation.
 - Warranty: Submit manufacturer's warranty, fully executed.

1.05 **QUALITY ASSURANCE**

- A. Comply with applicable requirements of the laws, codes, ordinances and regulations of Federal, State and Municipal authorities having jurisdiction. Obtain necessary permits/approvals from these authorities.
- Manufacturer Qualifications:
 - A manufacturer whose product is manufactured in an ISO/TS 16949 compliant and ISO 9001 - 2008 registered factory.
 - 2. A manufacturer with not less than 100 Silva Cell systems in-place, in the United States. Each system in use for not less than 7 years, confirming durability and longevity of the system.
 - A manufacturer with documented written approval of their product for use as a stormwater 3. treatment device by a minimum of 3 governmental jurisdictions.
 - 4. A manufacturer with an established and demonstrated utility service and repair process, including written procedure and photographs demonstrating work.
 - 5. A manufacturer with a published operating and maintenance manual
- C. Installer Qualifications: A qualified installer with not less than 5 years of successful experience installing Silva Cell systems or related products and materials, and whose work has resulted in successful installation of underground piping, chambers and vault structures, planting soils, and planter drainage systems of a similar scope and scale in dense urban areas.
- D. Installer's Field Supervisor: A full-time supervisor employed by the installer with not less than 5 years of successful experience similar to that of the installer and present at the Project site when Work is in progress. Utilize the same field supervisor throughout the Project, unless a substitution is submitted to and approved in writing by the City Representative.
- Mock-Up: Prior to the installation of the Silva Cell system, construct a mock-up of the complete installation at the Project site in the presence of the Landscape Architect.
 - Size and Extent: Minimum of 100 sq. ft. (10 sq. m.) in area and including the complete Silva Cell system installation with subbase, aggregate subbase, drainage installation, Silva

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- Cell decks, posts, and bases, base course aggregate, geotextile, geogrid, backfill, planting soil, and necessary accessories.
- 2. The mock-up area may remain as part of the installed Work at the end of the Project provided that it remains undamaged and meets the requirements of the Drawings and Specifications.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Silva Cell System: Protect Silva Cell system components from damage during delivery, storage and handling.
 - 1. Store components on smooth surfaces, free from dirt, mud and debris. Store under tarp to protect from sunlight when time from delivery to installation exceeds one week.
 - 2. Perform handling with equipment appropriate to the size (height) of Silva Cells and site conditions; equipment may include, hand, handcart, forklifts, extension lifts, or small cranes, with care given to minimize damage to Silva Cell bases, posts, decks and adjacent assembled Silva Cells.
- B. Packaged Materials: Deliver packaged materials in original, unopened containers indicating weight, certified analysis, name and address of manufacturer, and indication of conformance with State and Federal laws, if applicable. Protect materials from deterioration during delivery and while on the Project site.
 - 1. Do not deliver or place backfill, soils, or soil amendments in frozen, wet, or muddy conditions.
 - 2. Provide protection including tarps, plastic and/or matting between bulk materials and finished surfaces sufficient to protect the finish material.
 - 3. Bring planting soil to the site using equipment and methods that do not overly mix and further damage soil peds within the soil mix.
- D. Provide erosion-control measures to prevent erosion or displacement of bulk materials and discharge of soil-bearing water runoff or airborne dust to adjacent properties, water conveyance systems, and walkways. Provide additional sediment control to retain excavated material, backfill, soil amendments and planting mix within the Project limits as needed.

1.07 FIELD CONDITIONS

A. Existing Conditions: Do not proceed with Work when subgrades, soils and planting soils are in a wet, muddy or frozen condition.

1.08 WARRANTY

- A. The Contractor shall warrant the Silva Cell system to be free of faults and defects in accordance with the General Conditions, except that the warranty shall be extended by manufacturer's written warranty against defects in materials and workmanship as follows:
 - 1. DeepRoot® warrants to the original purchaser of its Silva Cell™ product that such product will be free from defects in materials and workmanship, and perform to DeepRoot's written specifications for the warranted product, when installed and used as specifically provided in the product's installation guidelines for a period of 20 years from the date of purchase. This warranty does not cover wear from normal use, or damage caused by abuse, mishandling, alterations, improper installation and/or assembly, accident, misuse, or lack of reasonable care of the product. This warranty does not apply to events and conditions beyond DeepRoot's control, such as ground subsidence or settlement, earthquakes and other natural events, acts of third parties, and/or Acts of God. If this warranty is breached, DeepRoot® will provide a replacement product. Incurred costs, such as labor for removal of the original product, installation of replacement product, and the cost of incidental or other materials or expenses are not covered under this warranty.
 - 2. Deeproot® makes no other warranties, express or implied, and specifically disclaims the warranty of merchantability or fitness for a particular purpose. Deeproot® shall not be liable either in tort or in contract for any direct, incidental or consequential damages, lost profits, lost revenues, loss of use, or any breach of any express or implied warranty.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Acceptable Manufacturers:

DeepRoot Green Infrastructure, LLC 101 Montgomery Street, Suite 2850 San Francisco, CA, 94104

Phone: 415.781.9700 Toll Free: 800.458.7668 Fax: 415.781.0191 www.deeproot.com

B. Substitutions: Manufacturers seeking approval of their products are required to receive prior approval 7 days prior to bid opening.

2.02 DESCRIPTION

- A. The term Silva Cell shall be used to refer to a single Silva Cell.
- B. Silva Cells shall be designed for the purpose of growing healthy trees and providing stormwater management.
- C. Silva Cells shall be modular, structural systems.
- D. Each Silva Cell shall be structurally-independent from all adjacent Silva Cells for incorporating utilities and other site features as well as for future repairs.
- E. Silva Cells shall be capable of supporting loads up to and including AASHTO H-20 (United States) or CSA-S6 87.5 kN (Canada) when used in conjunction with approved pavement profiles.
- F. Silva Cells shall be open on all vertical faces and horizontal planes and shall have no interior walls or diaphragms.
- G. Silva Cells shall be capable of providing a large, contiguous, continuous volume of planting soil that does not inhibit or prevent the following:
 - 1. Placement of planting soil
 - 2. Walk through compaction
 - 3. Compaction testing of planting soil, once in place
 - 4. Movement and growth of roots
 - 5. Movement of water within the provided soil volume, including lateral capillary movement
 - 6. Installation and maintenance of utilities placed within, adjacent to, or below the Silva Cell.
- H. Silva Cells shall be able capable of being filled with a variety of soil types and soils that include peds 2 inches (50 mm) or larger in diameter as is appropriate for the application, location of the installation, and tree species.

2.03 SILVA CELL MATERIALS AND ACCESSORIES

- A. Silva Cell System Components: Each "Silva Cell" soil cell module (hereafter Silva Cell or "cell") is composed of one base, 6 post assemblies, and one deck.
 - 1. 3x Silva Cell System:
 - a. Components: One base, six 3x posts (a combination of six 1x posts and six 2x posts), and one deck.
 - b. Assembled Dimensions (Each Cell): 47.2 inches long by 23.6 inches wide by 43 inches high (1200 mm long by 600 mm wide by 1092.2 mm high).]
- B. Silva Cell Materials and Fabrication:

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- 1. Bases and Posts: Homopolymer polypropylene.
- 2. Decks: Fiberglass reinforced, chemically-coupled, impact modified polypropylene.
- C. Manufacturer's Related Silva Cell Installation Accessories:
 - Strongbacks: An accessory designed to stabilize the Silva Cell posts temporarily, during soil placement, and removed for reuse prior to placing decks.
 - 2. Anchoring Spikes: 10" landscape spike for securing assembled Silva Cells to subbase.

2.04 RELATED PRODUCTS

- A. Root Barrier: Recyclable, black, injection molded panels manufactured with a minimum 50 percent post-consumer recycled polypropylene plastic with UV inhibitors, and integrated zipper joining system which allows instant assembly by sliding one panel into another; for redirecting tree roots down and away from hardscapes.
 - 1. Panel Sizes:
 - a. No. UB12-2: 24 inches long by 12 inches deep by 0.080 inches thick (61 cm long by 30 cm deep by 2.03 mm thick); for use with 1x systems and for pavement profiles less than 12 inches (30 cm) deep.
 - b. No. UB18-2: 24 inches long by 18 inches deep by 0.080 inches thick (61 cm long by 46 cm deep by 2.03 mm thick); for use with 2x and 3x systems, and for pavement profiles 12 inches or more in depth.
 - 2. Products meeting this specification:
 - a. DeepRoot Tree Root Barrier (DeepRoot Green Infrastructure, LLC)
- B. Geogrid: Net-shaped woven polyester fabric with PVC coating, uniaxial or biaxial geogrid, inert to biological degradation, resistant to naturally occurring chemicals, alkalis, and acids; used to provide a stabilizing force within soil structure as the fill interlocks with the grid.
 - 1. Tensile strength at ultimate (ASTM D6637):
 - a. 1850 lbs/ft (27.0 kN/m) minimum
 - 2. Creep reduced strength (ASTM D5262):
 - a. 1000 lbs/ft (14.6 kN/m) minimum
 - 3. Long term allowable design load (GRI GG-4):
 - a. 950 lbs/ft (13.9 kN/m) minimum
 - 4. Grid aperture size (MD):
 - a. 0.8 inch (20 mm) minimum
 - 5. Grid aperture size (CD):
 - a. 1.28 inch (32 mm) maximum
 - 6. Roll size: 6-foot (1.8-m) width is preferred, up to 18-foot (5.4-m).
 - 7. Products meeting this specification:
 - a. Stratagrid SG 150; http://www.geogrid.com
 - b. Miragrid 2XT; http://www.tencate.com
 - c. Fortrac 35 Geogrid; (http://www.hueskerinc.com
 - d. SF 20 Biaxial Geogrid; http://www.synteen.com
- C. Geotextile: composed of high tenacity polypropylene yarns which are woven into a network such that the yarns retain their relative position and is inert to biological degradation and resistant to naturally encountered chemicals, alkalis, and acids.
 - 1. Tensile strength at ultimate (ASTM D4595):
 - a. 4800 lbs/ft (70.0 KN/m) MD minimum
 - b. 4800 lbs/ft (70.0 KN/m) CD minimum
 - 2. Tensile strength at 5% strain (ASTM D4595)
 - a. 2400 lbs/ft (35.0 KN/m) MD minimum
 - b. 2700 lbs/ft (43.8 KN/m) CD minimum
 - 3. Flow rate (ASTM D4491):
 - a. 30 gal/min/ft2 (2648 l/min/m2) minimum
 - 4. Apparent opening size (ASTM D4751):

- 30 sieve (0.60 mm)
- UV Resistance (at 500 hours): 5.
 - 80 percent strength retained
- 6. Products meeting this specification:
 - Mirafi HP570; http://www.tencate.com
 - Geolon PP40; http://www.tencate.com b.
 - Nilex Woven 2044 (Nilex); http://www.nilex.com C.
- D. Plastic Cable Ties: A tensioning device or tool used to tie similar or different materials together with a specific degree of tension.

2.05 **OTHER RELATED MATERIALS**

- Wood Blocking: Nominal dimensioned untreated lumber used for spacing assembled Silva Cells.
- B. Aggregate Subbase (Below Silva Cell Base):
 - Aggregate meeting one of the following specifications:
 - Complying ASTM D1241, Type I, Gradation B; Type I mixtures shall consist of stone, a. gravel, or slag with natural or crushed sand and fine mineral particles passing a No. 200 sieve.

<u>Sieve</u>	Percent Passing
1-1/2 inches (37.5 mm)	100
1 inch (25 mm)	75 to 95
3/8 inch (9.5 mm)	40 to75
No 4 (4.75 mm)	30 to 60
No 10 (2 mm)	20 to 45
No 40 (425 µm)	15 to 30
No 200 (75 µm)	5 to 15

- Local Department of Transportation (DOT) virgin aggregate that most closely meets b. the gradation of ASTM D1241.
- Ontario Provincial Standard Specification (OPSS) 1010 Granular A. Dense graded aggregates intended for use as granular base within the pavement structure, granular shouldering, and backfill.

<u>Sieve</u>	Percent Passing
26.5 mm	100
19 mm	85 to100
13.2 mm	65 to90
9.5 mm	50 to73
4.75 mm	35 to55
1.18 mm	15 to 40
300 μm	5 to 22
75 µm	2 to 8

- D. Aggregate Base Course (Above Silva Cell Deck):
 - Same as aggregate subbase specified above.
- E. Aggregate Base Course for Porous Pavement (Above Silva Cell Deck):
 - Aggregate complying with ASTM D448, No. 57.

Percent Passing Sieve

V01.01: 02/06/2019 32 94 51 - PAGE 7 1-1/2 inches (37.5 mm) 100 1 inch (25 mm) 95 to 100 1/2 inch (12.5 mm) 25 to 60 No 4 (4.75 mm) 0 to 10 No 8 (2.36 mm) 0 to 5

F. Setting Bed for Unit Pavers (Above Silva Cell Deck):

Aggregate complying with ASTM D448, No. 8.

<u>Sieve</u>	Percent Passing
1/2 inch (12.5 mm)	100
3/8 inch (9.5 mm)	85 to 100
No 4 (4.75 mm)	10 to 30
No 8 (2.36 mm)	0 to 10
No 16 (1.18 mm)	0 to 5

- G. Backfill Material (Adjacent to Silva Cells): Clean, compactable, coarse grained fill soil free of organic material, trash and other debris, and free of toxic material injurious to plant growth.
- H. Planting Soil: Refer to Section 32 94 56 Planting Soil for Silva Cells.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine the conditions under which the Silva Cells are to be installed.
 - 1. Carefully check and verify dimensions, quantities, and grade elevations.
 - 2. Carefully examine the Drawings to become familiar with the existing underground conditions before digging. Verify the location of aboveground and underground utility lines, infrastructure, other improvements, and existing trees, shrubs, and plants to remain including their root system.
 - 3. Notify the Contractor and the City Representative in writing in the event of conflict between existing and new improvements, of discrepancies, and other conditions detrimental to proper and timely completion of the installation.
 - 4. Obtain written approval of changes to the Work prior to proceeding. Proceed with installation only after changes have been made and unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Take proper precautions as necessary to avoid damage to existing improvements and plantings.
- B. Prior to the start of Work, layout and stake the limits of excavation and horizontal and vertical control points sufficient to install the complete Silva Cell system.
- C. Coordinate installation with other trades that may impact the completion of the Work.

3.03 TEMPORARY PROTECTION

- A. Protect open excavations and Silva Cell system from access and damage both when Work is in progress and following completion, with highly visible construction tape, fencing, or other means until related construction is complete.
- B. Do not drive vehicles or operate equipment over the Silva Cell system until the final surface material has been installed.

3.04 EXCAVATION

- A. General: Excavate to the depths and shapes indicated on the Drawings. Provide smooth and level excavation base free of lumps and debris.
- B. Confirm that the depth of the excavation is accurate and includes the full section of materials required to place the subbase aggregate, Silva Cell, and pavement profile as indicated on the Drawings.

- C. Over-excavate beyond the perimeter of the Silva Cell to allow for:
 - The extension of aggregate subbase beyond the Silva Cell layout as shown on the Drawings.
 - 2. Adequate space for proper compaction of backfill around the Silva Cell system.
- D. If unsuitable subgrade soils are encountered, consult the Owner's geotechnical consultants for directions on how to proceed.
- If conflicts arise during excavation, notify the City Representative in writing and make recommendations for action. Proceed with Work only when action is approved in writing.

3.05 SUBGRADE COMPACTION

- A. Compact subgrade with a minimum of 3 passes with a vibratory plate compactor; or as directed by the project geotechnical consultant.
- B. Do not exceed 10 percent slope for subgrade profile in any one direction. If the 10 percent slope is exceeded, contact manufacturer's representative for directions on how to proceed.

INSTALLATION OF GEOTEXTILE OVER SUBGRADE 3.06

- Install geotextile over compacted subgrade.
 - 1. Lay geotextile flat with no folds or creases.
 - 2. Install the geotextile with a minimum joint overlap of 18 inches (450 mm).

INSTALLATION OF AGGREGATE SUBBASE BELOW SILVA CELL BASES 3.07

- A. Install aggregate subbase to the depths indicated on the Drawings.
- B. Extend subbase aggregate a minimum of 6 inches (150 mm) beyond the base of the Silva Cell layout.
- C. Compact aggregate subbase to a minimum of 95 percent of maximum dry density at optimum moisture content in accordance with ASTM D698, Standard Proctor Method.
- D. Do not exceed 10 percent slope on the surface of the subbase. Where proposed grades are greater than 10 percent, step the Silva Cells to maintain proper relation to the finished grade.

3.08 **INSTALLATION OF SILVA CELL BASE**

- A. Install the Silva Cell system in strict accordance with manufacturer's instructions and as specified herein; where requirements conflict or are contradictory, follow the more stringent requirements.
- B. Layout and Elevation Control:
 - Provide layout and elevation control during installation of the Silva Cell system to ensure that layout and elevations are in accordance with the Drawings.
- C. Establish the location of the tree openings in accordance with the Drawings. Once the trees are located, mark the inside dimensions of the tree openings on the prepared subbase.
- Locate and mark other Project features located within the Silva Cell layout (e.g. light pole bases, utility pipes). Apply marking to identify the extent of the Silva Cell layout around these features. Follow the layout as shown on the Drawings to ensure proper spacing of the Silva Cell bases. Refer to the Drawings for offsets between these features and the Silva Cells.
- E. Check each Silva Cell component for damage prior to placement. Reject cracked or chipped units.
- Place the Silva Cell bases on the compacted aggregate subbase. Start at the tree opening and place Silva Cell bases around the tree openings as shown on the Drawings.
- G. Working from tree opening to tree opening, place Silva Cell bases to fill in the area between tree
 - Maintain spacing no less than 1 inch (25 mm) and no more than 6 inches (150 mm) apart, 1. assuming geotextile covering the decks meets the specifications in section 2.04

V01.01: 02/06/2019 32 94 51 - PAGE 9 paragraph C.

- H. Follow the Silva Cell layout plan as shown on the Drawings.
- I. Install Silva Cell bases around, over, or under existing or proposed utility lines, as indicated on the Drawings.
- J. Level each Silva Cell base as needed to provide full contact with subbase. Adjust subbase material, including larger pieces of aggregate, so each base sits solidly on the surface of the subbase. Silva Cell bases that rock or bend over any stone or other obstruction protruding above the surface of the subbase material are not allowed. Silva Cell bases which bend into dips in the subbase material are not allowed. The maximum tolerance for deviations in the plane of the subbase material under the bottom of the horizontal beams of each Silva Cell base is 1/4 inch in 4 feet (6 mm in 1200 mm).
- K. Anchor Silva Cell base with 2 anchoring spikes per base.
 - 1. For applications where Silva Cells are installed over waterproofed structures, use wood blocking or similar spacing system consistent with requirements of the waterproofing system to maintain required spacing.

3.09 INSTALLATION OF SILVA CELL POSTS

A. 3x Silva Cell System:

- Attach 2x posts to the installed Silva Cell base. Each base will receive six 2x posts.
 Place the end of the post with tabs into the base. Rotate post clockwise to snap in place.
- 2. Following the placement of backfill and planting soil within the 2x posts, add a 1x post extension as described herein. A 2x post, used in combination with a 1x post is considered a 3x post assembly.]

3.10 INSTALLATION OF STRONGBACKS, GEOGRID, BACKFILL AND PLANTING SOIL

- A. Install strongbacks on top of the Silva Cell posts by snapping into place over installed posts prior to installing planting soil and backfill.
 - 1. Strongbacks are required only during the placement and compaction of the planting soil and backfill.
 - 2. Move strongbacks as the Work progresses across the installation.
 - 3. Remove strongbacks prior to the installation of the Silva Cell decks.
- B. Install geogrid around the perimeter of the Silva Cell system where the compacted backfill and planting soil interface.
 - 1. Do not place geogrid between the edge of the Silva Cells and adjacent planting areas.
 - 2. Cut the geogrid to allow for a 6-inch (150-mm) overlap at the Silva Cell base and a 12-inch (300-mm) overlap at the Silva Cell deck.
 - 3. Provide a minimum 12-inch (300-mm) overlap between adjacent sheets of geogrid.
 - 4. Secure geogrid with cable ties below the top of the posts, along the post ridges.
- C. Place the first lift of backfill material loosely around the perimeter of the Silva Cell system, between the geogrid and the sides of the excavation. Place backfill to approximately the midpoint of the Silva Cell post. Do not compact.
- D. Place the first lift of planting soil in the Silva Cell system to approximately the midpoint of the Silva Cell post.
 - 1. Level the planting soil throughout the system.
 - 2. Walk-through the placed planting soil to remove air pockets and settle the soil.
 - a. Lightly compact soils by walking through the soil following placement.
 - b. Walk through compaction shall result in 75-85 percent of maximum dry density in accordance with ASTM D698, Standard Proctor Method. Do not exceed root limiting compaction for the given soil type.

- E. Compact the first lift of backfill material, previously spread, to 95 percent of maximum dry density in accordance with ASTM D698, Standard Proctor Method or in accordance with Project Specifications for hardscape areas, whichever is greater.
- F. Add and compact additional backfill material so that the final finished elevation is at approximately the same level of the placed planting soil within the Silva Cells.
 - Maintain the geogrid between the Silva Cell system and the backfill material at all times.
- G. Place the second lift of backfill material loosely around the perimeter of the Silva Cell system, between the geogrid and the sides of the excavation so that the material is 2 to 3 inches below the top of the posts. Do not compact.
- H. Place the second lift of planting soil inside of the Silva Cell to the bottom of the strongbacks. Walk through compact.
- Remove strongbacks, place one 1x posts into each of the previously-installed 2x posts. Rotate clockwise to snap in place, forming a 3x post assembly.
- Immediately reinstall strongbacks on top of the post assembly.
- K. Repeat process of alternately placing backfill and planting soil so that elevation of the compacted backfill and the walked-through compacted planting soil are just below the level of the strongbacks.

3.11 INSTALLATION OF IRRIGATION AND WATER HARVESTING SYSTEM (including but not limited to Deeproot Water+Air System components)

Install irrigation and water harvesting system in accordance with the Drawings and Specifications. Remove only the minimum number of strongbacks needed to accommodate the Work and reinstall them immediately upon completion to maintain alignment of posts.

INSTALLATION OF SILVA CELL DECK 3.12

SPECIFIER: Select either "Landscape Architect", "Architect", or "Engineer" in the paragraph below as applicable.

- A. Obtain final approval by the City Representative of planting soil installation prior to installation of the Silva Cell decks.
- Remove strongbacks, level out the planting soil, and immediately install decks over the posts below. Place deck over the top of the posts. Push decks down until the deck clips lock into the posts, snapping the deck into place.
- C. Fold the 12 inches (300 mm) of geogrid onto the top of the decks.

3.13 FINAL BACKFILL PLACEMENT AND COMPACTION

Place and compact final lift of backfill material to 95 percent of maximum dry density in accordance with ASTM D698, Standard Proctor Method, such that the backfill is flush with the top of the installed deck. Do not allow compacting equipment to come in contact with the decks.

INSTALLATION OF GEOTEXTILE AND AGGREGATE BASE COURSE OVER THE DECK 3.14

- A. Ensure geotextile meets the specifications in section 2.04 paragraph C.
- B. Place geotextile over the top of the deck and extend to the edge of the excavation. Overlap joints a minimum of 18 inches (450 mm). Leave enough slack in the geotextile for the aggregate base course to push the geotextile down in the gaps in between the decks.
- C. Install the aggregate base course (including aggregate setting bed if installing unit pavers) over the geotextile immediately after completing the installation of the fabrics. Work the aggregate from one side of the layout to the other so that the fabric and aggregate conform to the Silva Cell deck contours.
- D. Maintain equipment used to place aggregate base course completely outside the limits of the Silva Cell excavation area to prevent damage to the installed system.
- For large or confined areas, where aggregate cannot easily be placed from the edges of the excavated area, obtain approval for the installation procedure and types of equipment to be used in the installation from the Silva Cell manufacturer.

V01.01: 02/06/2019 32 94 51 - PAGE 11

- F. Compact aggregate base course(s) to 95 percent of maximum dry density in accordance with ASTM D698, Standard Proctor Method. Utilize a vibration or plate compactor with a maximum weight of 800 lbs (362.87 kg).
- G Do not drive vehicles or operate equipment over the completed aggregate base course.

3.15 INSTALLATION OF CONCRETE CURBS AT TREE OPENINGS, AGGREGATE SUBBASE AND PAVEMENT ABOVE THE SILVA CELL SYSTEM

- A. Place concrete curbs along planting areas and tree openings as shown on the Drawings to retain the aggregate base course from migrating into the planting soil.
- B. When staking concrete forms (e.g. curbs around the tree openings), prevent stakes from penetrating the Silva Cell decks.
- C. Turn down edge of concrete paving to the Silva Cell deck along the edges of tree openings or planting areas to retain the aggregate base course material.
- D. When paving type is a unit paver or other flexible material, provide a concrete curb under the paving at the edge of the Silva Cell deck to retain the aggregate base course material at the tree opening.
- E. Place paving material over Silva Cell system in accordance with the Drawings.
 - 1. The Silva Cell system does not fully meet loading strength until the final paving is installed. Do not operate construction equipment on top of the Silva Cell system until paving installation has been completed.
- F. Use care when placing paving or other backfill on top of Silva Cell system to prevent damage to the Silva Cell system or its components.

3.16 INSTALLATION OF ROOT BARRIERS

A. Install root barrier in accordance with manufacturer's installation instructions.

3.17 INSTALLATION OF PLANTING SOIL WITHIN THE TREE PLANTING AREA

- A. Remove rubble, debris, dust and silt from the top of the planting soil within the tree opening that may have accumulated after the initial installation of the planting soil within the Silva Cells.
- B. Install additional planting soil within the tree openings, to the depths indicated on the Drawings.
 - 1. Use the same soil used within the Silva Cells for planting soil within the tree openings.
- C. Compact planting soil under the tree root ball as needed to prevent settlement of the root ball.
- D. Place trees in accordance with the Drawings.

3.18 PROTECTION

- A. Keep construction traffic away from the limits of the Silva Cells until the final pavement profile is in place. The Silva Cell system does not fully meet loading strength until the final paving is installed.
 - 1. Do not operate equipment directly on top of the Silva Cell system until paving installation has been completed.
 - 2. Provide fencing and other barriers to prevent vehicles from entering into the Silva Cell area.
- B. When the Silva Cell installation is completed and the permanent pavement is in place, limit traffic and construction related activities to only loads less than the design loads.

3.19 CLEAN UP

- A. Perform clean up during installation and upon completion of the Work. Maintain the site free of soil, sediment, trash and debris. Remove excess soil materials, debris, and equipment from the site following completion of the Work of this Section.
- B. Repair damage to adjacent materials and surfaces resulting from installation of this Work using mechanics skilled in remedial work of the construction type and trades affected.

32 94 51 - PAGE 12 SILVA CELL SYSTEM

Refer to the following Sections of the Water and Sewer Authority of Cabarrus County (WSACC) Standard Specifications, dated August 2006:

<i>02200</i>	Eartnworks
02210	Work in NCDOT Rights-of-Way
02230	Stone, Concrete, Asphalt Pavement Removal and Repair
02702	Water Coming Compations and Maters
02703	Water Service Connections and Meters
02704	Pipeline Pressure and Leakage Testing and Cleaning
03301	Concrete
15104	Resilient Seated Gate Valves
15106	Fire Hydrants
15108	Air Release and Combination Air Vacuum Valves

SECTION 332700 SANITARY SEWER PIPE AND APPURTENANCES

Refer to the following Sections of the Water and Sewer Authority of Cabarrus County (WSACC) Standard Specifications, dated August 2006:

02200	Earthworks
02210	Work in NCDOT Rights-of-Way
02230	Stone, Concrete, Asphalt Pavement Removal and Repair
02605	Sewer Manholes
02620	Ductile Iron Pipe
	•
02628	PVC Sewer Pipe
02701	Wastewater Service Connection
02702	Sewer Pipe Installation and Testing and Manhole Testing

APPENDIX A

GEOTECHNICAL REPORT

Geotechnical · Construction Materials · Environmental · Facilities

March 26, 2021

Ms. Kaylee M. Caton, RA
Design Manager - Planning & Neighborhood Development
City of Concord
26 Union Street, South
Concord, North Carolina

Reference: Revised Pavement Design Recommendations

Union Street Project

Concord, Cabarrus County, North Carolina

ECS Project No. 08:14562

Dear Ms. Caton:

ECS Southeast, LLP (ECS) has completed the existing asphalt pavement observations, field testing, and revised recommendations for the above referenced project. This project was performed in general accordance with ECS Proposal No. 0825830PR dated February 26, 2021 and authorized by contract and PO No. 135417, dated March 12, 2021.

We understand the project will consist of improvements along 2,100 linear feet of existing roadway along Union Street South near its intersection with Cabarrus Avenue West as part of the Concord Streetscapes project in Concord, Cabarrus County, North Carolina. We understand the roadway is currently maintained by the City of Concord and consists of a two-lane two-way roadway with street parking on both sides. Plans are to perform various improvements to Union Street South as part of the Concord Streetscapes project, including a full removal of the existing pavement section with a new asphalt pavement section.

ECS performed a limited pavement evaluation consisting of a total of seven (7) pavement cores along Union Street South and Cabarrus Avenue West. Stone base course thicknesses were measured at each of the core locations. In addition to the pavement cores, Kessler Dynamic Cone Penetrometer Testing (DCP) was performed at select core locations to obtain an in-place California Bearing Ratio (CBR) value of the underlying subgrade soils. One (1) hand auger probe to equipment refusal was requested in the vicinity of a duct bank to determine a possible depth to the top of the duct bank below the existing pavement surface. The existing pavement sections encountered during testing are shown in Table 1. The results of the hand auger probe (HA-1) indicated auger refusal at approximately 3.8 feet below the existing ground surface. Photographic logs of the pavement cores, Kessler DCP Test Data Sheets, and the Hand Auger Log are attached to this report.

Based on our site reconnaissance and pavement cores, the pavements along Union Street South. appear to be in fair to good condition and are likely able to provide a few more years of service before deterioration to a marginal to poor condition. However, as pavements begin to exhibit cracks and other signs of deterioration, the rate with which they continue to degrade will likely accelerate. This is a result of additional water infiltration through the asphalt resulting in increased moisture content in the stone

base and underlying subgrade. The deterioration of the pavement also reduces the structural integrity resulting in higher stresses being imposed on the subgrade during traffic loading. As the pavements continue to age and deteriorate, they will need to be repaired over time or replaced as part of ongoing maintenance of the roadway infrastructure.

Based on the field testing, the pavement section along Union Street South and Cabarrus Avenue West consists of an asphalt section over concrete. The average pavement section observed along the project corridor was approximately 2½ inches of asphalt pavement over 6 inches of concrete. The average stone base thickness observed was approximately 4½ inches, with no stone base observed at the C-5 and C-6 core locations. Based on the Kessler DCP testing, the average in-place CBR is 4.

Table 1: Existing Asphalt Pavement Sections					
Test Location	Roadway	Asphalt Thickness (inches)	Concrete Thickness (inches)	Stone Base Thickness (inches)	Kessler In-Place CBR Value
C-1	Union Street	3½	4	12	8
C-2	Union Street	5½	3	6½	4
C-3	Cabarrus Avenue	1¾	6¾	7½	3
C-4	Union Street	1¾	7¾	2	3
C-5	Union Street	1½	7¾	0	N/A ⁽¹⁾
C-6	Union Street	1¾	7¾	0	10
C-7/HA-1	Union Street	2	5½	2	N/A

Notes:

(1) Kessler DCP was not performed at the C-5 core location due to the presence of underground utilities marked in the area at the time of the exploration.

Anticipated traffic loading information has not been provided for the project corridor. ECS utilized the traffic information published by North Carolina Department of Transportation (NCDOT) on the Average Annual Daily Traffic (AADT) Web Mapping Application to estimate a required Structural Number (SN) for the pavements included in this study. For Union Street South, we used a 2018 Average Daily Traffic (ADT) volume of 11,500 vehicles per day, of which 5% is considered heavy truck traffic (3% duals and 1% tractor trail/semi-truck (TTST)). We used a 2% annual growth rate in our calculations. Based on our field testing and the assumed traffic loading, a SN of 3.74 is required for new asphalt pavements. Table 2 presents the pavement design parameters assumed to obtain the required SN.

Table 2: Rigid Pavement Design Parameters for Union Street South		
Design Parameters	Design Values	
AADT – Vehicles Per Day	11,500	
Duals (%)	3	
TTST (%)	1	
Lane Distribution Factor	1.0	
Reliability (%)	90	
Terminal Serviceability Index	2.5	
Design Life (years)	30	
Design 18-kip ESALS	1,012,600	
Structural Number (SN) Required	3.74	

We also understand that an 18-inch vertical curb is planned for the new pavements along Union Street South and Cabarrus Avenue West. Table 3 below presents the minimum recommended asphalt pavement section and Table 4 presents an alternative full-depth asphalt pavement section. ECS has utilized the NCDOT Pavement Design Procedure AASHTO 1993 Method to prepare the recommended pavement section. The recommendations presented herein assume that the production and placement of the asphalt pavement meets the requirements of current NCDOT standards.

Table 3: Minimum Recommended Asphalt Pavement Section			
Mix Type	Mix Type Thickness (inches)		
S 9.5B	3	1.32	
I 19.0C	3	1.32	
Stone Base	8	1.12	
Structural Number (SN) Provided		3.76	

Table 4: Alternate Full Depth Asphalt Pavement Section			
Mix Type Thickness (inches) Structural N			
S 9.5B	3	1.32	
I 19.0C	4	1.76	
B 25.0C	4*	1.20	
Structural Number (SN) Provided 4.28			

^{*} Minimum thickness required by NCDOT for unstabilized subgrade

ECS Southeast, LLP appreciates the opportunity to assist you during this phase of the project. If you have questions concerning this report, please contact our office at 704-525-5152.

Respectfully,

ECS SOUTHEAST/, LLP

Kelly N. de Montbrun, P Senior Project Engineer

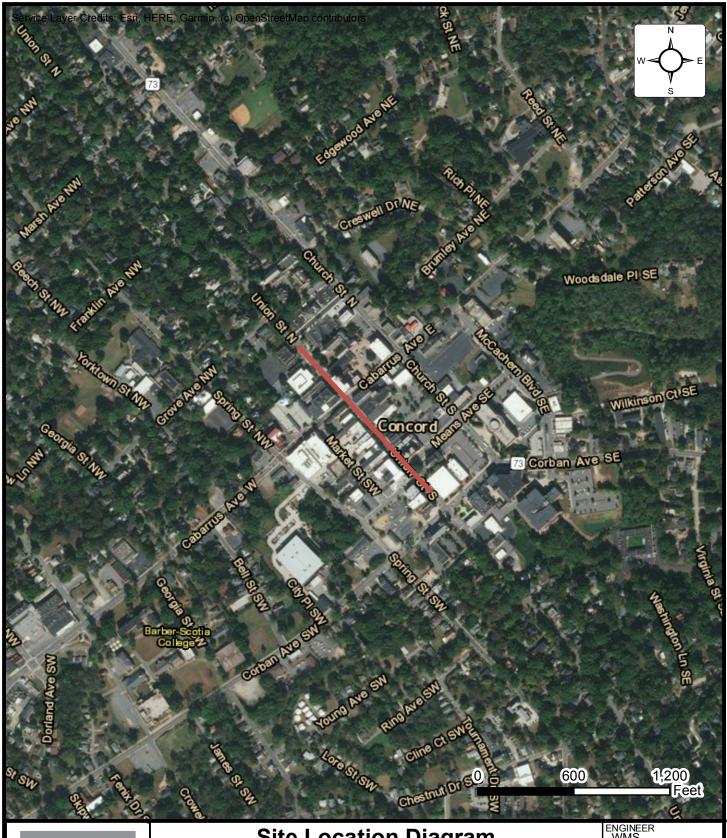
NC Registration No. 045542

Walid M. Sobh, P.E.

Principal Engineer

Attachments:

Site Location Diagram
Test Location Diagram
Pavement Core Photo Logs (C-1 through C-6 and C-7/HA-1)
Kessler DCP Test Data Sheets (C-1 through C-4, and C-6)
Hand Auger Log (HA-1)





Site Location Diagram UNION STREET SOUTH

UNION STREET, CONCORD, NORTH CAROLINA

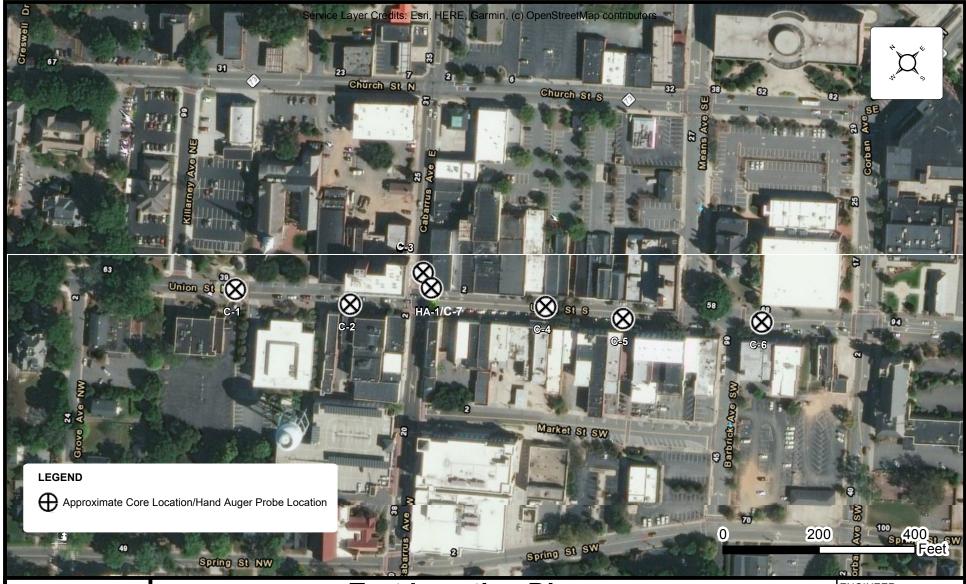
CITY OF CONCORD

SCALE AS NOTED

PROJECT NO. 08:14562

FIGURE 1

DATE 3/26/2021





Test Location Diagram UNION STREET SOUTH

UNION STREET, CONCORD, NORTH CAROLINA CITY OF CONCORD

ENGINI	EER
WMS	

SCALE

AS NOTED

PROJECT NO. 08:14562

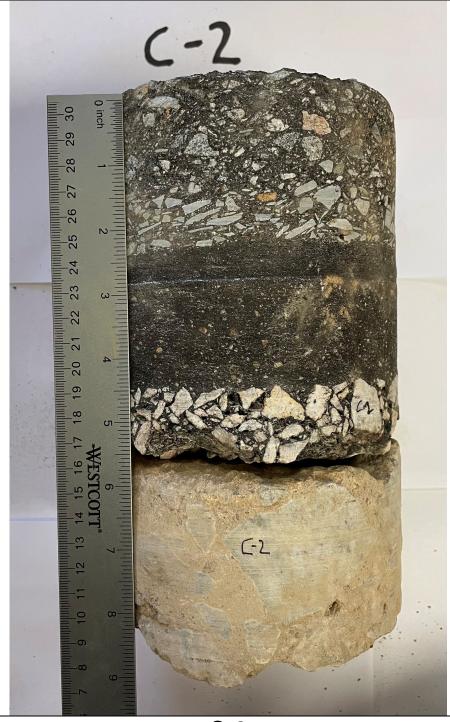
FIGURE

DATE 3/26/2021



C-1 Asphalt Thickness (3½") Concrete Thickness (4") Stone Base (12")





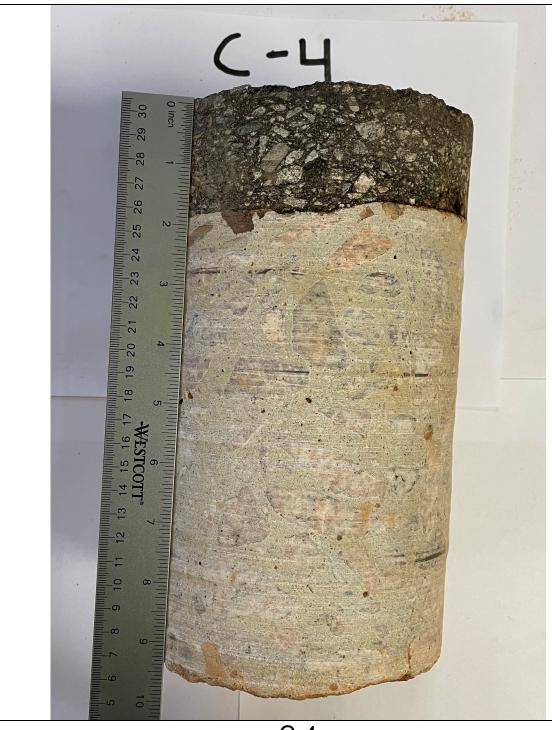
C-2 Asphalt Thickness (5½") Concrete Thickness (3") Stone Base (6½")





C-3
Asphalt Thickness (1¾")
Concrete Thickness (6¾")
Stone Base (7½")





C-4
Asphalt Thickness (1¾")
Concrete Thickness (7¾")
Stone Base (2")





C-5
Asphalt Thickness (1½")
Concrete Thickness (7¾")
Stone Base: Not Observed

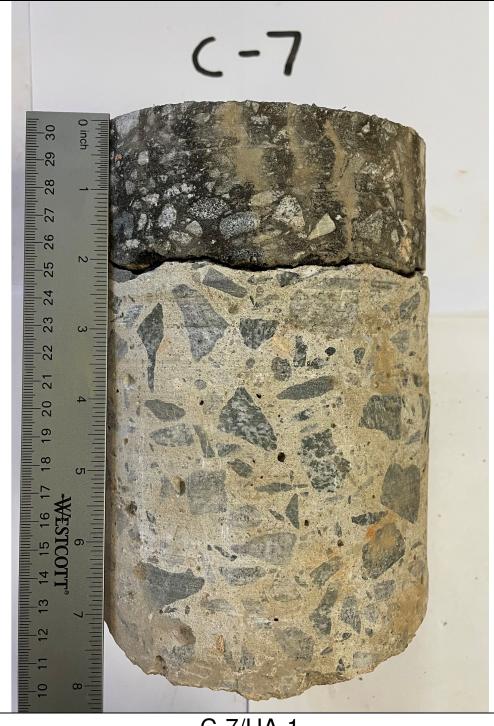




C-6
Asphalt Thickness (1¾")
Concrete Thickness (7¾")
Stone Base: Not Observed

UNION STREET PROJECT CONCORD, NORTH CAROLINA ECS PROJECT No. 08:14562



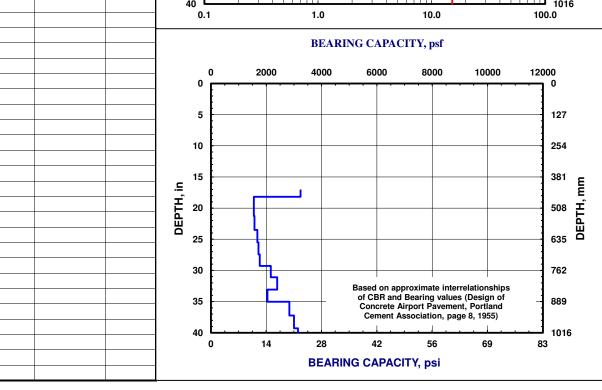


C-7/HA-1 Asphalt Thickness (2") Concrete Thickness (5½") Stone Base: (2")

UNION STREET PROJECT CONCORD, NORTH CAROLINA ECS PROJECT No. 08:14562



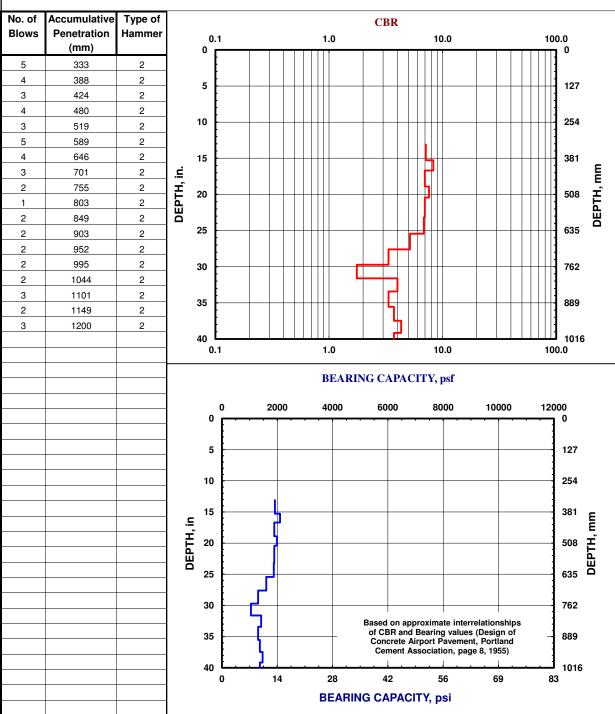
KESSLER DCP TEST DATA Project: 14562 - Union Street Date: March 11, 2021 Soil Type(s): ABC, MH Location: C-1 Soil Type CH CL Hammer — 10.1 lbs. 17.6 lbs. O Both hammers used All other soils No. of Accumulative Type of **CBR Blows** Penetration Hammer 10.0 0.1 1.0 100.0 (mm) DEPTH, mm DEPTH, 0.1 1.0 100.0 10.0 **BEARING CAPACITY, psf**



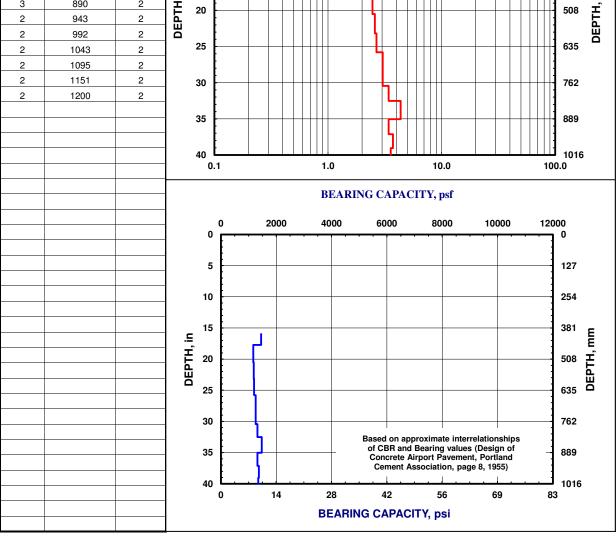
KESSLER DCP TEST DATA Project: 14562 - Union Street Date: March 11, 2021 Soil Type(s): ABC, MH Location: C-2 Soil Type CH CL Hammer — 10.1 lbs. 17.6 lbs. O Both hammers used All other soils Accumulative Type of No. of **CBR Blows** Penetration Hammer 10.0 0.1 1.0 100.0 (mm) DEPTH, mm DEPTH, 1.0 100.0 0.1 10.0 **BEARING CAPACITY, psf** DEPTH, Based on approximate interrelationships of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)

BEARING CAPACITY, psi

KESSLER DCP TEST DATA Project: 14562 - Union Street Date: March 11, 2021 Soil Type(s): ABC, MH Location: C-3 Soil Type CH CL Hammer — 10.1 lbs. 17.6 lbs. O Both hammers used All other soils No. of Accumulative Type of **CBR Blows** Penetration Hammer 10.0 0.1 1.0 100.0 (mm) 0 0 5 333 2 4 388 2 5 127



KESSLER DCP TEST DATA Project: 14562 - Union Street Date: March 11, 2021 Soil Type(s): ABC, MH Location: C-4 Soil Type CH CL Hammer — 10.1 lbs. 17.6 lbs. O Both hammers used All other soils No. of Accumulative Type of **CBR Blows** Penetration Hammer 10.0 0.1 1.0 100.0 (mm) DEPTH, mm DEPTH,



KESSLER DCP TEST DATA 14562 - Union Street Project: Date: March 11, 2021 Soil Type(s): ABC, MH Location: C-6 Soil Type CH CL Hammer — 10.1 lbs. 17.6 lbs. O Both hammers used All other soils No. of Accumulative Type of **CBR Blows** Penetration Hammer 10.0 0.1 1.0 100.0 (mm) DEPTH, mm DEPTH, in. 0.1 1.0 10.0 100.0 **BEARING CAPACITY, psf** DEPTH, Based on approximate interrelationships of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955) **BEARING CAPACITY**, psi

CLIENT: City of Concord PROJECT NAME: Union Street - Pavement Evaluation SITE LOCATION: Union Street, Concord, North Carolina 28025				25	PROJECT NO.: 08:14562 HAND AUGER NO.: HA-1	1 c	SHEET: of 1 URFACE ELEVATION: TATION:				: C	2
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ОЕРТН (FT)	WATER LEVELS	ELEVATION (FT)		DESCRIPTION OF N	MATERIAL			EXCAVATION EFFORT	DCP	SAMPLE NUMBER	FINES CONTENT (%)	MOISTURE CONTENT (%)
- - - -		- - - -	Asphalt Thickness Concrete Thickness ABC Stone Thicknes (ML FILL) SANDY S	ss[5.50"] ess[2.00"]			50022	E				
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APPENDIX B

NCDOT ENCROACHMENT AGREEMENT



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

July 9, 2021

COUNTY: Cabarrus

SUBJECT: Encroachment Contract E101-013-21-00118 - City of Concord

Lloyd Wm. Payne City Manager City of Concord P. O. Box 308 Concord, NC 28026-0308

Dear Mr. Payne:

Attached for your files is a copy of the above-referenced Right of Way Encroachment Contract, properly executed. This contract covers the following:

Removal of existing 16-inch, 10-inch, and 8-inch water lines, removal of existing 8-inch sewer lines and manhole, removal of sewer flushing manhole, and removal of abandoned water utility manhole. Installation of 50 LF of 16-inch ductile iron water pipe, 70 LF of 12-inch ductile iron water pipe, 15 LF of 8-inch ductile iron sewer pipe, (1) sewer manhole, (2) electrical duct banks, with (1) fiber duct bank at the intersection of Union Street and SR 1002 (Cabarrus Avenue) by open trench installation in Concord, NC.

APPROVED SUBJECT TO: Attached Special Provisions.

Sincerely,

Byron Sanders, Jr., PE, CPM State Utilities Manager

Vang Moua
Vang Maka 4B34F1...

for Larry D. Sanders, MGIST, PE, CPM State Encroachments Engineer

LDS/dhp Attachment

Location:

SPECIAL PROVISIONS R/W 16.1 City of Concord E101-013-21-00118

- 1. Approval may be rescinded upon failure to follow any of the provisions in this permit and may be considered a violation of the encroachment agreement.
- 2. The Encroaching party or their contractor shall provide the following notice prior to construction activity within the NCDOT Right of Way:

Three (3) business days advance phone call at telephone (704) 983-4360 or email to mmorgan@ncdot.gov to the District Engineer's office.

Failure to provide this notification prior to beginning construction is subject to the Division Engineer's discretion to cease construction activity for this encroachment. NCDOT reserves the right to cease any construction or maintenance work associated with this installation by the encroaching party until the construction or maintenance meets the satisfaction of the Division Engineer or their representative.

- 3. Prior to beginning work, it is the requirement of the Encroaching Party to contact the appropriate Utility Companies involved and make arrangements to adjust or relocate any utilities that conflict with the proposed work.
- 4. It shall be the responsibility of the encroaching party to determine the location of utilities within the encroachment area. NCGS § 87-115 through § 87-130 of the Underground Utility Safety and Damage Prevention Act requires underground utilities to be located by calling 811 prior to construction. The encroaching party shall be responsible for notifying other utility owners and providing protection and safeguards to prevent damage or interruption to existing facilities and maintain access to them.
- 5. The encroaching party shall notify the appropriate municipal office prior to beginning any work within the municipality's limits of jurisdiction.
- 6. Excavation within 1000 feet of a signalized intersection will require notification by the encroaching party to the Division Traffic Engineer at telephone number (704) 983-4400 no less than one week prior to beginning work. All traffic signal or detection cables must be located prior to excavation. Cost to replace or repair NCDOT signs, signals, pavement markings or associated equipment and facilities shall be the responsibility of the encroaching party.
- 7. At the option of the District Engineer, a preconstruction meeting including representatives of NCDOT, the encroaching party, contractors and municipality, if applicable, shall be required. A pre-construction conference held between a municipality (or other facility owner) and a contractor without the presence of NCDOT personnel with subsequent construction commencing may be subject to NCDOT personnel ceasing any work on NCDOT right-of-way related to this encroachment until such meeting is held. Contact the District office to schedule.
- 8. At the discretion of the District Engineer, a NOTIFICATION FOR UTILITY / NON-UTILITY ENCROACHMENT WITHIN NCDOT R/W form (See corresponding attachment) with the scheduled pre-construction meeting and associated construction schedule details must be completed and submitted to the District Engineer's office a minimum of one week prior to construction.

- 9. At the discretion of the District Engineer, the encroaching party (not the utility contractor) shall make arrangements to have a qualified inspector, under the supervision of a Professional Engineer registered in North Carolina, on site at all times during construction. The registered Professional Engineer shall be required to submit a signed and PE sealed certification that the utility was installed in accordance with the encroachment agreement.
- 10. This approval and associated plans and supporting documents shall not be interpreted to allow any design change or change in the intent of the design by the Owner, Design Engineer, or any of their representatives. Any revisions or changes to these approved plans or intent for construction must be obtained in writing from the Division Engineer's office or their representative prior to construction or during construction if an issue arises during construction to warrant changes.
- 11. NCDOT does not guarantee the right of way on this road, nor will it be responsible for any claim for damages brought about by any property owner by reason of this installation. It is the responsibility of the encroaching party to verify the right of way.
- 12. Encroaching party shall be responsible for obtaining all necessary permanent and/or temporary construction, drainage, utility and/or sight distance easements.
- 13. All Right of Way and easements necessary for construction and maintenance shall be dedicated to NCDOT with proof of dedication furnished to the District Engineer prior to beginning work.
- 14. Traffic control shall be coordinated with the District Engineer and the Division Traffic Engineer, Mr. Tony Tagliaferri, PE at telephone (704) 983-4400, prior to construction.

15. WORK ZONE TRAFFIC CONTROL OUALIFICATIONS AND TRAINING PROGRAM

All personnel performing any activity inside the highway right of way are required to be familiar with the NCDOT Maintenance / Utility Traffic Control Guidelines (MUTCG). No specific training course or test is required for qualification in the Maintenance /Utility Traffic Control Guidelines (MUTCG).

All flagging, spotting, or operating Automated Flagger Assist Devices (AFAD) inside the highway right of way requires qualified and trained Work Zone Flaggers. Training for this certification is provided by NCDOT approved training resources and by private entities that have been pre-approved to train themselves.

All personnel involved with the installation of Work Zone Traffic Control devices inside the highway right of way are required to be qualified and trained Work Zone Installers. Training for this certification is provided by NCDOT approved training resources and by private entities that have been pre-approved to train themselves.

All personnel in charge of overseeing work zone Temporary Traffic Control operations and installations inside the highway right of way are required to be qualified and trained Work Zone Supervisors. Training for this certification is provided by NCDOT approved training resources and by private entities that have been pre-approved to train themselves.

For questions and/or additional information regarding this training program please refer to https://connect.ncdot.gov/projects/WZTC/Pages/Training.aspx or call the NCDOT Work Zone Traffic Control Section (919) 814-5000.

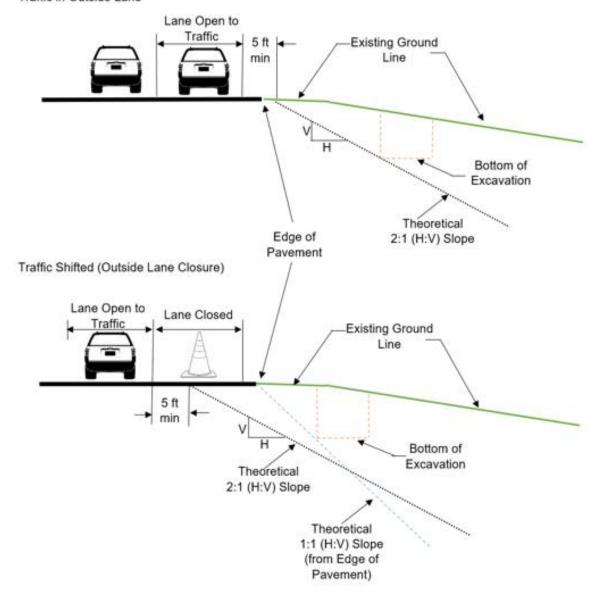
- 16. The party of the second part shall employ traffic control measures that are in accordance with the prevailing federal, state, local, and NCDOT policies, standards, and procedures. These policies, standards, and procedures include, but are not limited to the following:
 - a. Manual on Uniform Traffic Control Devices (MUTCD) North Carolina has adopted the MUTCD to provide basic principles and guidelines for traffic control device design, application, installation, and maintenance. North Carolina uses the MUTCD as a minimum requirement where higher supplemental standards specific to North Carolina are not established. Use fundamental principles and best practices of MUTCD (Part 6, Temporary Traffic Control).
 - b. NCDOT Maintenance / Utility Traffic Control Guidelines This document enhances the fundamental principles and best practices established in MUTCD Part 6, Temporary Traffic Control, incorporating NCDOT-specific standards and details. It also covers important safety knowledge for a wide range of work zone job responsibilities.
- 17. Ingress and egress shall be maintained to all businesses and dwellings affected by the construction of this encroachment. Special attention shall be paid to police, EMS and fire stations, fire hydrants, secondary schools, and hospitals.
- 18. Traffic shall be maintained at all times. All lanes of traffic are to be open during the hours of 7:00 A.M. to 9:00 A.M. and from 4:00 P.M. to 6:00 P.M. Monday through Friday, during any time of inclement weather, or as directed by the District Engineer. Any violation of these hours will result in ceasing any further construction by the Encroaching Party or their contractor.
- 19. Nighttime and weekend operations will NOT be allowed unless written approval is received from the District Engineer. If nighttime or weekend work is allowed or required, all signs must be retro-reflective, and a work zone lighting plan must be submitted for approval prior to construction.
- 20. Two-way traffic shall be maintained at all times unless designated by the District Engineer. Traffic shall not be rerouted or detoured without the prior written approval from the District Engineer. No utility work will be allowed on state holidays from 7:00 PM the night before through 9:00 AM the day prior to, following or during local events without prior approval from the District Engineer. If the construction is within 1000 feet of a school location or on a designated bus route, the construction shall be coordinated with the school start and end times to avoid traffic delays.
- 21. Work requiring lane or shoulder closures shall not be performed on both sides of the road simultaneously within the same area.
- 22. Any work requiring equipment or personnel within 5 feet of the edge of any travel lane of an undivided facility and within 10 feet of the edge of any travel lane of a divided facility shall require a lane closure with appropriate tapers per current *NCDOT Roadway Standard Drawings* or MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
- 23. At the discretion of the District Engineer, a traffic control plan shall be developed and submitted under the seal and signature of a Licensed North Carolina Professional Engineer prior to construction. The plan shall be specific to the site and adequately detailed. Issues such as the close proximity to intersections shall be addressed.

- 24. Any pavement markings that are damaged or obliterated shall be restored by the encroaching party at no expense to NCDOT.
- 25. Sidewalk closures shall be installed as necessary. Pedestrian traffic shall be detoured around these closures and shall be signed appropriately and in accordance with The American with Disabilities Act Accessibility Guidelines. The encroaching party must adhere to the guidelines for accommodating pedestrians in encroachment work zones as described in the NCDOT Pedestrian Work Zone Accommodations Training found at https://www.youtube.com/watch?v=AOuYa5IW3dg&feature=youtu.be
- 26. The encroaching party shall comply with all applicable Federal, State and local environmental regulations and shall obtain all necessary Federal, State and local environmental permits, including but not limited to, those related to sediment control, stormwater, wetland, streams, endangered species and historical sites. Additional information can be obtained by contacting the NCDOT Roadside Environmental Engineer regarding the North Carolina Natural Heritage Program or the United States Fish and Wildlife Services. Contact the Division Roadside Environmental Engineer's Office at (704) 244-8260.
- 27. When surface area in excess of one acre will be disturbed, the Encroacher shall submit a Sediment and Erosion Control Plan which has been approved by the appropriate regulatory agency or authority prior to beginning any work on the Right of Way. Failure to provide this information shall be grounds for suspension of operations. Proper temporary and permanent measures shall be used to control erosion and sedimentation in accordance with the approved sediment and erosion control plan.
- 28. The Verification of Compliance with Environmental Regulations (VCER-1) form is required for all non-utility encroachment agreements or any utility encroachments when land disturbance within NCDOT right of way exceeds 1 acre. The VCER-1 form must be PE sealed by a NC registered professional engineer who has verified that all appropriate environmental permits (if applicable) have been obtained and all applicable environmental regulations have been followed.
- 29. All erosion control devices and measures shall be constructed, installed, maintained, and removed by the Encroacher in accordance with all applicable Federal, State, and Local laws, regulations, ordinances, and policies. Permanent vegetation shall be established on all disturbed areas in accordance with the recommendations of the Division Roadside Environmental Engineer. All areas disturbed (shoulders, ditches, removed accesses, etc.) shall be graded and seeded in accordance with the latest *NCDOT Standards Specifications for Roads and Structures* and within 15 calendar days with an approved NCDOT seed mixture (all lawn type areas shall be maintained and reseeded as such). Seeding rates per acre shall be applied according to the Division Roadside Environmental Engineer. Any plant or vegetation in the NCDOT planted sites that is destroyed or damaged as a result of this encroachment shall be replaced with plants of like kind or similar shape.
- 30. Prior to installation, the Encroaching Party shall contact the District Engineer to discuss any environmental issues associated with the installation to address concerns related to the root system of trees impacted by boring or non-utility construction of sidewalk, roadway widening, etc.
- 31. The Encroaching Party is responsible for identifying project impacts to waters of the United States (wetlands, intermittent streams, perennial streams and ponds) located within the NCDOT right-of-way. The discharge of dredged or fill material into waters of the United States requires

authorization from the United States Army Corps of Engineers (USACE) and certification from the North Carolina Division of Water Quality (NCDWQ). The applicant is required to obtain pertinent permits or certification from these regulatory agencies if construction of the project impacts waters of the United States within the NCDOT right-of-way. The applicant is responsible for complying with any river or stream Riparian Buffer Rule as regulated by the NCDWQ. The Rule regulates activity within a 50-foot buffer along perennial streams, intermittent streams and ponds. Additional information can be obtained by contacting the NCDWQ or the USACE.

- 32. The contractor shall not begin the construction until after the traffic control and erosion control devices have been installed to the satisfaction of the Division Engineer or their agent.
- 33. The contractor shall perform all monitoring and record keeping and any required maintenance of erosion and sediment control measures to maintain compliance with stormwater regulations.
- 34. An executed copy of the encroachment agreement, provisions and approved plans shall be present at the construction site at all times. If safety or traffic conditions warrant such an action, NCDOT reserves the right to further limit, restrict or suspend operations within the right of way.
- 35. The Encroaching Party and/or their Contractor shall comply with all OSHA requirements. If OSHA visits the work area associated with this encroachment, the District Office shall be notified by the encroaching party immediately if any violations are cited.
- 36. All disturbed areas are to be fully restored to current NCDOT minimum roadway standards or as directed by the Division Engineer or their representative. Disturbed areas within NCDOT Right-of-Way include, but not limited to, any excavation areas, pavement removal, drainage or other features.
- 37. The encroaching party shall notify the Division Engineer or their representative immediately in the event any drainage structure is blocked, disturbed or damaged. All drainage structures disturbed, damaged or blocked shall be restored to its original condition as directed by the Division Engineer or their representative.
- 38. A minimum of 5 feet clearance is required for utility installations beneath or near drainage pipes, headwalls, and a minimum of two-foot clearance below the flowline of streams. If directional drilling, a minimum ten-foot clearance distance is required from drainage structures and a minimum of 5 feet below flowline of streams.
- 39. At points where the utility is placed under existing storm drainage, the trench will be backfilled with excavatable flowable fill up to the outside diameter of the existing pipe.
- 40. Unless specified otherwise, during non-working hours, equipment shall be located away from the job site or parked as close to the right of way line as possible and be properly barricaded in order not to have any equipment obstruction within the Clear Zone. Also, during non-working hours, no parking or material storage shall be allowed along the shoulders of any statemaintained roadway.
- 41. Right of Way monuments disturbed during construction shall be referenced by a registered Land Surveyor and reset after construction.

- 42. All Traffic signs moved during construction shall be reinstalled as soon as possible to the satisfaction of the Division Engineer or their representative.
- 43. Any utility markers, cabinets, pedestals, meter bases and services for meter reading required shall be as close to the Right of Way line as possible. If it is not feasible to install at or near Right of Way line, then written approval shall be obtained from NCDOT prior to installation.
- 44. All driveways disturbed during construction shall be returned to a state comparable with the condition of the driveways prior to construction.
- 45. If the approved method of construction is unsuccessful and other means are required, prior approval must be obtained through the District Engineer before construction may continue.
- 46. All traffic control, asphalt mixes, structures, construction, workmanship and construction methods, and materials shall be in compliance with the most-recent versions of the following resources: ASTM Standards, Manual on Uniform Traffic Control Devices, NCDOT Utilities Accommodations Manual, NCDOT Standard Specifications for Roads and Structures, NCDOT Roadway Standard Drawings, NCDOT Asphalt Quality Management System manual, and the approved plans.
- 47. All manholes, handholes, splice boxes, junction boxes and vaults and covers shall be flush with the ground when located within the vehicle clear zone.
- 48. Excavation material shall not be placed on pavement.
- 49. It is the responsibility of the encroaching party or their contractor to prevent any mud/dirt from tracking onto the roadway. Any dirt which may collect on the roadway pavement from equipment and/or truck traffic on site shall be immediately removed to avoid any unsafe traffic conditions.
- 50. The utility shall be installed within 5 feet of (or as close as practical to) the right of way line and outside the 5-foot minimum from travel lane plus theoretical 2:1 slope from the edge of pavement to the bottom of the nearest excavation wall for temporary shoring. Temporary shoring is required when a theoretical 2:1 slope from the bottom of excavation will intersect the existing ground line less than 5 feet from the outside edge of an open travel lane as shown in the figure below or when a theoretical 2:1 slope from the bottom of excavation will intersect any existing structure, support, utility, property, etc. to be protected.



If the 2:1 slope plus 5 feet requirement above is met for traffic, then temporary shoring is typically only necessary to protect roadways from damage when a theoretical 1:1 slope from the edge of pavement intersects the nearest excavation wall. This rule of thumb should be used with caution and does not apply to all subsurface conditions, surcharge loadings and excavation geometries. Situations where this 1:1 slope is not recommended include groundwater depth is above bottom of excavation or excavation is deeper than 10 feet or in Temporary shoring may be avoided by locating trenches, bore pits, and other excavations far enough away from the open travel lane, edge of pavement and any existing structure, support, utility, property, etc. to be protected.

Temporary shoring shall be designed and constructed in accordance with current NCDOT Standard Temporary Shoring provisions (refer to

https://connect.ncdot.gov/resources/Specifications/Pages/2018-Specifications-and-Special-Provisions.aspx and see SP11 R002

- a. Temporary excavation shoring, such as sheet piling, shall be installed. The design of the shoring shall include the effects of traffic loads. The shoring system shall be designed and sealed by a licensed North Carolina Professional Engineer. Shoring plans and design calculations shall be submitted to the Division Engineer for review and approval prior to construction. (See NCDOT *Utilities Accommodations Manual* for more information on requirements for shoring plans, design calculations, and subsurface investigation report.) Trench boxes shall not be accepted as temporary shoring and will not be approved for use in instances where shoring is required to protect the highway, drainage structure, and/or supporting pavement or structure foundation.
- b. All trench excavation inside the limits of the theoretical two-to-one slope plus 5 feet requirement, as defined by the policy, shall be completely backfilled and compacted at the end of each construction day. No portion of the trench shall be left open overnight. Any excavation that is not backfilled by the end of the workday must address any safety and traveling public concerns including accommodations for bicycles, pedestrians and persons with disabilities.
- c. The trench backfill material shall meet the Statewide Borrow Criteria. The trench shall be backfilled in accordance with Section 300-7 of the latest *NCDOT Standard Specifications for Roads and Structures*, which basically requires the backfill material to be placed in layers not to exceed 6 inches loose and compacted to at least 95% of the density obtained by compacting a sample in accordance with AASHTO T99 as modified by DOT.
- d. At the discretion of the Division Engineer, a qualified NCDOT inspector shall be on the site at all times during construction. The encroaching party shall reimburse NCDOT for the cost of providing the inspector. If NCDOT cannot supply an inspector, the encroaching party (not the utility contractor) should make arrangements to have a qualified inspector, under the supervision of a licensed North Carolina Professional Engineer, on the site at all times. The Professional Registered Engineer shall certify that the utility was installed in accordance with the encroachment agreement and that the backfill material meets the Statewide Borrow Criteria.
- e. The length of parallel excavation shall be limited to the length necessary to install and backfill one joint of pipe at a time, not to exceed twenty-five (25) feet.
- f. Active shoring details must be submitted to the District Engineer's office for review and approval prior to construction. The depth of the trench exceeds 10 feet in some locations and/or is within the 1:1 slope from the edge of pavement.
- 51. The minimum pavement design for pavement repair shall be according to NCDOT Standard Drawing 654.01 (https://connect.ncdot.gov/resources/Specifications/2018StandardRdwyDrawings/Division%2 006%20Asphalt%20Bases%20and%20Pavements.pdf) and shall include a mechanical overlay extent to be a minimum of 25 feet each side of the pavement repair area OR as directed by the District Engineer.
- 52. Pavement cuts shall be repaired the same day the cuts are made unless an asphalt patch cannot be accomplished the same day due to material availability or time restrictions. When the asphalt patch is not feasible, the following apply:
 - a. The pavement cut shall be filled to the surface with ABC stone or Flowable Fill per NCDOT's Standards and Specifications.

- b. Once the cut is filled, a minimum ¾-inch steel plate shall be placed and pinned to prevent moving. Plates shall be designed large enough to span a minimum of 1-foot on all sides on the pavement cut.
- c. When flowable fill is used, it shall cure for 24 hours prior to any asphalt material placement. Flowable fill bleed water shall not be present during paving operations. Paving shall not cause damage (shoving, distortion, pumping, etc.) to the flowable fill.
- d. Install and leave "BUMP" signs according to MUTCD until the steel plate has been removed. Once the flowable fill has cured, remove the steel plate, and mill/fill according to the directions of the District Engineer.
- e. All pavement cuts must be sealed with NCDOT approved sealant to prevent future pavement separation or cracking.
- 53. Any pavement damaged because of settlement of the pavement or damaged by equipment used to perform encroachment work, shall be re-surfaced to the satisfaction of the District Engineer. This may include the removal of pavement and a 50' mechanical overlay. All pavement work and pavement markings (temporary and final) are the responsibility of the Encroaching Party.
- 54. The Encroaching party shall notify the District Engineer's office within 2 business days after construction is complete. The District Engineer may perform a construction inspection. Any deficiencies may be noted and reported to the encroaching party to make immediate repairs or resolve any issues to restore the right-of-way to a similar condition prior to construction, including pavement, signage, traffic signals, pavement markings, drainage, structures/pipes, or other highway design features.
- 55. At the discretion of the District Engineer, a final inspection report may be provided to the encroaching party upon satisfactory completion of the work.
- 56. A written acknowledgement of the completed work by the District Engineer's office begins the one-year warranty period associated with the performance bond.
- 57. If the actual construction differs from the approved plans associated with this encroachment, a copy of "as-built" plans shall be submitted to the District Engineer's office in a PDF format and in a current ESRI GIS format within 4 weeks of construction.
- 58. The encroaching party and their construction contractor must sign and submit the NCDOT *Workforce Safety Plan for Encroachment Activities: COVID-19* form to the District Engineer prior to construction.

ROUTE	SR 1002	_ PROJECT	Union Street Improveme COUNTY OF	STATE OF NORTH CAROLINACabarrus
DEP	ARTMENT OF TRANS	PORTATION	RIGHT OF WAY	ENCROACHMENT AGREEMENT
	-AND- City of Concord P.O. Box 308, NC 28026	-0308	PRIMARY AI	ND SECONDARY HIGHWAYS
	EEMENT, made and er		the <u>9th</u> day of <u>July</u> 20 by of Concord	21 by and between the Department
				party of the second part,
			WITNESSETH	
Ti Route(s)	HAT WHEREAS, the pa SR 1002 (Cabarrus A	-	nd part desires to encroach on the right of	, ,
	61 T. 100 T.			
			/al of existing 16", 10", and 8" water lines,	
manhole,	removal of sewer flush	ng manhole, a	nd removal of abandoned water utility man	hole. Installation of 50 LF of 16" DIP 🛗
70 LF of 1	12" DIP water line, 15 L	F of 8" DIP sev	ver line, 1 sewer manhole, 2 electrical duct	banks, and one fiber duct bank.

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of the first part in the exercise of authority conferred upon it by statute, is willing to permit the encroachment within the limits of the right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right and privilege to make this encroachment as shown on attached plan sheet(s), specifications and special provisions which are made a part hereof upon the following conditions, to wit:

That the installation, operation, and maintenance of the above described facility will be accomplished in accordance with the party of the first part's latest <u>UTILITIES ACCOMMODATIONS MANUAL</u>, and such revisions and amendments thereto as may be in effect at the date of this agreement. Information as to these policies and procedures may be obtained from the Division Engineer or State Utilities Manager of the party of the first part.

That the said party of the second part binds and obligates himself to install and maintain the encroaching facility in such safe and proper condition that it will not interfere with or endanger travel upon said highway, nor obstruct nor interfere with the proper maintenance thereof, to reimburse the party of the first part for the cost incurred for any repairs or maintenance to its roadways and structures necessary due to the installation and existence of the facilities of the party of the second part, and if at any time the party of the first part shall require the removal of or changes in the location of the said facilities, that the said party of the second part binds himself, his successors and assigns, to promptly remove or alter the said facilities, in order to conform to the said requirement, without any cost to the party of the first part.

That the party of the second part agrees to provide during construction and any subsequent maintenance proper signs, signal lights, flagmen and other warning devices for the protection of traffic in conformance with the latest <u>Manual on Uniform Traffic Control Devices</u> <u>for Streets and Highways</u> and Amendments or Supplements thereto. Information as to the above rules and regulations may be obtained from the Division Engineer of the party of the first part.

That the party of the second part hereby agrees to indemnify and save harmless the party of the first part from all damages and claims for damage that may arise by reason of the installation and maintenance of this encroachment.

That the party of the second part agrees to restore all areas disturbed during installation and maintenance to the satisfaction of the Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during construction and maintenance to prevent eroding of soif; silting or pollution of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces or other property; or pollution of the air. There shall be compliance with applicable rules and regulations of the North Carolina Division of Environmental Management, North Carolina Sedimentation Control Commission, and with ordinances and regulations of various counties, municipalities and other official agencies relating to pollution prevention and control. When any installation or maintenance operation disturbs the ground surface and existing ground cover, the party of the second part agrees to remove and replace the sod or otherwise reestablish the grass cover to meet the satisfaction of the Division Engineer of the party of the first part.

That the party of the second part agrees to assume the actual cost of any inspection of the work considered to be necessary by the Division Engineer of the party of the first part.

That the party of the second part agrees to have available at the construction site, at all times during construction, a copy of this agreement showing evidence of approval by the party of the first part. The party of the first part reserves the right to stop all work unless evidence of approval can be shown.

Provided the work contained in this agreement is being performed on a completed highway open to traffic; the party of the second part agrees to give written notice to the Division Engineer of the party of the first part when all work contained herein has been completed. Unless specifically requested by the party of the first part, written notice of completion of work on highway projects under construction will not be required.

That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of the first part reserves the right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to the party of the first part.

That it is agreed by both parties that this agreement shall become void if actual construction of the work contemplated herein is not begun within one (1) year from the date of authorization by the party of the first part unless written waiver is secured by the party of the second part from the party of the first part.

During the performance of this contract, the second party, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor"), agrees as follows:

- a. <u>Compliance with Regulations</u>: The contractor shall comply with the Regulations relative to nondiscrimination in Federally-assisted programs of the U. S. Department of Transportation, Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.
- b. <u>Nondiscrimination</u>: The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials

and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.

- Solicitations for Subcontracts, including Procurements of Materials and Equipment: In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.
- Information and Reports: The contractor shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Department of Transportation or the Federal Highway Administration to be pertinent to ascertain compliance with such Regulations or directives. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the Department of Transportation, or the Federal Highway Administration as appropriate, and shall set forth what efforts it has made to obtain the information.
- Sanctions for Noncompliance: In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the Department of Transportation shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to,
 - (1) withholding of payments to the contractor under the contract until the contractor complies, and/or
- (2) cancellation, termination or suspension of the contract, in whole or in part
- Incorporation of Provisions: The contractor shall include the provisions of paragraphs "a" through "f" in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the Department of Transportation or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Department of Transportation to enter into such litigation to protect the interests of the State, and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

R/W (161): Party of the Second Part certifies that this agreement is true and accurate copy of the form R/W (161) incorporating all revisions to date.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and vear first above written.

DEPARTMENT OF TRANSPORTATION BY: ATTEST OR WITNESS: City of Concord City of Concord Kim Deason, City Second Party RUCTIONS

When the applicant is a corporation or a municipality this eggement must have the corporate seal and be attested by the corporation secretary or by the empowered city official, unless a carrier of corporate seal and attestation by the secretary or by the empowered City official is on file in the Raleigh office of the State dilities of Grager. In the space provided in this agreement for execution, the name of the corporation or municipality statistical particles and title of all persons signing the agreement should be typed directly below their signature.

When the applicant is not a corporation, then his signature must be witnessed by one person. The address should be included in this agreement and the names of all persons signing the agreement should be typed directly below their signature.

This agreement must be accompanied, in the form of an attachment, by plans or drawings showing the following applicable information:

- 1. 2. 3.
- All roadways and ramps. Right of way lines and where applicable, the control of access lines.
- Location of the existing and/or proposed encroachment.
- 4. Length, size and type of encroachment.
- 5. Method of installation.
- 6. 7. Dimensions showing the distance from the encroachment to edge of pavement, shoulders, etc.
- Location by highway survey station number. If station number cannot be obtained, location should be shown by distance from some identifiable point, such as a bridge, road, intersection, etc. (To assist in preparation of the encroachment plan, the Department's roadway plans may be seen at the various Highway Division Offices, or at the Raleigh office.)
- 8. Drainage structures or bridges if affected by encroachment (show vertical and horizontal dimensions from encroachment to
- 9. Method of attachment to drainage structures or bridges.
- Manhole design. 10.
- On underground utilities, the depth of bury under all traveled lanes, shoulders, ditches, sidewalks, etc. 11.
- 12. Length, size and type of encasement where required.
- 13. On underground crossings, notation as to method of crossing - boring and jacking, open cut, etc.
- Location of vents.

GENERAL REQUIREMENTS

- 1. Any attachment to a bridge or other drainage structure must be approved by the State Utilities Manager in Raleigh prior to submission of encroachment agreement to the Division Engineer.
- All crossings should be as near as possible normal to the centerline of the highway.
- 3. Minimum vertical clearances of overhead wires and cables above all roadways must conform to clearances set out in the National Electric Safety Code.
- Encasements shall extend from ditch line to ditch line in cut sections and 5' beyond toe of slopes in fill sections.
- All vents should be extended to the right of way line or as otherwise required by the Department.
- All pipe encasements as to material and strength shall meet the standards and specifications of the Department. 6.
- Any special provisions or specifications as to the performance of the work or the method of construction that may be required by the Department must be shown on a separate sheet attached to encroachment agreement provided that such information cannot be shown on plans or drawings
- 8 The Department's Division Engineer should be given notice by the applicant prior to actual starting of installation included in this agreement.

ATTACHMENT FORM

NOTIFICATION FOR UTILITY / NON-UTILITY ENCROACHMENT WITHIN NCDOT R/W

Instructions for use:

This form must be completed in its entirety and submitted <u>directly to the designated personnel in the District Engineer's office via email, fax or hand delivery a minimum of one week prior to construction for the encroachment.</u> If the designated NCDOT personnel names are unknown by the person completing this form, please contact the District Engineer's office to determine that contact info.

Date:	Submitted by	Name:
То:	District Personnel Name: District Personnel Email: District Fax No.:	
	notification is to inform you that we (eon the following project in a minimum	encroaching party or their contractor) will begin construction of one week.
	achment number ned by NCDOT) for the project:	
Const	ruction start date:	
Appro	oximate ending date:	
	ct NCDOT inspector a minimum of 7 ct Engineer's office or other location a	2 hrs. in advance to set-up Preconstruction meeting in the as directed by the District Engineer
Precoi	nstruction meeting date & time:	
Precoi	nstruction meeting address:	
	of project:	
	act Info for this project:	, , , , , , , , , , , , , , , , , , , ,
	actor Company Name:	NCDOT Utility Inspector Name:
Contra	actor Contact Name:	NCDOT Utility Inspector Phone:
		NCDOT Utility Inspector Email:
Contra	actor Phone Number:	Trebot outing inspector Email.
	actor Phone Number:actor Email:	NCDOT Utility Project Manager Name:

WORKFORCE SAFETY PLAN FOR ENCROACHMENT ACTIVITIES: COVID-19

EFFORTS THE N.C. TRANSPORTATION INDUSTRY IS TAKING TO STOP THE SPREAD OF COVID-19

The North Carolina Department of Transportation (NCDOT) and their partners expect all parties involved in the delivery of transportation projects to abide by the guidelines issued from the Centers for Disease Control and Prevention (CDC) and the North Carolina Department of Health and Human Services (NCDHHS).

Response to COVID-19 is rapidly evolving; new information and guidelines may be issued from the CDC, NCDHHS, or other state or federal agencies. NCDOT and their partners should review the current CDC and NCDHHS guidance, including the resources listed at the end of this document, for up-to-date information on how to respond to COVID-19. Additional guidelines may be issued by state or federal agencies that should be followed in addition to the guidance included in this document.

Though certain Americans with Disabilities Act (ADA) requirements have been relaxed in response to the pandemic, employers must still maintain all information about employee illness as a confidential medical record in compliance with the ADA. If an employee is suspected of having or tests positive for COVID-19, it is essential that management keep the identity of the employee and details related to the employee's health confidential.

Below are precautions required by NCDOT and from encroaching parties and their contractors performing construction within NCDOT Rights of Way. The term employee refers to any person on a job site within NCDOT right of way for the purpose of constructing or inspecting the work related to construction of a facility under an approved encroachment agreement and where that employee may or may not be under employment by or under contract to NCDOT.

EMPLOYEE WELLNESS

- If an employee has not yet reported to work and develops any COVID-19 symptoms (i.e. fever, coughing, or shortness of breath) STAY HOME and immediately:
 - Call a health care provider
 - Self-Isolate
 - o Communicate with your supervisor
 - Remain calm and follow all instructions from your health care provider
- Employees who appear to have acute respiratory illness symptoms (i.e. cough, shortness of breath)
 upon arrival to work, or become sick during the day, should be separated from others and sent
 home immediately. The potentially affected employees should immediately follow the steps
 outlined above, which includes immediately contacting a health care provider.
- Should an employee show symptoms of acute respiratory illness or be diagnosed with COVID-19, all
 other employees who have worked in close proximity to the affected employee during the last 14

days and all encroachment points of contact indicated at the end of this plan should be notified of potential exposure to the disease without identifying the affected employee.

- Consideration should be given to employees at "High Risk" of severe illness from COVID-19, who, per NCDHHS, include employees:
 - Over 65 years of age, OR
 - With underlying health conditions including heart disease, lung disease, or diabetes, OR
 - With weakened immune system
- "High Risk" Employees should be given the opportunity to discuss alternate work arrangements/duties with their employer or take leave according to their company policies.
- For guidance on confirmed positive tests for COVID-19, refer to the most recent version of the "COVID-19 Guidance for Employees on Encroachment Job Sites within NCDOT Right of Way" located on last page of this plan.

PERSONAL HYGIENE

- Clean hands often by washing with soap and water for 20 seconds. If soap and water are not
 available and hands are not visibly dirty, an alcohol-based hand sanitizer that contains 60%-95%
 alcohol may be used.
- Avoid touching your eyes, nose, mouth, or other parts of your face.
- Do not breathe, cough, or sneeze on another person or into the open air. Employees should cover their noses and mouth with a tissue when coughing or sneezing (or an elbow or shoulder if no tissue is available).
- A facemask for covering nose and mouth is encouraged on the job site.
- Appropriate gloves are encouraged while performing functions of the job.

CLEANING/DISINFECTING

- Wash stations and/or hand sanitizer are encouraged on each project site.
- Appropriate cleaning staff should clean frequently touched surfaces and objects with disinfectants at a minimum of once per day.
 - Office/buildings: door knobs, light switches, phones, computers/keyboards, copy machines, elevator buttons, toilets, faucets, sinks, countertops, paper towel dispensers, desktops, handrails, folders, vending machines, counters, tables, cabinets/knobs, etc.
 - Shop Yard/Jobsite: vehicle/equipment door handles, keys, gear shifts, steering wheel/operator controls and levers, fuel pump dispensers, touch points on machinery, etc.
 - <u>Electronic equipment</u>: cell phones, computers, keyboards, etc.
- Appropriate cleaning staff should sanitize/disinfect facilities and work areas after persons suspected/confirmed to have COVID-19 have been in the facility or work area.

- It is recommended to close off access to areas used by the ill persons and wait as long as practical, 24 hours if possible, before beginning cleaning and disinfection to minimize potential for exposure to respiratory droplets. Open outside doors and windows to increase air circulation in the area if possible.
- Appropriate cleaning staff should clean and disinfect all areas used by the ill persons, focusing especially on frequently touched surfaces.

GENERAL

- Increase communication measures between all parties regarding schedule, daily activities, etc. to reduce/minimize worker exposure in accordance with but not limited to the requirements below.
- Minimize on-site personnel such as subcontractors, work crews, QC personnel, and inspection staff
 to those required for that day's activities. If work is postponed or cancelled, immediately notify
 appropriate parties.
- Practice "Social Distancing" whenever feasible. Social Distancing is designed to limit the spread of a
 disease by reducing the opportunities for close contact between people. All personnel have the
 responsibility to remind each other to stay 6 feet or more apart. Examples of Social Distancing
 include:
 - Reducing face-to-face exposure by using conference calls and video conferencing
 - If an in-person meeting is absolutely required and cannot be rescheduled or attended remotely, the meeting is limited to a maximum of 10 people while maintaining Social Distancing of 6 feet or more.
 - Avoiding unnecessary travel
- Do not congregate at lunch or breaks. Bringing your lunch is encouraged.
- No communal coolers or drink stations are allowed. Supervisors should confirm with employees
 prior to beginning work for appropriate hydration and nutrition availability to employees for the
 duration of the employee's shift and without direct contact with others on the job site.
- First line of communication should be by phone, rather than in-person.
- Do not shake hands.
- Do not share iPads, tablets, pens, or clipboards for signing or any other purpose. Take pictures as proof of attendance at meetings.
- Sharing of Personal Protective Equipment (PPE) is strictly prohibited.
- Vehicles, equipment, and tools
 - o Limit the number of people riding in a vehicle together.
 - Wipe down and disinfect vehicles after each trip.
 - As much as possible, do not share tools or equipment. If a tool or piece of equipment must be shared, the parts of it that are touched should be sanitized between uses.

RETURN TO WORK

- The following criteria must be followed for an employee who is tested for Covid-19, or asked to self-quarantine by health officials, or has contact with another employee with a positive test result to return to work:
 - o at least a 14-day quarantine; OR
 - release by a health care provider.
- In accordance with CDC guidance, the following criteria must be followed for an employee with a positive test result to return to work:
 - o at least 14 days from positive test notification; AND
 - at least 3 days (72 hours) have passed since recovery defined as resolution of fever without the use of fever-reducing medications and improvement in respiratory symptoms (e.g., cough, shortness of breath); AND
 - o at least 7 days have passed since symptoms first appeared.

NCDOT may require certification of fitness to work from a health care provider.

ADDITIONAL RESOURCES

NCDOT and their partners should review the CDC and NCDHHS resources listed below for up-to-date information on how to respond to COVID-19. Additional guidelines may be issued by state or federal agencies that should be followed in addition to the guidelines included in this document.

- NCDHHS COVID-19 Resources:
 - https://www.ncdhhs.gov/divisions/public-health/coronavirus-disease-2019-covid-19-response-north-carolina
- NCOSHR Communicable Disease Emergency Policy
 - https://oshr.nc.gov/policies-forms/workplace-wellness/communicable-disease-emergency
- OSHA Guidance on Preparing Workplaces for COVID-19
 - o https://www.osha.gov/Publications/OSHA3990.pdf
- CDC COVID-19 Resources:
 - o https://www.cdc.gov/coronavirus/2019-ncov/index.html

AGREEMENT

The encroaching party shall adhere to the requirements of this plan in order to continue work under their approved encroachment agreement. Violations to this plan could result in the violating entity not being allowed to continue work or all work ceasing as determined by the NCDOT District Engineer or Resident Engineer.

PROJECT POINTS OF CONTACT

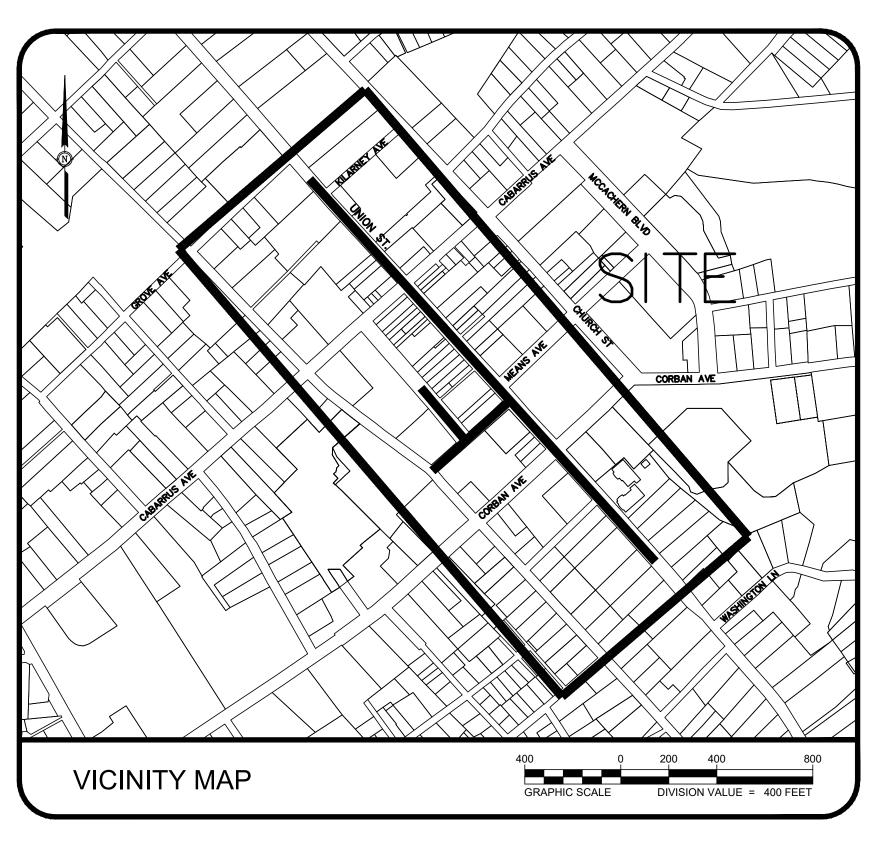
NCDOT Encroachment ID#: E101-013-21-00118

	NCDOT	Encroaching Party (Primary Contact)
Name:		Name: <u>City of Concord</u>
Phone #:		Contact: Sue Hyde, Engineering Director
		Phone #: <u>704-920-5425</u>
		Primary Contractor to Encroaching Party (Point of Contact)
		Name:
		Phone #·

	COVID-19 Guidance for Employees on Encroachment Job sites within NCDOT Right of Way							
Palationship to			CONTACT GROUP					
Relationship to Confirmed POSITIVE Test		What YOU Should Do Exposure within 6' and longer than 10 minutes		What PROJECT SITE Personnel Should Do No exposure within 6' and longer than 10 minutes				
Employee	You	Notify your supervisor Self-quarantine for 14 days	Advise of POSITIVE test without identifying the affected employee* Directly exposed crew self-quarantine for 14 days Continue hygiene & disinfecting measures	Advise of POSITIVE test without identifying the affected employee* Site personnel without direct contact may continue onsite work or follow their company policy Continue hygiene & disinfecting measures				
Direct Contact Interaction with an infected person within 6' and longer than 10 minutes	You	Self-quarantine for 14 days	Advise of POSITIVE test without identifying the affected employee* Crew may continue onsite work or follow their company policy Continue hygiene & disinfecting measures	Advise of POSITIVE test * Continue hygiene & disinfecting measures				
Secondary Contact	You	You may continue onsite work or follow your company policy Continue hygiene & disinfecting measures		Continue hygiene & disinfecting measures				
Two or more Persons Removed from Contact	You	Continue hygiene & disinfecting measures	Continue hygiene & disinfecting measures	Continue hygiene & disinfecting measures				
*Notification Protocol	NCDOT employee / agent tests POSITIVE	Contact, CDC and, if Resident Engineer h	eer notifies Encroaching Party's primary po as oversight for the job site, FHWA any Co s other Contractors, Sub-Contractors and S	nsultant Firms working for NCDOT				
(Comply with HIPAA & ADA confidentiality requirements)	Encroaching Party or Contract crew member on job site tests POSITIVE	Encroaching party representative or Contractor point of contact notifies appropriate NCDOT District Engineer or Resident Engineer and all other Contractors, Sub-Contractors and Suppliers with exposed Employees NCDOT notifies CDC, and as appropriate, FHWA and any Consultant Firms working for NCDOT						

UNION STREET IMPROVEMENTS CITY OF CONCORD

CABARRUS COUNTY, NORTH CAROLINA



MAY 2021

SCHEDULE OF DRAWINGS

G-001..... COVER SHEET

G-002. GENERAL NOTES AND LEGENDS

G-003..... SEQUENCING

G-004..... OVERALL PROJECT SHEET INDEX

CE-101-107. . . . EXISTING CONDITIONS - A THRU G

CD-101-107. . . . DEMOLITION PLAN - A THRU G

C-101-107. SITE PLAN - A THRU G

C-108-114. . . . LAYOUT PLAN - A THRU G

C-201-207. GRADING, DRAINAGE, & EROSION CONTROL - A THRU G

C-301.....UTILITY NOTES AND LEGEND

C-302-305. PROPOSED WATER LINE PLAN - PROFILE AREA - A THRU D

C-306 PROPOSED WATER LINE ALONG MEANS AVE. AND CABARRUS AVE.

C-307......WATER LINE ENLARGEMENTS

C-308-311.... PROPOSED SANITARY PLAN - PROFILE AREA - A THRU D

E-001.....ELECTRICAL LEGEND, NOTES, SCHEDULES AND

ABBREVIATIONS

ED-100..... ELECTRICAL OVERALL DEMOLITION PLAN

ED-101-107. . . . ELECTRICAL DEMOLITION PLAN - A THRU G

E-100.....ELECTRICAL OVERALL SITE PLAN

E-101-107.... ELECTRICAL SITE PLAN - A THRU G

E-501-502 ELECTRICAL DETAILS

E-601.....ELECTRICAL SCHEDULES AND DIAGRAMS

L-101-106 LANDSCAPE PLAN - A THRU F

I-101-104 IRRIGATION PLAN - A THRU D

C-501-510 DETAILS





NCDOT REVIEW
SUBMITTAL. NOT
FOR CONSTRUCTION

2. CONTRACTOR SHALL REPAIR ALL DISTURBED AREAS TO EQUAL OR BETTER CONDITION THAN THE ORIGINAL SITE OR AS NOTED.

3. LOCATIONS OF EXISTING UTILITIES AS SHOWN ARE APPROXIMATE ONLY. EXACT LOCATIONS ARE TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR. AT LEAST THREE DAYS PRIOR TO CONSTRUCTION CONTRACTOR MUST NOTIFY EXISTING UTILITY OWNERS. CALL BEFORE YOU DIG, NORTH CAROLINA ONE CALL (1-800-632-4949).

4. ALL WORK NEAR AND AROUND WATERWAYS MUST CONFORM TO THE RULES OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY. 5. CONTRACTOR MUST PROVIDE EROSION CONTROL DEVICES TO CONTROL RUNOFF FROM THE CONSTRUCTION SITE. CONTRACTOR WILL BE

RESPONSIBLE FOR ANY FINES THAT MAY BE LEVIED DUE TO POLLUTION CREATED DURING CONSTRUCTION.

6. CONTRACTOR SHALL FOLLOW ALL FEDERAL, STATE, AND LOCAL REGULATIONS PERTAINING TO CONSTRUCTION OPERATIONS.

7. CONTRACTOR SHALL NOTIFY THE PROPER LOCAL AUTHORITIES 24 HOURS PRIOR TO ANY ROAD BEING CLOSED FOR CONSTRUCTION, INCLUDING BUT NOT LIMITED TO THE LOCAL NEWSPAPER, RADIO STATION, FIRE DEPARTMENT, COUNTY SHERIFF'S DEPARTMENT, AMBULANCE, AND THE COUNTY EMERGENCY MANAGEMENT AGENCY. ALL TRAFFIC CONTROL SHALL CONFORM TO THE REQUIREMENTS OF THE NORTH CAROLINA DEPARTMENT OF

8. ALL FENCES DAMAGED DURING CONSTRUCTION SHALL BE REPLACED WITH LIKE MATERIAL IN A WORKMANLIKE MANNER AND IN ACCORDANCE WITH STANDARD FENCE CONSTRUCTION PRACTICES AT THE CONTRACTOR'S EXPENSE.

9. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING ROADS DURING CONSTRUCTION AND SHALL REPAIR ROADS PER REQUIREMENTS OF THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION. NO OPEN CUTS OF EXISTING ROADS SHALL BE ALLOWED EXCEPT WHERE INDICATED ON THE DRAWINGS OR WHERE SPECIFIC PERMISSION IS GRANTED BY THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION. SAND OR A SIMILAR MATERIAL APPROVED BY THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION SHALL BE PLACED AS A PROTECTIVE BARRIER BETWEEN TRACK EQUIPMENT AND THE ROAD AND CLEANED UP PROPERLY AFTER CONSTRUCTION.

10. THE PROJECT SITE IS NOT IN A FLOOD ZONE.

11. ANY DISCREPANCIES FOUND IN THE FIELD SHALL BE CALLED TO THE ATTENTION OF THE OWNER/ENGINEER/DESIGNER PRIOR TO PROCEEDING WITH ANY WORK.

12. HATCHING OF HARD SURFACE MATERIALS SUCH AS CONCRETE ARE FOR GENERAL INFORMATION PURPOSES. IN NO INSTANCE IS A UTILITY LID, COVER OR ACCESS POINT TO BE COVERED OVER AND CONCEALED BY THE PROPOSED SURFACE MATERIAL. ANY HIDDEN UTILITY BOXES, COVERS, ETC DISCOVERED DURING CONSTRUCTION SHALL BE ADJUSTED TO MATCH PROPOSED GRADE ELEVATIONS.

13. THE ENGINEER MAY MAKE MINOR GRADE CHANGES AS REQUIRED IN THE FIELD WITHOUT EFFECTING THE LUMP SUM PRICE FOR UNCLASSIFIED EXCAVATION.

14. UNLESS OTHERWISE STATED, ALL FILL AREAS SHALL BE CONSTRUCTED IN LAYERS OF 8" MAXIMUM THICKNESS WITH WATER ADDED OR SOIL CONDITIONED TO THE OPTIMUM MOISTURE CONTENT AS DETERMINED BY THE ENGINEER AND COMPACTED WITH A SHEEP'S FOOT ROLLER TO A COMPACTION EQUAL TO OR GREATER THAN 95% OF THE DENSITY OBTAINED BY COMPACTING A SAMPLE OF THE MATERIAL IN ACCORDANCE WITH THE STANDARD PROCTOR METHOD OF MOISTURE DENSITY RELATIONSHIP TEST, ASTM D698 OR AASHTO-99 UNLESS SPECIFIED IN OTHER SPECIFICATIONS.

15. ENTIRE AREA TO BE GRADED SHALL BE CLEARED AND GRUBBED. NO FILL SHALL BE PLACED ON ANY AREA NOT CLEARED OR GRUBBED.

16. ALL SOIL EROSION CONTROL MEASURES REQUIRED BY THE GRADING PLAN SHALL BE INSTALLED PRIOR TO GRADING, CLEARING OR GRUBBING. ALL EROSION CONTROL DEVICES SUCH AS SILT FENCES, ETC., SHALL BE MAINTAINED IN WORKABLE CONDITION FOR THE LIFE OF THE PROJECT AND SHALL BE REMOVED AT THE COMPLETION OF THE PROJECT ONLY ON THE ENGINEER'S APPROVAL. PAYMENT SHALL BE CONSIDERED INCIDENTAL TO CLEARING AND GRUBBING. IF DURING THE LIFE OF THE PROJECT, A STORM CAUSES SOIL EROSION WHICH CHANGES FINISH GRADES OR CREATES "GULLIES" AND "WASHED AREAS", THESE SHALL BE REPAIRED AT NO ADDITIONAL COST AND ALL SILT WASHED OFF OF THE PROJECT SITE ONTO ADJACENT PROPERTY SHALL BE REMOVED AS DIRECTED BY THE ENGINEER AT NO EXTRA COST. THE CONTRACTOR SHALL ADHERE TO ANY APPROVED EROSION CONTROL PLANS WHETHER INDICATED IN THE CONSTRUCTION PLANS OR UNDER SEPARATE COVER.

17. DISPOSABLE MATERIAL

A. CLEARING AND GRUBBING WASTES SHALL BE REMOVED FROM THE SITE AND PROPERLY DISPOSED OF BY THE CONTRACTOR AT HIS EXPENSE, UNLESS SPECIFIED OTHERWISE.

B. SOLID WASTES TO BE REMOVED, SUCH AS SIDEWALKS, CURBS, PAVEMENT, ETC., MUST BE DISPOSED OF OFF SITE AND IN A RESPONSIBLE MANNER AND IN ACCORDANCE WITH ALL APPLICABLE LAWS, BY THE CONTRACTOR. THE CONTRACTOR SHALL REMOVE THIS WASTE FROM THE SITE AND PROPERLY DISPOSE OF IT AT THEIR OWN EXPENSE.

C. ABANDONED UTILITIES SUCH AS CULVERTS, WATER PIPE, HYDRANTS, CASTINGS, PIPE APPURTENANCES, UTILITY POLES, ETC., SHALL BE THE PROPERTY OF THE SPECIFIED UTILITY AGENCY, OR COMPANY HAVING JURISDICTION. BEFORE THE CONTRACTOR CAN REMOVE, DESTROY, SALVAGE, REUSE, SELL OR STORE FOR HIS OWN USE ANY ABANDONED UTILITY, HE MUST PRESENT TO THE OWNER WRITTEN PERMISSION FROM THE UTILITY INVOLVED.

18. IN THE EVENT EXCESSIVE GROUNDWATER OR SPRINGS ARE ENCOUNTERED WITHIN THE LIMITS OF CONSTRUCTION, THE CONTRACTOR SHALL INSTALL NECESSARY UNDER DRAINS AND STONE AS DIRECTED BY THE ENGINEER, ALL WORK SHALL BE PAID BASED UPON UNIT BIDS UNLESS SPECIFIED OTHERWISE. THE CONTRACTOR IS RESPONSIBLE FOR THE COORDINATION OF ADJUSTMENT OF ALL UTILITY SURFACE ACCESSES WHETHER HE PERFORMS THE WORK OR A UTILITY COMPANY PERFORMS THE WORK.

19. THE CONTRACTOR SHALL CONTROL ALL "DUST" BY PERIODIC WATERING AND SHALL PROVIDE ACCESS AT ALL TIMES FOR PROPERTY OWNERS WITHIN THE PROJECT AREA AND FOR EMERGENCY VEHICLES. ALL OPEN DITCHES AND HAZARDOUS AREAS SHALL BE CLEARLY MARKED IN ACCORDANCE WITH THE SPECIFICATIONS.

20. ALL DISTURBED AREAS TO RECEIVE PERMANENT SEEDING. FINISHED SURFACES SHALL BE TO GRADE AND SMOOTH, FREE OF ALL ROCKS LARGER THAN 2", EQUIPMENT TRACKS, DIRT CLODS, BUMPS, RIDGES AND GOUGES PRIOR TO SEEDING. THE SURFACE SHALL BE LOOSENED TO A DEPTH OF $\pm 2"-3"$ TO ACCEPT SEED. THE CONTRACTOR SHALL NOT PROCEED WITH SEEDING OPERATIONS WITHOUT FIRST OBTAINING THE ENGINEER'S APPROVAL OF THE GRADED SURFACE.

21. ALL IMPROVEMENTS AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH NORTH CAROLINA STATE STANDARDS. ALL IMPROVEMENTS SHALL COMPLY WITH THE CITY OF CONCORD DEVELOPMENT STANDARDS.

22. THE GENERAL CONTRACTOR SHALL CONTACT ALL OWNERS OF EASEMENTS, UTILITIES AND RIGHT OF WAYS, PUBLIC OR PRIVATE, PRIOR TO WORKING IN THESE AREAS.

23. ALL UTILITIES OR STRUCTURES NOT DESIGNATED FOR REMOVAL OR MODIFICATION ARE TO REMAIN AND SHALL BE PROTECTED BY THE CONTRACTOR DURING CONSTRUCTION AND REMAIN IN WORKING ORDER.

24. ALL DEMOLITION WORK SHALL BE PERFORMED WITH "DUE CARE AND DILIGENCE" SO AS TO PREVENT THE ARBITRARY DESTRUCTION OR INTERRUPTION OF CONCEALED UTILITIES WHICH ARE INTENDED TO REMAIN IN USE AND THE ROUTING OF WHICH COULD NOT BE DETERMINED UNTIL DEMOLITION WAS STARTED. ALL SUCH DISCOVERIES OF UTILITIES DURING THE DEMOLITION PROCESS WHICH ARE IN A LOCATION DIFFERENT FROM THAT INDICATED, OR ARE UNIDENTIFIED, SHALL BE REPORTED TO THE ENGINEER BEFORE REMOVAL.

25. ANY EXISTING ASPHALT, DESIGNATED TO REMAIN, THAT IS DAMAGED DURING DEMOLITION AND CONSTRUCTION SHALL BE REPAIRED AT NO COST TO THE OWNER.

26. ANY NOTE, OR REFERENCE TO AN ELEMENT, WHICH DOES NOT SPECIFY ACTION BY THE CONTRACTOR SHALL BE CONSTRUED AS INFORMATION 27. THE GENERAL CONTRACTOR IS TO CONTACT AND COORDINATE WITH ALL APPROPRIATE PUBLIC AND PRIVATE UTILITY COMPANIES PRIOR TO ANY

DEMOLITION OR RELOCATION OF EXISTING UTILITIES. IT IS THE GENERAL CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ALL UTILITIES HAVE BEEN

PROPERLY CAPPED OFF OR RELOCATED. 28. PROTECT ALL ADJACENT PROPERTIES, THE GENERAL PUBLIC, AND ALL THE OWNER'S FACILITIES FROM DAMAGE. THE CONTRACTOR SHALL REPAIR ANY DAMAGE IMMEDIATELY AND SHALL MAKE REPAIRS AT THE CONTRACTOR'S EXPENSE.

29. CONTRACTOR SHALL HOLD HARMLESS THE OWNER FOR DAMAGES OR OTHER ACCIDENTS WHICH OCCUR DURING THESE CONSTRUCTION ACTIVITIES. 30. TREES AND LANDSCAPING NOT DESIGNATED FOR REMOVAL SHALL BE PROTECTED DURING CONSTRUCTION.

31. CONTRACTOR SHALL BE RESPONSIBLE FOR SCHEDULING AND COORDINATION OF ALL ILLUSTRATED CONSTRUCTION ACTIVITIES AT THE JOB SITE.

32. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE RULES AND REGULATIONS GOVERNING THE CONSTRUCTION INDUSTRY, INCLUDING BUT

NOT LIMITED TOO THOSE PERTAINING TO TRAVELING OPERATIONS AND OSHA. 33. CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING ENGINEER PRIOR TO ANY LOCATION/ADJUSTMENTS OF EXISTING VAULTS (REGARDLESS OF FUNCTION), METER BOXES, FIRE HYDRANTS, CLEAN OUTS, MANHOLES, ETC.

34. UNDER ABSOLUTELY NO CIRCUMSTANCES SHALL ANY UNMANNED EXCAVATION BE LEFT OPEN OR UNPROTECTED DURING NON-WORKING HOURS. UTILIZE SIGNS, BARRICADES, ETC. TO ENSURE THE SAFETY OF THE GENERAL PUBLIC.

NORTH CAROLINA LAND QUALITY SECTION **EROSION CONTROL NOTES**

GENERAL: ALL EROSION CONTROL MEASURES ARE TO BE PERFORMED IN STRICT ACCORDANCE WITH REQUIREMENTS OF THE NORTH CAROLINA DIVISION OF ENERGY, MINERAL, AND LAND RESOURCES (NCDEMLR). THE FOLLOWING CONSTRUCTION SEQUENCE SHALL BE COMPLIED WITH FOR 1. CONTRACTOR SHALL ATTEND THE PRE-CONSTRUCTION MEETING WITH THE CIVIL ENGINEER (OR LOCAL JURISDICTION) PRIOR TO BEGINNING

2. IDENTIFY WORK LIMITS BEFORE CONSTRUCTION ACTIVITY BEGINS.

CONSTRUCTION.

LEGEND

TC - TERRA COTTA

R/W - RIGHT OF WAY

CP - CALCULATED POINT

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING ALL RECORDS REQUIRED BY NCDEMLR FOR THE INSTALLATION AND MAINTENANCE OF THE SITE EROSION CONTROL.

4. INSTALL EROSION CONTROL MEASURES PER THE PLAN AND AS AS REQUIRED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF ENERGY, MINERAL AND LAND RESOURCES, LAND QUALITY SECTION.

5. CONTRACTOR TO UTILIZE MUD MATS FOR CONSTRUCTION ENTRANCE(S) AND ADJUST AS ACTIVE CONSTRUCTION AREAS SHIFT.

6. CONTRACTOR TO INSTALL SILT SAKS ON THE FIRST RECEIVING DOWNSTREAM INLET STRUCTURES OUTSIDE OF THE PROJECT AREA. CONTRACTOR TO INSTALL WATTLES AROUND ACTIVE CONSTRUCTION AREAS AND ENSURE ALL STORMWATER LEAVING THE CONSTRUCTION SITE PASSES THROUGH AN EROSION CONTROL DEVICE. ANY PUMPING OF WATER FROM UTILITY TRENCHES MUST PASS THROUGH AN EROSION CONTROL DEVICE. DEWATERING BAGS/SEDIMENT FILTER BAGS MAY BE USED TO FILTER STORMWATER FROM TRENCHING ACTIVITIES.

7. PROCEED WITH CONSTRUCTION AS GUIDED BY THE CONSTRUCTION SEQUENCE.

 □ LIGHT POLE → - SIGNAL BOX □ − ELECTRIC MANHOLE TELEPHONE MANHOLE ∀ − FIRE HYDRANT – IRRIGATION CONTROL VALVE SS - SANITARY SEWER MANHOLE – SANITARY SEWER CLEANOUT ⊕ - STORM MANHOLE □ − YARD INLET ■ - CATCH BASIN □ DROP INLET — MAILBOX ____s__ APPROXIMATE LOCATION OF EXISTING SEWER LINES ______G____APPROXIMATE LOCATION OF EXISTING GAS LINES

——— FO ——— FO ———— APPROXIMATE LOCATION OF UNDERGROUND FIRER OPTIC

GROUND STABILIZATION AND MATERIALS HANDLING PRACTICES FOR COMPLIANCE WITH

plementing the details and specifications on this plan sheet will result in the construction activity being considered compliant with the Ground Stabilization and Materials Handling sections of the NCG01 Construction General Permit (Sections E and F, respectively). The permittee shall comply with the Erosion and Sediment Control plan approved by the delegated authority having jurisdiction. All details and specifications shown on this sheet may not apply depending on site conditions and the delegated authority having jurisdiction.

SECTION E: GROUND STABILIZATION Required Ground Stabilization Timeframes

Site Area Description		Stabilize within this many calendar days after ceasing land disturbance	Timeframe variations	
(a)	Perimeter dikes, swales, ditches, and perimeter slopes	7	None	
(b)	High Quality Water (HQW) Zones	7	None	
(c)	Slopes steeper than 3:1	7	If slopes are 10' or less in length and an not steeper than 2:1, 14 days are allowed	
(d)	Slopes 3:1 to 4:1	14	-7 days for slopes greater than 50' in length and with slopes steeper than 4: -7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed	
(e)	Areas with slopes flatter than 4:1	14	-7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zo -10 days for Falls Lake Watershed unle there is zero slope	

Note: After the permanent cessation of construction activities, any areas with temporary ground stabilization shall be converted to permanent ground stabilization as soon as practicable but in no case longer than 90 calendar days after the last land disturbing activity. Temporary ground stabilization shall be maintained in a manner to render the surface stable against accelerated erosion until permanent ground stabilization is achieved.

GROUND STABILIZATION SPECIFICATION

Plastic sheeting

- techniques in the table below: Temporary Stabilization other mulches and tackifiers Hydroseeding Rolled erosion control products with or
- Stabilize the ground sufficiently so that rain will not dislodge the soil. Use one of the Permanent Stabilization • Temporary grass seed covered with straw or | • Permanent grass seed covered with straw or other mulches and tackifiers • Geotextile fabrics such as permanent soil reinforcement matting without temporary grass seed Hydroseeding Appropriately applied straw or other mulch
 Shrubs or other permanent plantings covered.
- retaining walls • Rolled erosion control products with grass seed POLYACRYLAMIDES (PAMS) AND FLOCCULANT

• Uniform and evenly distributed ground cover

• Structural methods such as concrete, asphalt or

sufficient to restrain erosion

- Select flocculants that are appropriate for the soils being exposed during construction, selecting from the NC DWR List of Approved PAMS/Flocculants.
- Apply flocculants at or before the inlets to Erosion and Sediment Control Measures. Apply flocculants at the concentrations specified in the NC DWR List of Approved *PAMS/Flocculants* and in accordance with the manufacturer's instructions. Provide ponding area for containment of treated Stormwater before discharging
- or surrounded by secondary containment structures.

EQUIPMENT AND VEHICLE MAINTENANCE

- Maintain vehicles and equipment to prevent discharge of fluids. 2. Provide drip pans under any stored equipment. 3. Identify leaks and repair as soon as feasible, or remove leaking equipment from the
- 4. Collect all spent fluids, store in separate containers and properly dispose as hazardous waste (recycle when possible).
- Remove leaking vehicles and construction equipment from service until the problem has been corrected. Bring used fuels, lubricants, coolants, hydraulic fluids and other petroleum products
- to a recycling or disposal center that handles these materials.
- LITTER, BUILDING MATERIAL AND LAND CLEARING WASTE Never bury or burn waste. Place litter and debris in approved waste containers. Provide a sufficient number and size of waste containers (e.g dumpster, trash
- receptacle) on site to contain construction and domestic wastes Locate waste containers at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available. Locate waste containers on areas that do not receive substantial amounts of runoff
- from upland areas and does not drain directly to a storm drain, stream or wetland. Cover waste containers at the end of each workday and before storm events or provide secondary containment. Repair or replace damaged waste containers. Anchor all lightweight items in waste containers during times of high winds.
- Empty waste containers as needed to prevent overflow. Clean up immediately if containers overflow. Dispose waste off-site at an approved disposal facility.
- 9. On business days, clean up and dispose of waste in designated waste containers.

. Contain liquid wastes in a controlled area.

- PAINT AND OTHER LIQUID WASTE . Do not dump paint and other liquid waste into storm drains, streams or wetlands. Locate paint washouts at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
- 4. Containment must be labeled, sized and placed appropriately for the needs of site. Prevent the discharge of soaps, solvents, detergents and other liquid wastes from construction sites.

- Install portable toilets on level ground, at least 50 feet away from storm drains, streams or wetlands unless there is no alternative reasonably available. If 50 foot offset is not attainable, provide relocation of portable toilet behind silt fence or place on a gravel pad and surround with sand bags. Provide staking or anchoring of portable toilets during periods of high winds or in high
- foot traffic areas. Monitor portable toilets for leaking and properly dispose of any leaked material. Utilize a licensed sanitary waste hauler to remove leaking portable toilets and replace with properly operating unit

EARTHEN STOCKPILE MANAGEMENT

- Show stockpile locations on plans. Locate earthen-material stockpile areas at least 50 feet away from storm drain inlets, sediment basins, perimeter sediment controls and surface waters unless it can be shown no other alternatives are reasonably
- Protect stockpile with silt fence installed along toe of slope with a minimum offset of five feet from the toe of stockpile Provide stable stone access point when feasible
- Stabilize stockpile within the timeframes provided on this sheet and in accordance with the approved plan and any additional requirements. Soil stabilization is defined as vegetative, physical or chemical coverage techniques that will restrain accelerated erosion on disturbed soils for temporary or permanent control needs.

CLEARLY MARKED SIGNAGE NOTING DEVICE (18"X24" MIN.) 2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75K OF THE STRUCTURES CAPACITY. 3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MANGED WITH SIGNAGE NOTING DEVICE. 3.CONCRETE WASHOUT STRUCTURE NEEDS TO SE CLEARY MARKED WITH SIGNAGE NOTING DEVICE. ABOVE GRADE WASHOUT STRUCTURE

CONCRETE WASHOUTS Do not discharge concrete or cement slurry from the site. Dispose of, or recycle settled, hardened concrete residue in accordance with local and state solid waste regulations and at an approved facility. Manage washout from mortar mixers in accordance with the above item and in

addition place the mixer and associated materials on impervious barrier and within lot perimeter silt fence. Install temporary concrete washouts per local requirements, where applicable. If an alternate method or product is to be used, contact your approval authority for review and approval. If local standard details are not available, use one of the two types of temporary concrete washouts provided on this detail. Do not use concrete washouts for dewatering or storing defective curb or sidewalk sections. Stormwater accumulated within the washout may not be pumped into or

discharged to the storm drain system or receiving surface waters. Liquid waste must be pumped out and removed from project. Locate washouts at least 50 feet from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. At a minimum, install protection of storm drain inlet(s) closest to the washout which could receive

spills or overflow. Locate washouts in an easily accessible area, on level ground and install a stone

entrance pad in front of the washout. Additional controls may be required by the approving authority. Install at least one sign directing concrete trucks to the washout within the project limits. Post signage on the washout itself to identify this location.

overflow events. Replace the tarp, sand bags or other temporary structural components when no longer functional. When utilizing alternative or proprietary products, follow manufacturer's instructions. At the completion of the concrete work, remove remaining leavings and dispose of in an approved disposal facility. Fill pit, if applicable, and stabilize any disturbance caused by removal of washout.

Remove leavings from the washout when at approximately 75% capacity to limit

HERBICIDES, PESTICIDES AND RODENTICIDES

Do not stockpile these materials onsite.

- Store and apply herbicides, pesticides and rodenticides in accordance with label Store herbicides, pesticides and rodenticides in their original containers with the label, which lists directions for use, ingredients and first aid steps in case of
- Do not store herbicides, pesticides and rodenticides in areas where flooding is possible or where they may spill or leak into wells, stormwater drains, ground water or surface water. If a spill occurs, clean area immediately.

HAZARDOUS AND TOXIC WASTE

Create designated hazardous waste collection areas on-site. Place hazardous waste containers under cover or in secondary containment. Do not store hazardous chemicals, drums or bagged materials directly on the ground.

SELF-INSPECTION, RECORDKEEPING AND REPORTING Self-inspections are required during normal business hours in accordance with the table below. When adverse weather or site conditions would cause the safety of the inspection personnel to be in jeopardy, the inspection may be delayed until the next business day on which it is safe to perform the inspection. In addition, when a storm event of equal to or greater than 1.0 inch occurs outside of normal business hours, the self-inspection shall be performed upon the commencement of the next business day. Any time when inspections were delayed shall be noted in the Inspection Record.

	Frequency					
Inspect	(during normal	Inspection records must include:				
	business hours)					
(1) Rain gauge maintained in good working order	Daily	Daily rainfall amounts. If no daily rain gauge observations are made during weekend or holiday periods, and no individual-day rainfall information is available, record the cumulative rain measurement for those unattended days (and this will determine if a site inspection is needed). Days on which no rainfall occurred shall be recorded as "zero." The permittee may use another rain-monitoring device				
(2) E&SC	At least once per	approved by the Division. 1. Identification of the measures inspected,				
Measures	7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Indication of whether the measures were operating properly, 5. Description of maintenance needs for the measure, 6. Description, evidence, and date of corrective actions taken.				
(3) Stormwater	At least once per	Identification of the discharge outfalls inspected,				
discharge	7 calendar days	2. Date and time of the inspection,				
outfalls (SDOs)	and within 24	3. Name of the person performing the inspection,				
	hours of a rain	4. Evidence of indicators of stormwater pollution such as oil				
	event ≥ 1.0 inch in	sheen, floating or suspended solids or discoloration,				
	24 hours	5. Indication of visible sediment leaving the site,				
		6. Description, evidence, and date of corrective actions taken.				
(4) Perimeter of site	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	If visible sedimentation is found outside site limits, then a record of the following shall be made: Actions taken to clean up or stabilize the sediment that has left the site limits, Description, evidence, and date of corrective actions taken, and An explanation as to the actions taken to control future releases.				
(5) Streams or	At least once per	If the stream or wetland has increased visible sedimentation or a				
wetlands onsite	7 calendar days	stream has visible increased turbidity from the construction				
or offsite	and within 24	activity, then a record of the following shall be made:				
(where accessible)	hours of a rain event ≥ 1.0 inch in 24 hours	Description, evidence and date of corrective actions taken, and Regional Office per Part III, Section C, Item (2)(a) of this permit of this permit.				
(6) Ground	After each phase	The phase of grading (installation of perimeter E&SC				
stabilization	of grading	measures, clearing and grubbing, installation of storm				
measures		drainage facilities, completion of all land-disturbing				
		activity, construction or redevelopment, permanent ground cover).				
		Documentation that the required ground stabilization				
		measures have been provided within the required				
		timeframe or an assurance that they will be provided as				
		soon as possible.				

NOTE: The rain inspection resets the required 7 calendar day inspection requirement.

(a) Each E&SC Measure has been installed | Initial and date each E&SC Measure on a copy and does not significantly deviate from the do locations, dimensions and relative elevations | and sign an inspection report that lists each shown on the approved E&SC Plan. E&SC Measure shown on the approved E&SC Plan. This documentation is required upon the initial installation of the E&SC Measures or if the E&SC Measures are modified after initial (b) A phase of grading has been completed. Initial and date a copy of the approved E&SC Plan or complete, date and sign an inspection report to indicate completion of the construction phase. (c) Ground cover is located and installed Initial and date a copy of the approved E&SC in accordance with the approved E&SC Plan or complete, date and sign an inspection report to indicate compliance with approved round cover specifications (d) The maintenance and repair Complete, date and sign an inspection report. requirements for all E&SC Measures have been performed. (e) Corrective actions have been taken Initial and date a copy of the approved E&SC to E&SC Measures. Plan or complete, date and sign an inspection report to indicate the completion of the corrective action. 2. Additional Documentation In addition to the E&SC Plan documents above, the following items shall be kept on the requirement not practical:

SELF-INSPECTION, RECORDKEEPING AND REPORTING

The approved E&SC plan as well as any approved deviation shall be kept on the site. The

approved E&SC plan must be kept up-to-date throughout the coverage under this permit.

Documentation Requirements

The following items pertaining to the E&SC plan shall be documented in the manner

L. E&SC Plan Documentation

Item to Document

described:

and available for agency inspectors at all times during normal business hours, unless the Division provides a site-specific exemption based on unique site conditions that make this (a) This general permit as well as the certificate of coverage, after it is received. (b) Records of inspections made during the previous 30 days. The permittee shall record the required observations on the Inspection Record Form provided by the Division or a similar inspection form that includes all the required elements. Use of electronically-available records in lieu of the required paper copies will be allowed if

All data used to complete the Notice of Intent and older inspection records shall be maintained for a period of three years after project completion and made available upon request. [40 CFR 122.41]

shown to provide equal access and utility as the hard-copy records.

	PART III				
3	ELF-INSPECTION, RECORDKEEPING AND REPORTING				
SECTION C: REPORTI					
1. Occurrences that r					
Permittees shall report the following occurrences:					
(a) Visible sedime	nt deposition in a stream or wetland.				
(b) Oil spills if:					
• They are 25	gallons or more,				
 They are less 	s than 25 gallons but cannot be cleaned up within 24 hours,				
 They cause s 	heen on surface waters (regardless of volume), or				
 They are wit 	hin 100 feet of surface waters (regardless of volume).				
of the Clean W	zardous substances in excess of reportable quantities under Section 31 (ater Act (Ref: 40 CFR 110.3 and 40 CFR 117.3) or Section 102 of CERCLA 02.4) or G.S. 143-215.85.				
(b) Anticipated by	passes and unanticipated bypasses.				
(c) Noncomplianc environment.	e with the conditions of this permit that may endanger health or the				
other requirement	s listed below. Occurrences outside normal business hours may also be vision's Emergency Response personnel at (800) 662-7956, (800)				
other requirement reported to the Div	733-3300.				
other requirement reported to the Div 858-0368 or (919)	s listed below. Occurrences outside normal business hours may also be vision's Emergency Response personnel at (800) 662-7956, (800)				
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NCG01 GROUND STABILIZATION AND MATERIALS HANDLING

EFFECTIVE: 04/01/19

NCG01 SELF-INSPECTION, RECORDKEEPING AND REPORTING

EFFECTIVE: 04/01/19

Division staff may waive the requirement for a written report on a

NCDOT REVIEW SUBMITTAL. NOT FOR CONSTRUCTION



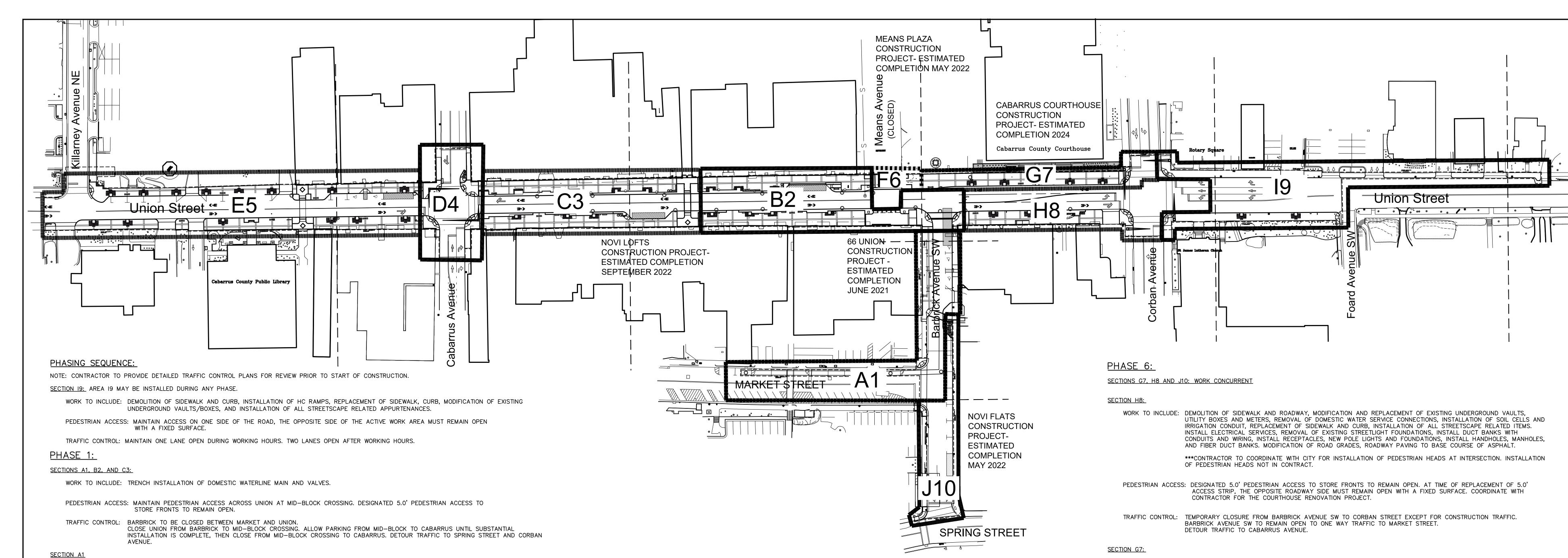


NO. DATE **DESCRIPTION**

UNION STREET IMPROVEMENTS CITY OF CONCORD CABARRUS COUNTY, NORTH CAROLINA

NOT TO SCALE GENERAL NOTES AND LEGENDS D.G. CHAPMAN C.L. CRANWILL ROJECT MANAGER MAY 2021 B. ROARK 19.01726 N/A M.J. NORRIS

SHEET G-002



WORK TO INCLUDE: INSTALLATION OF STORMWATER PIPING. DEMOLITION OF SIDEWALK AND ROADWAY, MODIFICATION AND REPLACEMENT OF EXISTING
UNDERGROUND VAULTS, UTILITY BOXES AND METERS, REMOVAL AND REPLACEMENT OF SANITARY SEWER SERVICES, REMOVAL AND
REPLACEMENT OF DOMESTIC WATER SERVICE CONNECTIONS, REPLACEMENT OF SIDEWALK, INSTALLATION OF ALL STREETSCAPE RELATED ITEMS,
INSTALL DUCT BANKS WITH CONDUITS AND WIRING, INSTALL RECEPTACLES, NEW POLE LIGHTS AND FOUNDATIONS, INSTALL HANDHOLES, AND
MANHOLES, MODIFICATION OF ROAD GRADES, AND ROADWAY PAVING TO BASE COURSE OF ASPHALT.

PEDESTRIAN ACCESS: DESIGNATED 5.0' PEDESTRIAN ACCESS TO STORE FRONTS TO REMAIN OPEN. AT TIME OF REPLACEMENT OF 5.0' ACCESS STRIP, THE OPPOSITE SIDE OF ACTIVE WORK AREAS MUST REMAIN OPEN WITH A FIXED SURFACE.

TRAFFIC CONTROL: ONE LANE OF TRAFFIC TO REMAIN OPEN DURING WORK HOURS ON MARKET STREET. NO ON STREET PARKING, UTILIZE AREA TO MAINTAIN TWO WAY TRAFFIC AFTER WORK HOURS. CONTRACTOR TO WORK WITH ADJACENT BUSINESSES TO KEEP ACCESS TO PARKING AREAS.

BARBRICK TO BE CLOSED BETWEEN MARKET AND UNION.

PHASE 2:

SECTIONS D4, E5, AND H8

SECTION D4:

WORK TO INCLUDE: TRENCH INSTALLATION OF WATERLINE MAIN AND VALVES.

TRAFFIC CONTROL: INTERSECTION OF UNION AND CABARRUS TO BE TEMPORARILY CLOSED FOR TRENCHING ACTIVITIES AND REOPENED FOR TRAFFIC.

DETOUR TRAFFIC TO CORBAN AVENUE.

SECTION E5: WORK TO PROCEED AFTER INTERSECTION OF CABARRUS AND UNION IS REOPENED

WORK TO INCLUDE: TRENCH INSTALLATION OF WATERLINE MAIN, SERVICES, AND VALVES.

TRAFFIC CONTROL: UNION STREET FROM KILLARNEY AVENUE NE TO CABARRUS AVENUE TO BE TO BE TEMPORARILY CLOSED FOR TRENCHING ACTIVITIES DURING THE DAY AND REOPENED TO TRAFFIC AFTER WORK HOURS AND WEEKENDS.

DETOUR TRAFFIC TO SPRING STREET AND CHURCH STREET.

SECTION H8: WORK TO PROCEED AFTER INTERSECTION OF CABARRUS AND UNION IS REOPENED

WORK TO INCLUDE: TRENCH INSTALLATION OF WATERLINE MAIN, SERVICES AND VALVES.

TRAFFIC CONTROL: UNION FROM BARBRICK TO WATERLINE CONNECTIONS AT CORBAN INTERSECTION, TO BE CLOSED TO PUBLIC USE AND ONE LANE
TO REMAIN OPEN FOR CONSTRUCTION TRAFFIC. DURING WORK HOURS FOR TRENCHING ACTIVITIES DURING THE DAY AND REOPENED TO
TRAFFIC AFTER WORK HOURS AND WEEKENDS. TEMPORARY CLOSURE OF UNION AND CORBAN INTERSECTION DURING THE DAY AND
REOPENED AFTER WORK HOURS.
DETOUR TRAFFIC TO CABARRUS AVENUE.

PHASE 3:

SECTIONS A1, B2, C3, F6, G7 AND H8:

SECTIONS A1, B2 AND C3:

WORK TO INCLUDE: DEMOLITION OF SIDEWALK AND ROADWAY, MODIFICATION AND REPLACEMENT OF EXISTING UNDERGROUND VAULTS, UTILITY BOXES AND METERS, REMOVAL AND REPLACEMENT OF SANITARY SEWER SERVICES, INSTALLATION AND REMOVAL OF DOMESTIC WATER SERVICE CONNECTIONS, REPLACEMENT OF SIDEWALK AND CURB, INSTALL SOIL CELLS AND IRRIGATION CONDUIT, INSTALLATION OF ALL STREETSCAPE RELATED ITEMS. INSTALL ELECTRICAL SERVICE, REMOVAL OF EXISTING STREETLIGHT FOUNDATIONS, INSTALL DUCT BANKS WITH CONDUITS AND WIRING, INSTALL RECEPTACLES, NEW POLE LIGHTS AND FOUNDATIONS, INSTALL HANDHOLES, MANHOLES, AND FIBER DUCT BANKS. INSTALLATION OF STORM DRAINAGE AFTER WATER MAIN AND ALL PROPOSED SERVICE CONNECTIONS ARE OPERATIONAL AND EXISTING WATERLINES HAVE HAVE BEEN REMOVED, MODIFICATION OF ROAD GRADES, ROADWAY PAVING TO BASE COURSE OF ASPHALT.

SECTIONS F6, G7 AND H8:

WORK TO INCLUDE: COMPLETE INSTALLATION OF STORMWATER PIPING, AFTER PROPOSED WATERLINE AND SERVICES ARE ACTIVE. REMOVAL OF ANY INACTIVE WATERLINES THAT ARE IN CONFLICT WITH THE STORMWATER INSTALLATION.

PEDESTRIAN ACCESS: DESIGNATED 5.0' PEDESTRIAN ACCESS TO STORE FRONTS TO REMAIN OPEN. AT TIME OF REPLACEMENT OF 5.0' ACCESS STRIP, THE OPPOSITE SIDE OF ACTIVE WORK AREAS MUST REMAIN OPEN WITH A FIXED SURFACE. MID BLOCK PEDESTRIAN ACCESS TO REMAIN OPEN AS LONG AS POSSIBLE THEN ROUTE PEDESTRIANS TO INTERSECTIONS FOR UNION STREET AND CABARRUS AVENUE AND UNION STREET AND CORBAN AVENUE FOR CROSSINGS.

TRAFFIC CONTROL: CLOSE UNION FROM BARBRICK TO INTERSECTION OF UNION STREET AND CABARRUS AVENUE. BARBRICK AVENUE SW TO CORBAN AVENUE TO REMAIN OPEN FOR CONSTRUCTION TRAFFIC TO COURTHOUSE DETOUR TRAFFIC TO SPRING STREET.

PHASE 4:

SECTION D4 AND E5:

SECTION D4:

WORK TO INCLUDE: DEMOLITION OF SIDEWALK AND ROADWAY, MODIFICATION AND REPLACEMENT OF EXISTING UNDERGROUND VAULTS, UTILITY BOXES AND METERS, INSTALLATION OF SANITARY SEWER, REMOVAL AND ABANDONMENT OF EXISTING SANITARY SEWER, REMOVAL OF EXISTING WATER MAINS, REPLACEMENT OF SIDEWALK AND CURB, INSTALL SOIL CELLS AND IRRIGATION CONDUIT, INSTALLATION OF ALL STREETSCAPE RELATED ITEMS. INSTALL ELECTRICAL SERVICE, REMOVAL OF EXISTING STREETLIGHT FOUNDATIONS, INSTALL DUCT BANKS WITH CONDUITS AND WIRING, INSTALL RECEPTACLES, NEW POLE LIGHTS AND FOUNDATIONS, INSTALL HANDHOLES, MANHOLES, AND FIBER DUCT BANKS. INSTALLATION OF STORM DRAINAGE AFTER WATER MAIN AND ALL PROPOSED SERVICE CONNECTIONS ARE OPERATIONAL. MODIFICATION OF ROAD GRADES, ROADWAY PAVING TO BASE COURSE OF ASPHALT.

***CONTRACTOR TO COORDINATE WITH CITY FOR INSTALLATION OF MAST ARM POLE AND PEDESTRIAN HEADS AT INTERSECTION.

SECTION E5:

WORK TO INCLUDE: INSTALLATION OF STORMWATER PIPES AND STRUCTURES

INSTALLATION OF PEDESTRIAN HEADS NOT IN CONTRACT.

PEDESTRIAN ACCESS: MAINTAIN ACCESS ON ONE SIDE OF THE ROAD, THE OPPOSITE SIDE OF ACTIVE WORK AREAS MUST REMAIN OPEN WITH A FIXED SURFACE.

TRAFFIC CONTROL: INTERSECTION OF UNION STREET AND CABARRUS AVENUE CLOSED. ALLOW ACCESS FROM KILLARNEY AVENUE NE TO CHURCH DRIVEWAY ENTRANCE.

DETOUR TRAFFIC TO SPRING STREET AND CORBAN AVENUE.

PHASE 5:

SECTION E5:

WORK TO INCLUDE: DEMOLITION OF SIDEWALK AND ROADWAY, MODIFICATION AND REPLACEMENT OF EXISTING UNDERGROUND VAULTS, UTILITY BOXES AND METERS, INSTALLATION OF SOIL CELLS, REPLACEMENT OF SIDEWALK AND CURB, SOIL CELLS, IRRIGATION CONDUIT, INSTALLATION OF ALL STREETSCAPE RELATED ITEMS. INSTALL ELECTRICAL SERVICES, REMOVAL OF STREETLIGHT FOUNDATIONS, INSTALL DUCT BANKS WITH CONDUITS AND WIRING, INSTALL RECEPTACLES, NEW POLE LIGHTS AND FOUNDATIONS, INSTALL HANDHOLES, MANHOLES, AND FIBER DUCT BANKS. INSTALLATION OF STORM DRAINAGE AFTER WATER MAIN AND ALL PROPOSED SERVICE CONNECTIONS ARE OPERATIONAL. MODIFICATION OF ROAD GRADES, ROADWAY PAVING TO BASE COURSE OF ASPHALT.

PEDESTRIAN ACCESS: MAINTAIN ACCESS ON ONE SIDE OF THE ROAD, THE OPPOSITE SIDE OF ACTIVE WORK AREAS MUST REMAIN OPEN WITH A FIXED SURFACE.

TRAFFIC CONTROL: ROAD CLOSURE FROM KILLARNEY AVENUE NE TO CABARRUS AVENUE. DETOUR TRAFFIC TO CABARRUS AVENUE.

WORK TO INCLUDE: MODIFICATION OF ROADWAY GRADES, INSTALLATION OF UNDERGROUND UTILITIES, AND INSTALLATION OF TEMPORARY BASE COURSE OF ASPHALT. ALL OTHER INSTALLATION OF DESIGN FEATURES, EXCEPT UNDERGROUND UTILITIES, TO BE INSTALLED AT END OF COURTHOUSE RENOVATION IN 2024 — NOT IN CONTRACT.

TRAFFIC CONTROL: TEMPORARY CLOSURE FROM BARBRICK AVENUE SW AND CORBAN AVENUE.

DETOUR TRAFFIC TO CABARRUS AVENUE.

SECTION J10:

PHASE TO BE SCHEDULED WHEN NOVI LOFTS HAS COMPLETED CONSTRUCTION AND BARBRICK IS NO LONGER BEING USED FOR CONSTRUCTION ACCESS — EXPECTED COMPLETION MAY 2022.

WORK TO INCLUDE: DEMOLITION OF SIDEWALK, REPLACEMENT OF SIDEWALK, MODIFICATION OF EXISTING UNDERGROUND VAULTS, INSTALLATION OF ALL STREETSCAPE RELATED ITEMS.

PEDESTRIAN ACCESS: MAINTAIN ACCESS ON ONE SIDE OF THE ROAD, THE OPPOSITE SIDE MUST REMAIN OPEN WITH A FIXED SURFACE.

TRAFFIC CONTROL: MAINTAIN ONE LANE OPEN TO FROM MARKET STREET TO SPRING DURING WORKING HOURS. TEMPORARY CLOSURE FOR INSTALLATION OF CROSSWALK PAVERS. OPEN LANES TO SPRING STREET AFTER WORK HOURS. NO PUBLIC PARKING.

PHASE 7:

SECTION F6:

PHASE TO BE SCHEDULED WHEN MEANS PLAZA IS NO LONGER BEING UTILIZED AS A CONSTRUCTION ENTRANCE FOR THE COURTHOUSE RENOVATION PROJECT. EXPECTED COMPLETION SPRING OF 2022.

WORK TO INCLUDE: DEMOLITION OF SIDEWALK AND ROADWAY, MODIFICATION AND REPLACEMENT OF EXISTING UNDERGROUND VAULTS, UTILITY BOXES AND METERS, INSTALLATION OF SOIL CELLS, IRRIGATION CONDUIT, REPLACEMENT OF SIDEWALK AND CURB, INSTALLATION OF ALL STREETSCAPE RELATED ITEMS. INSTALL ELECTRICAL SERVICE AT REMOVAL OF EXISTING LIGHTING AND FOUNDATIONS ALONG SECTION, INSTALL DUCT BANKS WITH CONDUITS AND WIRING, INSTALL RECEPTACLES, NEW POLE LIGHTS AND FOUNDATIONS, INSTALL HANDHOLES, MANHOLES, AND FIBER DUCT BANKS. INSTALLATION OF STORM DRAINAGE AFTER WATER MAIN AND ALL PROPOSED SERVICE CONNECTIONS ARE OPERATIONAL. MODIFICATION OF ROAD GRADES.

PEDESTRIAN ACCESS: MAINTAIN ACCESS ON ONE SIDE OF THE ROAD, THE OPPOSITE SIDE OF ACTIVE WORK AREA MUST REMAIN OPEN WITH A FIXED SURFACE.

TRAFFIC CONTROL: MAINTAIN ONE LANE OPEN TO MARKET DURING WORKING HOURS. TEMPORARY CLOSURE OF UNION FOR INSTALLATION OF PAVERS.

DETOUR TRAFFIC TO MARKET.

PHASE 8:

ALL SECTIONS:

WORK TO INCLUDE: ROADWAY PAVING FOR SURFACE COURSE OF ASPHALT, STRIPING, LANDSCAPE INSTALLATION, IRRIGATION, SITE FURNITURE, PUNCH LIST, AND FINAL CLEAN UP.

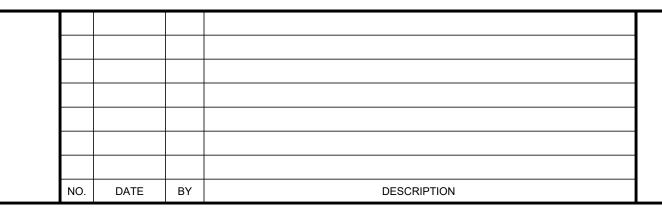
TRAFFIC CONTROL: ONE LANE OPEN DURING WORK HOURS
DETOURS TO BE PROVIDED BY CONTRACTOR DURING PAVING OPERATIONS
TWO LANES OPEN DURING NON WORK HOURS

NO PUBLIC PARKING









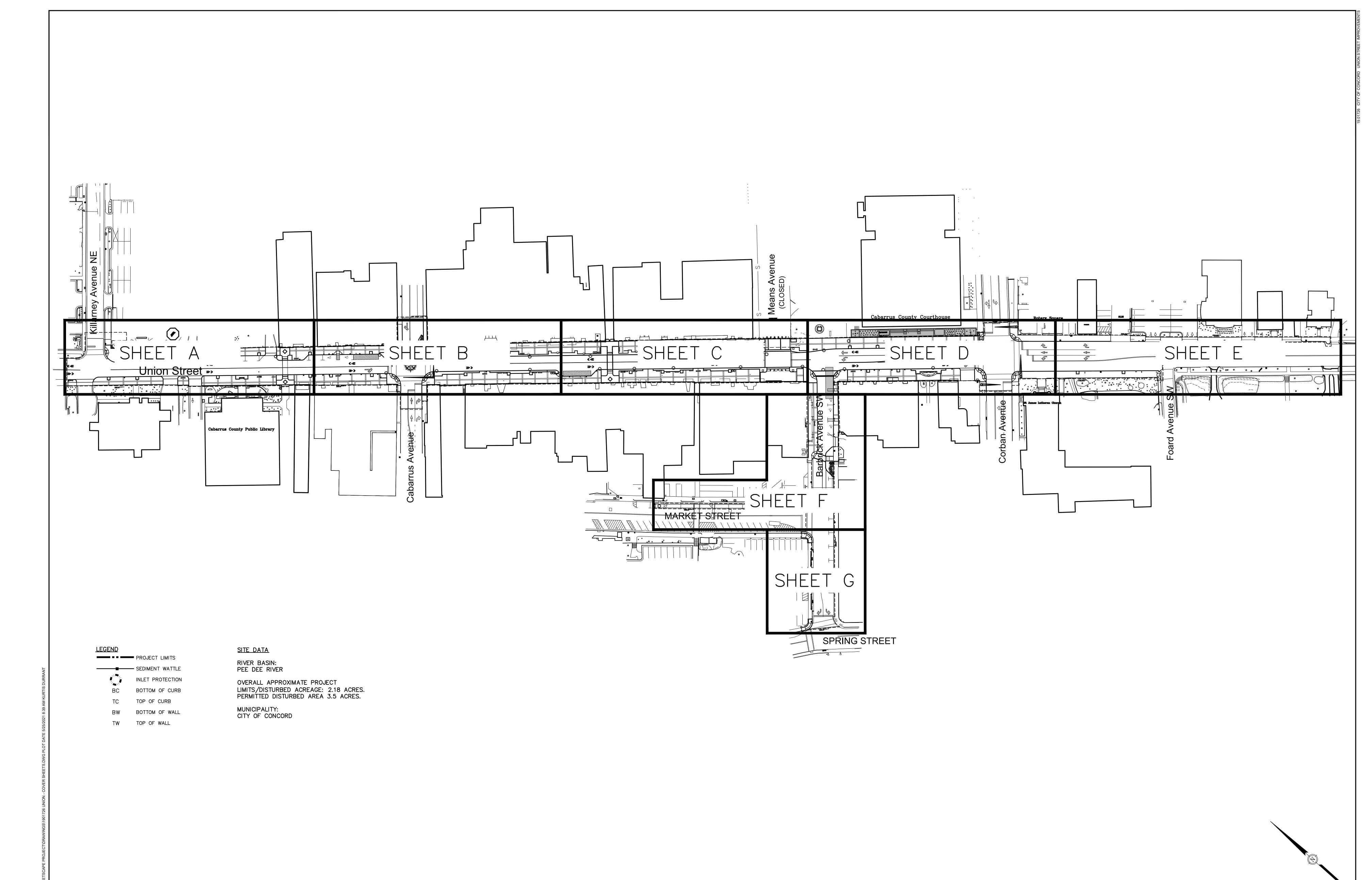
UNION STREET IMPROVEMENTS

CITY OF CONCORD

CABARRUS COUNTY, NORTH CAROLINA

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		SEQUENCING	NOT TO SCALE			
1 (=-()(DESIGNER	CE MANAGER	
				C.L. CRANWILL	G. CHAPMAN	
1	FUNDING #	PROJECT#	DATE	REVIEWER	JECT MANAGER	
	N/A	19.01726	MAY 2021	B. ROARK	.J. NORRIS	
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NCDOT REVIEW
SUBMITTAL. NOT
FOR CONSTRUCTION







DESCRIPTION

NO. DATE BY

	NOT TO	SCALE
	OFFICE MANAGER	DESIGNER
	D.G. CHAPMAN	C.L. CRANV
	PROJECT MANAGER	REVIEWER
`	M.J. NORRIS	B. ROARK

SCALE OVERALL PROJECT SHEET INDEX C.L. CRANWILL
REVIEWER

19.01726

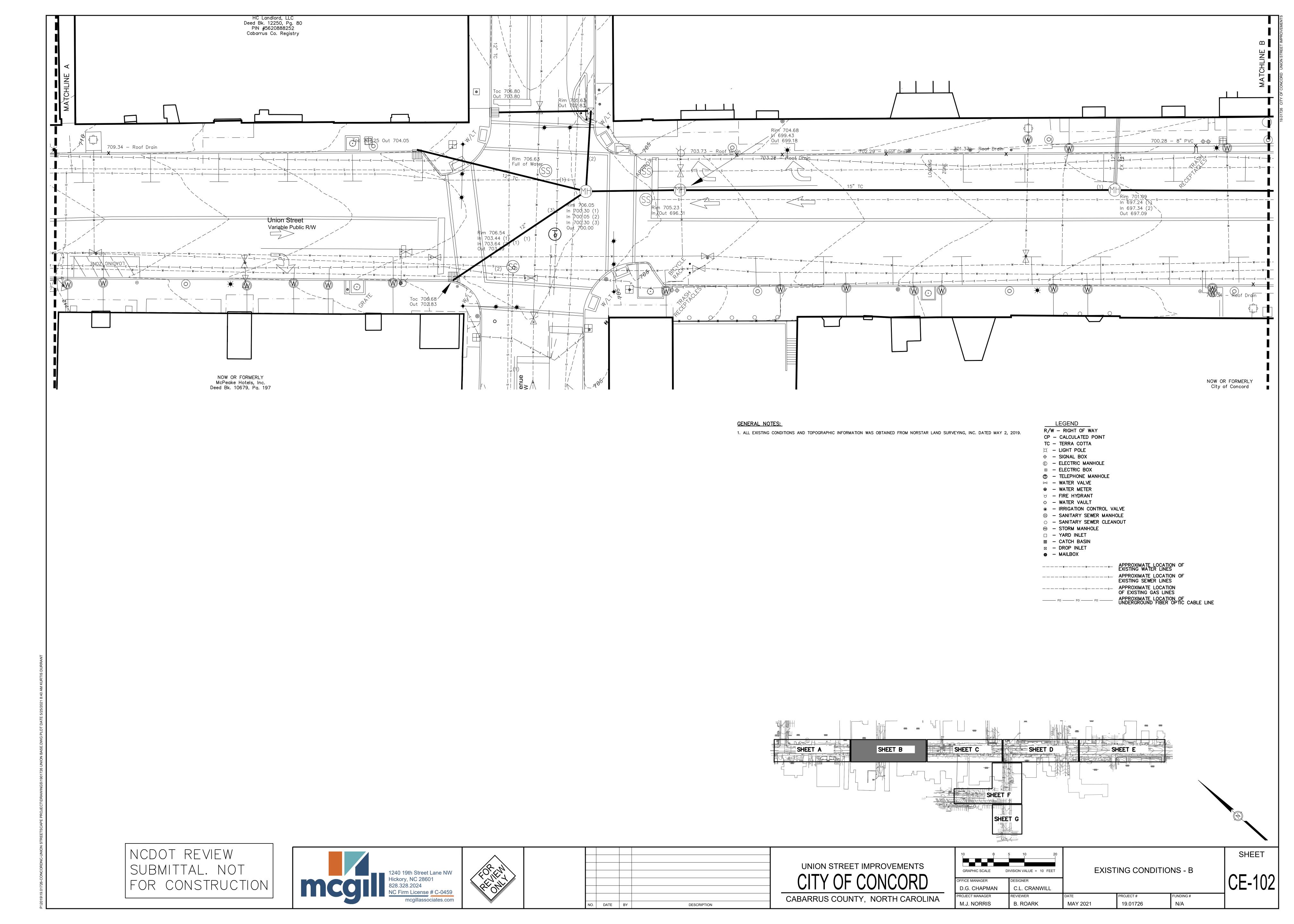
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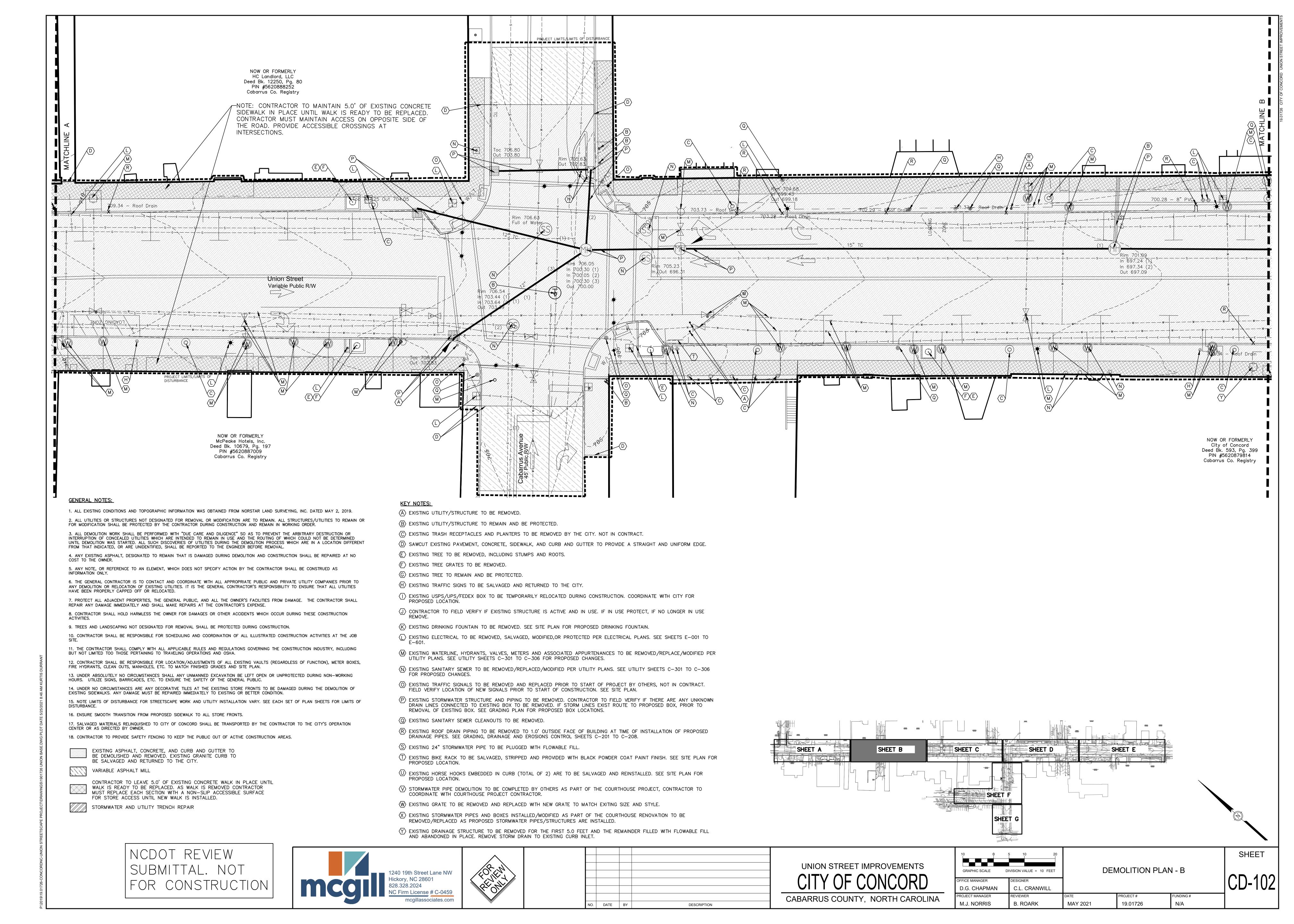
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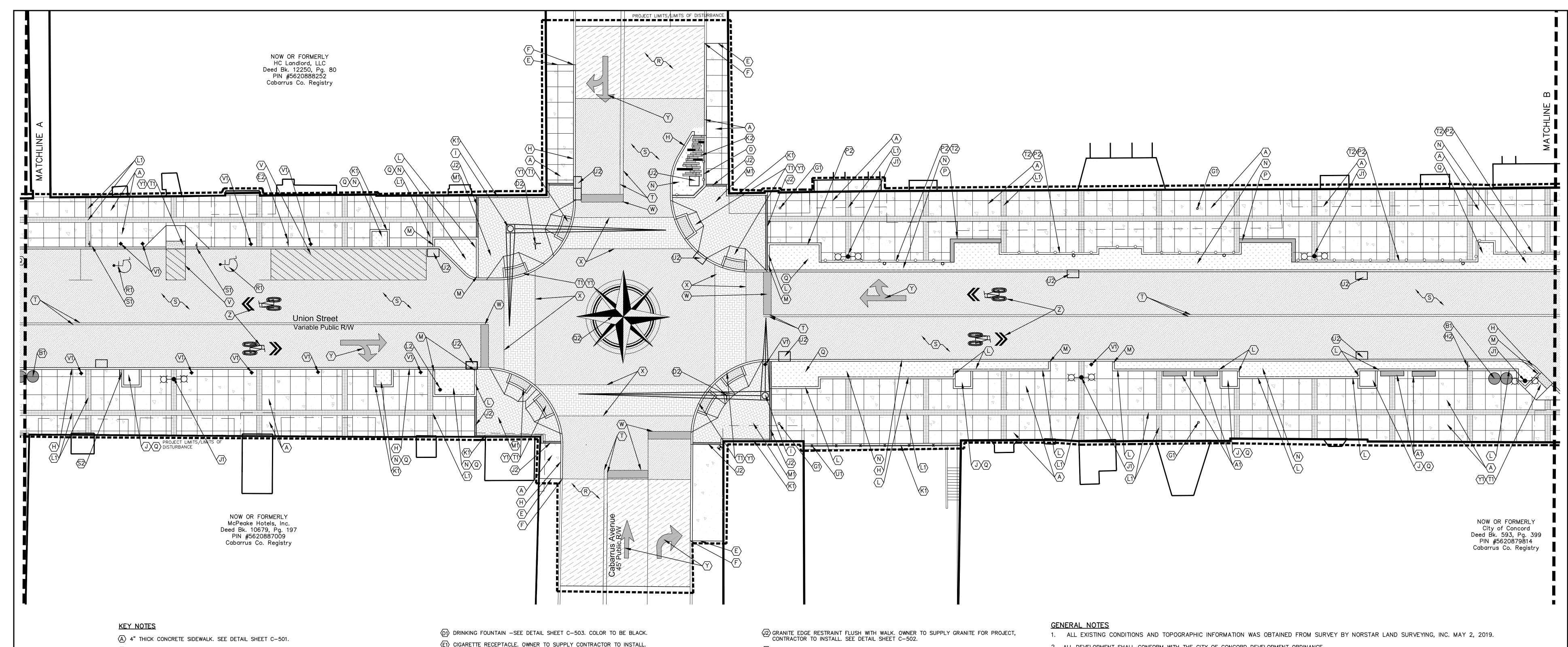
G-004

SHEET

CITY OF CONCORD CABARRUS COUNTY, NORTH CAROLINA







(B) TAPER CURB FLUSH WITH WALK.

(C) CONCRETE DRIVE APRON. GENERAL CONTRACTOR TO MATCH EXISTING ELEVATIONS AND ENSURE SMOOTH TRANSITION TO EXISTING DRIVES AND STREET. SEE CONCRETE SECTION DETAIL SHEET C-501.

(D) 6" CONCRETE DRIVE SECTION. SEE DETAIL SHEET C-501.

(E) MATCH EXISTING SURFACE WITH SMOOTH TRANSITION, USE ISOLATION JOINT AT INTERFACE OF EXISTING AND PROPOSED SIDEWALKS AND VERTICAL SURFACES.

F) TIE PROPOSED CURB TO EXISTING CURB AND/OR CURB AND GUTTER WITH SMOOTH TRANSITION. USE CONSTRUCTION JOINT AT INTERFACE OF EXISTING AND PROPOSED. TAPER PROPOSED CURB AS NECESSARY TO MATCH EXISTING TOP OF CURB.

(G) 30" CURB AND GUTTER. NOTE HEIGHT OF CURB VARIES. SEE GRADING PLAN. SEE DETAIL SHEET C-501.

(H) STAND UP CURB. SEE DETAIL SHEET C-501.

TRAFFIC SIGNAL INSTALLED BY OTHERS AFTER SURVEY WAS COMPLETED. CONTRACTOR TO FIELD VERIFY LOCATIONS AND NOTIFY ENGINEER/LANDSCAPE ARCHITECT IF LOCATIONS DIFFER FROM THOSE SHOWN ON PLANS. CONTRACTOR TO COORDINATE WITH CITY FOR INSTALLATION OF PEDESTRIAN HEADS TO BE INSTALLED DURING THE STREETSCAPE CONSTRUCTION..

 $\langle J \rangle$ 4'X4' TREE GRATE AND FRAME WITH CONCRETE EDGE RESTRAINT. SEE DETAIL SHEET C-503.

(K) EXISTING TREE TO BE PROTECTED.

LANDSCAPE CURB. SEE DETAIL SHEET C-501.

M TAPER LANDSCAPE CURB FLUSH IN 6". ALL LANDSCAPE CURB ADJOINING CURB AT ROADWAY SHOULD BE TAPERED FLUSH.

(N) LANDSCAPE AREA. SEE LANDSCAPE SHEETS L-101 TO L-106.

(O) ELECTRICAL PANEL AND DIGITAL DISPLAY. SEE ELECTRICAL SHEETS E101-E107.

(P) SEAT WALL. SEE DETAIL SHEET C-501

 $\langle Q \rangle$ SOIL CELLS. SEE SHEETS I-101 TO I-104 AND LANDSCAPE SHEETS L-101 TO L-106 FOR TREE LOCATIONS.

(R) VARIABLE ASPHALT OVERLAY. SEE DETAIL SHEET C-501.

(S) FULL DEPTH ASPHALT PAVING. SEE DETAIL SHEET C-501.

⟨T⟩ 4" CENTER LINE, YELLOW THERMOPLASTIC PAINT, 120 MILS. SEE DETAIL SHEET C-506.

(U) 4" PAVEMENT STRIPE, WHITE THERMOPLASTIC PAINT, 120 MILS. SEE DETAIL SHEET C-506. $\langle V \rangle$ 4" PAVEMENT STRIPE, WHITE THERMOPLASTIC PAINT, 90 MILS (TYPICAL). SEE DETAIL SHEET C-506.

(W) 24" WIDE STOP BAR, WHITE THERMOPLASTIC PAINT, 120 MILS. EXTEND ACROSS LANE WIDTH. SEE DETAIL

TRAFFIC ARROWS AND SYMBOLS, WHITE THERMOPLASTIC PAINT, 90 MILS. SEE DETAIL SHEET DETAIL SHEET

BICYCLE SHARED LANE MARKINGS, WHITE THERMOPLASTIC PAINT, 90 MILS. SEE DETAIL SHEET C-503. (A1) BENCH. OWNER TO PROVIDE AND CONTRACTOR TO INSTALL.

(B1) TRASH/RECYCLING RECEPTACLES. OWNER TO PROVIDE AND CONTRACTOR TO INSTALL.

(C1) RELOCATED BIKE RACK.

(E1) CIGARETTE RECEPTACLE. OWNER TO SUPPLY CONTRACTOR TO INSTALL.

(F1) BOLLARDS. SEE DETAIL SHEET C-501.

1) BRONZE CAROLINA THREAD TRAIL TRAIL MARKERS. TRAIL MARKERS TO BE MORTARED IN PLACE AND FLUSH WITH PROPOSED CONCRETE SIDEWALK. SEE DETAIL SHEET C-504.

(H1) BRONZE DOWNTOWN GREENWAY LOOP TRAIL MARKERS. TRAIL MARKERS TO BE MORTARED IN PLACE AND

FLUSH WITH PROPOSED CONCRETE SIDEWALK. SEE DETAIL SHEET C-504. (II) RELOCATED USPS/UPS/FEDEX BOX.

(J1) PROPOSED LIGHT POLE/LIGHTED BOLLARD.. SEE ELECTRICAL SHEETS E-001 TO E-107.

(K1) 6" CONCRETE EDGE RESTRAINT, FLUSH WITH WALK. SEE DETAIL SHEET C-502.

(L1) BRICK BAND - PINEHALL BRICK PATHWAY RED. SEE DETAIL SHEET C-502.

MI) BRICK PAVERS - PINEHALL BRICK PATHWAY AUTUMN, HERRINGBONE PATTERN, HEAVY DUTY. SEE DETAIL

(NI) BRICK PAVERS - PINEHALL BRICK PATHWAY AUTUMN, HERRINGBONE PATTERN, LIGHT DUTY. SEE DETAIL

(01) PLAZA PAVERS, PINEHALL BRICK PATHWAY AUTUMN, HERRINGBONE PATTERN STREET SECTION. SEE

(P1) BRICK PAVER CROSSWALK WITH 8" CONCRETE EDGE RESTRAINT. 8" WHITE THERMOPLASTIC STRIPE, 120

MILS, PAVER TO BE PINEHALL BRICK PATHWAY RED. SEE DETAIL SHEET C-504.

(Q1) 18" CONCRETE GRADE BEAM. SEE DETAIL SHEET C-502.

(R1) HC PARKING. SEE DETAIL SHEET C-503.

DETAIL SHEET C-502.

(S1) HC PARKING SIGN. SEE DETAIL SHEET C-503. (T1) HC RAMP, LAYOUT OF RAMPS VARY. SEE DETAIL SHEET C-503.

(U1) WOOD FENCE. SEE DETAILS SHEET C-501.

(V1) FLAG HOLDER, 2" SCHEDULE 40 PVC SLEEVE SET IN CONCRETE. 6" DEPTH. SEE DETAIL SHEET C-506.

(WI) HORSE HOOKS, DECORATIVE HORSESHOES AND GRANITE PLAQUE. HORSESHOES TO BE SET FLUSH WITH PROPOSED CONCRETE SIDEWALK. SEE DETAIL SHEET C-506.

XI) STORMWATER TRENCH REPAIR. SEE DETAIL SHEET C-504.

(Y1) BRICK RED COMPOSITE DETECTABLE WARNING PLATE, SET IN CONCRETE. 6" CONCRETE BAND AROUND DOME INSET. SEE HANDICAP DETAIL SHEET C-503.

(Z1) CONCRETE STAIR WITH HANDRAIL. SEE DETAIL SHEET C-502.

© CONCRETE STAIR AND RAMP STORE ENTRANCE ACCESS. SEE DETAIL SHEET C-502.

© RELOCATED WAYFINDING SIGN, SALVAGED REINSTALL. CONTRACTOR TO PROVIDE SIGNED AND SEALED STRUCTURAL DRAWINGS FOR FOOTING AND POLE INSTALLATION.

◆◆ STREET SIGN. SEE SIGN INSTALLATION DETAIL SHEET C-503. (E2) LOADING ZONE SIGN. SEE SIGN INSTALLATION DETAIL SHEET C-503.

(F2) ADOPT A STREET SIGN. SEE SIGN INSTALLATION DETAIL SHEET C-503.

© CONCORD HISTORIC DISTRICT SIGN. SEE SIGN INSTALLATION DETAIL SHEET C-503. (H2) ORIGINAL CITY LIMIT SIGN. SEE SIGN INSTALLATION DETAIL SHEET C-503.

 $\langle \overline{12} \rangle$ HISTORICAL SIGN. SEE SIGN INSTALLATION DETAIL SHEET C-503.

GRANITE STORMWATER FLUME. OWNER TO SUPPLY GRANITE FOR PROJECT, CONTRACTOR TO INSTALL. SEE DETAIL SHEET C-504.

PROPOSED FUTURE CLOCK, CLOCK NOT IN CONTRACT. SEE ELECTRICAL PLANS FOR CONDUIT LOCATIONS.

(M2) MOSAIC LIGHT STRUCTURES. SEE ELECTRICAL PLANS PROVIDED BY THE CITY. (N2) GRANITE MARKER FOR ORIGINAL SURVEYORS STONE. SEE DETAIL SHEET C-506 ©2 CONCRETE EDGE RESTRAINT TO MATCH LOCATION AND WIDTH OF PROPOSED PLAZA CONCRETE BANDS. VERIFY LOCATION OF BANDS WITH CURRENT SET OF COURTHOUSE RENOVATION PLANS BY

KIMLEY HORN. PLANS TO BE PROVIDED BY THE CITY. MONOLITHIC RETAINING WALL WITH LANDSCAPE CURB OR METAL RAILING. SEE DETAIL SHEET C-506.

Q2 THERMOPLASTIC COMPASS SYMBOL, 120 MIL. SEE DETAIL SHEET C-506.

R2 HC RAMP WITH HANDRAILS. SEE DETAILS SHEET C-503.

(V2) RIGHT TURN PROHIBITED SIGN. SEE DETAIL SHEET C-503.

\$2 PUBLIC PARKING DIRECTION SIGN. SEE DETAIL SHEET C-503.

(12) 18" METAL RAILING/TREE GUARD TO BE PROVIDED BY THE OWNER AND CONTRACTOR INSTALLED. SEE DETAIL C-506. (U2) STORMWATER STRUCTURE. SEE GRADING, DRAINAGE AND EROSION CONTROL PLANS.

2. ALL DEVELOPMENT SHALL CONFORM WITH THE CITY OF CONCORD DEVELOPMENT ORDINANCE.

3. SITE SIGNAGE SHALL CONFORM WITH APPLICABLE CODES AND ORDINANCES.

4. ALL PAINT STRIPING, PAVEMENT MARKINGS, AND SIGNAGE SHALL CONFORM TO THE LATEST "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" AND CITY OF CONCORD STANDARDS.

5. ALL DIMENSIONS ARE FACE OF CURB, EDGE OF PAVEMENT AND FACE OF WALL, UNLESS OTHERWISE NOTED.

6. THIS SITE IS NOT LOCATED IN ANY FLOOD ZONE.

7. ALL IMPROVEMENTS AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH NORTH CAROLINA STATE STANDARDS. ALL IMPROVEMENTS SHALL COMPLY WITH THE CITY OF CONCORD STANDARDS FOR STORM DRAINAGE, SIGNAGE, LANDSCAPE, PLANTING, UTILITY AND PARKING REQUIREMENTS. 8. ANY DISCREPANCIES FOUND IN THE FIELD SHALL BE CALLED TO THE ATTENTION OF THE OWNER/ENGINEER/DESIGNER PRIOR TO PROCEEDING WITH

9. THE GENERAL CONTRACTOR SHALL CONTACT ALL OWNERS OF EASEMENTS, UTILITIES AND RIGHT OF WAYS, PUBLIC OR PRIVATE, PRIOR TO WORKING IN THESE AREAS.

10. HATCHING OF HARD SURFACE MATERIALS SUCH AS BRICK AND CONCRETE ARE FOR GENERAL INFORMATION PURPOSES. IN NO INSTANCE IS A UTILITY LID, COVER OR ACCESS POINT TO BE COVERED OVER AND CONCEALED BY THE PROPOSED SURFACE MATERIAL. ANY HIDDEN UTILITY BOXES, COVERS, ETC DISCOVERED DURING CONSTRUCTION SHALL BE ADJUSTED TO MATCH PROPOSED GRADE ELEVATIONS.

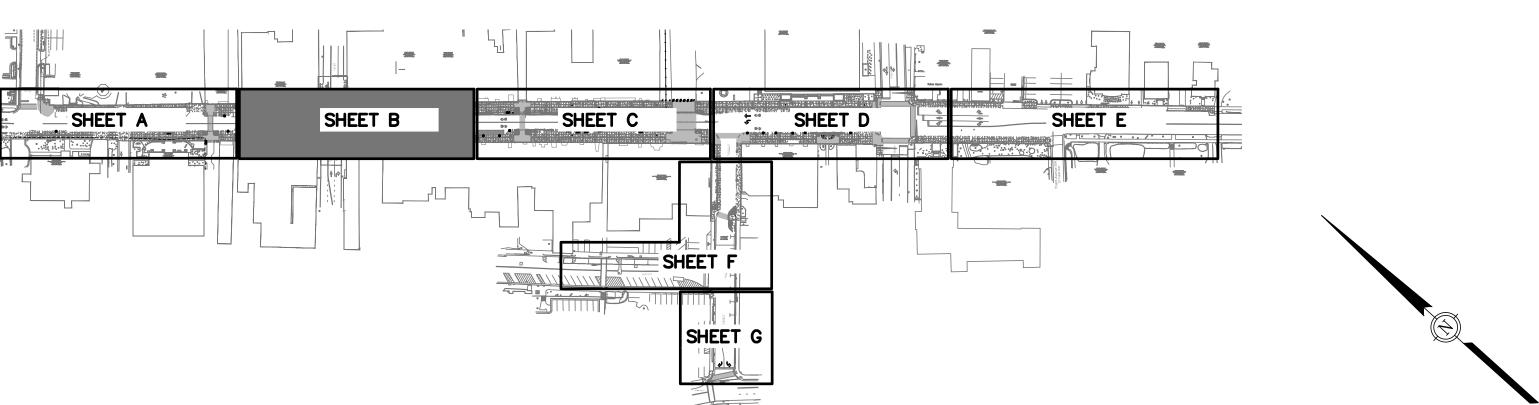
11. PROVIDE CONSTRUCTION JOINTS AT ALL INTERFACES BETWEEN PROPOSED AND EXISTING SURFACES/BUILDINGS. ALL CONSTRUCTION JOINTS ARE TO BE SEALED.

12. ENSURE SMOOTH TRANSITION FROM PROPOSED SIDEWALK TO ALL STORE FRONTS

13. ALL UTILITY BOXES AND TREE GRATES ARE TO BE ALIGNED WITH PROPOSED CONCRETE SCORING PATTERN.

14. NOTE LIMITS OF DISTURBANCE FOR STREETSCAPE WORK AND UTILITY INSTALLATION VARY. SEE EACH SET OF PLANS FOR LIMITS OF DISTURBANCE. 15. CONTRACTOR MUST PROVIDE SECURE, NON-SLIP ADA ACCESSIBLE SURFACES/STRUCTURES AND MAINTAIN ACCESS TO BUSINESSES DURING

CONSTRUCTION. 16. CONTRACTOR TO PROVIDE MINIMUM OF FOUR PROJECT IDENTIFICATION SIGNS.



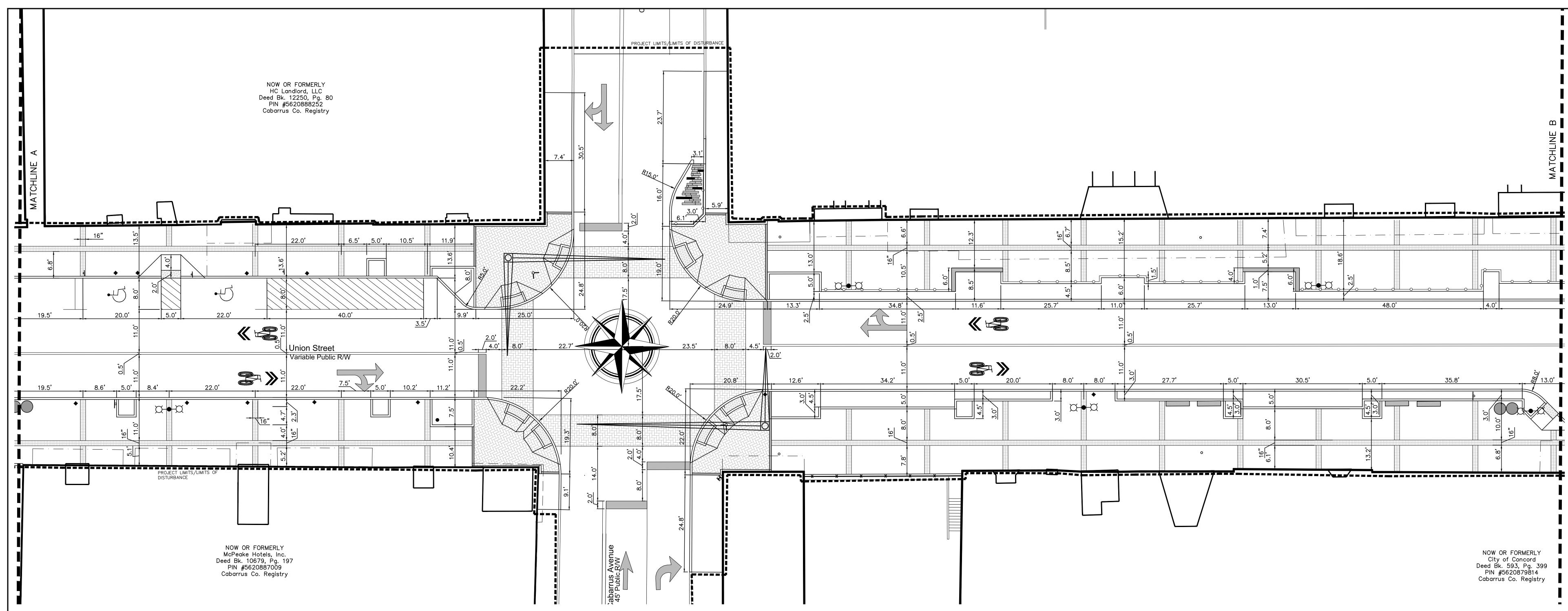
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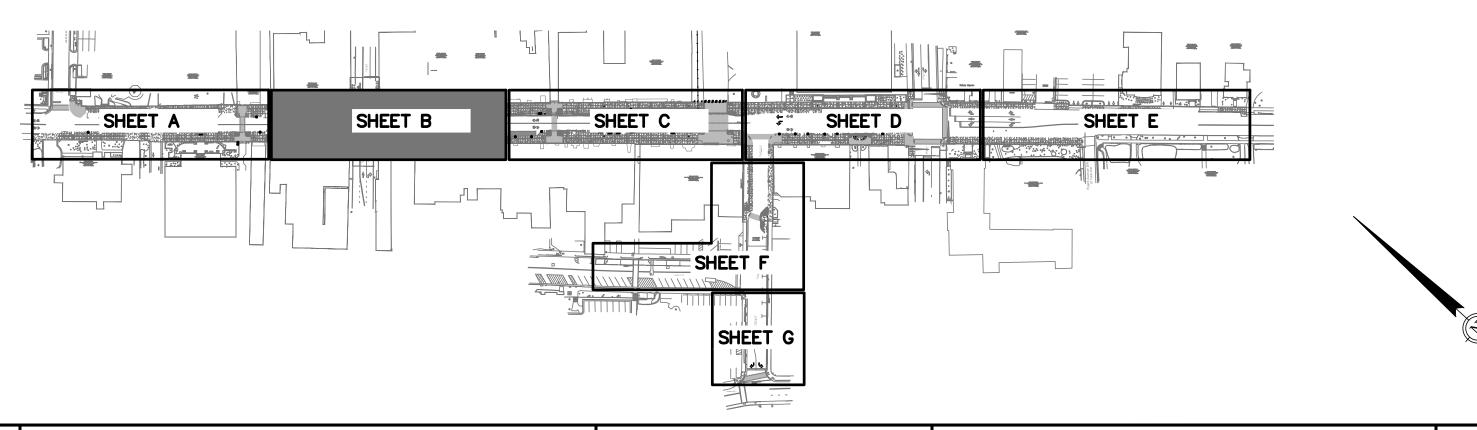


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10 0	5 10 20		SHEET			
GRAPHIC SCALE D	DIVISION VALUE = 10 FEET	SITE PLAN - B			0 400	
OFFICE MANAGER	DESIGNER				('_1()',	
D.G. CHAPMAN	C.L. CRANWILL				0-102	
PROJECT MANAGER	REVIEWER	DATE	PROJECT#	FUNDING #		
M.J. NORRIS	B. ROARK	MAY 2021	19.01726	N/A		
_	_	_	_	_		



GENERAL NOTES

- 1. ALL EXISTING CONDITIONS AND TOPOGRAPHIC INFORMATION WAS OBTAINED FROM SURVEY BY NORSTAR LAND SURVEYING, INC. MAY 2, 2019.
- 2. ALL DEVELOPMENT SHALL CONFORM WITH THE CITY OF CONCORD DEVELOPMENT ORDINANCE.
- 3. SITE SIGNAGE SHALL CONFORM WITH APPLICABLE CODES AND ORDINANCES.
- 4. ALL PAINT STRIPING, PAVEMENT MARKINGS, AND SIGNAGE SHALL CONFORM TO THE LATEST "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" AND CITY OF CONCORD STANDARDS.
- 5. ALL DIMENSIONS ARE FACE OF CURB, EDGE OF PAVEMENT AND FACE OF WALL, UNLESS OTHERWISE
- 6. THIS SITE IS NOT LOCATED IN ANY FLOOD ZONE.
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- 8. ANY DISCREPANCIES FOUND IN THE FIELD SHALL BE CALLED TO THE ATTENTION OF THE OWNER/ENGINEER/DESIGNER PRIOR TO PROCEEDING WITH ANY WORK.
- 9. THE GENERAL CONTRACTOR SHALL CONTACT ALL OWNERS OF EASEMENTS, UTILITIES AND RIGHT OF WAYS, PUBLIC OR PRIVATE, PRIOR TO WORKING IN THESE AREAS.
- 10. HATCHING OF HARD SURFACE MATERIALS SUCH AS BRICK AND CONCRETE ARE FOR GENERAL INFORMATION PURPOSES. IN NO INSTANCE IS A UTILITY LID, COVER OR ACCESS POINT TO BE COVERED OVER AND CONCEALED BY THE PROPOSED SURFACE MATERIAL. ANY HIDDEN UTILITY BOXES, COVERS, ETC DISCOVERED DURING CONSTRUCTION SHALL BE ADJUSTED TO MATCH PROPOSED GRADE ELEVATIONS.
- 11. PROVIDE CONSTRUCTION JOINTS AT ALL INTERFACES BETWEEN PROPOSED AND EXISTING SURFACES/BUILDINGS. ALL CONSTRUCTION JOINTS ARE TO BE SEALED.
- 12. ENSURE SMOOTH TRANSITION FROM PROPOSED SIDEWALK TO ALL STORE FRONTS
- 13. ALL UTILITY BOXES AND TREE GRATES ARE TO BE ALIGNED WITH PROPOSED CONCRETE SCORING
- 14. NOTE LIMITS OF DISTURBANCE FOR STREETSCAPE WORK AND UTILITY INSTALLATION VARY. SEE EACH SET OF PLANS FOR LIMITS OF DISTURBANCE.
- 15. CONTRACTOR MUST PROVIDE SECURE, NON-SLIP ADA ACCESSIBLE SURFACES/STRUCTURES AND MAINTAIN
- ACCESS TO BUSINESSES DURING CONSTRUCTION. 16. CONTRACTOR TO PROVIDE MINIMUM OF FOUR PROJECT IDENTIFICATION SIGNS.



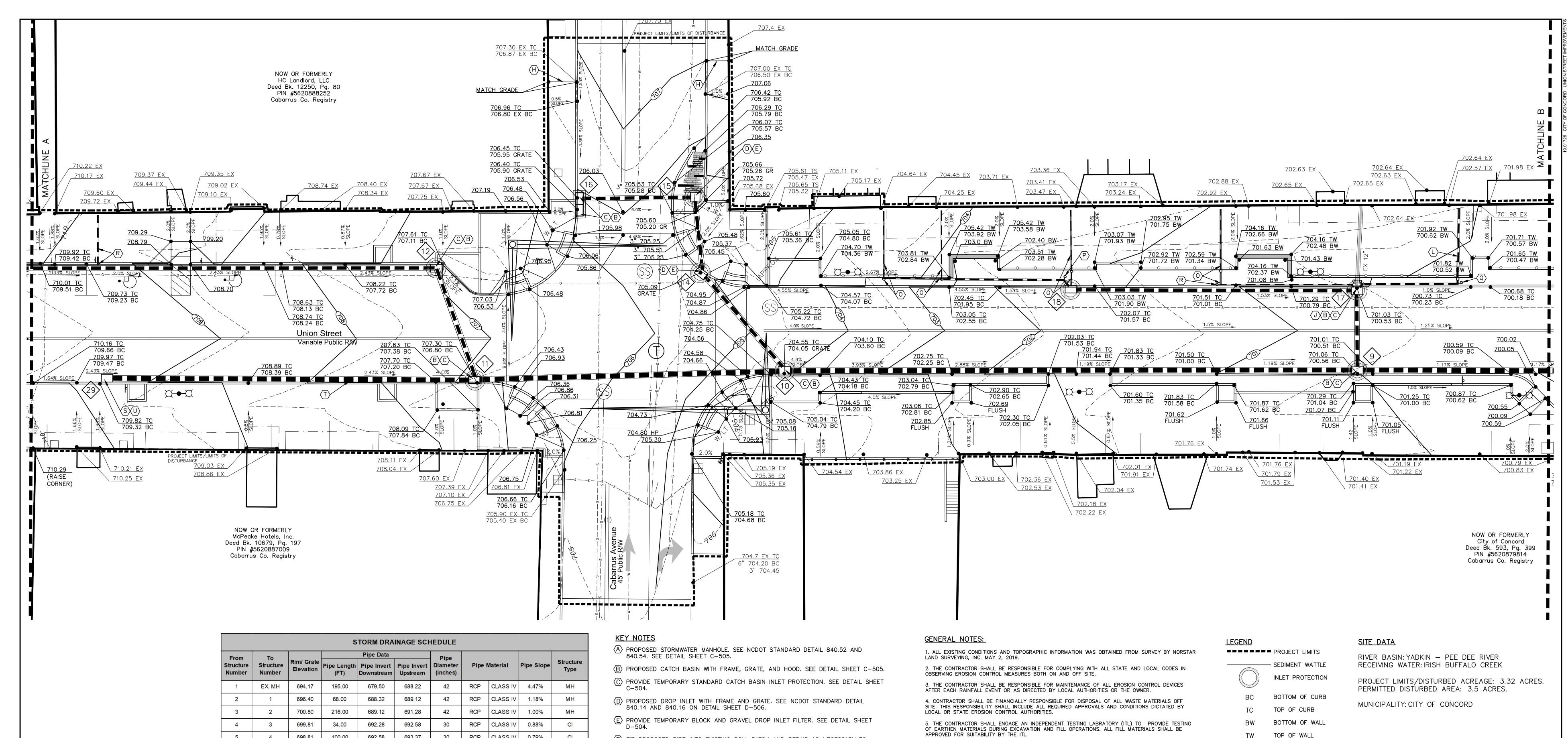
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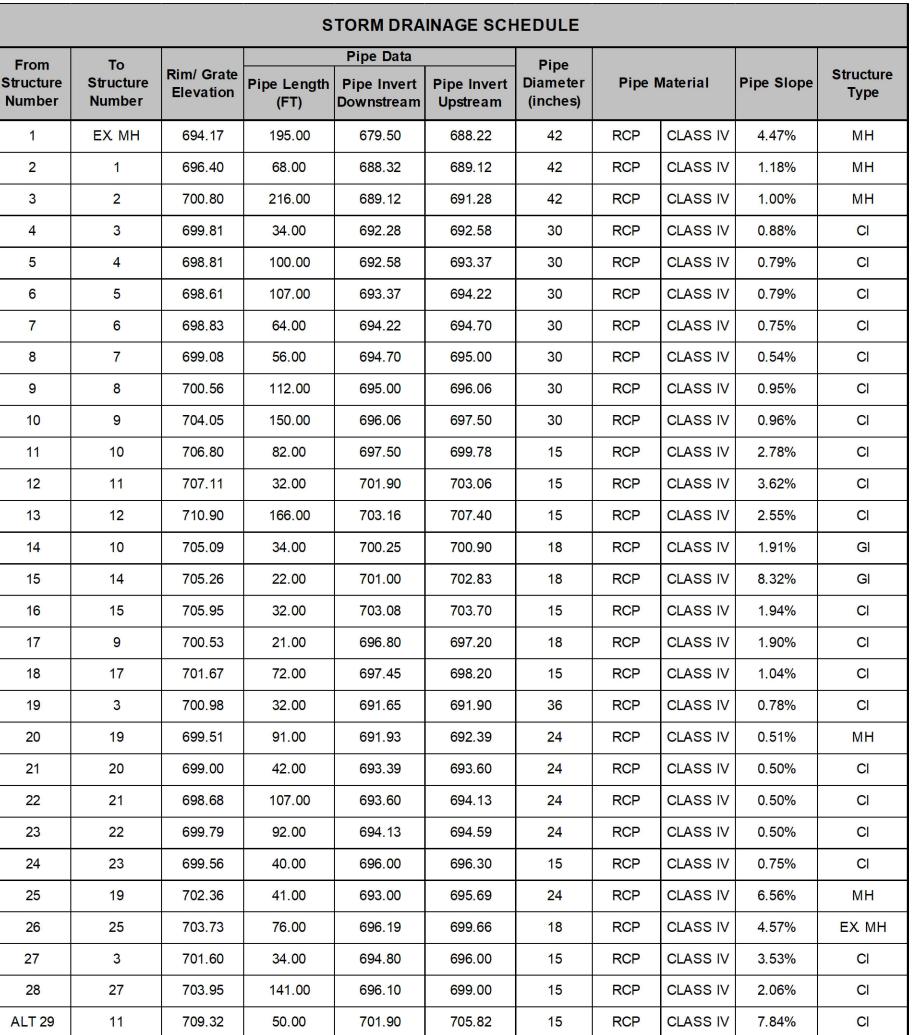


14.2				
	NO.	DATE	BY	DESCRIPTION



	5 10 20	LAYOUT PLAN - B			SHEET
FICE MANAGER	DESIGNER				I (:_1/)Q
G. CHAPMAN	C.L. CRANWILL				0-103
DJECT MANAGER	REVIEWER	DATE	PROJECT#	FUNDING #	
1.J. NORRIS	B. ROARK	MAY 2021	19.01726	N/A	





- (F) TIE PROPOSED PIPE INTO EXISTING BOX. PATCH AND REPAIR AS NECESSARY TO ENSURE SEALED CONNECTION.
- (G) SILT SAK. SEE DETAIL SHEET C-504.

BOX INSTALLATION.

- (H) MATCH EXISTING GRADE WITH SMOOTH TRANSITION.
- (1) PROPOSED 3" SCHEDULE 40 PVC ROOF DRAIN TO DAYLIGHT AT LOCATIONS SHOWN. (J) CONNECT PROPOSED BOX TO EX. PIPE. VERIFY INVERTS OF EXISTING PIPE PRIOR TO
- (K) PROPOSED 3" ROOF DRAIN CLEANOUT. SEE DETAIL SHEET C-504.
- SHOWN. PROVIDE 2" AIR GAP BETWEEN PIPE EXIT AND TOP OF 10" NYOPLAST DRAIN. CONNECT 10" DROP IN DRAIN TO PROPOSED BOX AS SHOWN, MIN. SLOPE 2%. PROVIDE CLEANOUTS AS SHOWN.
- $\langle M \rangle$ SEDIMENT WATTLE. SEE DETAILS SHEET C-504.
- (N) PROPOSED 3" AND 6" SCHEDULE 40 PVC DRAINS FROM EXISTING UTILITY BOX TO TIE TO PROPOSED STORM STRUCTURE.
- (O) PROPOSED 3" SCHEDULE 40 PVC ROOF DRAIN TO DAYLIGHT AT WALL LOCATION SHOWN. PROVIDE 2" AIR GAP BETWEEN PIPE EXIT AND TOP OF 6" DROP IN NYOPLAST DRAIN. CONNECT 6" DROP IN DRAINS TO PROPOSED BOX AS SHOWN, MIN SLOPE 2%. PROVIDE CLEANOUTS AS SHOWN.
- (P) PROPOSED 6" ROOF DRAIN CLEANOUT. SEE DETAIL SHEET C-504.
- $\langle Q \rangle$ PROPOSED 8" ROOF DRAIN CLEANOUT. SEE DETAIL SHEET C-504.
- $\langle \mathbb{R}
 angle$ PROPOSED 3" SCHEDULE 40 PVC ROOF DRAIN TO DAYLIGHT TO CURB. PROVIDE CLEANOUTS AS SHOWN.
- S ADD ALTERNATE #1 CATCH BASIN WITH FRAME, GRATE, AND HOOD. SEE DETAIL
- ADD ALTERNATE #1 15" CLASS IV RCP.
- (U) ADD ALTERNATE #1 PROVIDE TEMPORARY STANDARD CATCH BASIN INLET PROTECTION. SEE DETAIL SHEET C-504.
- W MUD MAT TO BE INSTALLED AS TEMPORARY CONSTRUCTION ENTRANCE AND RELOCATED AS NECESSARY TO ACTIVE CONSTRUCTION AREAS.

NO. DATE

6. SEED ALL DISTURBED AREAS UTILIZING A FESCUE BLEND (MIN. 2 REBEL, JAGUAR, FALCON) APPLICATION RATE OF SEED PER AAN STANDARDS. ALL FERTILIZER AND LIME AS RECOMMENDED BY 7. ALL SPOT ELEVATIONS AT CURB ARE AT TOP FACE OF CURB. ALL OTHER SPOT ELEVATIONS ARE AT

8. ALL OPEN STORM DRAIN PIPES SHALL BE PROTECTED WITH STONE FILTER PROTECTION AFTER STOPPAGE OF WORK EACH DAY. SEE DETAIL SHEET C-504. 9. CONTRACTOR TO ENSURE POSITIVE DRAINAGE ON ALL SURFACES. NOTIFY ENGINEER/LANDSCAPE ARCHITECT PRIOR TO INSTALLATION OF ANY PAVING/SURFACES IF ON SITE CONDITIONS ARE FIELD

SLAB GRADE OR AS INDICATED.

DETERMINED NOT TO PROVIDE POSITIVE DRAINAGE.

10. CONTRACTOR TO INSTALL SILK SAK EROSION PROTECTION AS SHOWN ON THE DRAWINGS AND ON THE FIRST DOWNSTREAM INLET STRUCTURES OUTSIDE OF THE PROJECT AREA RECEIVING RUNOFF FROM THE ACTIVE CONSTRUCTION AREA. AS WORK IS PHASED, CONTRACTOR TO UTILIZE WATTLES AS APPLICABLE AROUND THE OPEN WORK AREA TO DISCHARGE THE STORM WATER. DEWATERING BAGS/SEDIMENT FILTER BAGS MAY BE USED TO FILETER STORMWATER FROM TRENCHING ACTIVITIES. UNDER NO CIRCUMSTANCE IS UNTREATED WATER TO BE RELEASED FROM THE WORK AREA WITHOUT PASSING THROUGH AN EROSION CONTROL DEVICE. 11. PROJECT IS BID UNCLASSIFIED

STORMWATER STRUCTURE ID

SHEET A SHEET B SHEET C SHEET E

NCDOT REVIEW SUBMITTAL. NOT FOR CONSTRUCTION





CABARRUS COUNTY, NORTH CAROLINA DESCRIPTION

UNION STREET IMPROVEMENTS CITY OF CONCORD

GRADING, DRAINAGE, & GRAPHIC SCALE DIVISION VALUE = 10 FEET **EROSION CONTROL - B** FFICE MANAGER D.G. CHAPMAN C.L. CRANWILL ROJECT MANAGER MAY 2021 19.01726 B. ROARK N/A M.J. NORRIS

SHEET C-202

GENERAL UTILITY NOTES:

- 1. LOCATIONS OF EXISTING UTILITIES AS SHOWN ARE APPROXIMATE, AND ARE SHOWN ACCORDING TO A SITE SURVEY PROVIDED BY NORSTAR LAND SURVEYING, INC., UTILITY MAPS PROVIDED BY THE CITY OF CONCORD, AND SEWER TV INSPECTION RECORDS PROVIDED BY THE CITY OF CONCORD. EXACT LOCATIONS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR. CALL BEFORE YOU DIG, NORTH CAROLINA ONE CALL (1-800-632-4949).
- 2. ALL PROPOSED DOMESTIC WATER SERVICES SHALL BE 2-INCH TYPE K COPPER UNLESS NOTED OTHERWISE. NEW DOMESTIC WATER SERVICES SHALL BE CONNECTED TO EXISTING SERVICES USING APPROPRIATE COUPLINGS.
- 3. EXACT LOCATION AND SIZE OF FIRE SPRINKLER SERVICE LINES IS UNKNOWN. THE CONTRACTOR SHALL NOTIFY THE CITY OF CONCORD WATER RESOURCES. ENGINEERING. AND FIRE DEPARTMENTS OF THE LOCATION AND SIZE OF ANY FIRE SPRINKLER LINES DISCOVERED DURING PROJECT EXCAVATION WHICH ARE NOT SHOWN ON THE PLANS AND SHALL COORDINATE TIE-OVER OF EXISTING FIRE SPRINKLER LINES WITH THESE DEPARTMENTS PRIOR TO EXECUTING TIE-OVER WORK. EXISTING FIRE SPRINKLER LINES SHALL BE REPLACED AND CONNECTED TO THE NEW WATER MAIN USING DUCTILE IRON PIPE OF LIKE SIZE AS THE EXISTING FIRE SPRINKLER SERVICE PIPE. ACCORDING TO THE CITY OF CONCORD FIRE DEPARTMENT, THE FOLLOWING PROPERTIES HAVE FIRE SPRINKLER SYSTEMS: * 9 NORTH UNION STREET
- * 14 NORTH UNION STREET * 30 NORTH UNION STREET
- * 11 SOUTH UNION STREET
- * 30 SOUTH UNION STREET * 57 SOUTH UNION STREET

BREATHING EQUIPMENT.

- 4. NEW AND REPLACEMENT SEWER SERVICE LINES ARE TO BE CONSTRUCTED USING C-900 DR-14 PVC PIPE OF LIKE SIZE AS THE EXISTING SEWER SERVICE LINES, WITH THE MINIMUM SIZE BEING 4" DIAMETER. ALL SEWER LATERAL CLEANOUTS SHALL BE HOUSED IN A TRAFFIC RATED STEEL MINI-MANHOLE (REFER TO DETAIL C-509).
- 5. THE CONTRACTOR SHALL REPORT ANY UNKNOWN WATER AND SEWER SERVICE LINES TO THE CITY OF CONCORD UPON DISCOVERY AND COORDINATE WITH THE CITY OF CONCORD REGARDING REPLACEMENT OR DISCONNECTION/ABANDONMENT/REMOVAL OF UNKNOWN SERVICE LINES.
- 6. THE CONTRACTOR SHALL FIELD VERIFY ALL PROPOSED MANHOLE TOP ELEVATIONS AND EXISTING MANHOLE INVERTS PRIOR TO CONSTRUCTION AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES. CONTRACTOR SHALL ADJUST ALL PROPOSED SEWER STRUCTURES TO MATCH FINISHED PAVEMENT ELEVATIONS. COSTS OF ADJUSTING STRUCTURE TOPS SHALL BE CONSIDERED INCIDENTAL TO OTHER WORK ON THE PROJECT.
- 7. UTILITY SERVICE AND FIRE WATER COVERAGE IS TO BE MAINTAINED THROUGHOUT PROJECT CONSTRUCTION EXCEPT FOR BRIEF PERIODS DURING TIE-OVER OF MAINS AND SERVICE LINES. THE CONTRACTOR SHALL PROVIDE TEMPORARY VALVES, FITTINGS, AND CONNECTIONS TO MAINTAIN UTILITY SERVICE AND TO ACCOMMODATE PROJECT PHASING.
- 8. ALL CONNECTIONS TO EXISTING WATER LINES 4-INCHES AND LARGER SHALL BE ACCOMPLISHED USING MECHANICAL SLEEVES WITH RESTRAINED JOINTS.
- 9. THE CONTRACTOR SHALL MAINTAIN SEWAGE FLOW IN SEWER SYSTEM AT ALL TIMES AND SHALL PROVIDE BYPASS PUMPING AND/OR PIPING AS REQUIRED. THE CONTRACTOR SHALL SUBMIT A SEWER BYPASS PLAN TO THE CITY ENGINEERING DEPARTMENT FOR APPROVAL PRIOR TO INSTALLATION. NO SANITARY SEWER OVERFLOWS ARE PERMITTED.
- 10. THE CONTRACTOR SHALL COORDINATE WATER LINE ISOLATION WITH THE DESIGNATED CITY OF CONCORD INSPECTOR.
- 11. METER BOXES AND METER BOX LIDS SHALL BE TRAFFIC RATED AND INSTALLED FLUSH WITH THE FINAL GRADE.
- 12. METER VAULTS, METER BOXES, PRV BOXES, AND OTHER WATER RELATED APPURTENANCES SHALL NOT BE INSTALLED IN BRICK PAVER BAND AREAS.
- 13. THE CONTRACTOR SHALL COORDINATE THE LOCATIONS OF TEMPORARY JUMPER CONNECTION ASSEMBLIES AND BLOW-OFFS WITH THE CITY OF CONCORD DESIGNATED INSPECTOR. THE LOCATION OF THE TEMPORARY JUMPER CONNECTION ASSEMBLIES AND BLOW-OFF ASSEMBLIES MUST NOT IMPEDE VEHICULAR AND PEDESTRIAN TRAFFIC AND OTHER UTILITY RELOCATION WORK. WHERE POSSIBLE, THE PROPOSED HYDRANTS AND/OR EXISTING HYDRANTS SHOULD BE UTILIZED FOR FLUSHING IN LIEU OF TEMPORARY BLOW-OFF ASSEMBLIES. THE CONTRACTOR SHALL ALSO COORDINATE LOCATIONS FOR TEMPORARY JUMPER ASSEMBLIES AND BLOW-OFFS WITHIN CABARRUS ROAD RIGHT OF WAY WITH NCDOT.
- 14. THE CONTRACTOR SHALL COORDINATE ALL WORK WITHIN 5' OF GAS LINES WITH DOMINION ENERGY PRIOR TO BEGINNING WORK.
- 15. REFER TO SHEET G-003 FOR SEQUENCING AND TRAFFIC CONTROL INFORMATION. THE CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL PLANS AND COORDINATE TRAFFIC CONTROL WITH THE CITY OF CONCORD AND NCDOT AS APPLICABLE PRIOR TO CLOSING ANY STREET ROAD, OR SIDEWALK.

SPECIAL REQUIREMENTS FOR ASBESTOS CEMENT PIPE

CONSTRUCTION ACTIVITIES WILL REQUIRE CUTTING, MODIFYING, REMOVAL, AND DISPOSAL OF EXISTING ASBESTOS CEMENT (AC) PIPE. WHERE RECORDS ARE AVAILABLE, EXISTING AC PIPE MATERIALS ARE LABELED ON THE PLANS. THE CONTRACTOR SHALL ANTICIPATE ENCOUNTERING AC PIPE THAT MAY NOT BE LABELED. ALL EXISTING AC PIPE SHOWN "TO BE ABANDONED" SHALL BE ABANDONED IN PLACE UNLESS SPECIFICALLY LABELED TO BE REMOVED. AC PIPE TO BE ABANDONED IN PLACE SHALL NOT BE CRUSHED BY MACHINERY. IF AC PIPE IS CRUSHED, THE SITE SHALL BE CONSIDERED A REGULATED ASBESTOS CONTAINING MATERIALS (RACM) SITE AND CONSIDERED AN ACTIVE WASTE DISPOSAL SITE. THE CRUSHED PIPE AND CONTAMINATED SOIL SHALL BE REMOVED, HANDLED, AND DISPOSED BY A LICENSED ASBESTOS REMOVAL CONTRACTOR FOLLOWING REQUIRED PROTOCOLS FOR HANDLING AND DISPOSAL OF ASBESTOS. WHERE EXCAVATIONS OR GRADING REQUIRED FOR CONSTRUCTION EXPOSES EXISTING AC PIPES, THE WORK SITE SHALL BE MARKED WITH SIGNAGE WARNING OF ASBESTOS. EXPOSED PIPE, WHETHER INTACT OR NOT, SHALL BE HANDLED AND DISPOSED OF BY A LICENSED ASBESTOS REMOVAL CONTRACTOR. ALL WORK REQUIRING HANDLING, REMOVAL, OR DISPOSAL OF AC PIPE SHALL BE DONE IN STRICT ACCORDANCE WITH NCGS CHAPTER 130A PUBLIC HEALTH ARTICLE 19: ASBESTOS HAZARD MANAGEMENT PROGRAM.

WORKER TRAINING AND WORKPLACE RULES AND PROCEDURES SHALL MEET THE MINIMUM REQUIREMENTS OF NC AND FEDERAL OSHA RULES. WHERE THE WORK REQUIRES CONNECTING INTO EXISTING AC PIPING, THE FOLLOWING REQUIREMENTS SHALL APPLY:

- A. ALL PERSONNEL INVOLVED IN THE WORK SHALL RECEIVE TRAINING IN PROPER PROCEDURES FOR HANDLING AND WORKING WITH AC PIPE B. ALL PERSONNEL SHALL BE EQUIPPED WITH APPROVED PERSONAL PROTECTIVE EQUIPMENT (PPE) INCLUDING SHOES, CLOTHING, AND
- C. THE CONTRACTOR SHALL DESIGNATE A "PERSON IN CHARGE" WHO SHALL BE PRESENT AT ALL TIMES WHEN AC PIPE IS BEING MODIFIED. D. ALL PIPE CUTTING SHALL BE BY APPROVED "SNAP CUTTERS". THE USE OF SAWS OR GRINDERS EMPLOYING CARBIDE BLADES IS STRICTLY PROHIBITED.
- E. COMPRESSED AIR SHALL NEVER BE USED TO BLOW OR CLEAN PIPE CUTS WHERE NEW PIPES ARE TO BE CONNECTED TO EXISTING AC
- F. MODIFIED WATER CONTAINING SURFACTANTS SHALL BE USED TO LUBRICATE AND WET ALL PIPE CUTS TO MINIMIZE PRODUCTION OF DUST. G. WORK SITES SHALL BE ROPED OFF AND SIGNS WARNING OF ASBESTOS SHALL BE POSTED.
- H. ALL SECTIONS OF AC PIPE CUT FOR CONNECTIONS OF NEW PIPING SHALL BE REMOVED FROM THE EXCAVATION, DOUBLE BAGGED IN HEAVY PLASTIC WRAP, LABELED AS "ASBESTOS" AND PLACED IN A SECURE STORAGE AREA PENDING TRANSPORT AND DISPOSAL TO A LICENSED ASBESTOS DISPOSAL LANDFILL.
- I. WHERE THE WORK REQUIRES PREPARING THE CUT END OF AN EXISTING AC PIPE FOR CONNECTION OF A NEW PIPE, ONLY TOOLS APPROVED FOR THIS WORK SHALL BE USED. PIPE SHALL BE CONTINUOUSLY LUBRICATED WITH "MODIFIED WATER" TO LIMIT DUST. J. CLEAN UP AT WORK SITES SHALL NEVER EMPLOY COMPRESSED AIR, BLOWERS, MECHANICAL BROOMS, OR OTHER DEVICES THAT WILL PRODUCE DUST.
- K. AT THE END OF EACH WORK DAY WHERE AC PIPE IS CUT, HANDLED, MODIFIED, OR REMOVED, ALL WORKERS' PERSONAL PROTECTION EQUIPMENT (PPE) SHALL BE STORED AT A SUITABLE LOCATION FOR CLEANING, DECONTAMINATION DISPOSAL, OR FUTURE USE. WORKERS INVOLVED IN CUTTING, REMOVAL, AND DISPOSAL OF AC PIPE SHALL NOT BE ALLOWED TO REMOVE PPE FROM THE WORK SITE
- L. REFER TO PROJECT SPECIFICATIONS AND SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION.

100% SUBMITTAL FOR REVIEW, NOT FOR CONSTRUCTION







DATE **DESCRIPTION**

UNION STREET IMPROVEMENTS

CITY OF CONCORE CABARRUS COUNTY, NORTH CAROLINA

DIVISION VALUE = 10 FEET FICE MANAGER D.G. CHAPMAN M. OETTING ROJECT MANAGER M.J. NORRIS D.G. CHAPMAN

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____FW ___FW __

UTILITY NOTES AND LEGEND

19.01726

MAY, 2021

N/A

C-301

SHEET

CITY OF CONCORD UTILITY NOTES:

- 1. PER CITY OF CONCORD CODE OF ORDINANCE CHAPTER 62, ARTICLE 3, SECTION 62-98 (2) ALL MATERIALS, EQUIPMENT, LABOR, AND WORKMANSHIP ASSOCIATED WITH PUBLIC WATER AND /OR SEWER EXTENSION AND/OR MODIFICATION SHALL BE IN ACCORDANCE WITH AND SUBJECT TO THE WATER AND SEWER AUTHORITY OF CABARRUS COUNTY'S STANDARD SPECIFICATIONS; THE CITY OF CONCORD'S ORDINANCES, POLICIES, AND STANDARD SPECIFICATIONS, AND THE NORTH CAROLINA ADMINISTRATIVE CODE FOR WASTEWATER COLLECTION AND WATER DISTRIBUTION SYSTEMS. IN THE EVENT OF CONFLICT BETWEEN THE WATER AND SEWER AUTHORITY OF CABARRUS COUNTY'S STANDARD SPECIFICATIONS; THE CITY OF CONCORD'S ORDINANCES, POLICIES, AND STANDARD SPECIFICATIONS, OR THE NORTH CAROLINA ADMINISTRATIVE CODE, THE MORE RESTRICTIVE REQUIREMENTS SHALL APPLY.
- 2. REVIEW AND APPROVAL OF THE PLANS DOES NOT RELIEVE THE OWNER, CONTRACTOR, OR DEVELOPER FROM MEETING THE REQUIREMENTS OF THE CITY OF CONCORD'S OR CABARRUS COUNTY ORDINANCES, POLICIES, AND STANDARD SPECIFICATIONS, (AS APPLICABLE), CONCORD WATER & SEWER POLICIES AND TECHNICAL SPECIFICATIONS, THE "STANDARD SPECIFICATION FOR WASTEWATER COLLECTION & WASTE DISTRIBUTION FOR CABARRUS COUNTY (WSACC MANUAL) AND ANY OTHER LOCAL, STATE, AND FEDERAL REGULATIONS & APPROVALS.
- 3. THE CONTRACTOR MUST CONTACT THE CITY OF CONCORD ENGINEERING CONSTRUCTION MANAGER AT 704-920-5425 AT LEAST 24-HOURS PRIOR TO INITIATING ANY CONSTRUCTION ACTIVITY.
- 4. THE EXISTING WATER MAIN VALVE RIMS AND STEMS AND THE EXISTING SEWER MAIN MANHOLES RIMS ARE TO BE RAISED OR LOWERED TO FINAL GRADE, AS APPLICABLE AND AT LEAST 3-FT OF GROUND COVER IS TO BE MAINTAINED OVER THE EXISTING UTILITIES AT ALL TIMES PER THE CITY OF CONCORD CODE OF ORDINANCE CHAPTER 62, ARTICLE 3, SECTION 62-98.
- 5. CONCORD CODE OF ORDINANCES CHAPTER 62, ARTICLE II WATER AND SEWER SERVICE, SEC. 62-34(I) THE CUSTOMER SHALL BE RESPONSIBLE FOR INSTALLING THE NECESSARY APPROVED DEVICE(S) TO MAKE ANY ADJUSTMENTS TO THE WATER PRESSURE SUPPLIED BY CONCORD UTILITIES AND SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL SUCH DEVICES."
- 6. PER THE CITY OF CONCORD CODE OF ORDINANCE CHAPTER 62, ARTICLE 3, SECTION 62-98- THE FOLLOWING MINIMUM SEPARATIONS MUST BE INDICATED, UNLESS OTHERWISE APPROVED BY THE CITY. * A MINIMUM HORIZONTAL SEPARATION OF FIVE FEET SHALL BE MAINTAINED BETWEEN ANY TYPE OF MAINTENANCE OBSTRUCTION AND THE CITY'S WATER DISTRIBUTION LINES, WASTEWATER COLLECTION LINES, AND ASSOCIATED APPURTENANCES, UNLESS AN EXCEPTION IS GRANTED. GREATER SEPARATION DISTANCES MAY BE REQUIRED AS SPECIFIED BY FEDERAL, STATE, OR
- * A MINIMUM VERTICAL SEPARATION OF TWO FEET SHALL BE MAINTAINED BETWEEN ANY TYPE OF MAINTENANCE OBSTRUCTION, INCLUDING BUT NOT LIMITED TO ANY OTHER UTILITY PROVIDER'S LINES OR EQUIPMENT, AND THE CITY WATER DISTRIBUTION LINES, WASTEWATER COLLECTION LINES, AND ASSOCIATED APPURTENANCES, UNLESS AN EXCEPTION IS GRANTED. IF AN EXCEPTION IS GRANTED, A MINIMUM VERTICAL SEPARATION OF ONE FOOT MUST BE MAINTAINED AND THE CITY WATER DISTRIBUTION LINES, WASTEWATER COLLECTION LINES, AND ASSOCIATED APPURTENANCES SHALL BE CONSTRUCTED OF DUCTILE IRON PIPE OR AN APPROVED FERROUS MATERIAL WITH JOINTS THAT ARE EQUIVALENT TO POTABLE WATER MAIN STANDARDS FOR A DISTANCE OF TEN FEET ON EITHER SIDE OF THE POINT OF CROSSING. GREATER SEPARATION DISTANCES MAY BE REQUIRED AS SPECIFIED BY
- FEDERAL, STATE, OR LOCAL REGULATIONS. * A MINIMUM HORIZONTAL SEPARATION OF TEN FEET SHALL BE MAINTAINED BETWEEN THE CITY WATER DISTRIBUTION SYSTEM AND WASTEWATER COLLECTION LINES, AND ASSOCIATED APPURTENANCES, UNLESS AN EXCEPTION IS GRANTED.
- 7. CONTRACTOR SHALL OBTAIN REQUIRED PLUMBING PERMITS AND PAY APPLICABLE PLUMBING PERMITTING CHARGES AND FEES; AND COMPLY WITH THE REQUIRED PLUMBING CODE IN ASSOCIATION WITH ESTABLISHING THE WATER AND SEWER SERVICE CONNECTIONS TO THE PUBLIC MAINS.
- 8. THE DURATION OF ANY SERVICE DISRUPTION SHALL BE MINIMIZED. THE CONTRACTOR SHALL NOTIFY THE CITY OF CONCORD ENGINEERING CONSTRUCTION MANAGER, GARY STANSBURY, AT 704-920-5425 AT LEAST 48 HOURS IN ADVANCE OF ANY SCHEDULED SERVICE DISRUPTION. PROVIDE NOTICE ON A CITY APPROVED FORM TO CITY OF CONCORD CUSTOMERS SPECIFYING THE DAY AND DURATION OF ANY SCHEDULE DISRUPTION, INCLUDE APPROPRIATE CITY CONTACT NUMBERS
- 9. THE CONTRACTOR SHALL PROVIDE TEMPORARY POTABLE WATER SUPPLIES TO CITY OF CONCORD CUSTOMERS WHEN THE DRUATION OF WATER SERVICE DISRUPTION EXCEEDS 6 HOURS OR AS DIRECTED BY THE DESIGNATED CITY INSPECTOR. THIS PROVISION IS CONSIDERED INCIDENTAL TO THE WATER LINE. NO ADDITIONAL PAYMENT WILL BE MADE.

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LITH ITIES I ECENID

RESTRAINED JOINT WATER LINE

DOMESTIC WATER SERVICE LINE

FIRE WATER SERVICE LINE

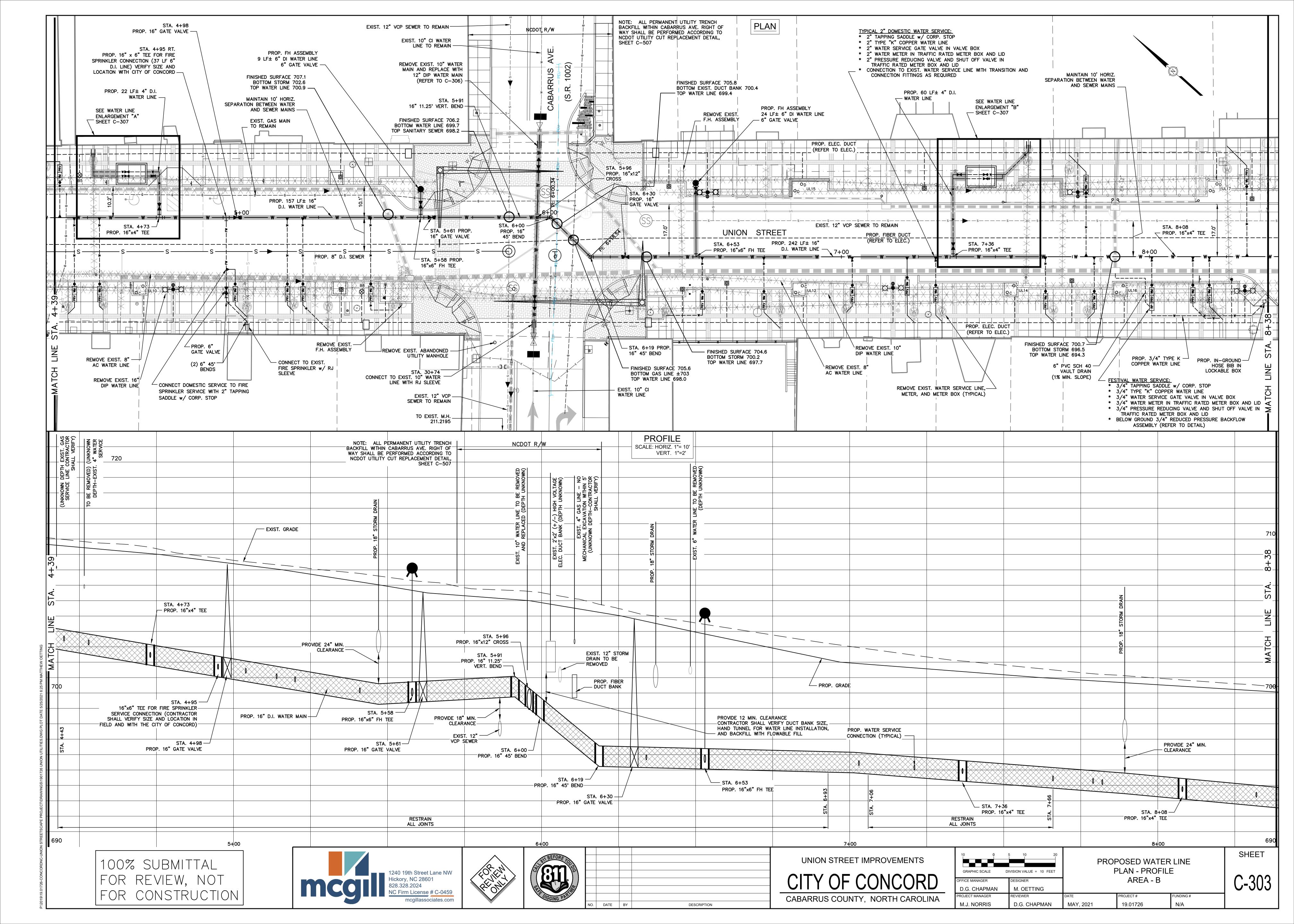
EXISTING UTILITY LINE

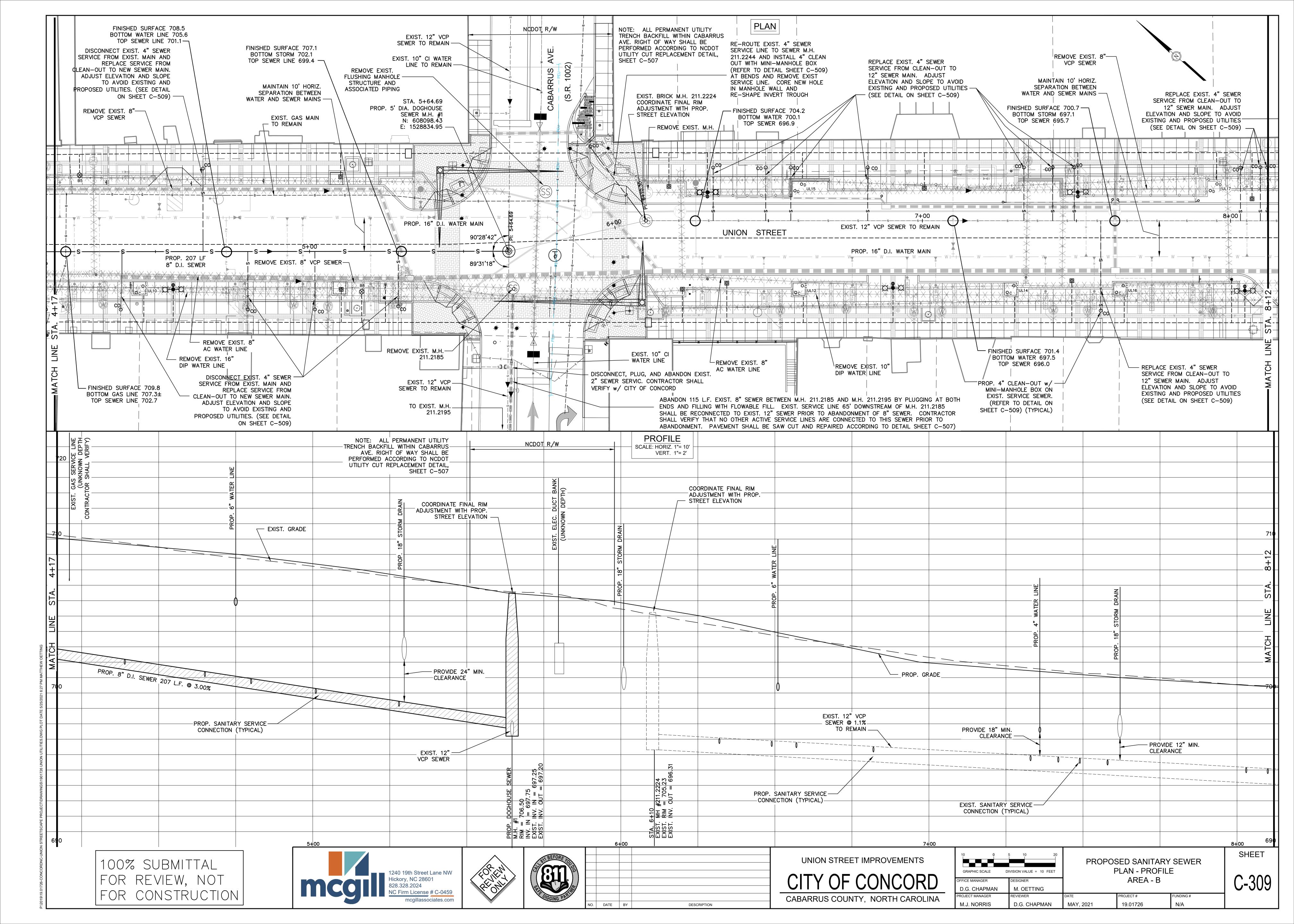
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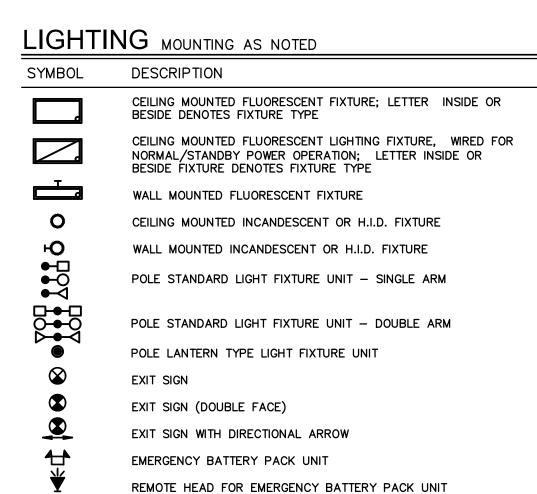
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	PROPOSED
SEWER MANHOLE	
SEWER CLEAN-OUT WITH MINI-MANHOLE (REFER TO DETAIL SHEET C-509)	oco
FIRE HYDRANT	A
GATE VALVE	H
END CAP	3
MECHANICAL JOINT CONNECTION SLEEVE	=
2" WATER METER IN TRAFFIC RATED METER BOX AND LID (REFER TO DETAIL SHEET <u>C-508</u>)	W
2" PRESSURE REDUCING VALVE AND SHUT-OFF VALVE IN TRAFFIC RATED METER BOX AND LID	PRV
BELOW GROUND REDUCED PRESSURE BACKFLOW ASSEMBLY (REFER TO DETAIL SHEET C-510)	RP
AIR RELEASE VALVE IN METER BOX (REFER TO DETAIL SHEET C-508)	ARV
2" WATER SERVICE GATE VALVE IN VALVE BOX (REFER TO DETAIL SHEET C-508)	•
2" TAPPING SADDLE WITH CORPORATION STOP (REFER TO DETAIL SHEET C-508)	•
IN-GROUND HOSE BIB IN LOCKABLE BOX	
EXIST. UTILITY TO BE CAPPED AND ABANDONED	J C
SEWER LINE	s
SEWER SERVICE LINE	ss
WATER LINE	w w
DECTRAINED JOINT WATER LINE	14/

EXIST. UTILITY TO BE PLUGGED, FILLED WITH







SWITCHING

<u> </u>	CHING						
SYMBOL	MOUNTING	DESCRIPTION					
S	48"AFF	SWITCH, SINGLE POLE					
\mathbf{S}_2	48"AFF	SWITCH, DOUBLE POLE					
S ₃	48"AFF	SWITCH, 3-WAY					
\mathbf{S}_4	48"AFF	SWITCH, 4-WAY					
$\mathbf{S}_{ extsf{DM}}$	48"AFF	SWITCH, DIMMER					
$S_{ riangle}$	48"AFF	SWITCH WITH PILOT LIGHT					
$\mathbf{S}_{\mathbb{M}}$	48"AFF	SWITCH, MANUAL MOTOR STARTER, RATING AND THERMAL OVERLOADS TO MATCH MOTOR NAME PLATE DATA					
\mathbf{S}_{MI}	48"AFF	SWITCH, MANUAL MOTOR STARTER WITH IVORY, ILLUMINATED HANDLE					
S _{MP}	48"AFF	SWITCH, MANUAL MOTOR STARTER WITH PILOT LIGHT					
$\mathbf{S}_{ op}$	48"AFF	MANUAL MOTOR STARTER SWITCH FRACTIONAL HORSEPOWER					
	AS NOTED	PHOTOELECTRIC CONTROL					
$\square_{_{R1_{-}}}$	48"AFF	LIGHTING CONTACTOR					
1/1	DE:	SIGNATION					
• LC-1		LIGHTING CONTACTOR REMOTE PUSH-BUTTON "ON-OFF" CONTROL					
	REI	PRESENTS LIGHTING CONTACTOR BEING CONTROLLED					
DS	AS NOTED	DOOR SWITCH					
MC	AS NOTED	MOTION CONTROL					
M	CEILING	MOTION SENSOR					

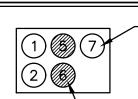
PANELBOARDS

SYMBOL	MOUNTING	DESCRIPTION
	TOP BREAKER 6'-0"AFF	NEW PANELBOARD - SURFACE MOUNTED
	TOP BREAKER 6'-0"AFF	NEW PANELBOARD - FLUSH MOUNTED
		EXISTING PANELBOARD - SURFACE MOUNTED
		EXISTING PANELBOARD - FLUSH MOUNTED

OCCUPANCY SENSOR

DUCTBANK SYMBOL KEY

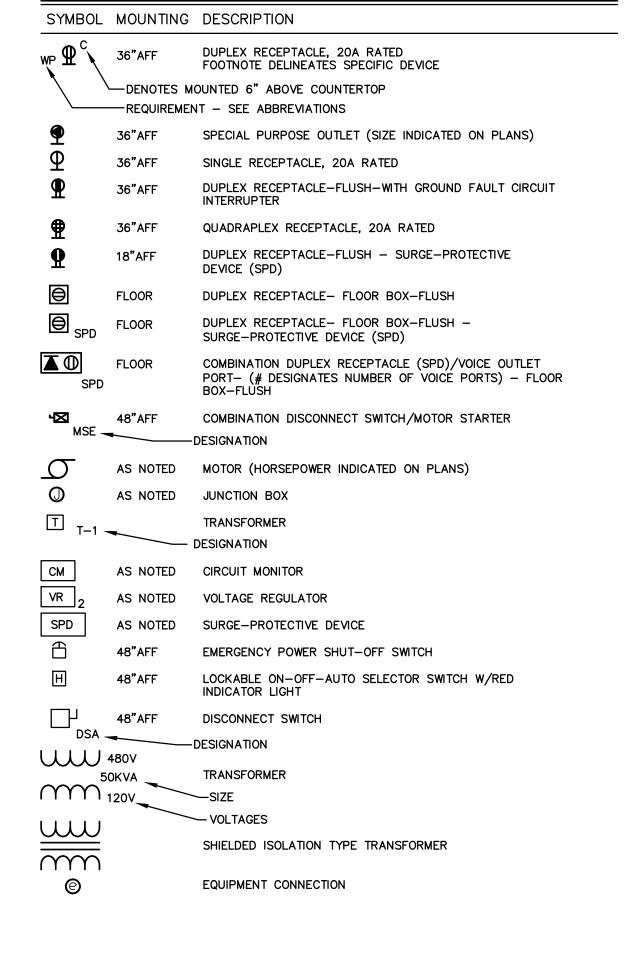
NEW CONDUIT, TYP.



EXISTING CONDUIT, TYP. NOTE: REFER TO DUCTBANK SCHEDULE & PLANS

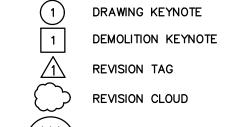
FOR EXACT NUMBER & SIZE OF CONDUITS.

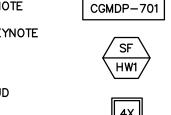
POWER



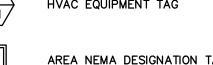
TYPICAL ANNOTATION

INSTRUMENTATION TAG





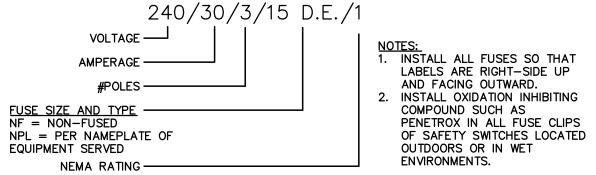






PROCESS EQUIPMENT TAG

SAFETY SWITCH DESIGNATOR



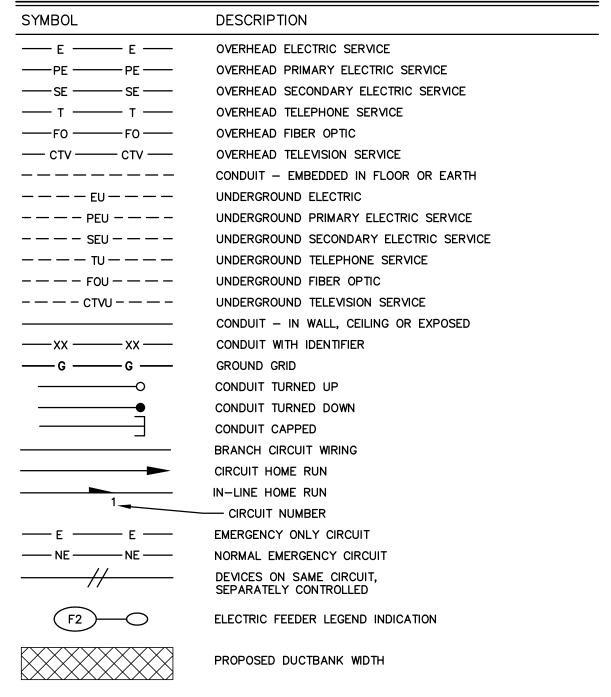
SAFETY SWITCH

PROPOSED DEMOLITION LEGEND



TO BE DEMOLISHED AND REMOVED

CONDUIT FEEDERS AND BRANCH CIRCUITS



ARREVIATIONS

A OR AMP	AMPERE	H.I.D.	HIGH INTENSITY DISCHARGE	Р	# OF POLES IN CIRCUIT BREAKER
A.C.	ALTERNATING CURRENT	HP	HORSEPOWER	PH OR Ø	PHASE
AF	FRAME AMPERE	H.P.S.	HIGH PRESSURE PUMP STATION	PM	POWER MONITOR
A.F.F.	ABOVE FINISHED FLOOR	HSPS	HIGH SERVICE PUMP STATION	PMT	PAD MOUNTED TRANSFORMER
A.F.G.	ABOVE FINISHED GRADE	HVAC	HEAT-VENT-AIR CONDITIONING	PNL	PANEL
A.I.C.	AMPERE INTERRUPTING CURRENT	I.G.	ISOLATED GROUND	PSI	POUNDS PER SQUARE INCH
AS	AMMETER SELECTOR SWITCH	I.D.	INNER DIAMETER	PT	POTENTIAL TRANSFORMER
AT	TRIP AMPERE	IMC	INTERMEDIATE METAL CONDUIT	PVC	POLYVINYL CHLORIDE
ATL	ACROSS-THE-LINE	IND.	INDUSTRIAL	REPL	REPLACE
A.T.S.	AUTOMATIC TRANSFER SWITCH	JB	JUNCTION BOX	QTY.	QUANTITY
AUTO	AUTOMATIC	J.I.C.	JOINT INDUSTRIAL COUNCIL	RGS	RIGID GALVANIZED STEEL
AWG	AMERICAN WIRE GAUGE	KA	KILOAMPERE	RVSS	REDUCED VOLTAGE SOLID STATE
B.F.G.	BELOW FINISHED GRADE	KCMIL	1000 CIRCULAR MILS	SC	SURGE CAPACITOR
BLDG.	BUILDING	KV	KILOVOLT	SCC	SYSTEM CONTROL CENTER
C OR COND.	CONDUIT	KVA	KILOVOLT AMPERE	SER	SERVICE ENTRANCE RATED
СВ	CIRCUIT BREAKER	KW	KILOWATT	SM	SUB-METER
CKT	CIRCUIT	LA	LIGHTNING ARRESTOR	SP	SPARE
CP	CONTROL PANEL	LC	LIGHTING CONTACTOR	SPD	SURGE-PROTECTIVE DEVICE
CPT	CONTROL PANEL TRANSFORMER	LTG	LIGHTING	S.S.	STAINLESS STEEL
CR	CONTROL RELAY	MAX	MAXIMUM	SWBD	SWTCHBOARD
DESIG	DESIGNATION	MCB	MAIN CIRCUIT BREAKER	TBA	TO BE ABANDONED
DIA.	DIAMETER	mA	MILI-AMP	TBR	TO BE REMOVED
DIV.	DIVISION	МС	MANUFACTURER'S CABLE	TCC	TELECOMMUNICATIONS CLOSET
DPDT	DOUBLE POLE, DOUBLE THROW	MCC	MOTOR CONTROL CENTER	TDC	TELECOMMUNICATIONS DISTRIBUTION CLOS
DS	DISCONNECT SWITCH	MFR	MANUFACTURER	TYP.	TYPICAL
E.C.	ELECTRICAL CONTRACTOR	MIN.	MINIMUM	UE	UNDERGROUND ELECTRIC
ЕНН	ELECTRIC HANDHOLE	M.L.O.	MAIN LUG ONLY	UH	UNIT HEATER
ЕМН	ELECTRIC MANHOLE	M.O.D.	MOTOR OPERATED DAMPER	UL	UNDERWRITERS LABORATORY
EP	EXPLOSION PROOF	MS	MOTOR STARTER	U.O.N.	UNLESS OTHERWISE NOTED
EUH	ELECTRIC UNIT HEATER	MTD.	MOUNTED	UT	UNDERGROUND TELEPHONE
E.W.	EACH WAY	N/A	NOT APPLICABLE	UV	ULTRAVIOLET
EX	EXISTING TO REMAIN	N.C.	NORMALLY CLOSED	٧	VOLT
EXH	EXHAUST FAN	NEC	NATIONAL ELECTRICAL CODE	VAC	VOLTS ALTERNATING CIRCUIT
FU	FUSE	NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION	VFD	VARIABLE FREQUENCY DRIVE
FRE	FIBERGLASS REINFORCED EPOXY	NID	NETWORK INTERFACE DEVICE (4 POSITION)	VS	VOLTMETER SELECTOR SWITCH
G.C.	GENERAL CONTRACTOR	N.O.	NORMALLY OPEN	W	WIRE
GEN	GENERATOR	NO.	NUMBER	W/	WITH
GFCI	GROUND FAULT CIRCUIT INTERRUPTER	NPT	NOMINAL PIPE THREADS	WP	WEATHERPROOF
GND. OR GRD.	GROUND	OE	OVERHEAD ELECTRIC	XFMR	TRANSFORMER

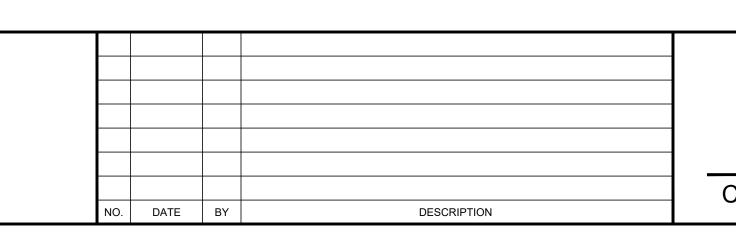
GENERAL NOTES:

- A. DRAWINGS ARE DIAGRAMMATIC IN NATURE, CONTRACTOR SHALL VERIFY DIMENSIONS PRIOR TO INSTALLATION. CONTRACTOR SHALL COORDINATE ALL WORK WITH OTHER DIVISION TRADES TO PROVIDE A COMPLETE AND OPERABLE SYSTEM. LOCATE FIXTURES, DEVICES, ETC. IN ORDER TO AVOID INTERFERENCES.
- B. ALL WORK SHALL BE PERFORMED AS REQUIRED BY APPLICABLE SECTION OF THE NATIONAL ELECTRICAL CODE, LATEST EDITION, AND
- ALL GOVERNING LOCAL CODES, LAWS, AND/OR REGULATIONS. C. SYSTEM AND EQUIPMENT GROUNDING CONTINUITY SHALL BE ASSURED AS REQUIRED BY APPLICABLE SECTIONS OF THE NATIONAL
- ELECTRICAL CODE. D. ALL WIRING SHALL BE TYPE "THHN-THWN" U.O.N.; MINIMUM WIRING SHALL BE #12 (POWER WIRE). ALL WIRE SHALL BE COPPER. MINIMUM CONDUIT SIZE FOR METALLIC CONDUIT TO BE 3/4" AND 1" FOR PVC.
- E. ALL CIRCUIT PROTECTIVE DEVICES SHALL HAVE THE REQUIRED RATING INTERRUPTING CAPACITY EQUAL TO OR GREATER THAN THE AVAILABLE SHORT-CIRCUIT CURRENT AT ITS SUPPLY TERMINAL; MINIMUM INTERRUPTING CAPACITY. SHALL BE 10,000 AMPS, SYMMETRICAL A.I.C. FOR 120/208V SYSTEMS AND 14,000 AMPS, SYMMETRICAL A.I.C. FOR 277/480V SYSTEMS. REFER TO PANEL
- F. ALL OUTDOOR EXPOSED CONDUIT TO BE RIGID GALVANIZED STEEL. TRANSITION FROM UNDERGROUND TO EXPOSED SHALL BE RIGID
- G. ALL UNDERGROUND CONDUITS TO BE SCHEDULE 40 PVC UNLESS OTHERWISE INDICATED. ALL CONDUITS SHALL INCLUDE A NYLON

100% SUBMITTAL FOR REVIEW, NOT FOR CONSTRUCTION







UNION STREET IMPROVEMENTS CITY OF CONCORD CABARRUS COUNTY, NORTH CAROLINA

N.HUFFMAN

P.FISHER

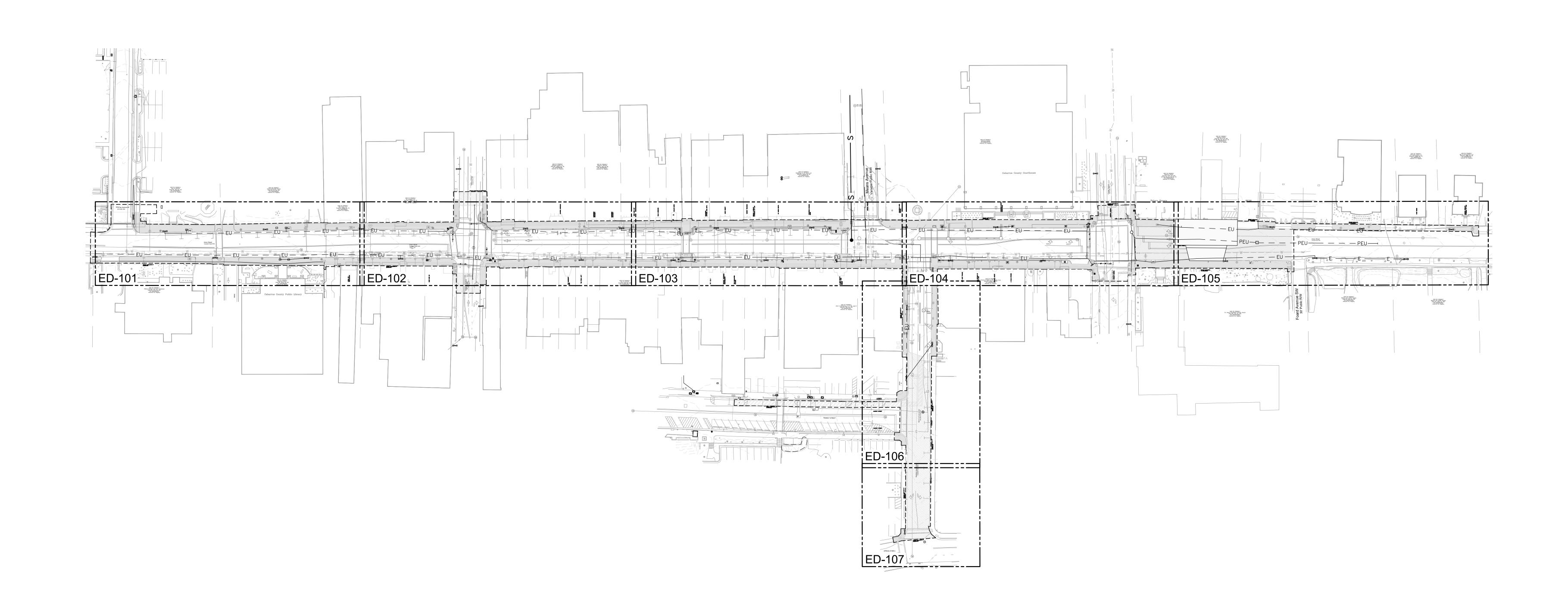
NOT TO	SCALE	ELECTRICAL LEGEND, NOTES, SCHEDULES, AND ABBREVIATIONS
OFFICE MANAGER	DESIGNER	ŕ
D.G. CHAPMAN	W.FLEMING	

MAY 2021

19.01726

E-001

SHEET



DESCRIPTION

NO. DATE BY

SHEET

ED-100

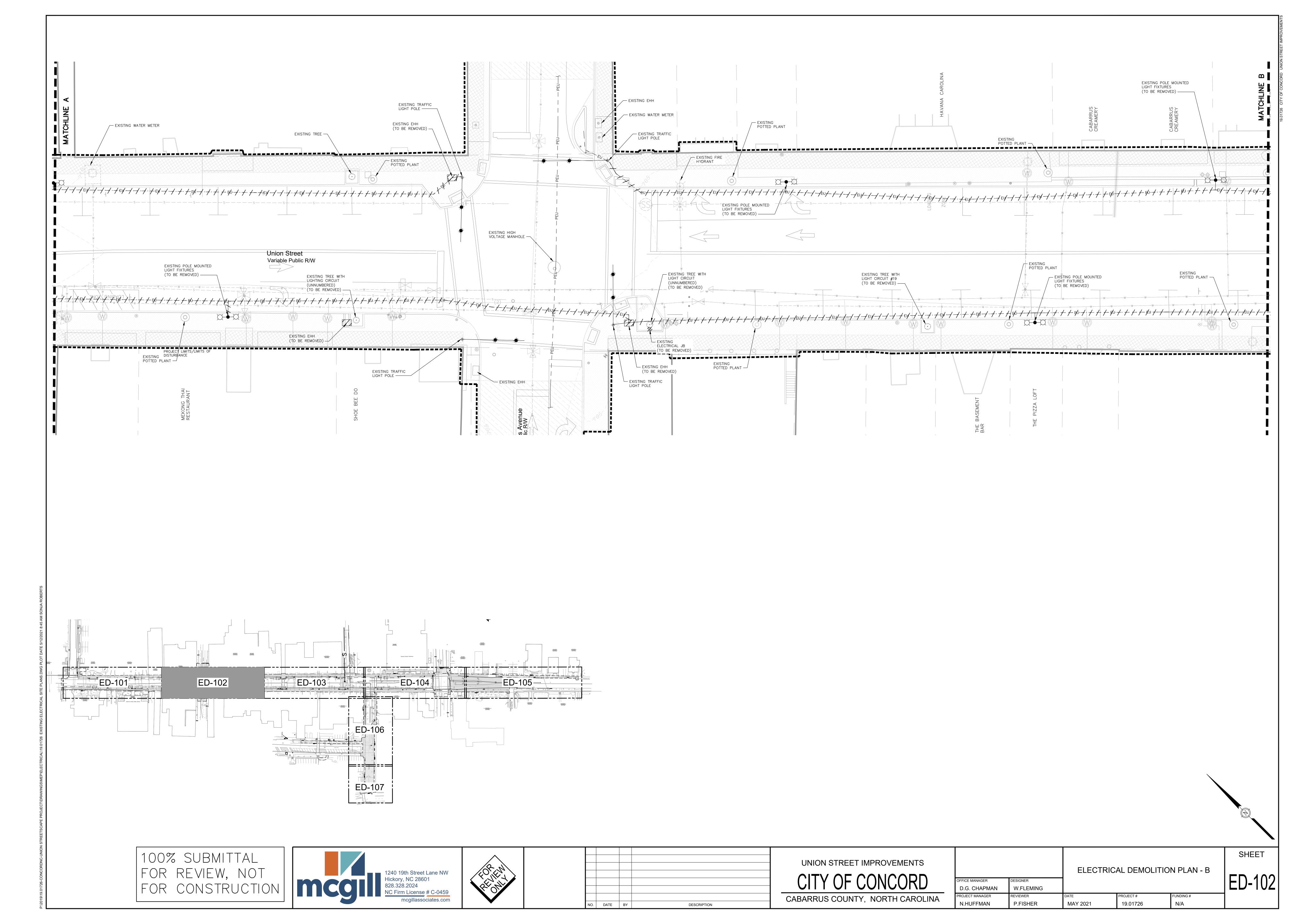


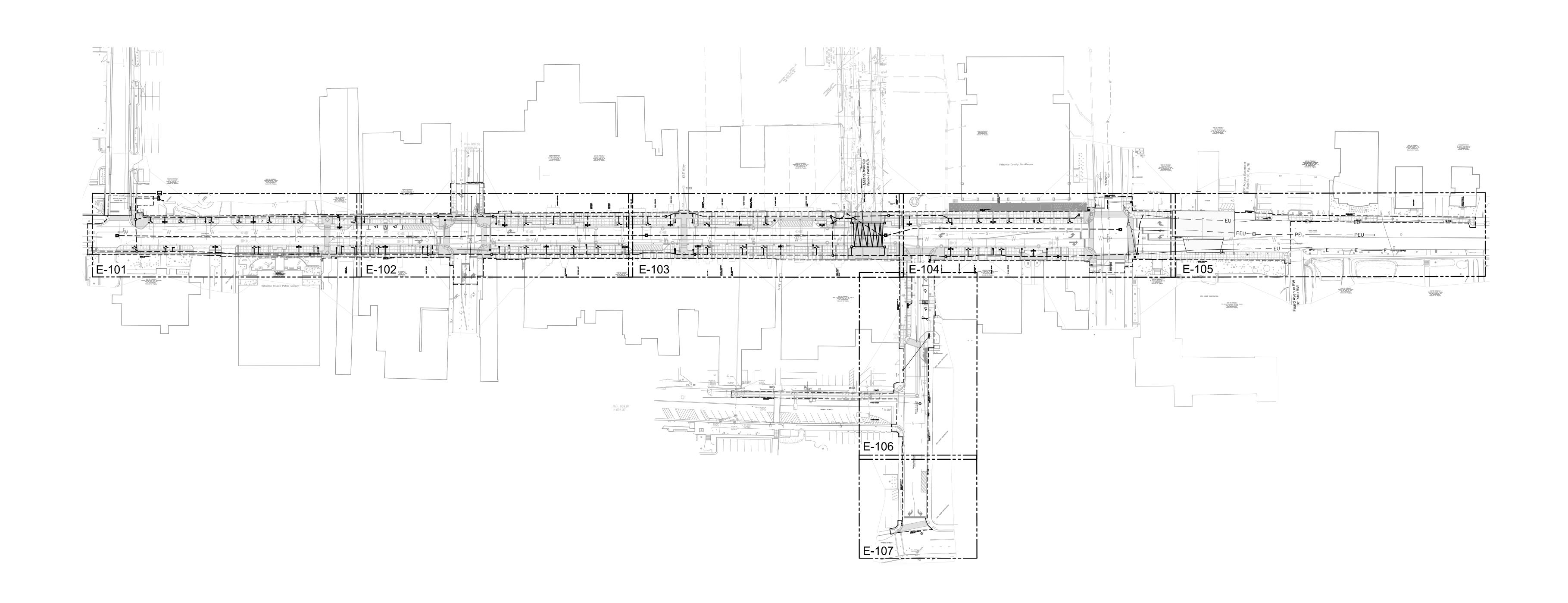


UNION STREET IMPROVEMENTS
CITY OF CONCORD
CABARRUS COUNTY, NORTH CAROL

D.G. CHAPMAN

N.HUFFMAN

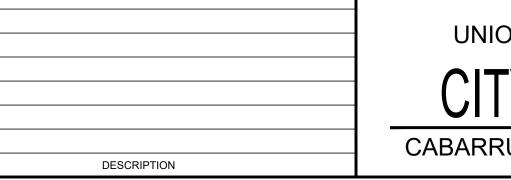








NO. DATE BY





10 GRAPHIC SCALE			0 ALUE = 10	20 FEET		ELEC
OFFICE MANAGER D.G. CHAPM	1AN	DESIGN W.FI	ER L EMING			
PROJECT MANAGE	R	REVIEW	ER		DATE	

P.FISHER

N.HUFFMAN

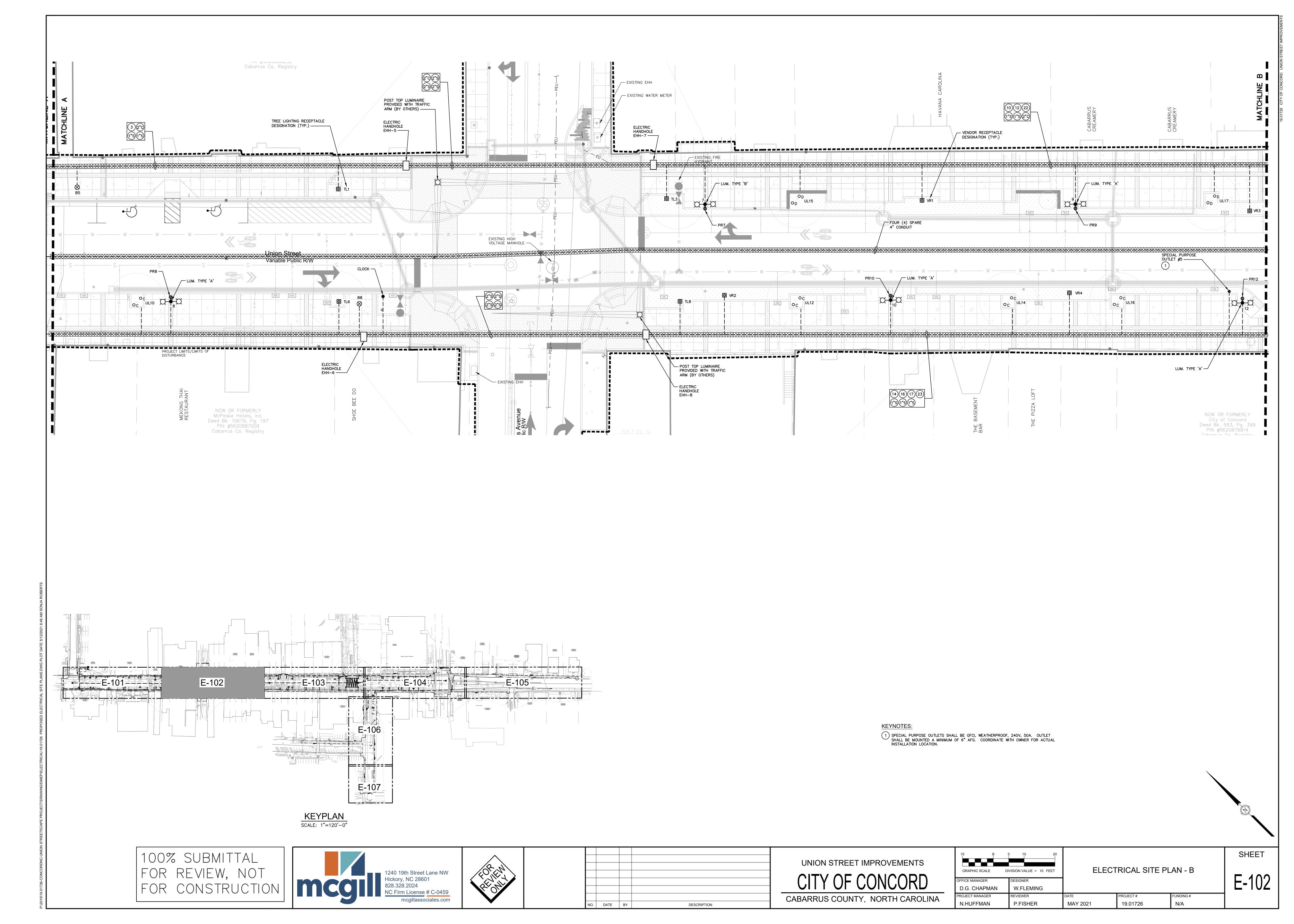
ECTRICAL OVERALL SITE PLAN

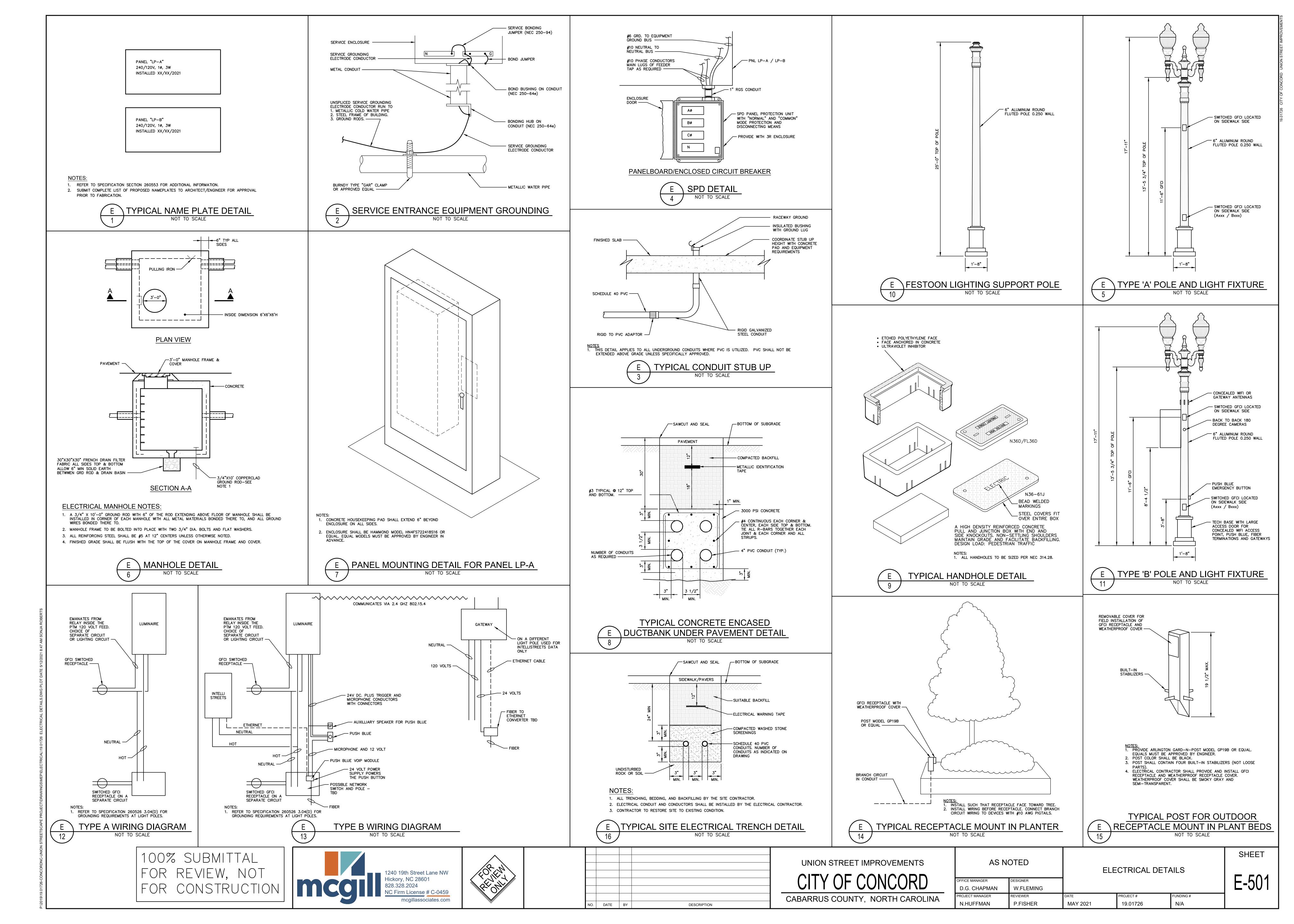
19.01726

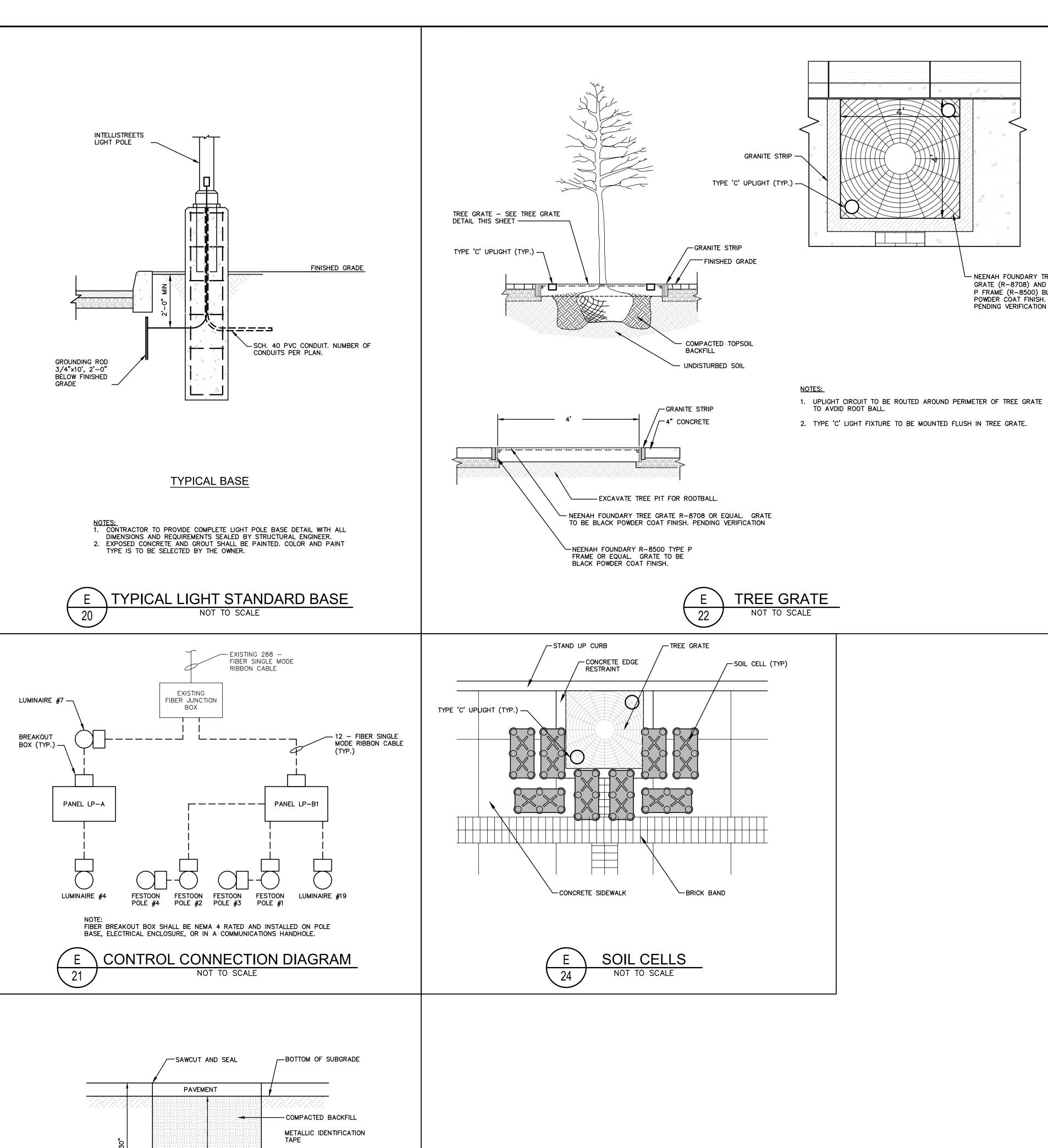
MAY 2021

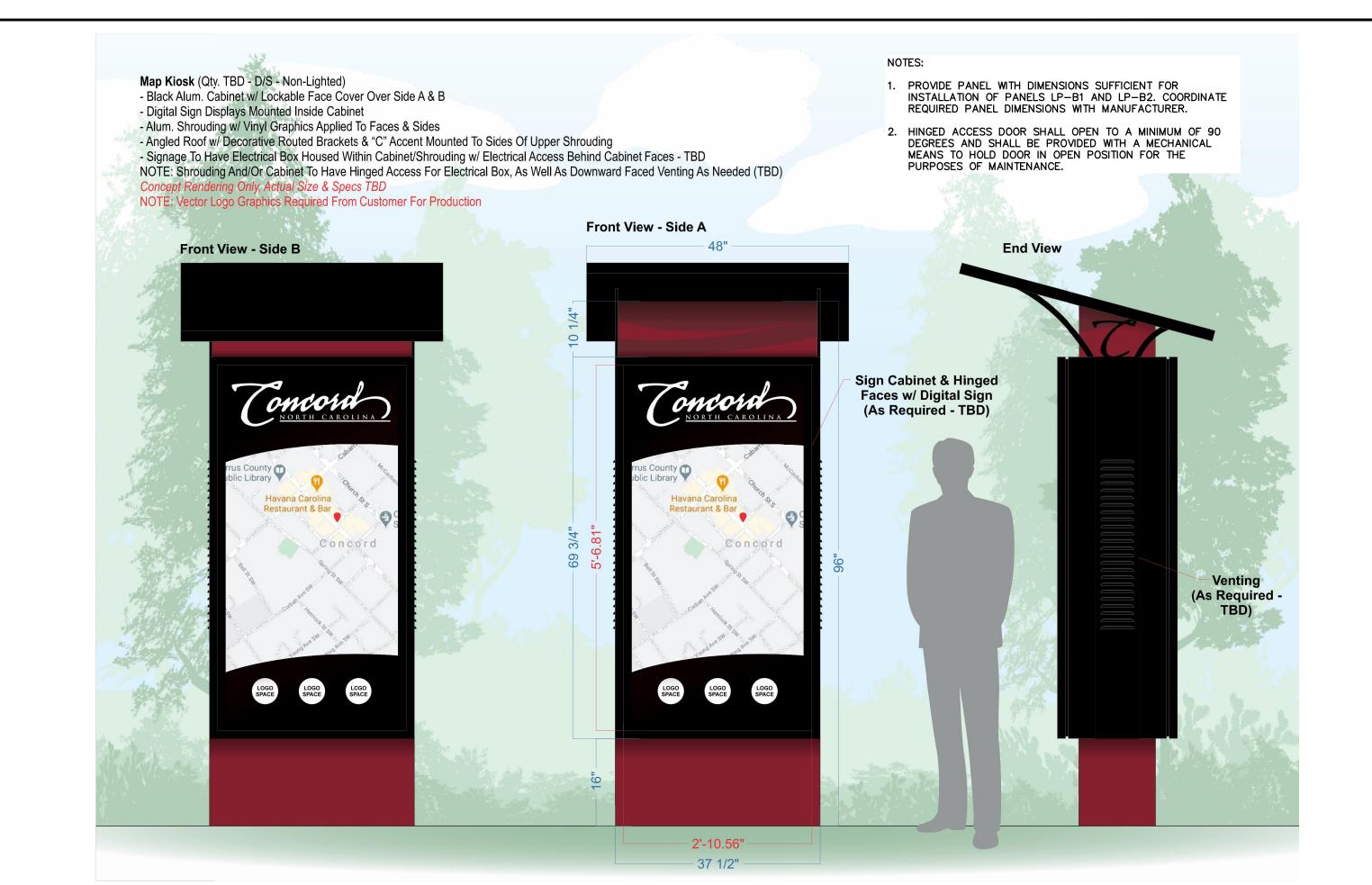
E-100

SHEET

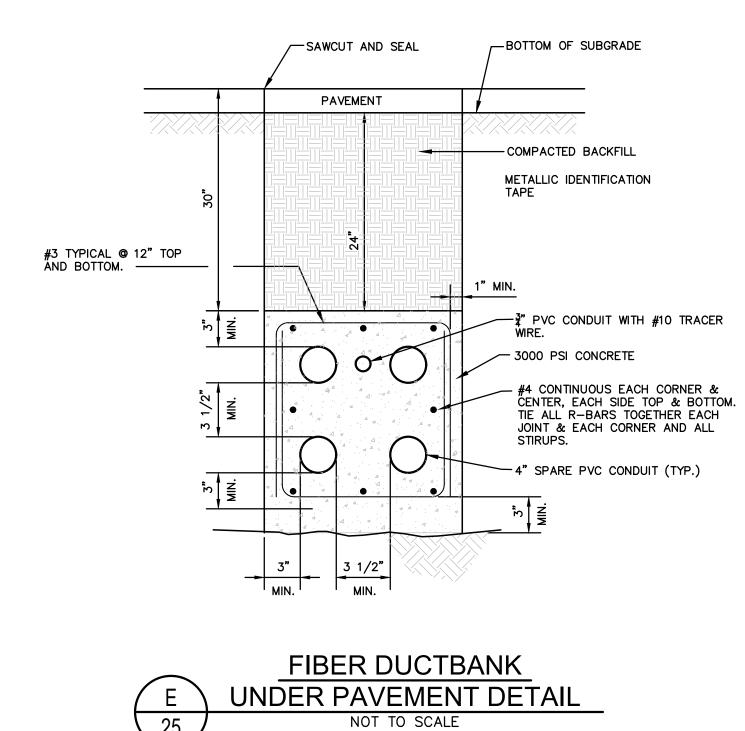








KIOSK PANEL NOT TO SCALE



100% SUBMITTAL FOR REVIEW, NOT FOR CONSTRUCTION





				_
				CAB
NO.	DATE	BY	DESCRIPTION	

NEENAH FOUNDARY TREE
GRATE (R-8708) AND TYPE
P FRAME (R-8500) BLACK
POWDER COAT FINISH.

PENDING VERIFICATION

UNION STREET IMPROVEMENTS
CITY OF CONCORD
CABARRUS COUNTY, NORTH CAROLINA

AS N	OTED	ELE	SHEET		
OFFICE MANAGER D.G. CHAPMAN	DESIGNER W.FLEMING				E-502
PROJECT MANAGER N.HUFFMAN	REVIEWER P.FISHER	MAY 2021	PROJECT# 19.01726	FUNDING # N/A	



CITY OF CONCORD 2
ELECTRIC SERVICE

METERBASE

PANEL LP-B1

PANEL LP-B2

PROPOSED ONE-LINE-B

NOT TO SCALE

NOTES

(BY CONTRACTOR)

NEMA 3R SERVICE RATED

NEMA 3R

- EXISTING HANDHOLE

- MAIN BONDING JUMPER

NO. 1/0 AWG

SPD

240/120, 3W, 1ø

MOUNTED ON UTILITY TRANSFORMER

3#500, EXISTING CONDUIT

3#500, 3 1/2" C —

GROUND RODS MINIMUM 10' APART

#1/0 GROUNDING ELECTRODE CONDUCTOR

IN 1 1/4" C ———

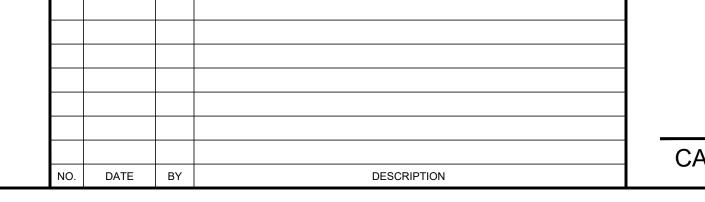
3/4"x10' COPPER CLAD

STEEL GROUND ROD

LOAD

ENCLOSURE ---







ELECTRICAL SCHEDULES AND DIAGRAMS			
7			
DATE	PROJECT#	FUNDING #	
MAY 2021 19.01726 N/A			
	DATE	AND DIAGRAMS DATE PROJECT #	

SHEET E-601

1	20	50	1	2#8	#12	1"	600V	LP-A-1	PR1, B1, PR3, B3, PR5, B5		
2	20	35	1	2#10	#12	1"	600V	LP-A-3	UL 1,3,5,7		
3	20	50	1	2#8	#12	1"	600V	LP-A-5	UL 9,11,13, TL1		
4	20	50	1	2#8	#12	1"	600V	LP-A-7	PR2, B2, PR4, B4, PR6		
5	20	65	1	2#6	#12	1"	600V	LP-A-9	B6, PR8, B8		
6	20	50	1	2#8	#12	1"	600V	LP-A-11	UL 2,4,6, TL2,4		
7	20	65	1	2#6	#12	1"	600V	LP-A-13	UL8,10, TL6		
8	20	50	1	2#8	#12	1"	600V	LP-A-2,4	Lights 1,3,5		
9	20	65	1	2#6	#12	1"	600V	LP-A-6,8	Lights 2,4,6,8		
10	20	65	1	2#6	#12	1"	600V	LP-B1-1	PR7, VR1, PR9, VR3, PR11		
11	20	50	1	2#8	#12	1"	600V	LP-B1-3	VR5, PR13, VR7, PR15		
12	20	65	1	2#6	#12	1"	600V	LP-B1-5	TL3, UL15,17,19, TL5		
13	20	35	1	2#10	#12	1"	600V	LP-B1-7	TL7, UL21,23		
14	20	65	1	2#6	#12	1"	600V	LP-B1-9	VR2, PR10, VR4, PR12		
15	20	50	1	2#8	#12	1"	600V	LP-B1-11	PR14, VR6, PR16, VR8		
16	20	65	1	2#6	#12	1"	600V	LP-B1-13	TL8, UL12,14,16, TL10		
17	20	35	1	2#10	#12	1"	600V	LP-B1-15	TL12, UL18,20,22,24		
18	20	50	1	2#8	#12	1"	600V	LP-B1-17	PR17, B7, PR19, B9		
19	20	50	1	2#8	#12	1"	600V	LP-B1-19	UL 25,27,29,31,33		
20	20	65	1	2#6	#12	1"	600V	LP-B1-21	PR22, PR21, PR18, B10, PR20,		
21	20	65	1	2#6	#12	1"	600V	LP-B1-23	UL 26,28, TL 14,16		
22	30	65	1	2#6	#12	1"	600V	LP-B1-2,4	Lights 7,9,11,13,15		
23	20	65	1	2#6	#12	1"	600V	LP-B1-6,8	Lights 10,12,14,16		
24	20	50	1	2#8	#12	1"	600V	LP-B1-10,12	Lights 17,19		
25	20	50	1	2#8	#12	1"	600V	LP-B1-14,16	Lights 18,20,21,22		
26											
27	20	25	1	2#12	#12	1"	600V	LP-A-19	Clock		
28	50	65	1	3#6	#10	1"	600V	LP-A-10,12	Special Outlet 1		
29	50	65	1	3#6	#10	1"	600V	LP-B2-1,3	Special Outlet 2		
30	50	65	1	3#6	#10	1"	600V	LP-B2-5,7	Special Outlet 3		
31	50	65	1	3#6	#10	1"	600V	LP-B2-9,11	Special Outlet 4		
32	50	65	1	3#6	#10	1"	600V	LP-B2-13,15	Special Outlet 5		
33	50	65	1	3#6	#10	1"	600V	LP-B2-17,19	Special Outlet 6		
	20	25						LP-B1-18	Festoon Pole #1		
34	20	25	1	6#12	#12	1"	600V	LP-B1-20	Festoon Pole #1	THREE CIRCUITS IN	
	20	25						LP-B1-22	Festoon Pole #1	SINGLE CONDUIT	
	20	25						LP-B1-24	Festoon Pole #2		
35	20	25	1	6#12	#12	1"	600V	LP-B1-26	Festoon Pole #2	THREE CIRCUITS IN	
	20	25						LP-B1-28	Festoon Pole #2	SINGLE CONDUIT	
	20	25						LP-B1-30	Festoon Pole #3		
36	20	25	1	6#12	#12	1"	600V	LP-B1-32	Festoon Pole #3	THREE CIRCUITS IN	
	20	25						LP-B1-34	Festoon Pole #3	SINGLE CONDUIT	
	20	25						LP-B1-36	Festoon Pole #4		
37	20	25	1	6#12	#12	1"	600V	LP-B1-38	Festoon Pole #4	THREE CIRCUITS IN	
	20	25						LP-B1-40	Festoon Pole #4	SINGLE CONDUIT	
						I			. 20000 0.0		

FEEDER SCHEDULE

CLASS

CIRCUIT

GROUND CONDUIT VOLTAGE

CITY OF CONCORD 1

SERVICE RATED

NO. 1/0 AWG

SPD

- MAIN BONDING JUMPER

240/120, 3W, 1ø

METERBASE

PANEL LP-A

PROPOSED ONE-LINE-A

NOT TO SCALE

(BY CONTRACTOR)

SERVICE CONDUCTORS

3#500, 3 1/2" C —

GROUND RODS

MINIMUM 10' APART

BY UTILITY (CONDUIT BY CONTRACTOR) ——

#1/0 GROUNDING ELECTRODE CONDUCTOR

IN 1 1/4" C ———

STEEL GROUND ROD

3/4"x10' COPPER CLAD

OCPD CO

CONDUCTOR RATING NO. OF PARALLEL SETS

PHASE/ NEUTRAL

TYPE	MANUFACTURER			CAT	ALOG N	UMBER	1	۱٥.	LAM TYPE		INPUT WATTS	MT. HEIGHT	REMARKS VOLTS		
Α	Illuminating Concepts			910 Intellis	treets 3/	s 3A–1R–35T MDL–03, A–1R–35T MDL–03 SLAVE, 5/GFI, NA		19	LED	40	92	14'	HISTORIC LED MULTI-MEDIA POST TOP LUMINAIRE ASSEMBLY WITH EMBEDDED TECHNOLOGY, HISTORIC LED SLAVE POST TOP LUMINAIRES MATCHING THAT ARE NON- INTELLISTREETS, SWITCHED RECEPTACLE - FOR POLE MOUNTING OF 0UTLET - 2 PER POLE, HISTORIC POLE - 14 FOOT TALL 6" DIAMETER STRAIGHT FLUTED, TWIN ARM HISTORIC SIDE MOUNT (OWNER FURNISHED)		
В	Illuminating Concepts	A-1130A - 9 ⁻ IS -360-C,	10 Intel	llistreets 3A IS-LED-BA	-1R-35	.—03 driver—MASTER, iT MDL—03 SLAVE, IS—PTM — slot, IS—GW, DUAL PORT MANA 14,, NA	C360, AGED,	3	LED	40	657		HISTORIC LED MULTI-MEDIA POST TOP LUMINAIRE ASSEMBLY WITH EMBEDDED TECHNOLOGY, HISTORIC LED SLAVE POST TOP LUMINAIRES MATCHING THAT ARE NON— INTELLISTREETS, INTELLISTREETS MULTI-MEDIA HOUSING WITH TWO 180 DEGREE CAMERAS AND MOUNTING ARM, INSTALL CAMERAS IN I—SLOT, NOTIFICATION BUTTON WITH TWO WAY HANDS FREE TALK AND INTELLISTREETS CONNECTIONS FOR ALERTS, 24" X 48" DOUBLE SIDED LED BANNER WITH 4MM PITCH, AUTO-DIM, CLOUD BASED SOFTWARE, i—SLOT INSERTS INTO POLE FOR CAMERAS, GATEWAYS AND PUSH BLUE,GATEWAY FOR MULTI-MEDIA ECM — 4G — EXCLUDES MODEM, MODEM FOR EITHER MULTI-MEDIA — OR — ON OFF DIM CELLULAR — 4G, SWITCHED RECEPTACLE — FOR POLE MOUNTING OF OUTLET — 2 PER POLE, HISTORIC POLE — 14 FOOT TALL 6" DIAMETER STRAIGHT FLUTED, TWIN ARM HISTORIC SIDE MOUNT (OWNER FURNISHED)		
С	Targetti We—ef (or Equal)			KPLM-4	1–HE–F 611–31	L-L2-40- 21			LED		14 18	FLUSH IN TREE GRATE	UP LIGHTING 120		
D	Hadco (or Equal)			B9-D-	C-A-SP	P1-19WATT			LED		19	GROUND LEVEL	UP LIGHTING 120		
	BUS AMP PHASE NEMA TYPE	1 3R	. A.I.C WIRE _	3		BREAKER 400A VOLTAGE 240/120								VOLTAGE 240 TE: FEED-THRU LUGS.	
R I	LOAD (KW) WIRE A B NO SIZE		COND SIZE	GND. SIZE SIZI	WIRE NO	LOAD (KW) BREAKER A B POLES AMP	DESCRIF	PTION		СКТ		СКТ	DESCRIPTION BREAKER LOAD (KW) WIRE GND. COND COND GND. AMP POLES A B NO SIZE SIZE SIZE SIZE SIZE SIZE	WIRE LOAD (KW) BRE	EAKE A
1	0.7 2 10	12 1	1	12 10		0.8 2 20				2		1 F	R7, VR1, PR9, VR3, PR11 20 1 0.48 2 8 12 1 1 10	6 3 1.8 2	3
	- 					+ + + + - +	LIGHTS	1,3,5)	\vdash					\vdash

VR5, PR13, VR7, PR15

TL3, UL15,17,19, TL5

TL7, UL21,23

VR2, PR10, VR4, PR12

PR14, VR6, PR16, VR8

TL8, UL12,14,16, TL10

TL12, UL18,20,22,24

PR17, B7, PR19, B9

UL 25,27,29,31,33

UL 26,28, TL 14,16

SPARE

SPARE

SPARE SPARE

SPARE

TVSS (150kA)

SUB-TOTAL LOAD KW

20 1 0.54 2 10 12

20 1 0.54 2 8 12 1

20 1 1.32 2 10 12 1

20 1 1.56 2 8 12 1

30 2 - 3 10 10 3/4

4.56 6.48

20 1 1.32 2 10 12

21 PR22, PR21, PR18, B10, PR20, 20 1 0.66 2 8 12 1

20 1 1.08 2 8

LUMINAIRE SCHEDULE

	MOUNTING		CE			•	PHASE	400A 1			22,000		MAIN E	REAK VOLT		$\overline{}$	00A 0/120	<u>.</u>	
	LOCATION	I ELECT	RICAL (CABINI	ET	. NEM	IA TYPE	3R	-										
СКТ	DESCRIPTION	BREA		LOAD	(KW)		/IRE	GND.	COND	COND	GND.		IRE	LOAD			AKER	DESCRIPTION	СКТ
1	PR1, B1, PR3, B3, PR5, B5	20	POLES 1	0.7	В	NO 2	SIZE 10	SIZE 12	SIZE 1	SIZE 1	SIZE 12	SIZE 10	NO 3	0.8	В	POLES 2	20		2
3	UL 1,3,5,7	20	1	0.7	0.5	2	10	12	1		12	10	, , , , , , , , , , , , , , , , , , ,	0.0	0.8		20	LIGHTS 1,3,5	4
5	UL 9,11,13, TL1	20	1	0.5	0.5	2	10	12	1	1	12	8	3	1.4	0.0	2	20		6
7	PR2, B2, PR4, B4, PR6	20	1	0.0	0.5	2	10	12	1		12			17	1.4			LIGHTS 2,4,6,8	8
9	B6, PR8, B8	20	1	0.4	0.5	2	10	12	1	1	10	8	3	1.4	1	2	50		10
11	UL 2,4,6, TL 2,4	20	1	0.4	0.5	2	10	12	1		10	<u> </u>		17	1.4			SPECIAL PURPOSE OUTLET 1	12
13	UL 8,10 TL6	20	1	0.5	0.0	2	12	12	3/4	1				0.4	1	2	50		14
15	GAZEBO LIGHTING *	20	1	0.0	_	2	12	12	3/4	· ·				0.1	0.4			SPARE	16
17	MONUMENT LIGHTING *	20	1	_		2	12	12	3/4					_	0	2	20		18
19	CLOCK	20	1		0.2	2	12	12	3/4						_	_		SPARE	20
21	SPARE	20	1	_	V	_			, ,	1				_		2	20		22
23	SPARE	20	1		_										_			SPARE	24
25	SPARE	20	1	_										_		2	20		26
27	SPARE	20	1		_										_			SPARE	28
29	SPARE	20	1	-										_		2	20		30
31	SPARE	20	1		_										_			SPARE	32
33	SPARE	20	1	-										-		2	20		34
35	SPARE	20	1		-										-			SPARE	36
37	SPARE	20	1	-										-		1	20	SPARE	38
39	SPARE	20	1		-					3/4	10	10	3		-	2	30		40
41	SPARE	20	1	-										-				TVSS (150kA)	42
1.									1		laun ===		5 1011						
E	SUB-TOTAL LOAD KW	1		2.1	1.8		<u> </u>	ļ			SUB-TOTAL LO		ט KW	4.1 6.2					

					—					
*	INDICATES EXISTIN	CIRCUIT	RECONNECTED	IN	NEW	PANEL.	EXTEND	CIRCUIT	AS NECESSARY.	•

	PANE MOUNTIN LOCATIO		CE			•	US AMP PHASE 1A TYPE	•		MIN. A.I.C. WIRE	3	-	MAIN B	REAK VOLT)/120		
СКТ	DESCRIPTION	BREA	KER	LOAD	(KW)	W	/IRE	GND.	COND	COND	GND.	W	IRE	LOAD	(KW)	BRE	AKER	DESCRIPTION	
+		AMP	POLES		В	NO	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	NO	Α	В	POLES	AMP		\dashv
1	SPECIAL PURPOSE OUTLET 2	50	2	1.44		3	8	10	1					-		1	20	SPARE	
3					1.44		10		1						-	1	20	SPARE	
5	SPECIAL PURPOSE	50	2	1.44		3	10	10	1					-		1	20	SPARE	
7	OUTLET 3				1.44		8		1						-	1	20	SPARE	
9	CDECIAL DUDDOCE	50	2	1.44		3	8	10	1					-		1	20	SPARE	
11	SPECIAL PURPOSE OUTLET 4				1.44		10		1						-	1	20	SPARE	
13		50	2	1.44		3	10	10	1					-		1	20	SPARE	
15	SPECIAL PURPOSE OUTLET 5				1.44		10		1						-	1	20	SPARE	
17		50	2	1.44		3	10	10	1					-		1	20	SPARE	
19	SPECIAL PURPOSE OUTLET 6				1.44		10		1						-	1	20	SPARE	
21	SPACE - PFFB																	SPACE - PFFB	
23	SPACE - PFFB																	SPACE - PFFB	
25	SPACE - PFFB																	SPACE - PFFB	
27	SPACE - PFFB																	SPACE - PFFB	
29	SPACE - PFFB																	SPACE - PFFB	
31	SPACE - PFFB																	SPACE - PFFB	
33	SPACE - PFFB																	SPACE - PFFB	
35	SPACE - PFFB																	SPACE - PFFB	
37	SPACE - PFFB																	SPACE - PFFB	\dashv
39	SPACE - PFFB	+																SPACE - PFFB	\dashv
41	SPACE - PFFB																	SPACE - PFFB	
	SPACE - PFFB						<u> </u>	<u> </u>		1	<u> </u>	<u> </u>				<u> </u>		SPACE - PFFB	

KEYNOTES:
1) COORDINATE ELECTRICAL SERVICE WITH ELECTRIC UTILITY. SERVICE CONDUCTOR BY ELECTRIC UTILITY. CONTRACTOR TO PROVIDE AND INSTALL 3 1/2" CONDUCTORS.
WITH PULL CORDS FOR SERVICE CONDUCTORS.

3 1.44 2 20

1.44

12 12 2 0.36 1 20

12 | 12 | 2 | 0.36 | 1 | 20 |

12 12 2 0.36 1 20

12 | 12 | 2 | 0.36 | 1 | 20 |

12 | 12 | 2 | 0.36 | 1 | 20 |

12 | 12 | 2 | 0.36 | 1 | 20 |

12 | 12 | 2 | 0.36 | 1 | 20 |

12 | 12 | 2 | 0.36 | 1 | 20 |

 SUB-TOTAL LOAD KW
 7.08
 7.08

 TOTAL LOAD KW
 11.6
 13.6

12 2 0.36 1 20

DESCRIPTION

Lights 7,9,11,13,15

Lights 10,12,14,16

Lights 17,19

Lights 18,20,21,22

FESTOON POLE 1

FESTOON POLE 1

FESTOON POLE 1

FESTOON POLE 2

FESTOON POLE 2

FESTOON POLE 2

FESTOON POLE 3

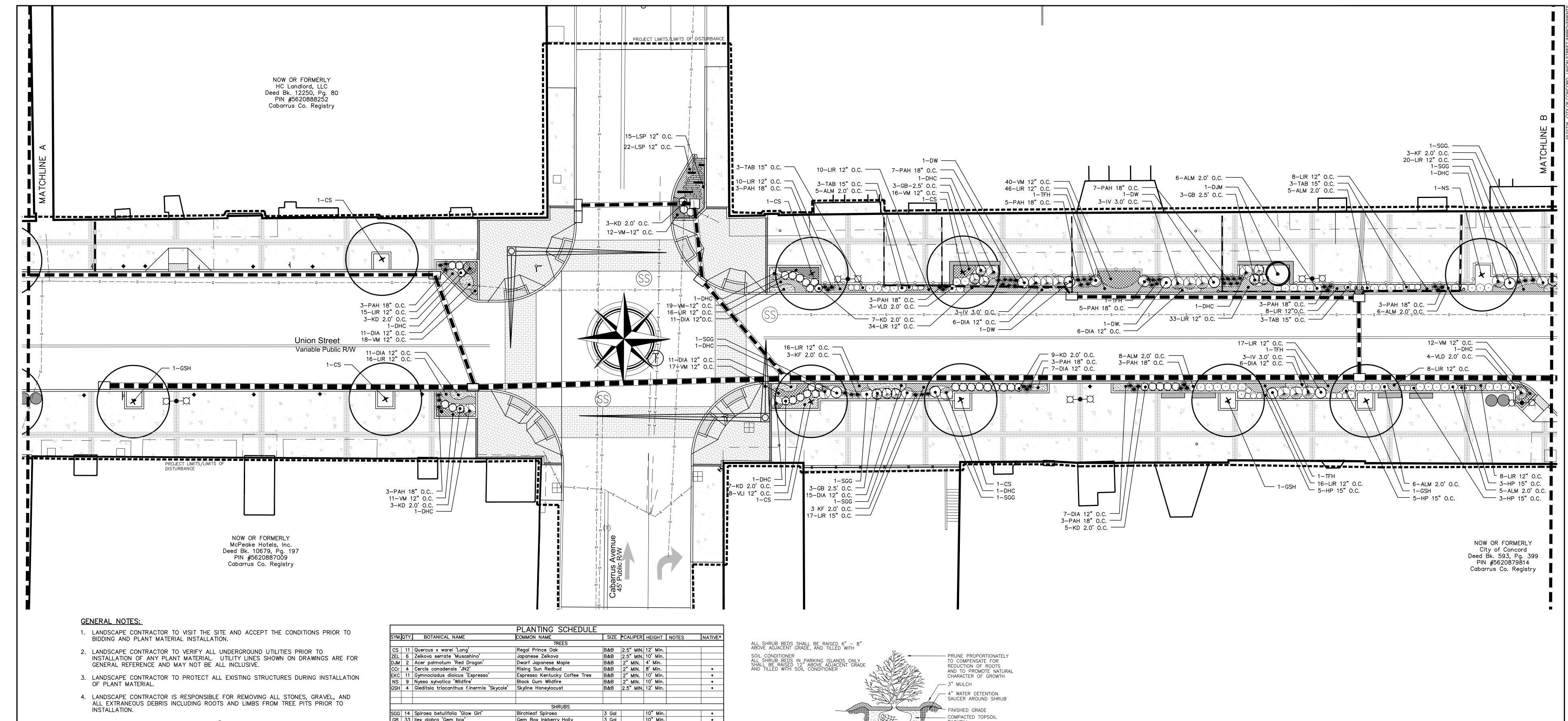
FESTOON POLE 3

FESTOON POLE 3 FESTOON POLE 4

FESTOON POLE 4

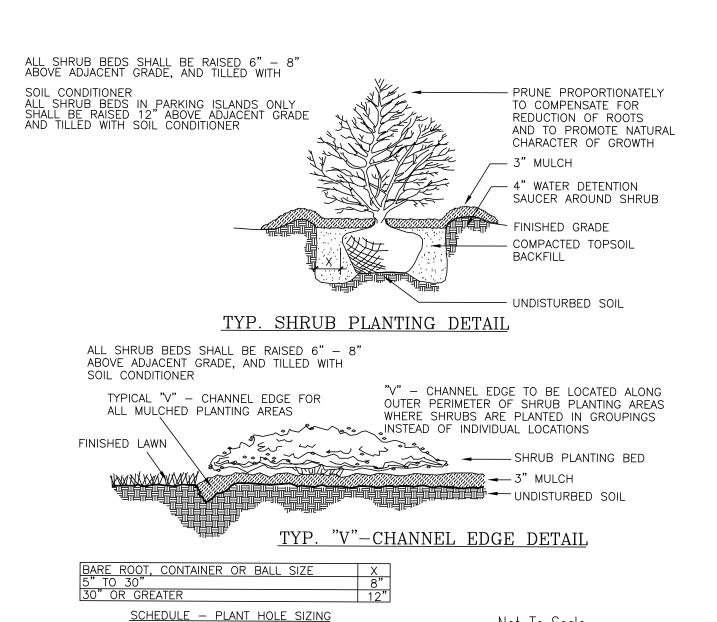
FESTOON POLE 4

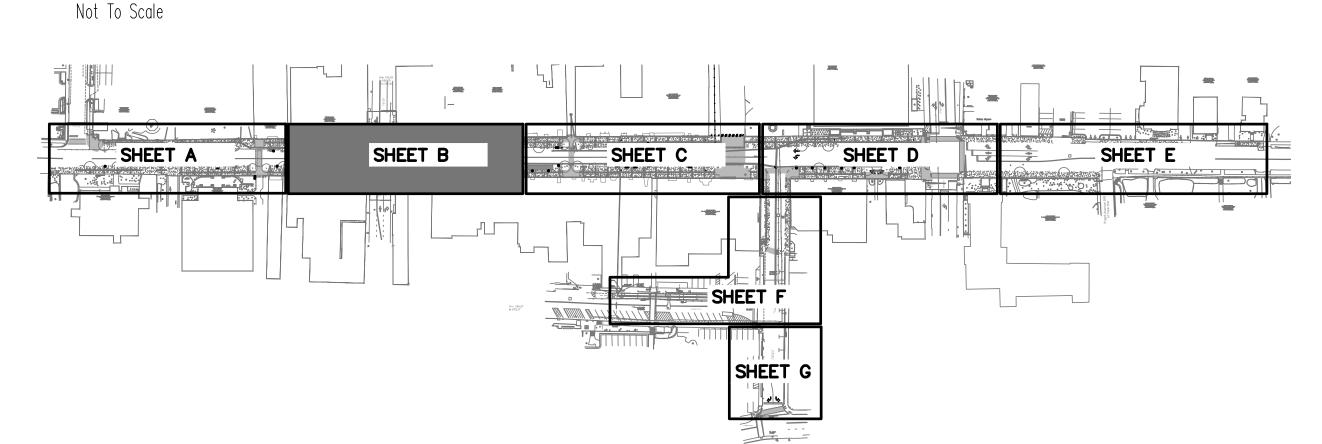
⁽²⁾ COORDINATE ELECTRICAL SERVICE WITH ELECTRIC UTILITY.



- 5. ALL PLANT BEDS TO BE COVERED WITH 3" CLEAN TRIPLE SHRED HARDWOOD MULCH IMMEDIATELY AFTER PLANTING.
- 6. TOP 6" OF ALL BEDS TO BE TILLED AND AMENDED WITH ORGANIC MATTER. TOP 6" OF TREE PITS TO BE AMENDED WITH ORGANIC MATTER AND WORKED INTO BACKFILL.
- 7. LANDSCAPE CONTRACTOR SHALL FURNISH ALL QUANTITIES NECESSARY TO COMPLETE PLANTINGS AS SHOWN/LOCATED ON DRAWINGS. QUANTITIES SHOWN ON PLANT LIST ARE FOR CONVENIENCE OF CONTRACTORS AND ARE BELIEVED TO BE SUBSTANTIALLY CORRECT, BUT ACCURACY OF QUANTITIES IN LIST IS NOT GUARANTEED.
- 8. LANDSCAPE CONTRACTOR TO GUARANTEE ALL PLANT MATERIAL AND WORK FOR A PERIOD OF ONE YEAR FROM ACCEPTANCE OF WORK BY OWNER.
- 9. ANY PLANT MATERIAL SUBSTITUTIONS OR ADJUSTMENTS ARE TO BE REQUESTED IN WRITING TO THE OWNER. NO SUBSTITUTIONS WILL BE PERMITTED WITHOUT WRITTEN NOTICE BY THE OWNER.
- 10. ALL PLANT MATERIAL TO CONFORM TO THE CURRENT EDITION OF "AMERICAN STANDARD FOR NURSERY STOCK".
- 11. ALL TREES TO BE LIMBED UP TO 6' MINIMUM CLEAR HEIGHT.
- 12. ALL TREES SHALL BE SPECIMEN QUALITY AND WELL SHAPED.
- 13. ALL TREES OF THE SAME VARIETY SHALL MATCH IN SHAPE, FORM AND SIZE WHERE THEY ARE TO BE INSTALLED IN GROUPS, ROWS, OR AS STREET TREES.

			PLANTING SCHEDULE					
SYM.	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	*CALIPER	HEIGHT	NOTES	NATIVE*
•			TREES					
cs	11	Quercus x warei 'Long'	Regal Prince Oak	B&B	2.5" MIN.	12' Min		
ZEL	6	Zelkova serrate 'Musashino'	Japanese Zelkova	B&B	2.5" MIN.			
DJM	2	Acer palmatum 'Red Dragon'	Dwarf Japanese Maple	B&B	2" MIN.	4' Min.		
CCr	4	Cercis canadensis 'JN2'	Rising Sun Redbud	B&B	2" MIN.	8' Min.		*
EKC	11	Gymnocladus dioicus 'Espresso'	Espresso Kentucky Coffee Tree	B&B	2" MIN.	10' Min		*
NS	9	Nyssa sylvatica 'Wildfire'	Black Gum Wildfire	B&B	2" MIN.	10' Min		*
GSH	4	Gleditsia triacanthus f.inermis 'Skycole'	Skyline Honeylocust	B&B	2.5" MIN.	12' Min		*
		•						
			SHRUBS				•	•
SGG	14	Spiraea betulifolia 'Glow Girl'	Birchleaf Spiraea	3 Gal		10" Mir	1.	*
GB	33	llex glabra 'Gem box'	Gem Box Inkberry Holly	3 Gal		10" Mir	1.	*
TAB	39	Thuja occidentalis 'Anna Van Vloten'	Anna's Magic Ball Arborvitae	3 Gal		10" Mir	1.	*
IV		Itea Virginica 'Henry's Garnet'	Virginia Sweetspire	1 Gal		8" Min.		*
LPP	6	Loropetalum chinense 'Peack'	Purple Pixie Weeping Loropetalum	3 Gal		8" Min.		
ALM	72	Aronia melonocarpa 'Low scape Mound'	Chokeberry	1 Gal		6" Min.		*
VLD		Viburnum cassinoides 'Lil Ditty'	Witherod Viburnum	1 Gal		8" Min.		*
DHC	17	Chamaecyparis obtusa 'Nana Gracilis'	Dwarf Hinoiki Cypress	3 Gal		10" Mir	1.	
KD	104	Cornus sericea 'Kelseyi'	Kelsey's Dwarf Red-Osier Dogwood	1 Gal		8" Min.		*
DW	4	Distylium hybrid 'BLDY01'	Jewel Box Distylium	3 Gal		8" Min.		
TFH	9	Hydrangea Paniculata 'Limelight'	Treeform Limelight Hydrangea	7 Gal		48" Mi	ո.	
		•						
<u> </u>		ORNAM	ENTAL GRASSES/PERENNIALS/GROUN	DCOVE	RS			•
KF	76	Calamagrostis acutiflora 'Karl Foerster'	Feather Reed Grass	1 Gal				
PAH	144	Pennisetum alopecuroides 'Hameln'	Dwarf Fountain Grass	1 Gal				
HP	50	Heuchera micrantha 'Palace Purple'	Heuchera Palace Purple	1 Gal				
СО	48	Coreposis	Tickseed	1 Gal				*
DIA	162	Dianthus gratianopolitanus 'Firewitch'	Firewitch Dianthus	Quart				
VLI	125	Liriope muscari 'Variegata'	Variegated Liriope	4"				
LIR	786	Liriope muscari 'Royal Purple'	Liriope	4"				
VM	445	Vinca Minor	Littleleaf Periwinkle	4"				
LSP	131	Liriope spicata	Creeping lilly turf	4"				





NCDOT REVIEW
SUBMITTAL. NOT
FOR CONSTRUCTION

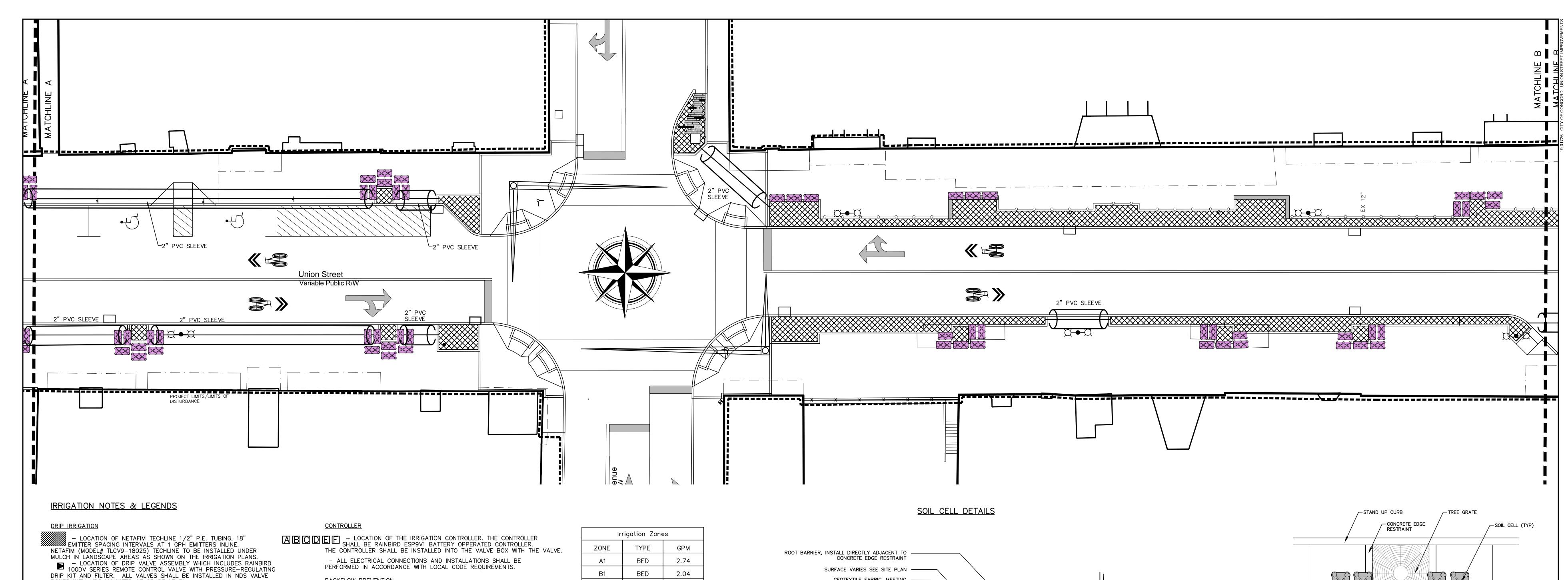


UNION STREET IMPROVEMENTS
CITY OF CONCORD
CABARRUS COUNTY, NORTH CAROLINA

	5 10 20 IVISION VALUE = 10 FEET DESIGNER	LAN	IDSCAPE PLAN	1 - B
D.G. CHAPMAN	C.L. CRANWILL			
PROJECT MANAGER	REVIEWER	DATE	PROJECT#	FUNDING #
M.J. NORRIS	B. ROARK	MAY 2021	19.01726	N/A

SHEET

L-102



BOXES WITH LIDS MOUNTED AT GRADE LEVEL.

- DENOTES ROUTE OF PR200 PVC LATERAL PIPING. SIZE OF LATERAL PIPING SHALL BE AS NOTED BELOW. MINIMUM DEPTH OF COVER OVER LATERAL PIPING TO BE 12". LATERAL PIPING SIZING SCHEDULE

SUMMATION OF GALLONAGE DEMAND ON THE PARTICULAR BRANCHES OF PIPE WITHIN A CONTROL SECTION SHALL BE DETERMINED BY USING THE GPM FOR A NOZZLE BASED ON A 50 PSI BASE OF HEAD PRESSURE AND FULL RADIUS AT THAT PRESSURE AS REPORTED IN THE RAINBIRD 2021 IRRIGATION PRODUCTS CATALOG. PIPE SIZES FOR THE LATERALS SHALL BE AS FOLLOWS:

ZERO TO FIFTEEN GPM ACCUMULATED FLOW USE 1" PR200 PVC PIPE GREATER THAN FIFTEEN UP TO THIRTY-FIVE GPM USE 1-1/2" PR200 PVC PIPE

FRICTION LOSS ALLOWANCES FOR THIS PROJECT HAVE BEEN DETERMINED USING THE ABOVE FLOW RANGES AND DEMANDS. - DENOTES ROUTE OF PR200 MAIN LINE PIPING. SIZE OF PIPE TO BE 1-1/2". MINIMUM DEPTH OF COVER OVER MAINLINE PIPING TO BE 18". - PIPING SHALL BE PR200 SOLVENT WELD PVC PIPE WITH SCHEDULE 40 PVC SOLVENT WELD FITTINGS UNLESS OTHERWISE NOTED. ALL PIPING RUNS SHALL BE "SNAKED" IN THE TRENCH DURING INSTALLATION TO PREVENT EXCESSIVE STRAIN DUE TO THERMAL EXPANSION OR CONTRACTION.

- THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO AVOID DAMAGING PLANTINGS (INCLUDING ROOTS) DURING INSTALLATION OF THE IRRIGATION SYSTEM AND SHALL COORDINATE HIS EFFORTS WITH THE LANDSCAPER AND LANDSCAPE ARCHITECT SO AS TO OPTIMIZE THE EFFICIENCY AND THE AESTHETIC QUALITY OF THE INSTALLATION.

HEAD RADII

- THE IRRIGATION CONTRACTOR SHALL ADJUST THE RADIUS AND THROW OF EACH SPRINKLER HEAD TO PROVIDE OPTIMUM COVERAGE WHILE MINIMIZING OVERSPRAY ONTO HARDSCAPES OR BUILDINGS. ADJUST HEADS TO ELIMINATE DRY SPOTS. - APPROXIMATE ARC AND RADIUS OF INDIVIDUAL SPRINKLER HEAD COVERAGE SHALL BE AS ILLUSTRATED. INDIVIDUAL HEAD OR NOZZLE MODEL NUMBERS MAY BE DEPENDENT UPON THESE SPECIFIC CHARACTERISTICS.

24 VAC CONTROL WIRING

- ALL 24 V.A.C. CONTROL WIRING SHALL BE SINGLE STRAND COPPER WIRE WITH POLYETHYLENE PE DIRECT BURIAL INSULATION RATED FOR 300 V.A.C. VALVE "COMMON" WIRES SHALL HAVE WHITE INSULATION WHILE VALVE "HOT" WIRES SHALL HAVE INSULATION RED IN COLOR. THE "COMMON" WIRES SHALL BE #14 AWG. "HOT" WIRES SHALL BE #14 AWG. VALVE WIRING SHALL FOLLÖW MAINLINE PIPING WHERE FEASIBLE AND SHALL BE LAID IN A COMMON TRENCHLINE WITH THE MAINLINE PIPING AND IN THE BOTTOM OF THE TRENCH. WIRING SHALL BE "BUNDLED" AND TAPED AT INTERVALS OF APPROXIMATELY TEN FEET ALL WIRING SHALL BE INSTALLED IN ACCORDANCE WITH LOCAL CODE REQUIREMENTS. - WIRE SPLICES SHALL BE KEPT TO AN ABSOLUTE MINIMUM. WHERE MAJOR CONCENTRATIONS OF SPLICES ARE NECESSARY SAID SPLICES SHALL BE PLACED IN A NDS VALVE BOX, WITH AN NDS COVER INSTALLED AT GRADE LEVEL. SPLICES AT VALVE LOCATIONS SHALL BE MADE INSIDE OF THE VALVE BOX. ALL SPLICE LOCATIONS SHALL BE NOTED ON THE AS BUILT PLAN. - WIRE RUNS SHALL BE INSTALLED WITH ENOUGH SLACK AND/OR OCCASIONAL EXPANSION LOOPS TO PREVENT EXCESSIVE STRAIN DUE TO THERMAL CONTRACTION. - ALL WIRE SPLICES SHALL BE MADE USING UL APPROVED DIRECT BURIAL CONNECTORS AND WATERPROOFING MATERIALS. ALL ELECTRICAL

WORK SHALL BE INSTALLED ACCORDING TO CODE.

BACKFLOW PREVENTION

- DENOTES THE LOCATION OF REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY. THE BACKFLOW SHALL BE THE CONTRACTOR'S RESPONSIBILITY. THE BACKFLOW SHALL BE 3/4" IN SIZE. THE BACKFLOW ASSEMBLY SHALL BE INSTALLED DOWNSTREAM OF THE IRRIGATION METER AS SHOWN ON THE LAYOUT. THE UNIT MUST BE INSTALLED IN ACCORDANCE WITH ALL LOCAL AND STATE CODE REQUIREMENTS AND SHALL HAVE APPROVED COVER.

WATER SUPPLY

(M) - DENOTES THE PROPOSED LOCATION OF THE IRRIGATION METER. THE METER SHALL BE THE GENERAL CONTRACTOR'S RESPONSIBILITY. THE METER SHALL BE 3/4" IN SIZE. SINCE THE WATER SUPPLY FOR THE SYSTEM SHALL BE POTABLE WATER, THE CONTRACTOR WILL BE REQUIRED TO INSTALL BACKFLOW PREVENTION DEVICE WHICH WILL BE LOCATED DOWNSTREAM OF THE IRRIGATION METER AS NOTED ON PLAN.

- THE IRRIGATION SYSTEM SHALL BE CAPABLE OF DELIVERING 30 GPM MAXIMUM WITH ONE STATION OPERATING WITH 50 PSI AT THE BASE OF THE HEAD FOR OPTIMUM PERFORMANCE OF THE IRRIGATION SYSTEM AS DESIGNED AND SPECIFIED.

* NOTE * - IF THE WATER SUPPLY IS NOT CAPABLE OF THE DESIGNED CAPACITY (FLOW AND/OR PRESSURE), THE IRRIGATION SYSTEM WILL NEED TO BE REDESIGNED, WHICH MAY ALTER THE IRRIGATION MATERIAL ESTIMATE.

<u>SLEEVING</u>

- DENOTES LOCATION OF PVC SLEEVES FOR $ldsymbol{oldsymbol{arPsi}}$ RRIGATION PIPING. SIZE OF SLEEVES TO BE AS NOTED. - WHERE IRRIGATION PIPING CROSSES SIDEWALKS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PLACING A SLEEVE 2 SIZES LARGER THAN THE PIPE THAT IS CROSSING,

- THE IRRIGATION CONTRACTOR SHALL COORDINATE THE INSTALLATION OF THE IRRIGATION SYSTEM WITH THE LANDSCAPE CONTRACTOR TO INSURE PROPER INSTALLATION OF BOTH THE IRRIGATION SYSTEM WITH THE LANDSCAPE AND HARDSCAPE.

NOTE: THE IRRIGATION SYSTEM IS DISPLAYED SCHEMATIC IN NATURE. THE IRRIGATION CONTRACTOR MAY BE REQUIRED TO MAKE MINOR ADJUSTMENTS IN THE FIELD. THESE MINOR ADJUSTMENTS SHALL BE MADE AT NO ADDITIONAL COST TO THE OWNER BUT SHALL BE MADE ONLY AFTER NOTIFICATION IS MADE TO THE OWNER OR HIS REPRESENTATIVE.

- THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE SITE SO THAT HE IS AWARE OF ANY SPECIAL CONDITIONS WHICH EXIST THAT MAY AFFECT HIS BID PROPOSAL AND SHALL THEREAFTER BE RESPONSIBLE FOR ALL COST INCURRED IN RELATION TO THE INSTALLATION.

- THIS DESIGN IS BASED ON THE SITE INFORMATION AND/OR DRAWINGS SUPPLIED BY THE CLIENT OF RECORD WITH DESIGN CRITERIA BEING SET BY THE CLIENT AND/OR PROJECT OWNER (I.E. AREA TO BE IRRIGATED, MANUFACTURER'S EQUIPMENT TO BE EMPLOYED, WATER SOURCE (LOCATION, FLOW & PRESSURE) CAPACITIES, ELECTRICAL POWER AVAILABILITY FOR IRRIGATION SYSTEM USE, ETC.). SMITH TURF & IRRIGATION BEARS NO RESPONSIBILITY OR LIABILITY FOR ANY ERRORS IN DESIGN OR APPLICATION WHICH MIGHT ARISE DUE TO INACCURACIES IN THE ABOVE REFERENCED INFORMATION SUPPLIED TO SMITH TURF & IRRIGATION IN RELATION TO THIS SPECIFIC PROJECT UNLESS OTHERWISE NOTED.

lrı	rigation Zone	es
ZONE	TYPE	GPM
A1	BED	2.74
B1	BED	2.04
C1	BED	7.46
D1	BED	4.7
E1	BED	11.1
F1	BED	3.28
Total		31.32

MAINLINE/LATERAL SHOWN ON PLAN IS DIAGRAMMATIC FOR CLARITY. ALL MAINLINE, LATERAL AND VALVES SHALL BE FIELD LOCATED OUTSIDE OF HARDSCAPE, FENCES AND OTHER UTILITIES.

NOTE

WHERE IRRIGATION MAINLINE/LATERAL LINE CROSSES HARDSCAPE THERE SHALL BE A SLEEVE 2 SIZES BIGGER. NOT ALL SLEEVES ARE SHOWN FOR CLARITY REASONS.

DEEPROOT UB 12-2 ROOT BARRIER, INSTALL ----

CONCRETE EDGE RESTRAINT

MANUFACTURER'S REQUIREMENTS, TO EDGE

CABLE TIE, ATTACHING GEOGRID TO SILVA CELL

GEOGRID, MEETING MANUFACTURER'S REQUIREMENTS-

COMPACTED BACKFILL, PER PROJECT SPECIFICATIONS -

NO. DATE BY

AT BASE OF UPPER LEG FLARE, AS NEEDED

ANCHORING SPIKES, CONTACT DEEPROOT -

GEOTEXTILE FABRIC, PLACED ABOVE SUBGRADE ——

PLANTING SOIL, PER PROJECT SPECIFICATIONS, -

PLACED IN LIFTS AND WALK-IN COMPACTED TO 75-85% PROCTOR

TO 95% PROCTOR

SOIL CELL: TREE GRATE /OPEN PLANTER

NOT TO SCALE

SUBGRADE, COMPACTED-

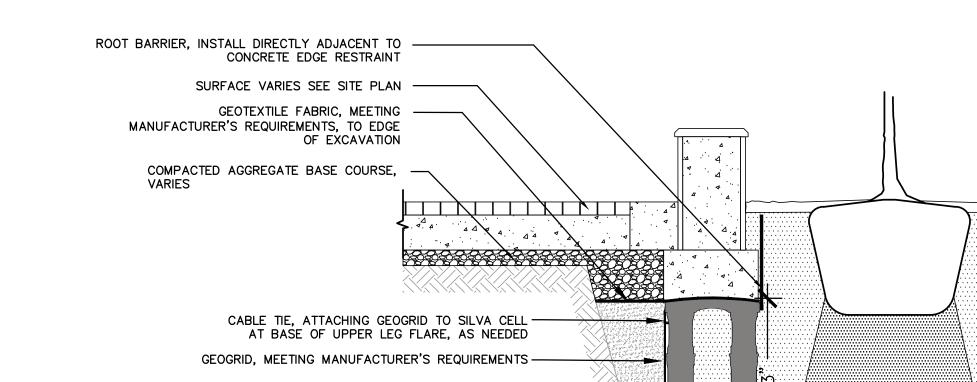
DESCRIPTION

SURFACE VARIES SEE SITE PLAN -----

GEOTEXTILE FABRIC, MEETING ----

OF EXCAVATION

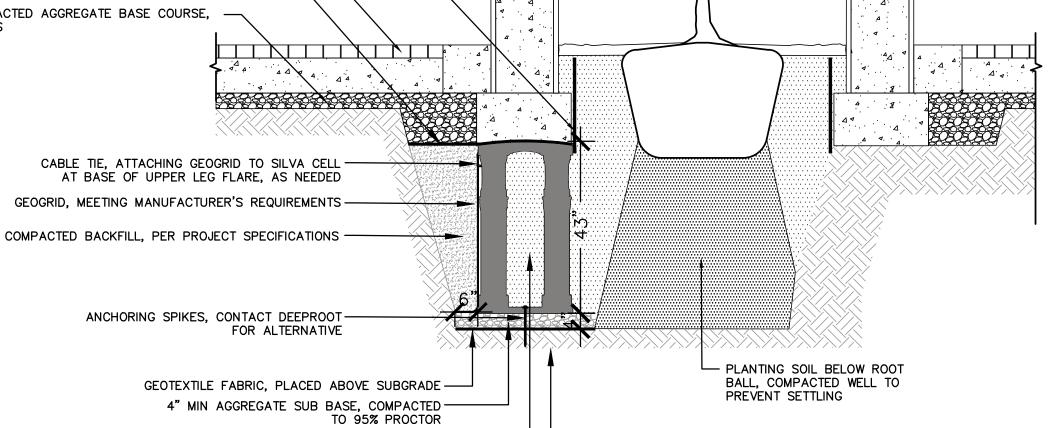
DIRECTLY ADJACENT TO CONCRETE EDGE RESTRAINT

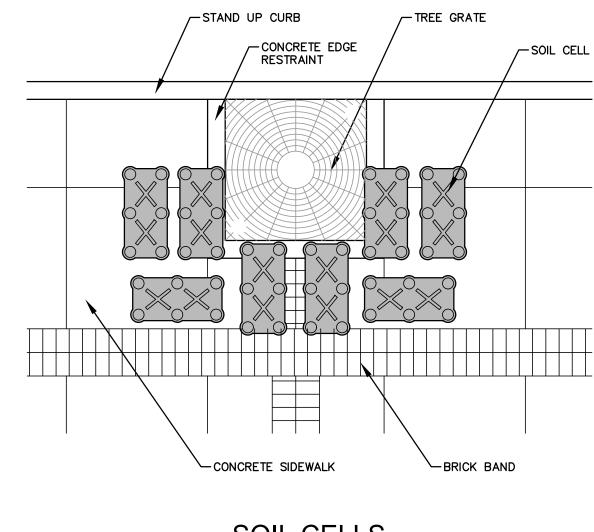


PLANTING SOIL, PER PROJECT SPECIFICATIONS, -

SUBGRADE, COMPACTED-

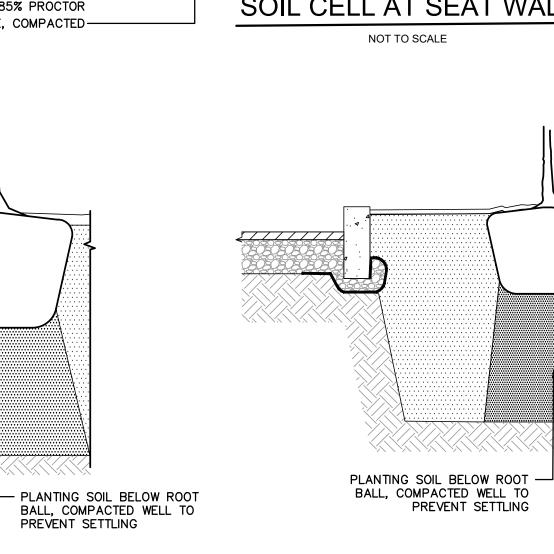
PLACED IN LIFTS AND WALK-IN COMPACTED TO 75-85% PROCTOR





SOIL CELLS NOT TO SCALE

SOIL CELL AT SEAT WALL NOT TO SCALE



— ROOT BARRIER, INSTALL DIRECTLY ADJACENT TO CONCRETE WALL — MONOLITHIC RETAINING WALL — GEOTEXTILE FABRIC TO EDGE OF EXCAVATION - AGGREGATE BASE, DEPTH YARIES CABLE TIE, ATTACHING GEOGRID TO SILVA CELL AT BASE OF UPPER LEG FLARE, AS NEEDED

- GEOGRID, MEETING MANUFACTURER'S REQUIREMENTS - COMPACTED BACKFILL, PER PROJECT SPECIFICATIONS

UNDING #

N/A

SHEET

I-102

— PLANTING SOIL, PER PROJECT SPECIFICATIONS,
PLACED IN LIFTS AND WALK—IN COMPACTED TO 75—85% -SUBGRADE, COMPACTED

SOIL CELL AT MONOLITHIC WALL NOT TO SCALE

B. ROARK

IRRIGATION PLAN - B

19.01726

- GEOTEXTILE FABRIC, PLACED ABOVE

TO 95% PROCTOR

4" MIN AGGREGATE SUB BASE, COMPACTED

UNION STREET IMPROVEMENTS

CABARRUS COUNTY, NORTH CAROLINA

FFICE MANAGER D.G. CHAPMAN ROJECT MANAGER

M.J. NORRIS

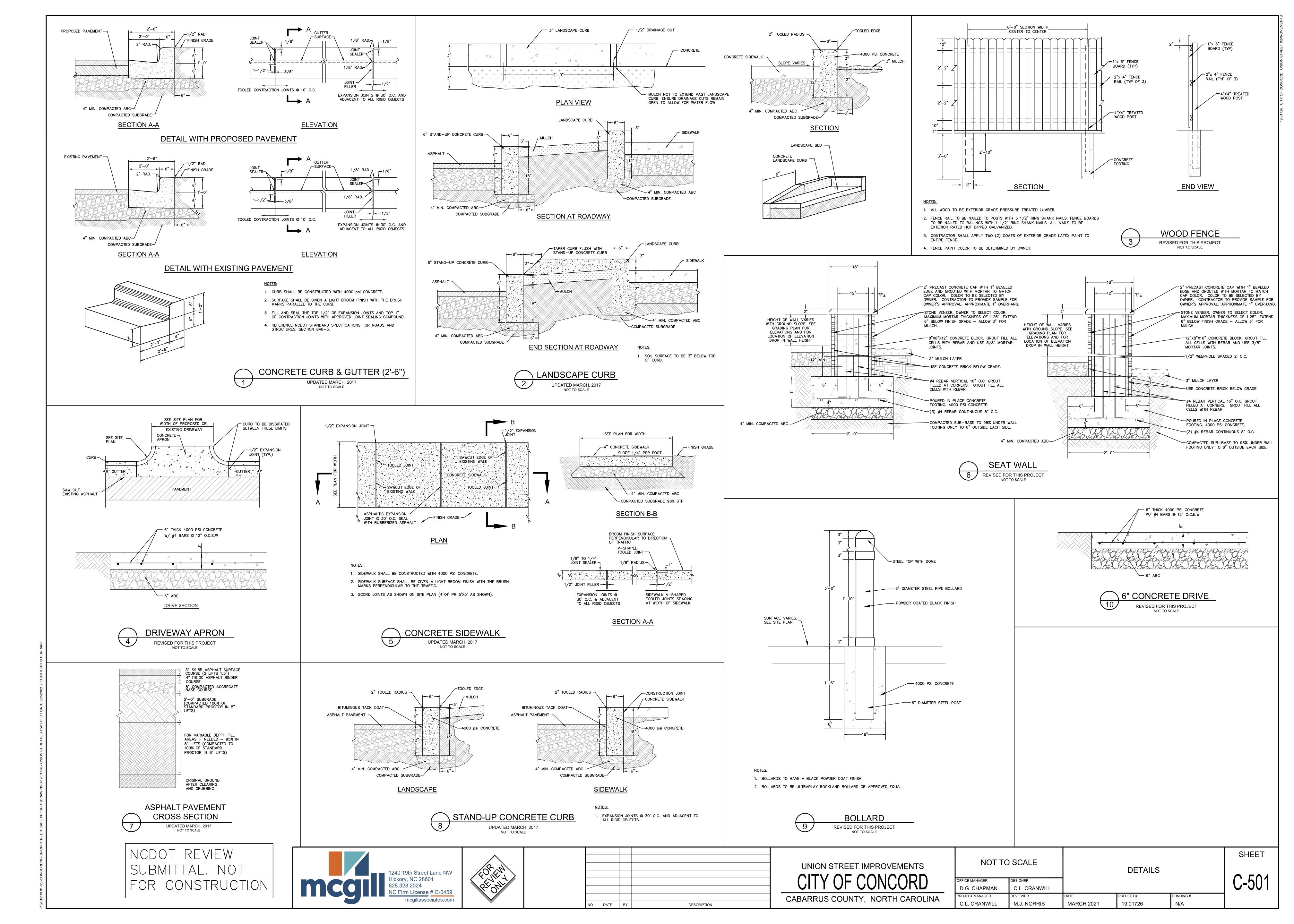
PREVENT SETTLING

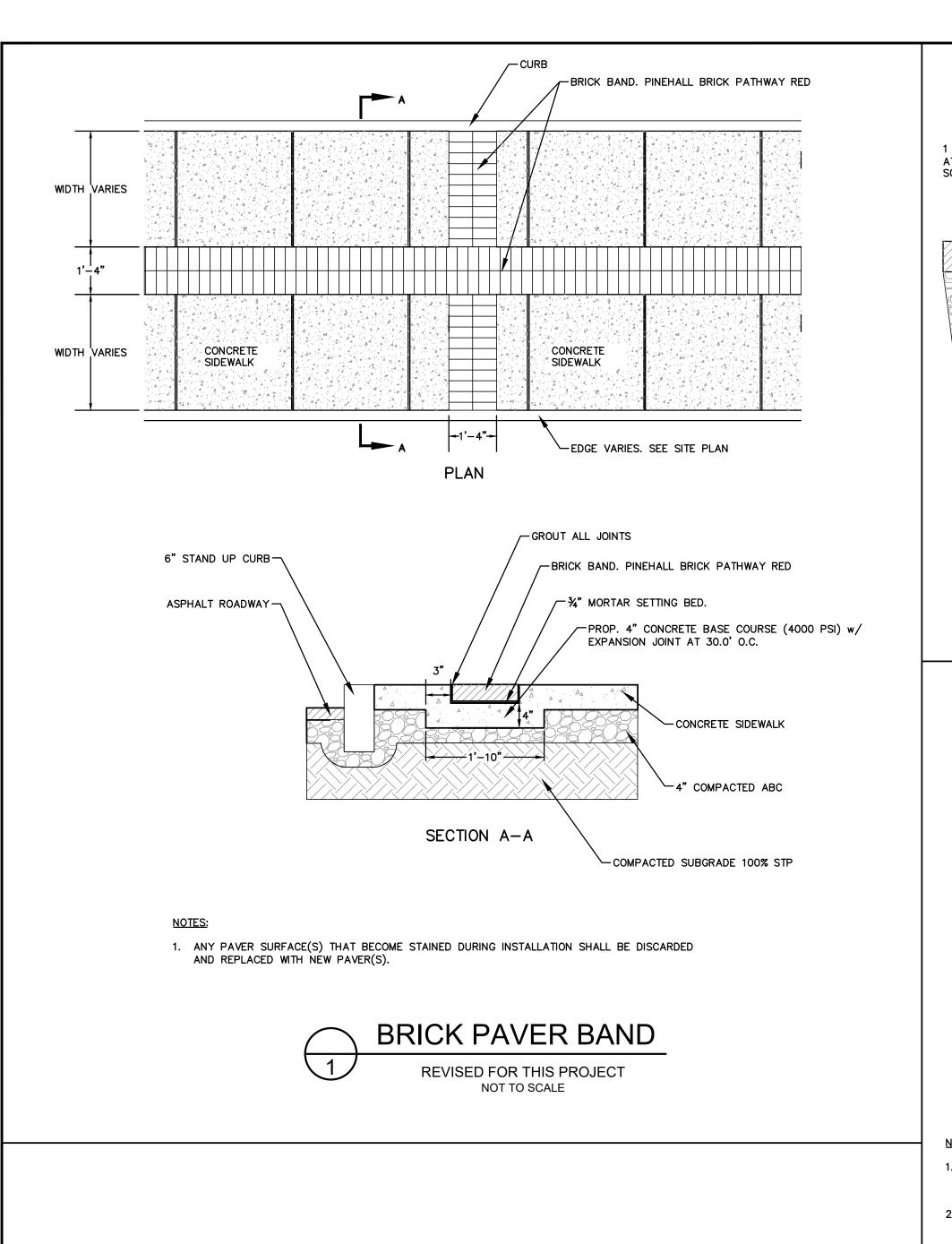
GRAPHIC SCALE DIVISION VALUE = 10 FEET C.L. CRANWILL

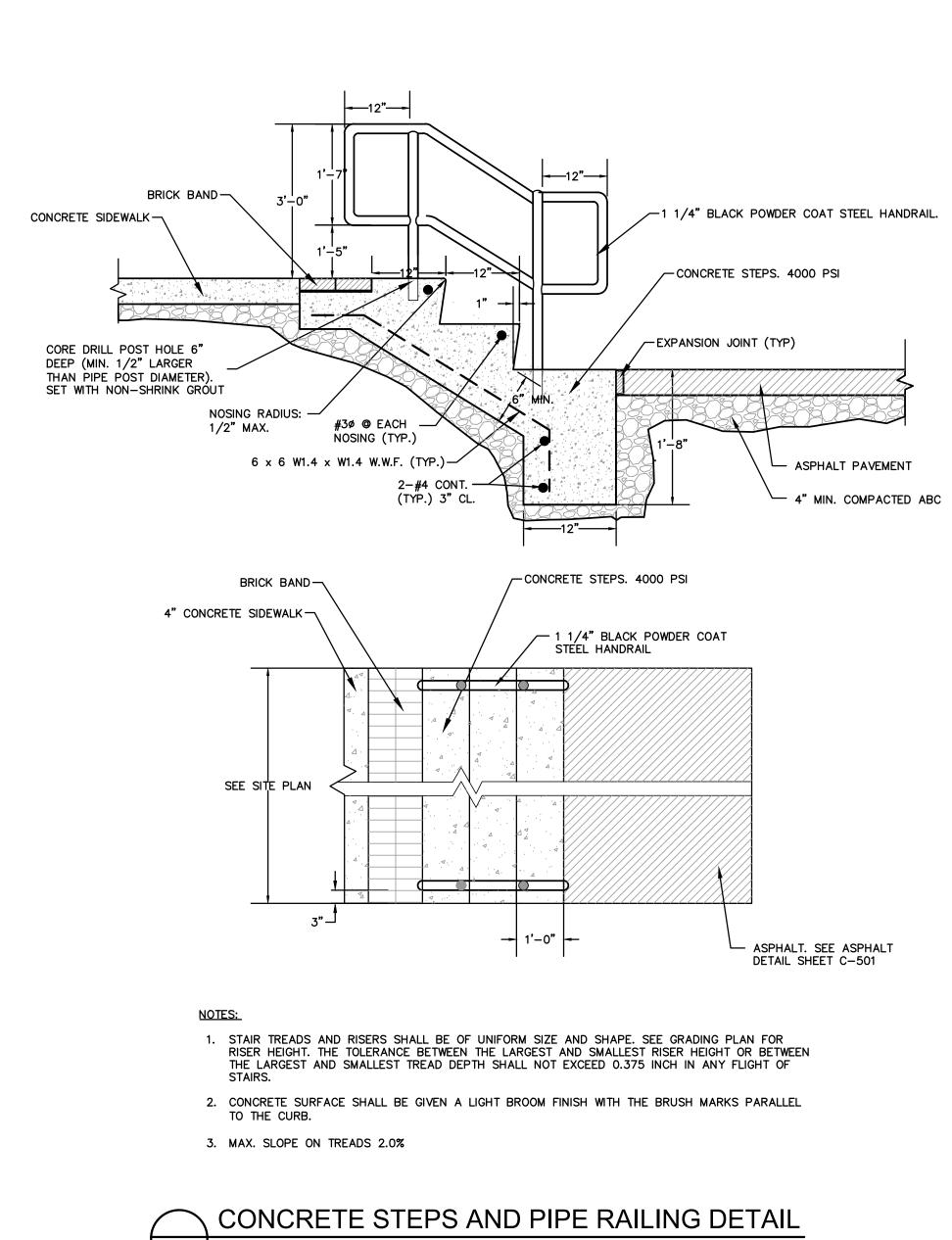
MAY 2021

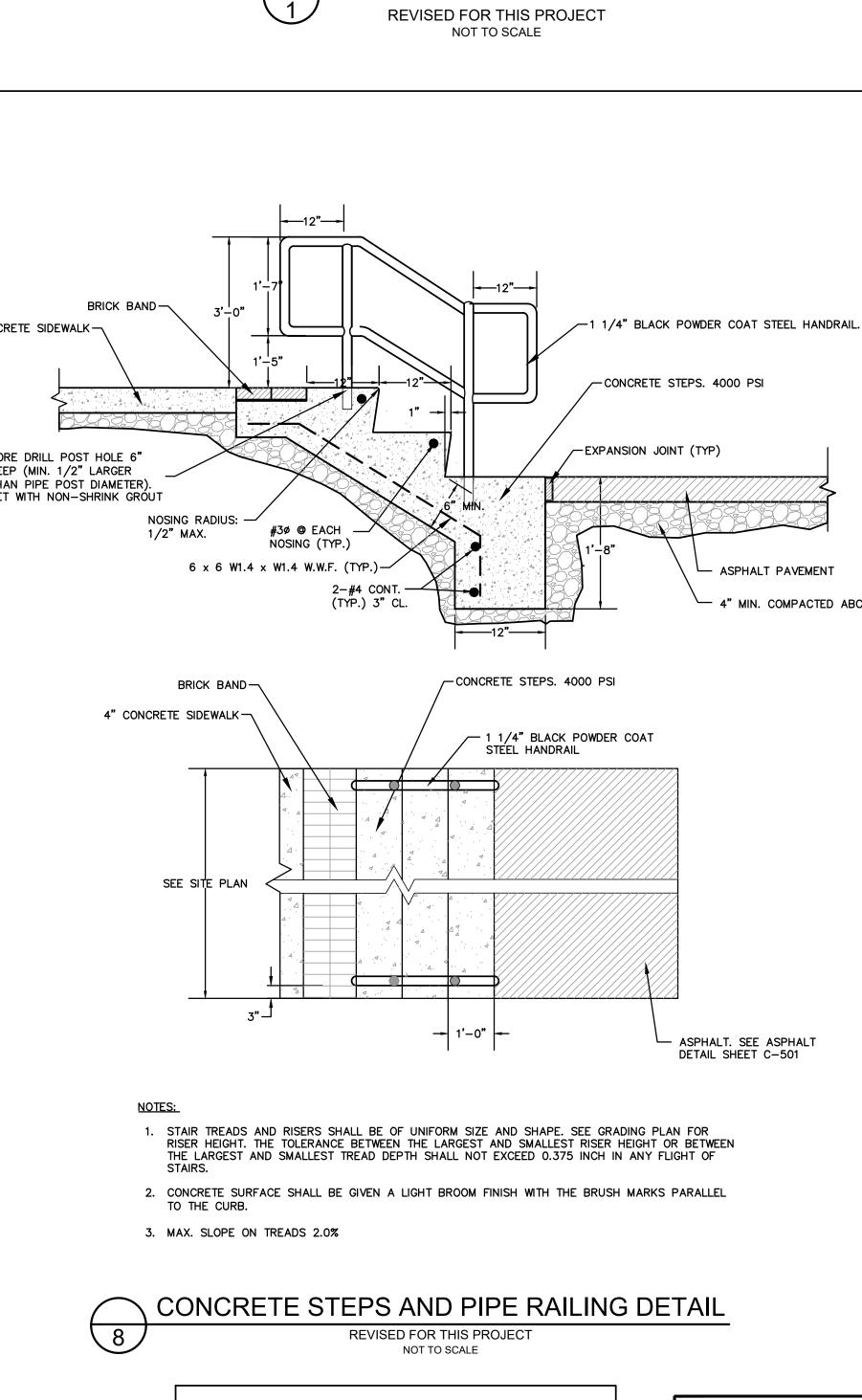
NCDOT REVIEW SUBMITTAL. NOT FOR CONSTRUCTION

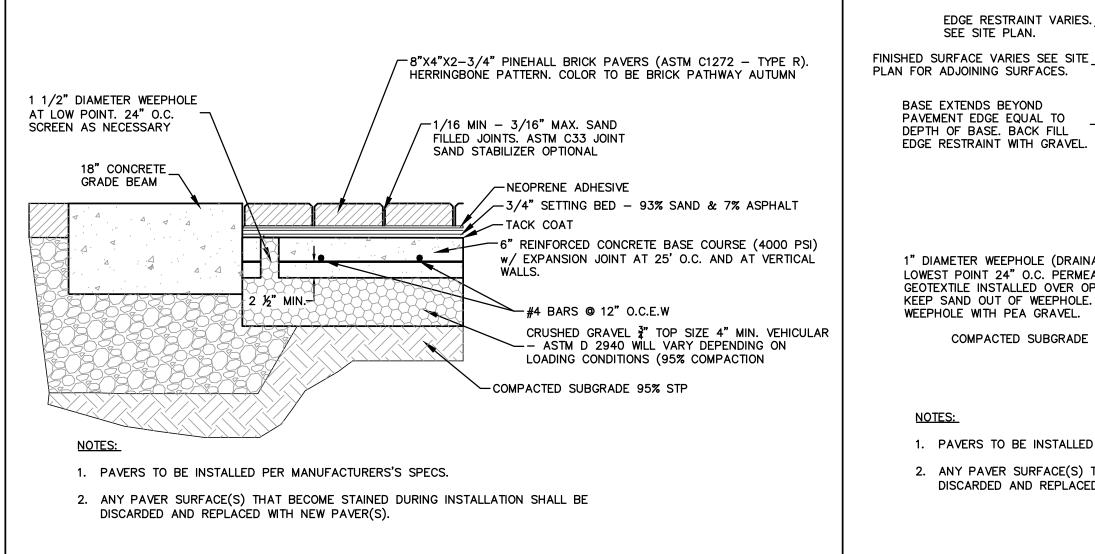












VEHICULAR PAVERS

REVISED FOR THIS PROJECT

NOT TO SCALE

NOTES: 1. PAVERS TO BE INSTALLED PER MANUFACTURERS'S SPECS. 2. ANY PAVER SURFACE(S) THAT BECOME STAINED DURING INSTALLATION SHALL BE

EDGE RESTRAINT VARIES.

SEE SITE PLAN.

BASE EXTENDS BEYOND PAVEMENT EDGE EQUAL TO

DEPTH OF BASE. BACK FILL

EDGE RESTRAINT WITH GRAVEL.

1" DIAMETER WEEPHOLE (DRAINAGE) AT

GEOTEXTILE INSTALLED OVER OPENING TO

COMPACTED SUBGRADE 100% STP-

DISCARDED AND REPLACED WITH NEW PAVER(S).

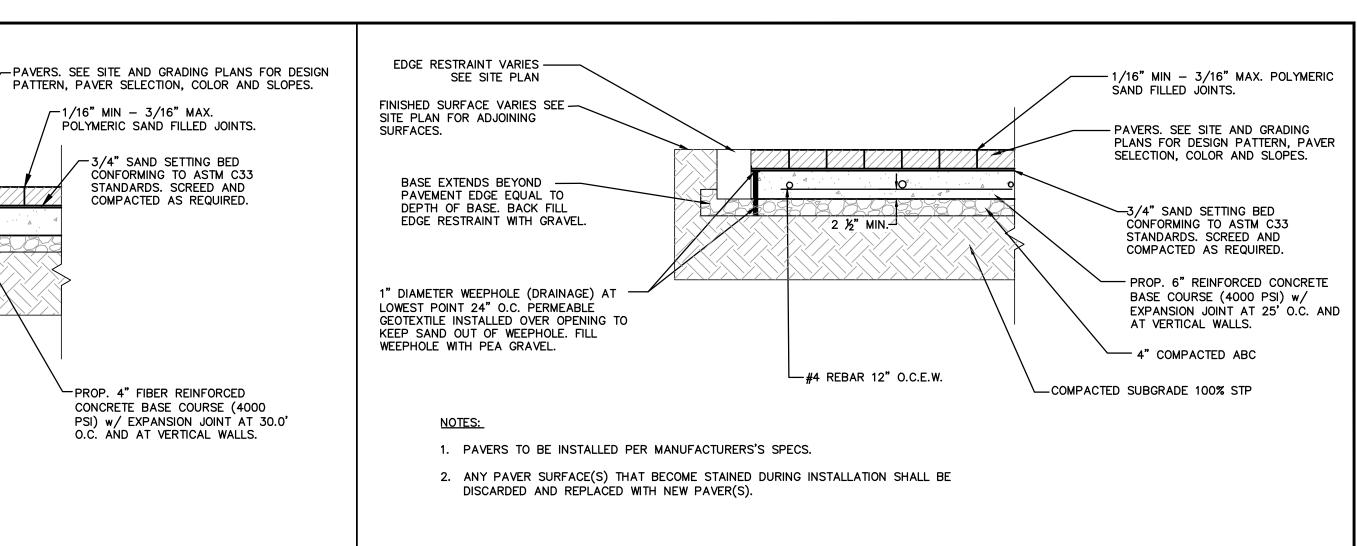
LOWEST POINT 24" O.C. PERMEABLÉ

KEEP SAND OUT OF WEEPHOLE. FILL

WEEPHOLE WITH PEA GRAVEL.

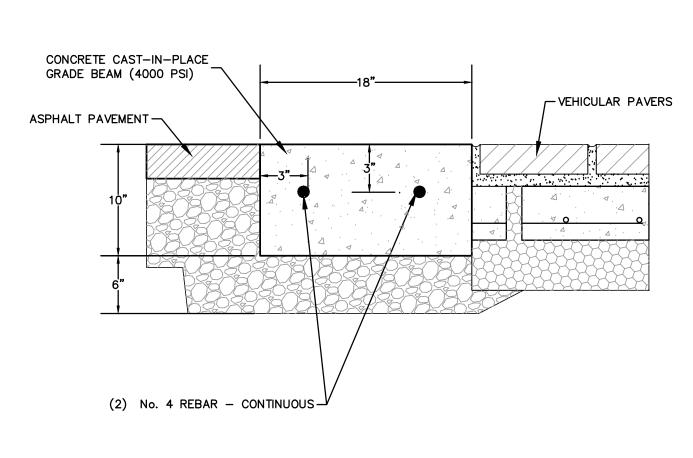
FLEXIBLE PAVER OVER **RIGID BASE - LIGHT DUTY** REVISED FOR THIS PROJECT

4" COMPACTED ABC-



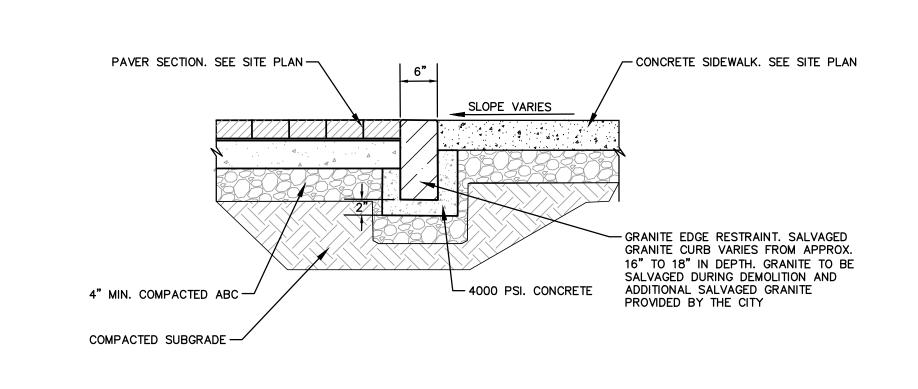
FLEXIBLE PAVER OVER RIGID **BASE - HEAVY DUTY**

> REVISED FOR THIS PROJECT NOT TO SCALE



- 1. EXISTING "ABC" IN ROADWAY MAY BE USED AS BASE COURSE AFTER COMPACTING TO ACHIEVE 100% PROCTOR. LOCALIZED UNDERCUTTING AND REPAIR SHALL BE REQUIRED WHERE PROOFROLLING RESULTS IN PUMPING OR AS DIRECTED BY THE INSPECTOR. TESTING OF SUBGRADE/"CABC" COMPACTION SHALL BE REQUIRED.
- 2. EXISTING ROADWAY PAVING SHALL BE SAW—CUT TO RECEIVE PLACEMENT OF GRADE BEAMS. A THREE—DAY CURING PERIOD SHALL BE REQUIRED FOR GRADE BEAMS PRIOR TO REMOVAL OF REMAINING BITUMINOUS PAVING. BASE BELOW GRADE BEAMS SHALL BE COMPACTED TO 100% PROCTOR.





NOT TO SCALE

1/16" MIN - 3/16" MAX.

POLYMERIC SAND FILLED JOINTS.

∕-3/4" SAND SETTING BED

PROP. 4" FIBER REINFORCED

CONCRETE BASE COURSE (4000 PSI) w/ EXPANSION JOINT AT 30.0'

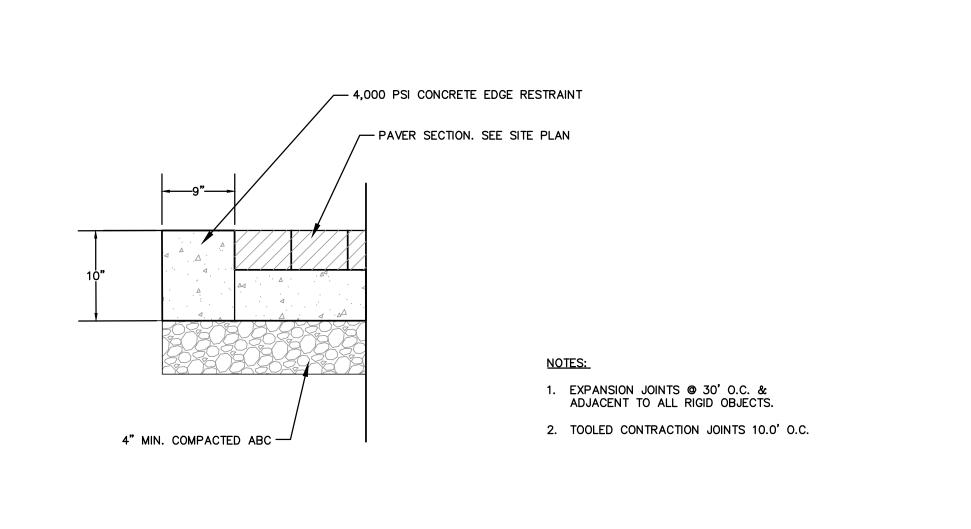
O.C. AND AT VERTICAL WALLS.

CONFORMING TO ASTM C33

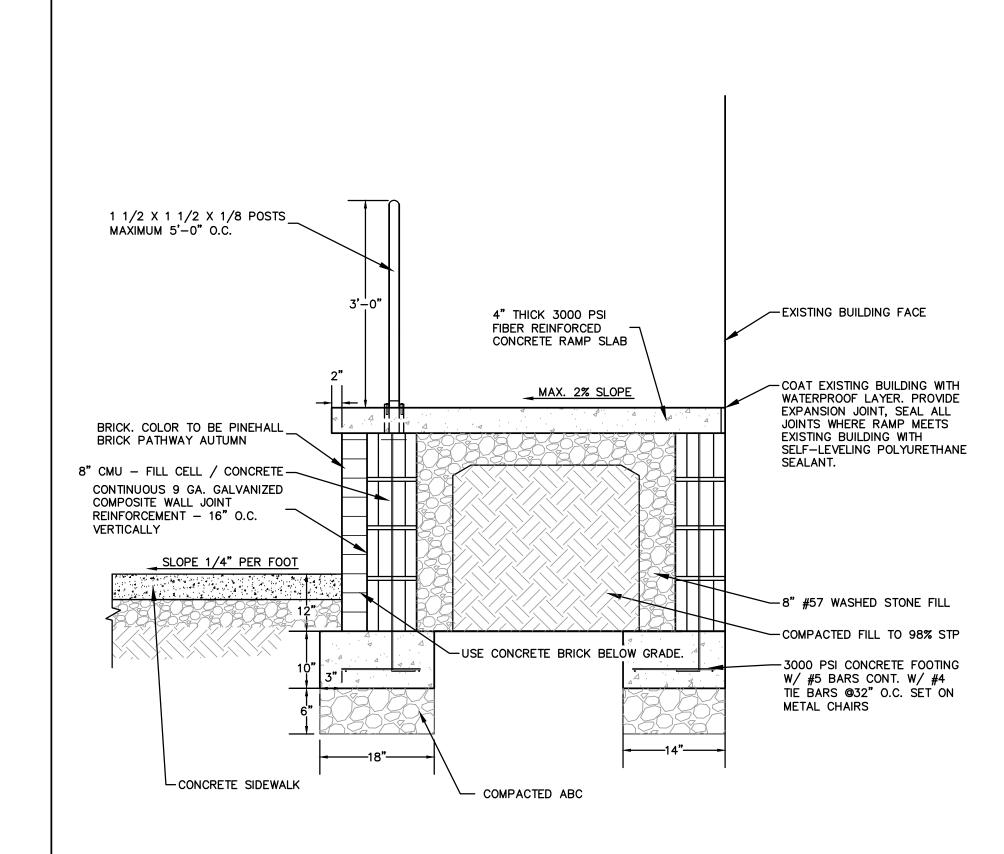
COMPACTED AS REQUIRED.

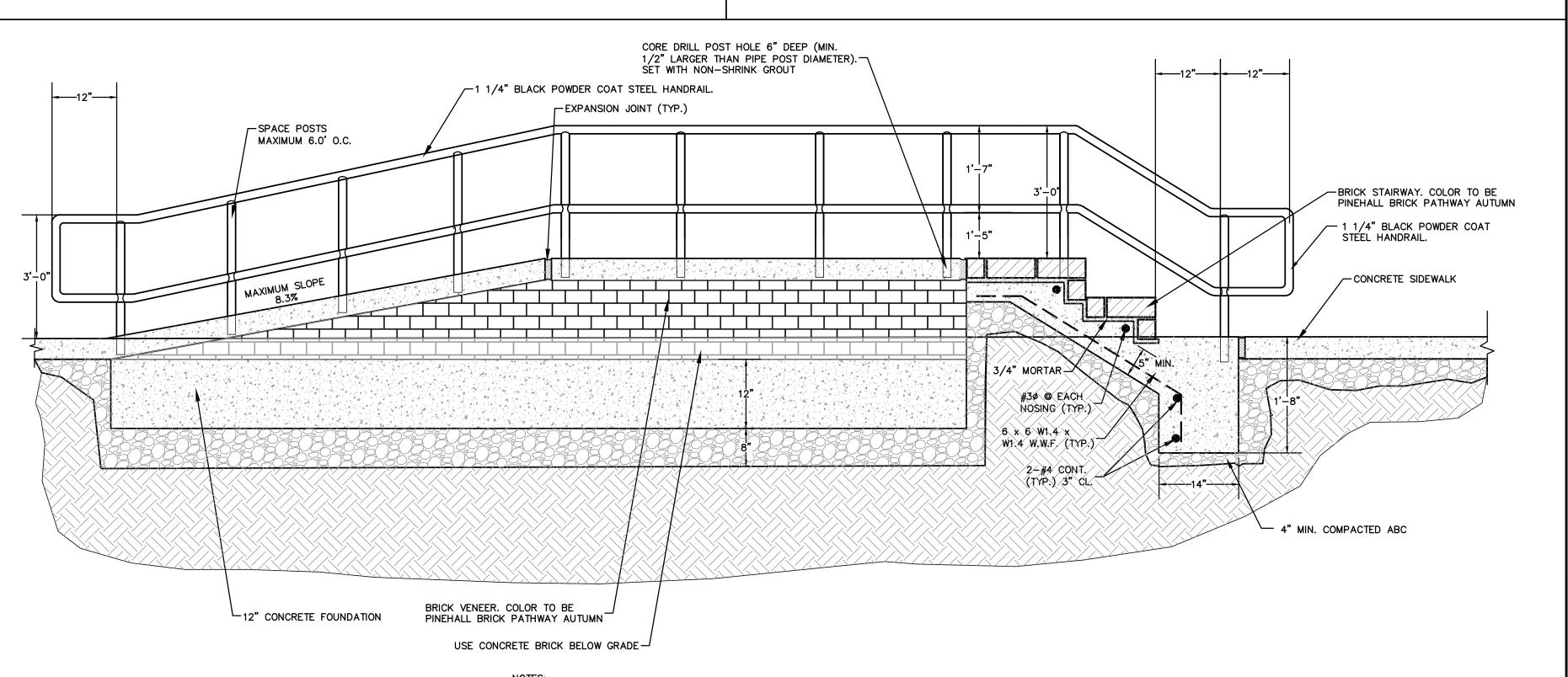
- 1. GRANITE TO BE SUPPLIED BY THE OWNER.
- 2. THE GRANITE SHALL BE SOUND AND DURABLE AND FREE FROM SEAMS WHICH COULD IMPAIR THE STRUCTURAL STABILITY. THE EDGE RESTRAINT SHALL BE STRAIGHT FROM END TO END WITH A VARIANCE OF NO MORE THAN 3/16" IN EITHER DIRECTION. QUARRY DRILL HOLES OR OTHER IMPERFECTIONS WILL NOT BE ACCEPTED. THE ENDS SHALL BE PERPENDICULAR TO THE TOP. THE ENDS SHALL ALIGN SO THAT NO SPACE GREATER THAN 1/4" IS CREATED BETWEEN THE ENDS.
- 3. THE GRANITE EDGE RESTRAINT SHALL BE CLEANED OR PROTECTED FROM CONCRETE SPLASH AT ALL TIMES.











1. STAIR TREADS AND RISERS SHALL BE OF UNIFORM SIZE AND SHAPE. SEE GRADING PLAN FOR RISER HEIGHT. THE TOLERANCE BETWEEN THE LARGEST AND SMALLEST RISER HEIGHT OR BETWEEN THE LARGEST AND SMALLEST TREAD DEPTH SHALL NOT EXCEED 0.375 INCH IN ANY FLIGHT OF STAIRS. 2. CONCRETE SURFACE SHALL BE GIVEN A LIGHT BROOM FINISH WITH THE BRUSH MARKS PERPENDICULAR TO THE CURB.

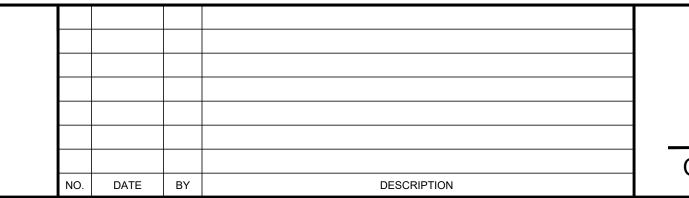
3. MAX. SLOPE ON TREADS 2.0%

CONCRETE STEPS AND RAMP STORE ACCESS

NCDOT REVIEW SUBMITTAL. NOT FOR CONSTRUCTION

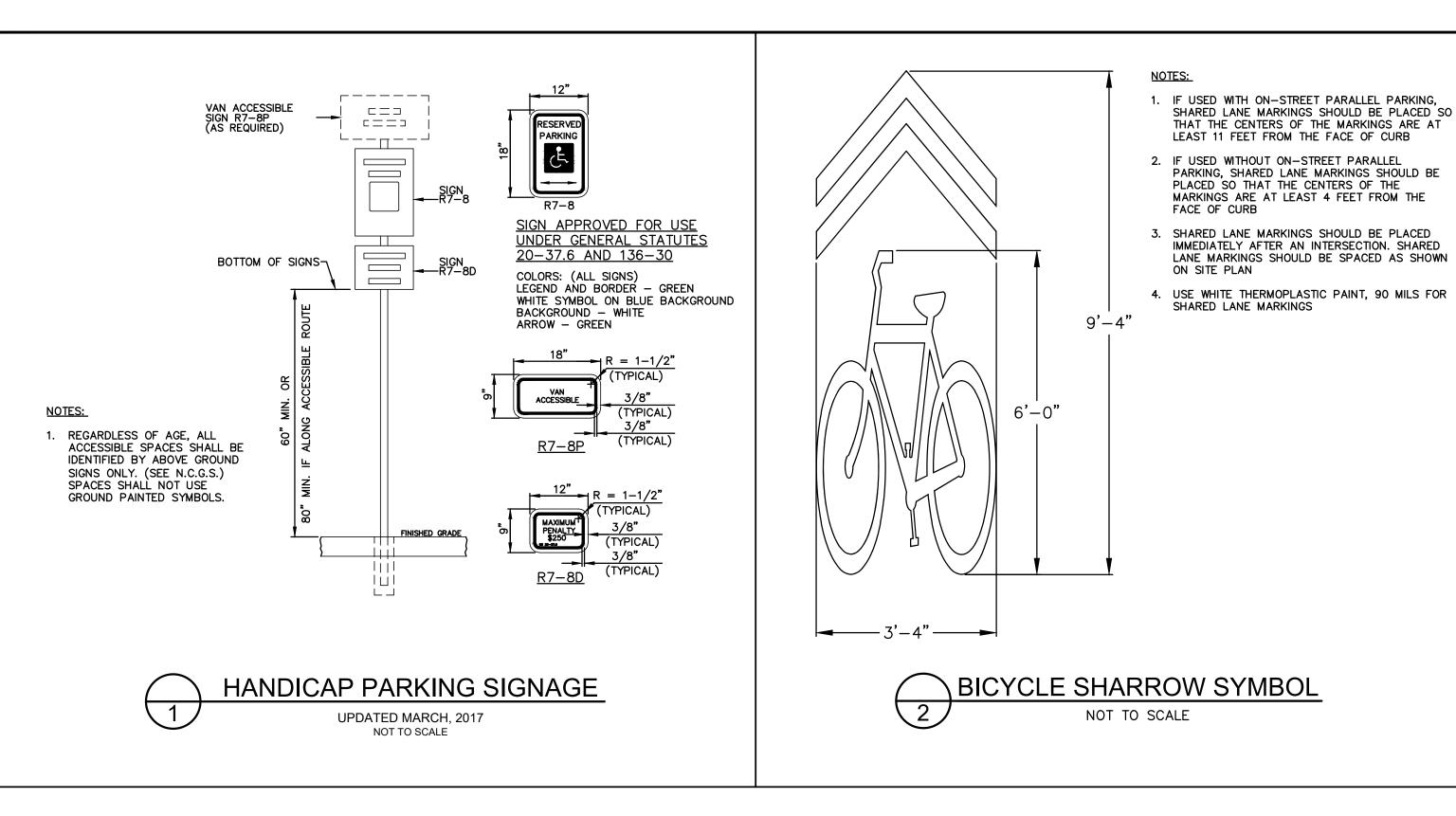


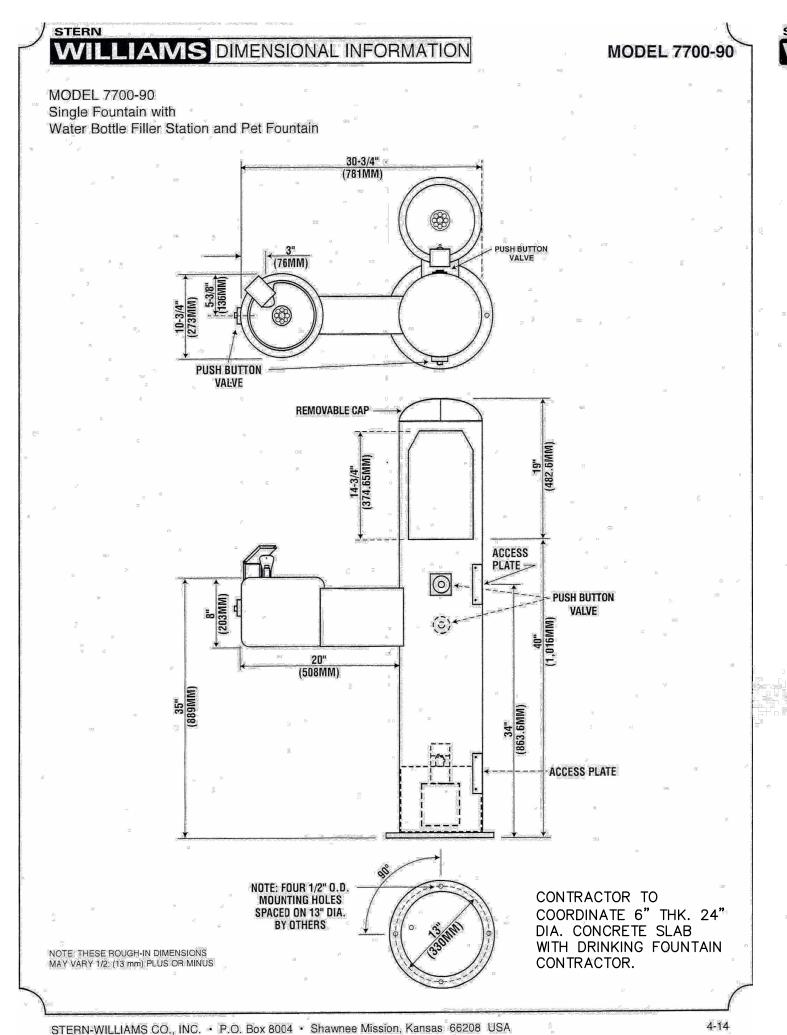


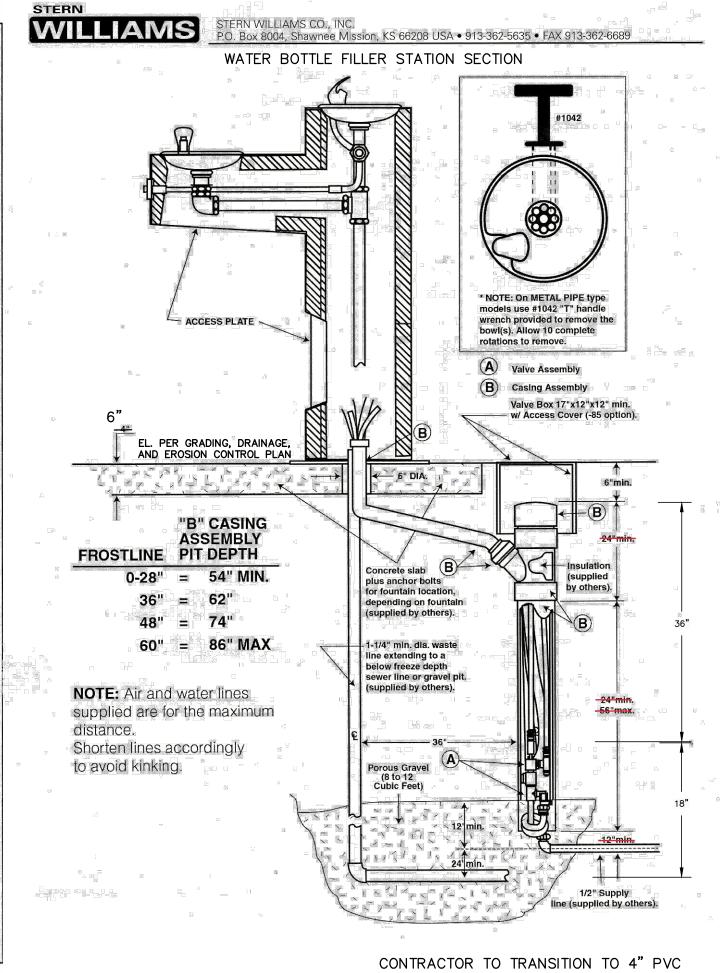


UNION STREET IMPROVEMENTS CITY OF CONCORD CABARRUS COUNTY, NORTH CAROLINA

SHEET NOT TO SCALE **DETAILS** C-502 OFFICE MANAGER D.G. CHAPMAN C.L. CRANWILL ROJECT MANAGER C.L. CRANWILL M.J. NORRIS MARCH 2021 19.01726 N/A

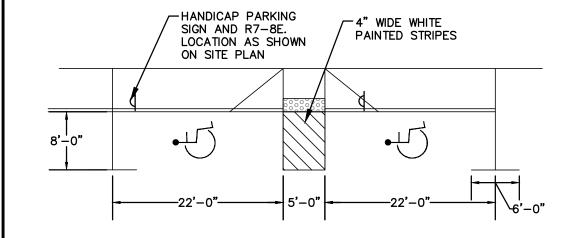






DRINKING WATER FOUNTAIN





Telephone: (913) 362-5635 • Fax: (913) 362-6689 • Web address: www.sternwilliams.com

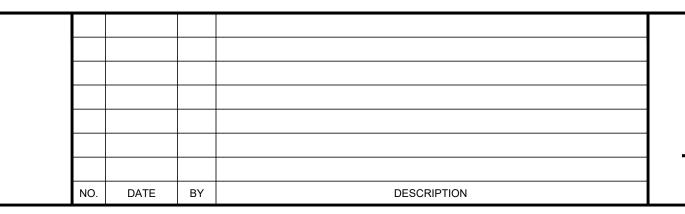
- 1. REGARDLESS OF AGE, ALL ACCESSIBLE SPACES SHALL BE IDENTIFIED BY ABOVE- GROUND SIGNS ONLY. (SEE N.C.G.S.)
- 2. GROUND-PAINTED SYMBOLS TO BE WHITE THERMOPLASTIC 90 MIL.
- 3. ACCESSIBLE SPACES ARE REQUIRED TO BE STRIPED OFF ONLY; BLUE COLORING IS NOT NECESSARY NOR
- 4. STRIPING IS WHITE ON DARK PAVEMENT; BLACK ON LIGHT PAVEMENT. (N.C.D.O.T.)
- 5. SEE GRADING PLAN FOR SLOPE. EXISTING ROAD GRADES VARY.



NCDOT REVIEW SUBMITTAL. NOT FOR CONSTRUCTION









PLAN VIEW CORE DRILL POST HOLE 6" DEEP (MIN. 1/2" LARGER THAN PIPE POST DIAMETER). —/
SET WITH NON-SHRINK GROUT CONCRETE WALK-STEEL HANDRAIL (TYP.)-CONCRETE SIDEWALK 1:12 MAX. -RAMP FLUSH WITH TRUNCATED DOMES PER DECK AND LANDING SITE LAYOUT SHEET -MONOLITHIC RETAINING WALL WITH METAL RAILING -TRUNCATED DOMES PER SITE LAYOUT SHEET. HANDICAP RAMP W/ HANDRAIL #1 NOT TO SCALE REVISED FOR THIS PROJECT -PAVERS LANDSCAPE CURB RAMP FLUSH w/ TAPER LANDSCAPE FACE OF CURB/WALK CURB FLUSH IN 1.0 -STEEL HANDRAIL (TYP.)

NOT TO SCALE

REVISED FOR THIS PROJECT

- TRUNCATED DOMES PER

SITE LAYOUT SHEET

1 1/4" BLACK POWDER COAT STEEL HANDRAIL.

RETURN HANDRAIL EXTENSION AT 90°-

FOR TOTAL LENGTH OF 12"

LANDSCAPE BED-

SPACE POSTS MAXIMUM 6.0' O.C.—

-HANDRAIL

EXTENSION

NOT TO SCALE REVISED FOR THIS PROJECT HANDICAP RAMP W/ HANDRAIL #2

TRUNCATED DOMES PER SITE LAYOUT SHEET.

FACE OF CURB/WALK

TOP OF CURB

RAMP FLUSH w/ DECK AND LANDING __LANDSCAPE CURB - TRUNCATED DOMES PER SITE LAYOUT SHEET TAPER LANDSCAPE CURB FLUSH IN 1.0' ——— 6" STAND UP CONCRETE CURB SLOPE WIDTH VARIES. SEE LAYOUT

-NEENAH FOUNDARY TREE

GRATE R-8708 48"X48" W/

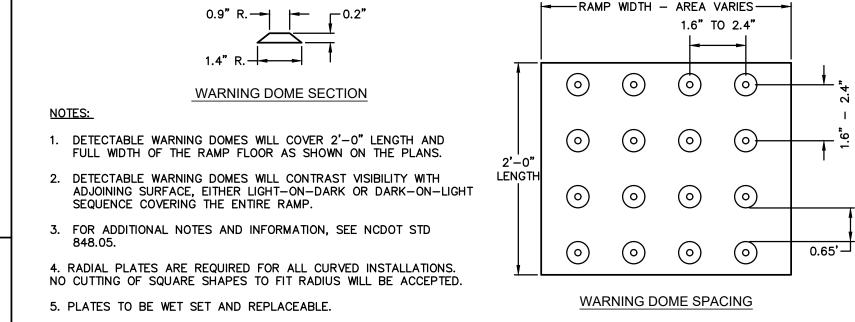
20" DIAMETER OPENING AND 2 LIGHT OPENINGS. TYPE P FRAME (R-8500) BLACK POWDER COAT FINISH.

WIDTH VARIES.

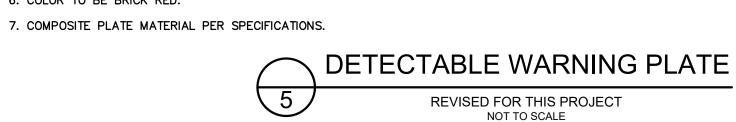
SEE LAYOUT

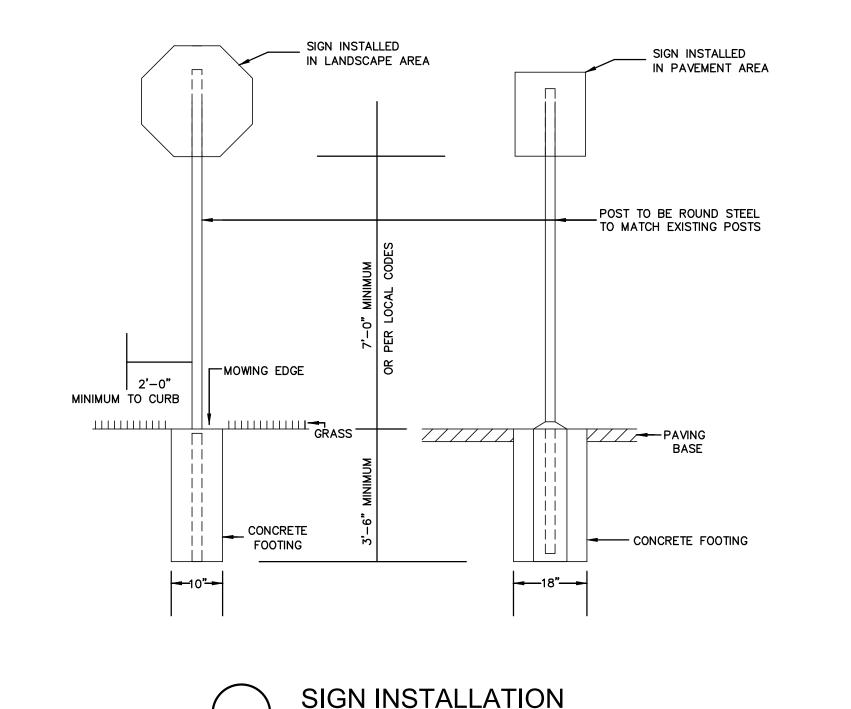
HANDICAP RAMP #4

HANDICAP RAMP #5 NOT TO SCALE REVISED FOR THIS PROJECT



6. COLOR TO BE BRICK RED.







SHEET NOT TO SCALE **DETAILS** C-503 FFICE MANAGER D.G. CHAPMAN C.L. CRANWILL ROJECT MANAGER C.L. CRANWILL M.J. NORRIS MARCH 2021 19.01726 N/A

2. NO SLOPE SHALL EXCEED 1"= 1' (1:12) ON THE RAMPS. 3. IN NO CASE SHALL THE WIDTH OF A WHEELCHAIR RAMPS BE LESS THAN 48" (4'-0"). WIDTHS MAY EXCEED 4. A 1/2" EXPANSION JOINT WILL BE REQUIRED WHERE THE CONCRETE WHEELCHAIR RAMP JOINS ANY RIGID PAVEMENT OR STRUCTURE. 5. ALL CONCRETE TO BE 4000 PSI AT 28 DAYS. RAMP TO BE PLACED ON MIN. 4" AGGREGATE BASE COURSE. 1. SEE SITE PLAN FOR SURFACE TREATMENTS AT HC RAMPS AND REFER TO RELATED PAVING DETAILS AS REFERENCED IN KEY NOTES. SCH 40 SEWER AND INSTALL CLEANOUT WITH P-TRAP WITHIN 3 FEET OF NEENAH FOUNDRY R-8500 TYPE P GRATE FRAME

MIN. 6.0'

RAMP FLUSH w/ DECK ____

AND LANDING

TAPER LANDSCAPE CURB FLUSH IN 1.0'

HANDICAP RAMP #1

NOT TO SCALE REVISED FOR THIS PROJECT

HANDICAP RAMP #2

NOT TO SCALE REVISED FOR THIS PROJECT

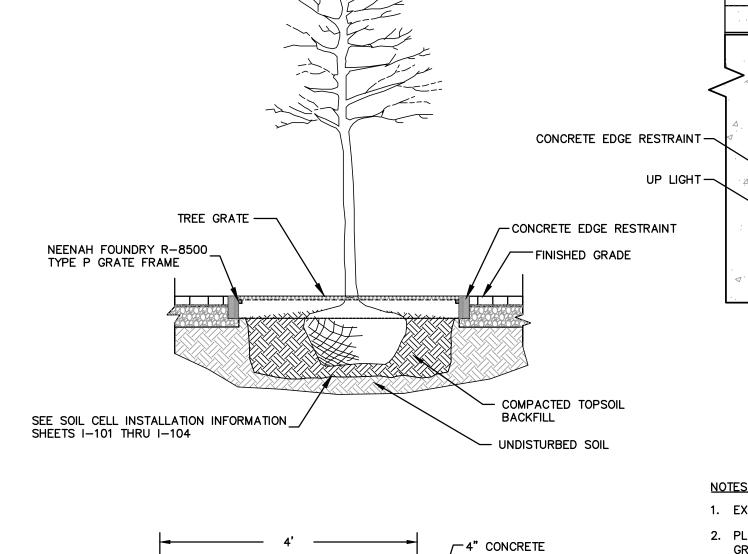
1. ALL ACCESSIBLE RAMPS TO COMPLY WITH CURRENT N.C. BUILDING CODE VOLUME IBC 2015 ACCESSIBILITY

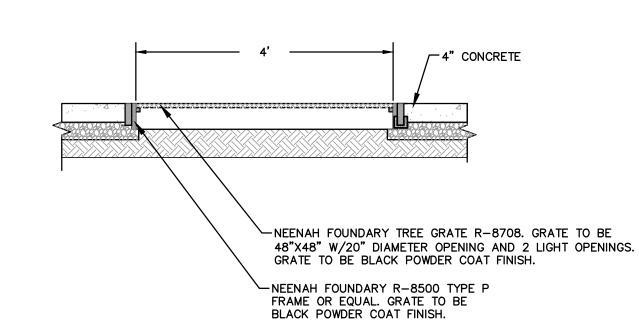
ACCESSIBLE RAMPS

REVISED FOR THIS PROJECT

NOT TO SCALE

A. LOCATION OF HANDICAP RAMPS:





1. EXCAVATE TREE PIT AREA TO DEPTH OF R-8500 TYPE P FRAME.

CONTROL JOINT -TYP. EACH SIDE

-----6'−0"---

1/2" EXPANSION JOINT - TYP. -

CONTROL JOINT -

TYP. EACH SIDE

WIDTH VARIES

SEE LAYOUT

HANDICAP RAMP #3

NOT TO SCALE

REVISED FOR THIS PROJECT

- TRUNCATED DOMES PER SITE LAYOUT SHEET. RADIAL

PLATES TO BE ORDERED TO FIT PROPOSED RADIUS

- CONCRETE SIDEWALK

- TRUNCATED DOMES PER SITE LAYOUT SHEET

- LANDSCAPE CURB

- WIDTH AND SHAPE OF HC

RAMPS VARY, SEE SITE PLAN.

- SURFACE MATERIAL VARIES. SEE SITE PLAN

2. PLACE R-8500 TYPE P FRAME IN EXCAVATION AND SET AT PROPER GRADE PER MANUFACTURER'S RECOMMENDATIONS. 3. PLACE BOTH NEENAH FOUNDARY TREE GRATE R-8708 HALVES WITHIN THE FRAME. PROPOSED TREE WELLS.

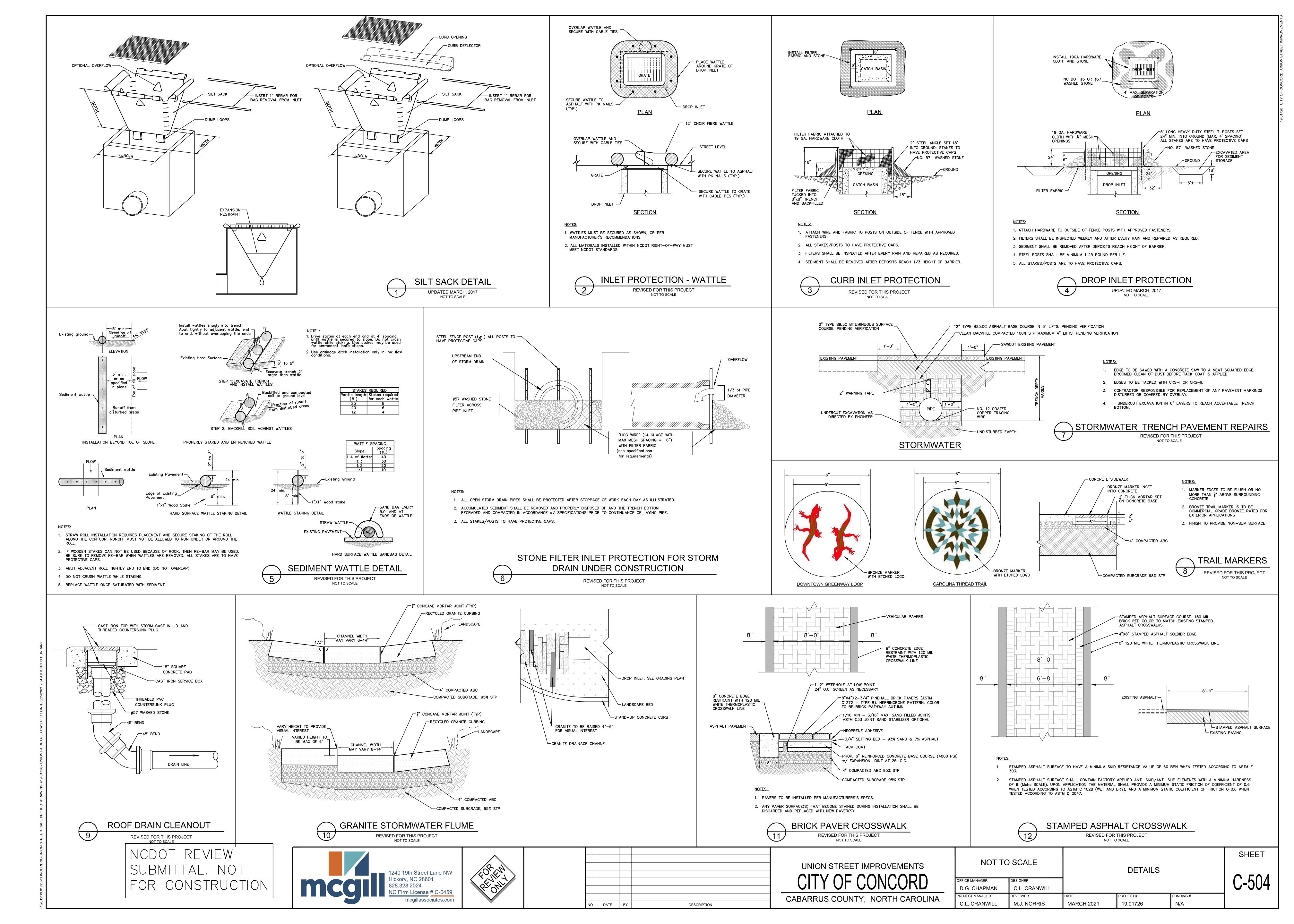
4. CONTRACTOR TO PROVIDE TREE GRATES FOR ALL EXISTING AND

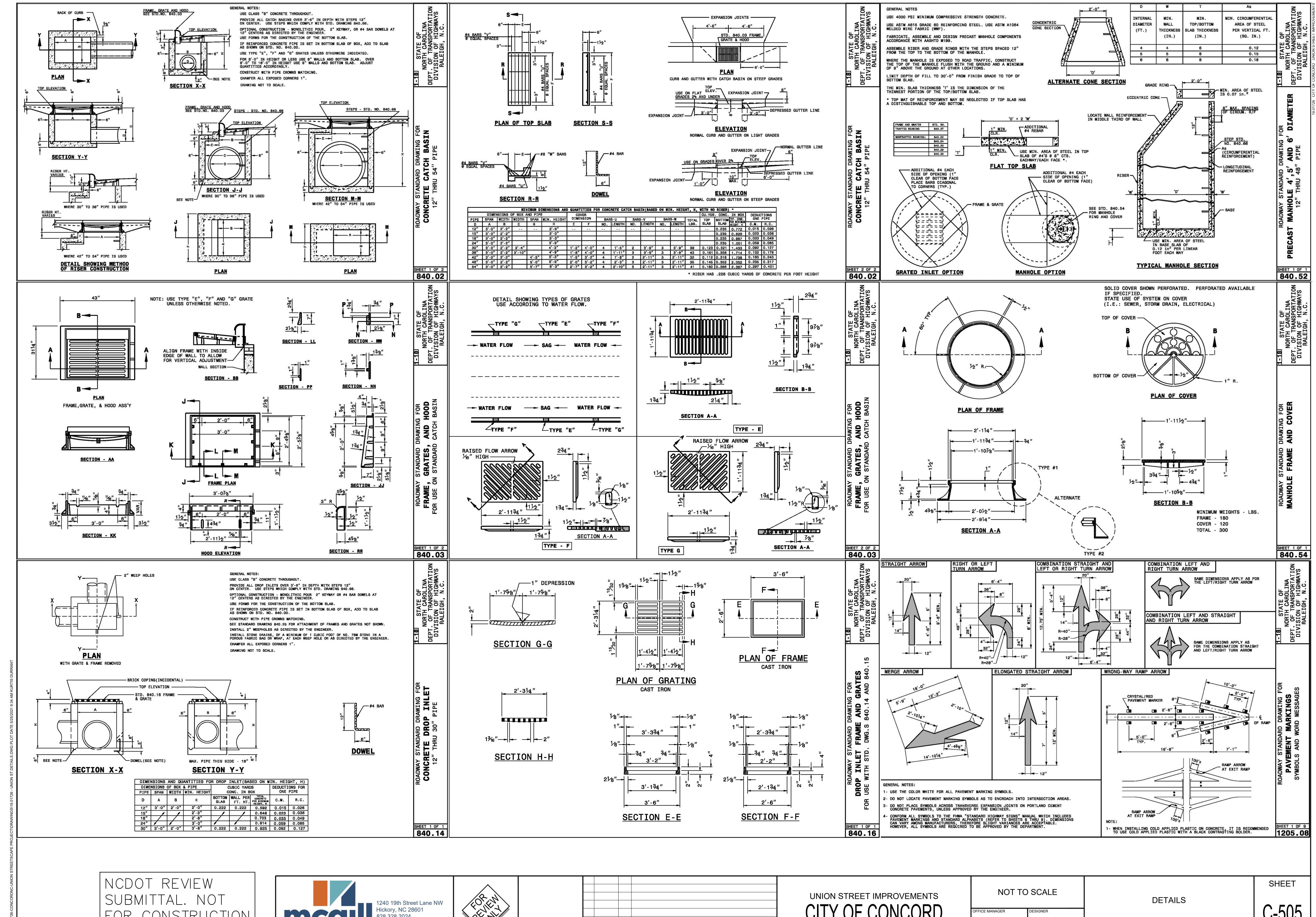
5. PLACE SETTING BED AND PAVERS/CONCRETE SIDEWALK.

6. TOP OF ROOTBALL TO BE 2" MAX. FROM BOTTOM OF TREE GRATE.

TREE GRATE

7 REVISED FOR THIS PROJECT

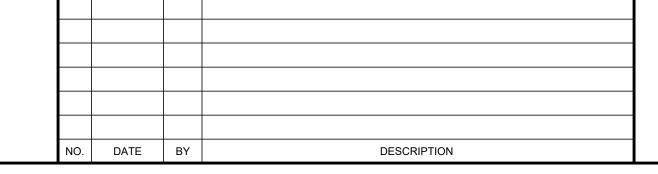




FOR CONSTRUCTION

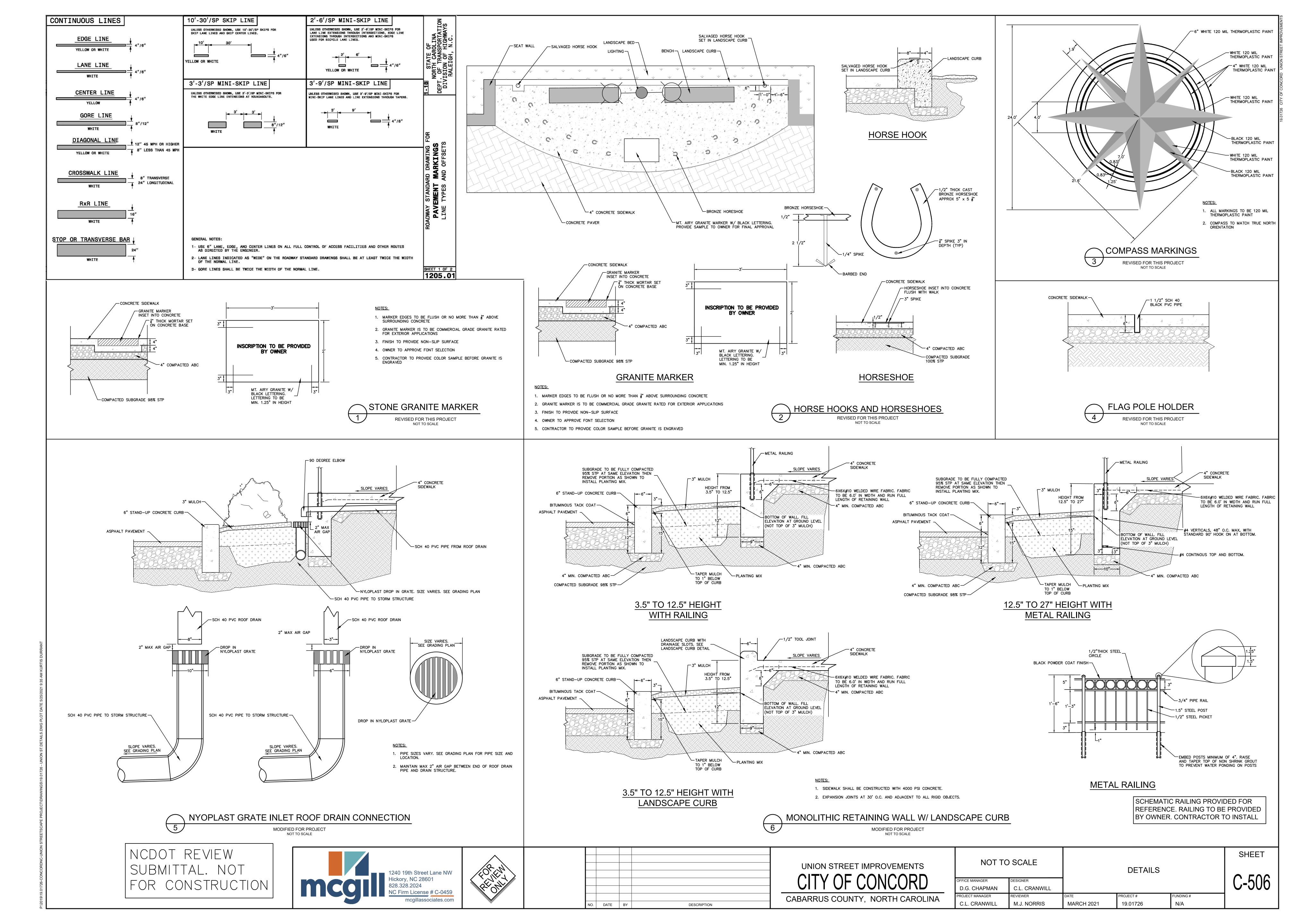


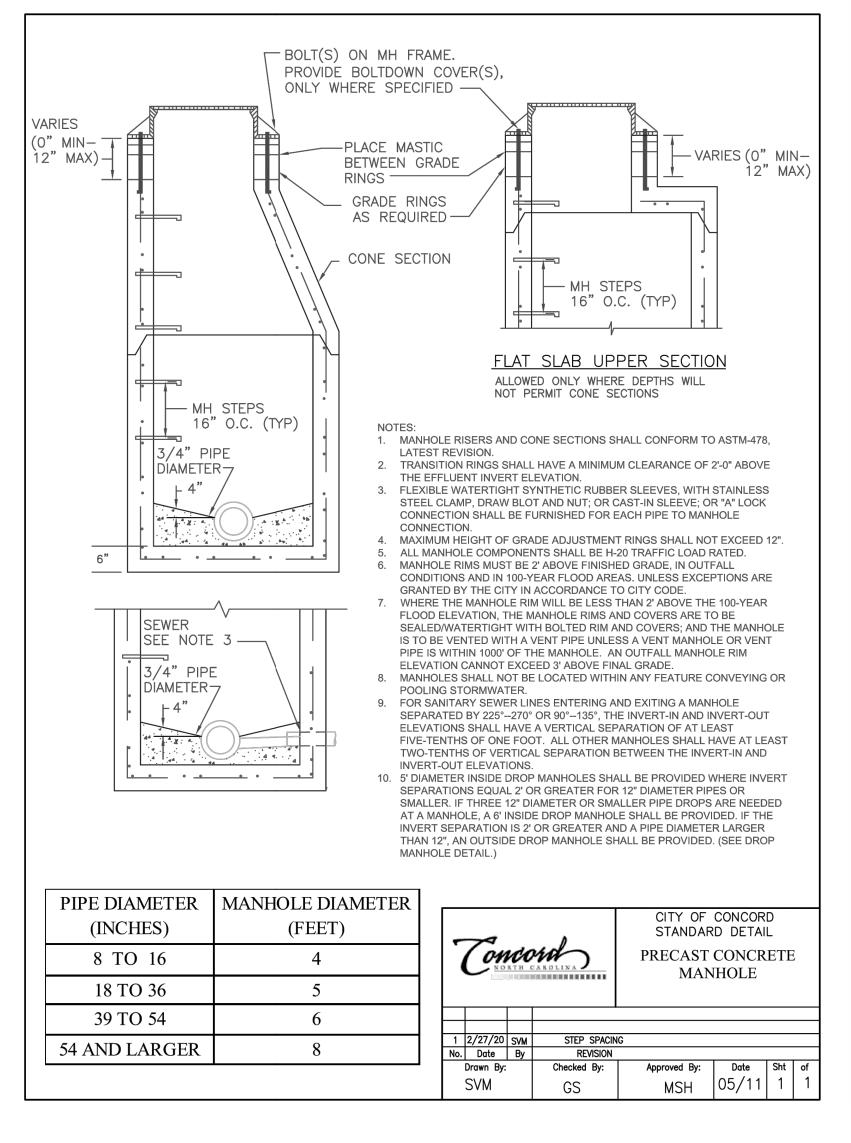


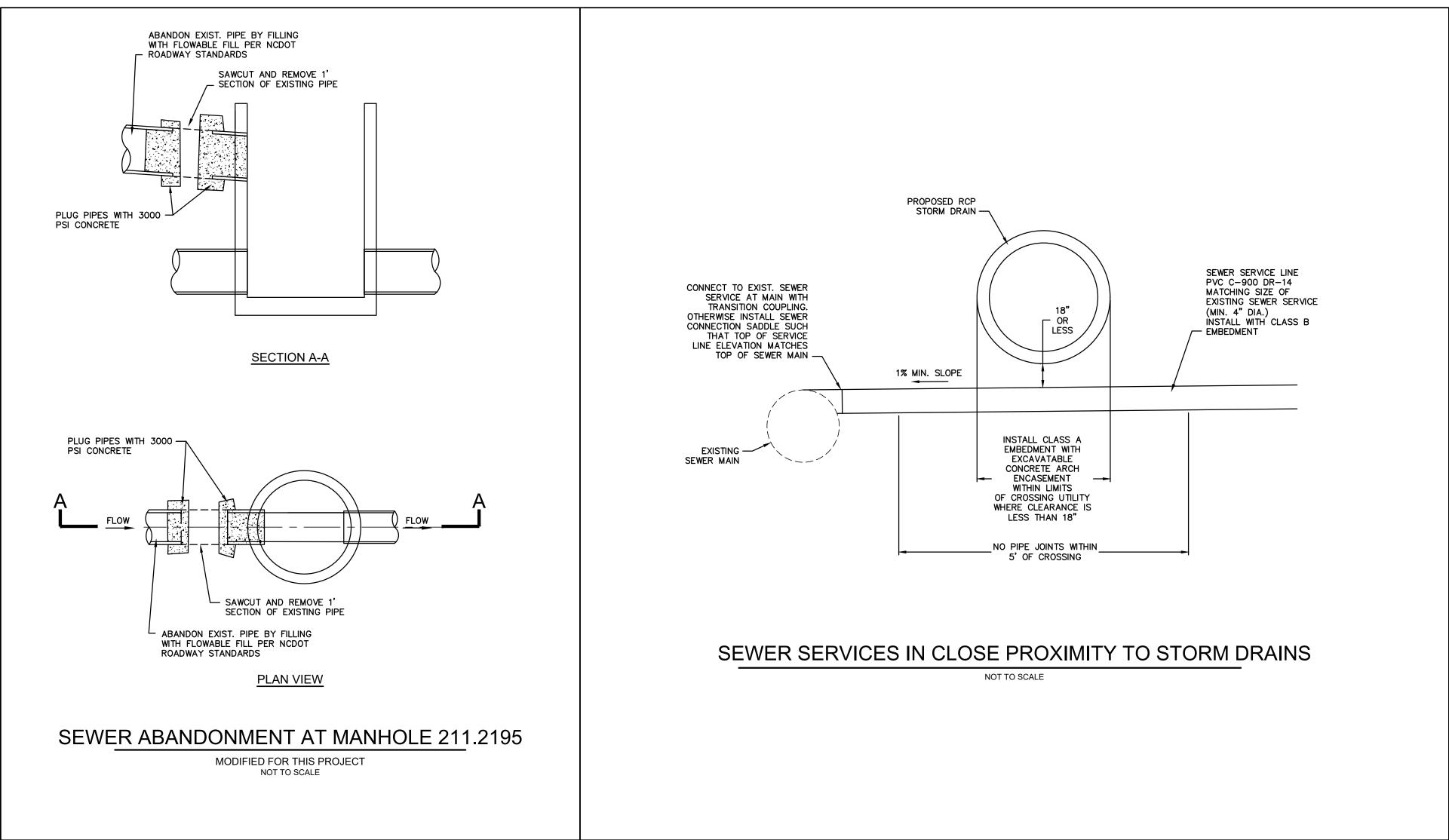


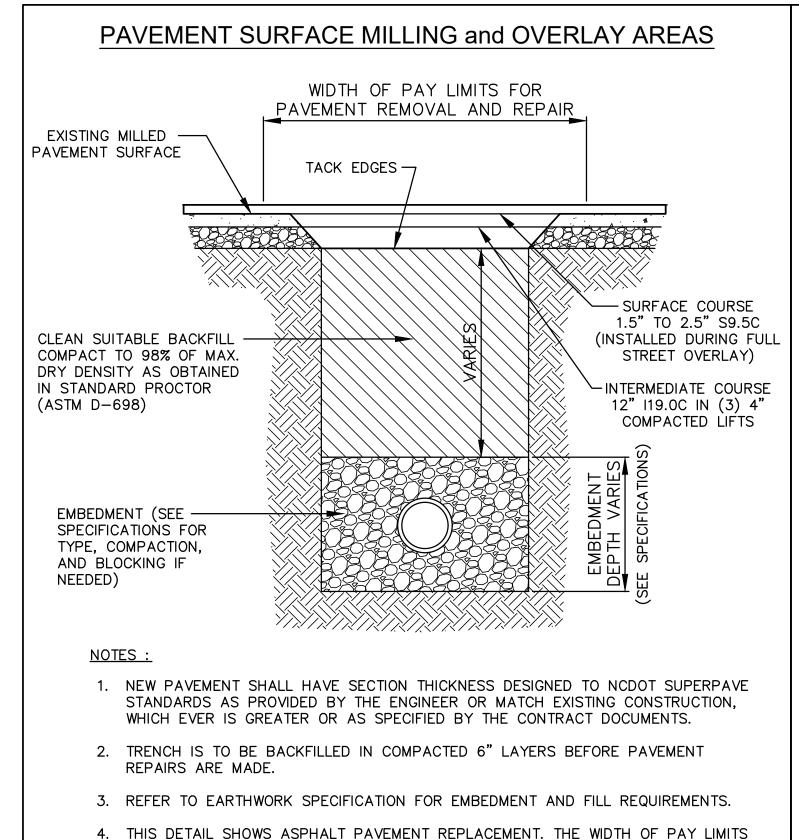
CITY OF CONCORD CABARRUS COUNTY, NORTH CAROLINA

NOT TO	SCALE		DETAILS		SHEET
OFFICE MANAGER	DESIGNER	1			l (; <u>-</u> 505
D.G. CHAPMAN	C.L. CRANWILL				
PROJECT MANAGER	REVIEWER	DATE	PROJECT#	FUNDING #	
C.L. CRANWILL	M.J. NORRIS	MARCH 2021	19.01726	N/A	









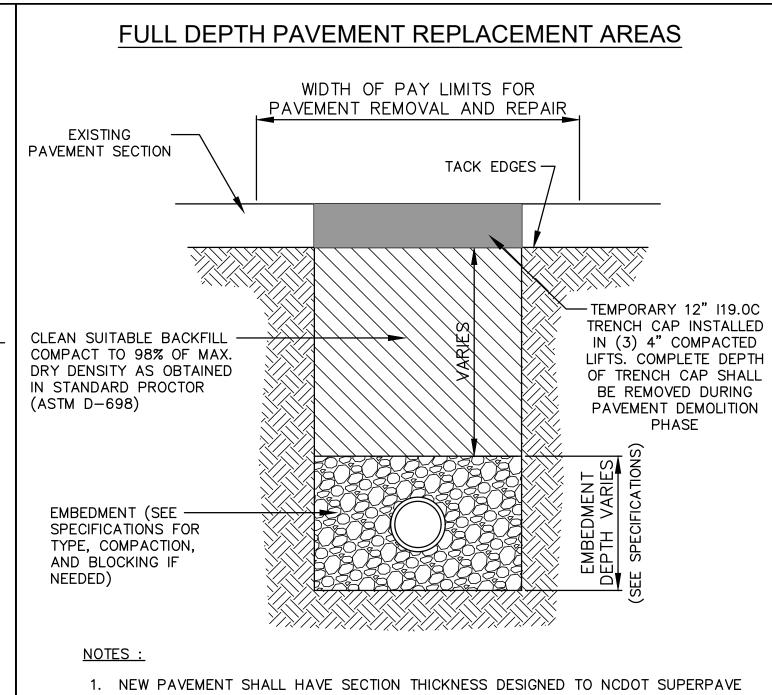
SHALL APPLY TO STONE AND CONCRETE PAVEMENT AS WELL.

UTILITY CUT REPLACEMENT DETAIL (CITY STREET)

MODIFIED FOR THIS PROJECT

NOT TO SCALE

5. 18" MIN. AROUND PATCHES AND 36" MIN. AT CURB CUTS.



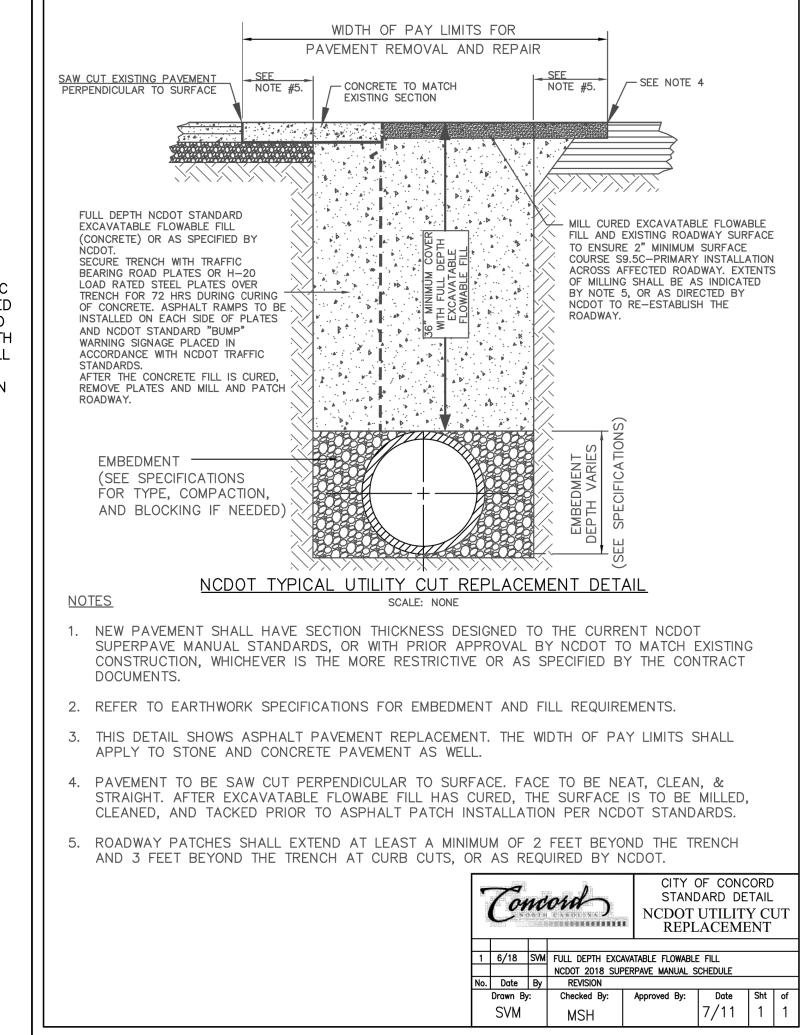
STANDARDS AS PROVIDED BY THE ENGINEER OR MATCH EXISTING CONSTRUCTION, WHICH EVER IS GREATER OR AS SPECIFIED BY THE CONTRACT DOCUMENTS. 2. TRENCH IS TO BE BACKFILLED IN COMPACTED 6" LAYERS BEFORE PAVEMENT REPAIRS ARE MADE.

3. REFER TO EARTHWORK SPECIFICATION FOR EMBEDMENT AND FILL REQUIREMENTS. 4. THIS DETAIL SHOWS ASPHALT PAVEMENT REPLACEMENT. THE WIDTH OF PAY LIMITS

SHALL APPLY TO STONE AND CONCRETE PAVEMENT AS WELL.

5. 18" MIN. AROUND PATCHES AND 36" MIN. AT CURB CUTS.

UTILITY CUT REPLACEMENT DETAIL (CITY STREET) MODIFIED FOR THIS PROJECT NOT TO SCALE



100% SUBMITTAL FOR REVIEW, NOT FOR CONSTRUCTION







NO. DATE BY

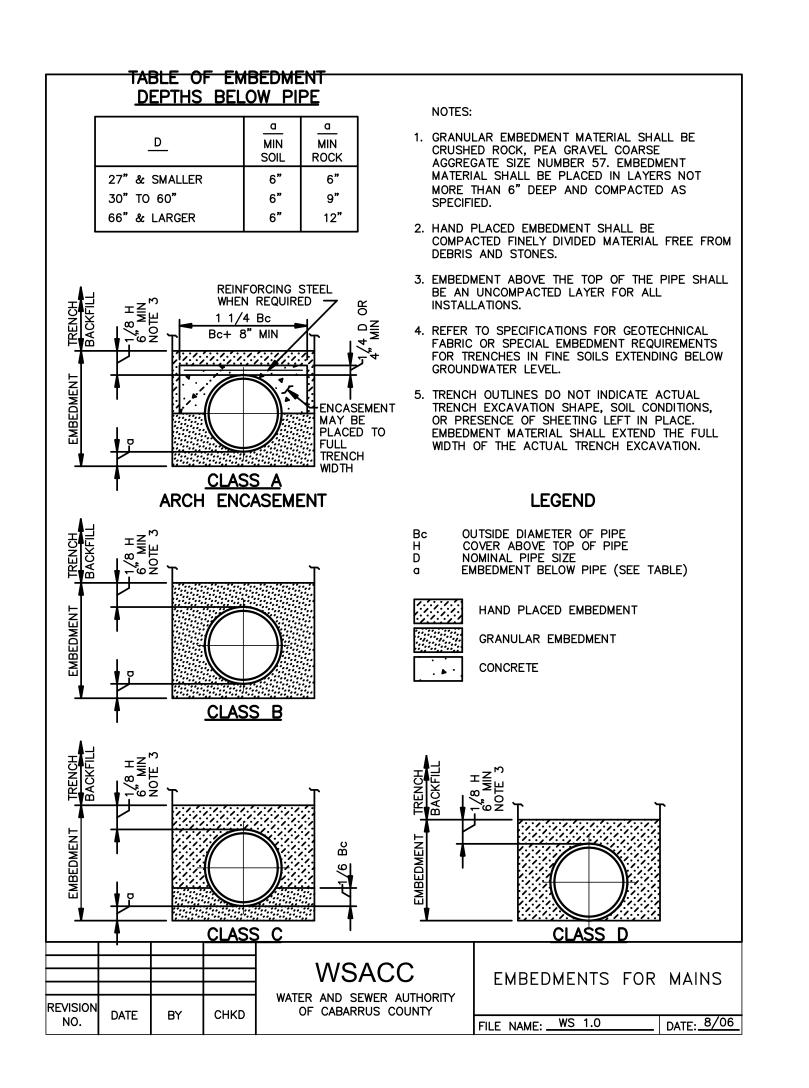
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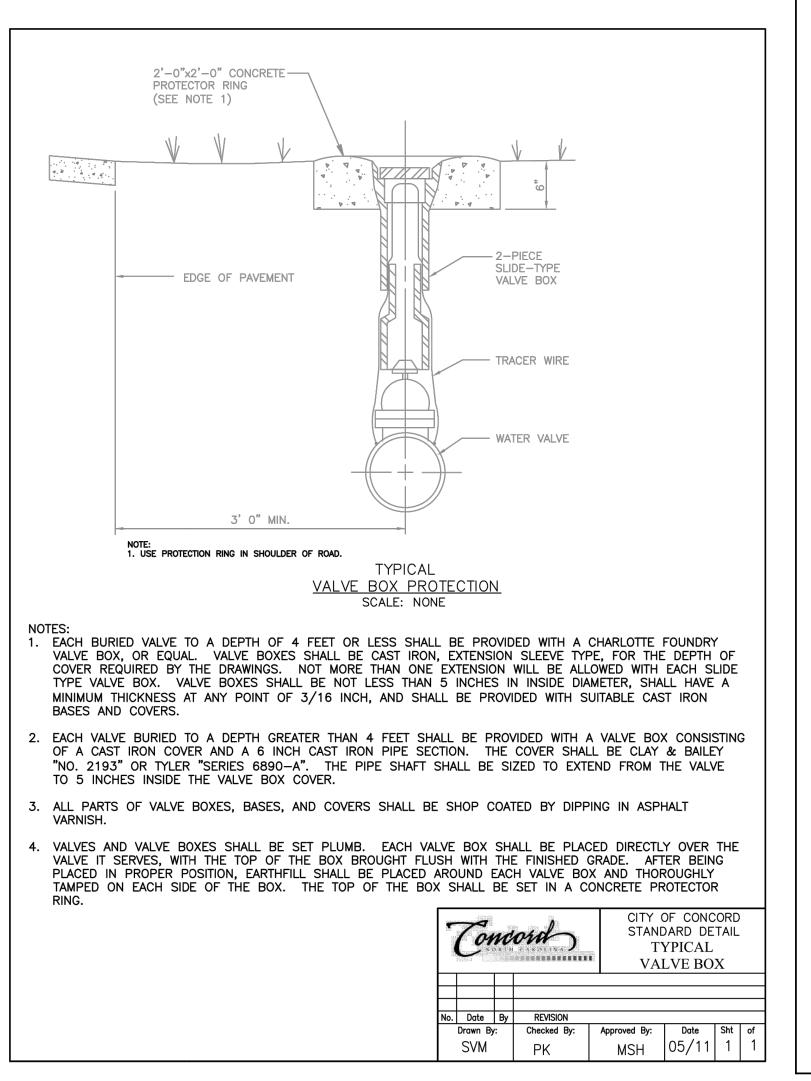


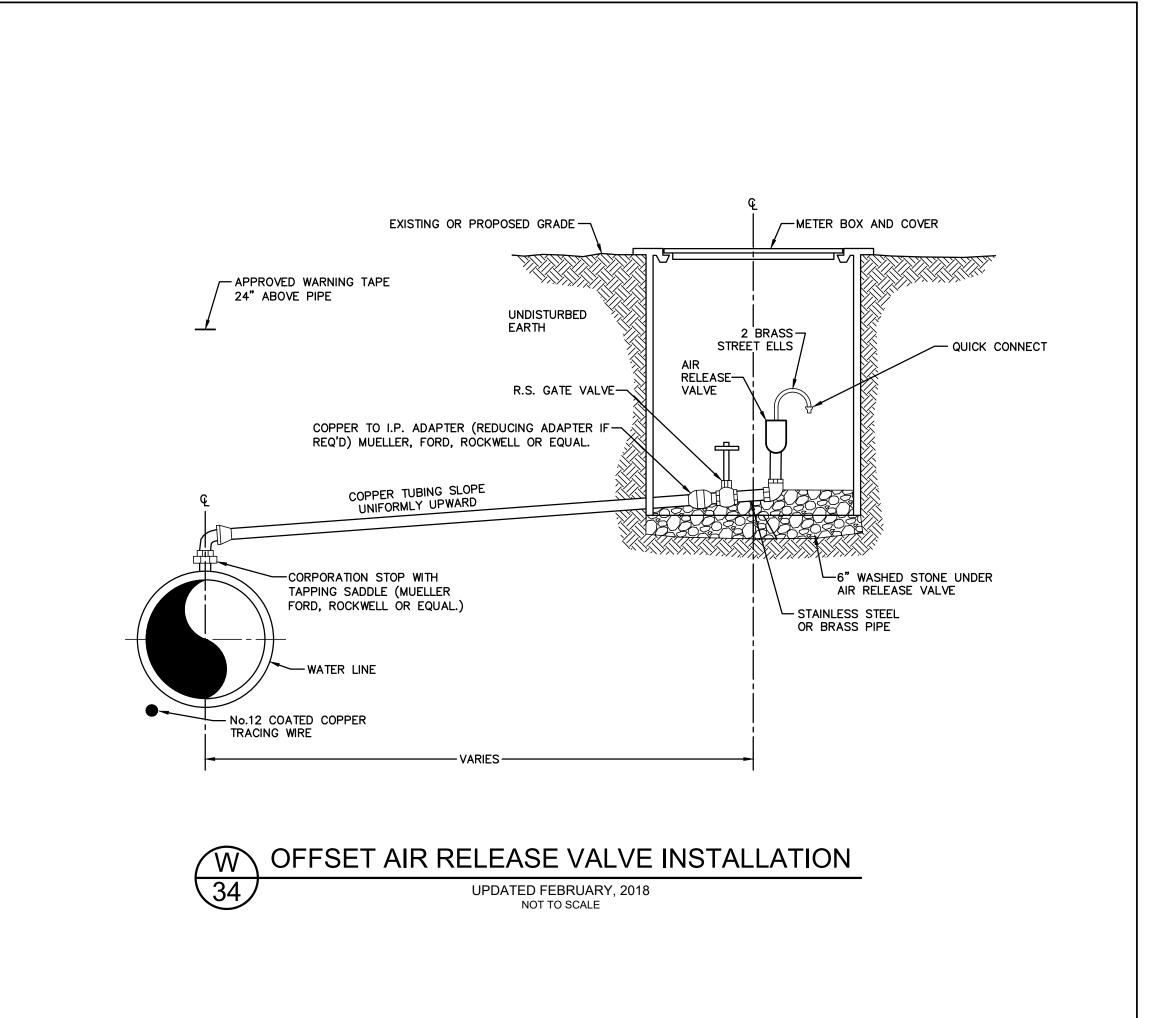
NOT TO SCALE STANDARD UTILITY DETAILS FICE MANAGER D.G. CHAPMAN M. OETTING ROJECT MANAGER 19.01726 M.J. NORRIS D.G. CHAPMAN MAY, 2021 N/A

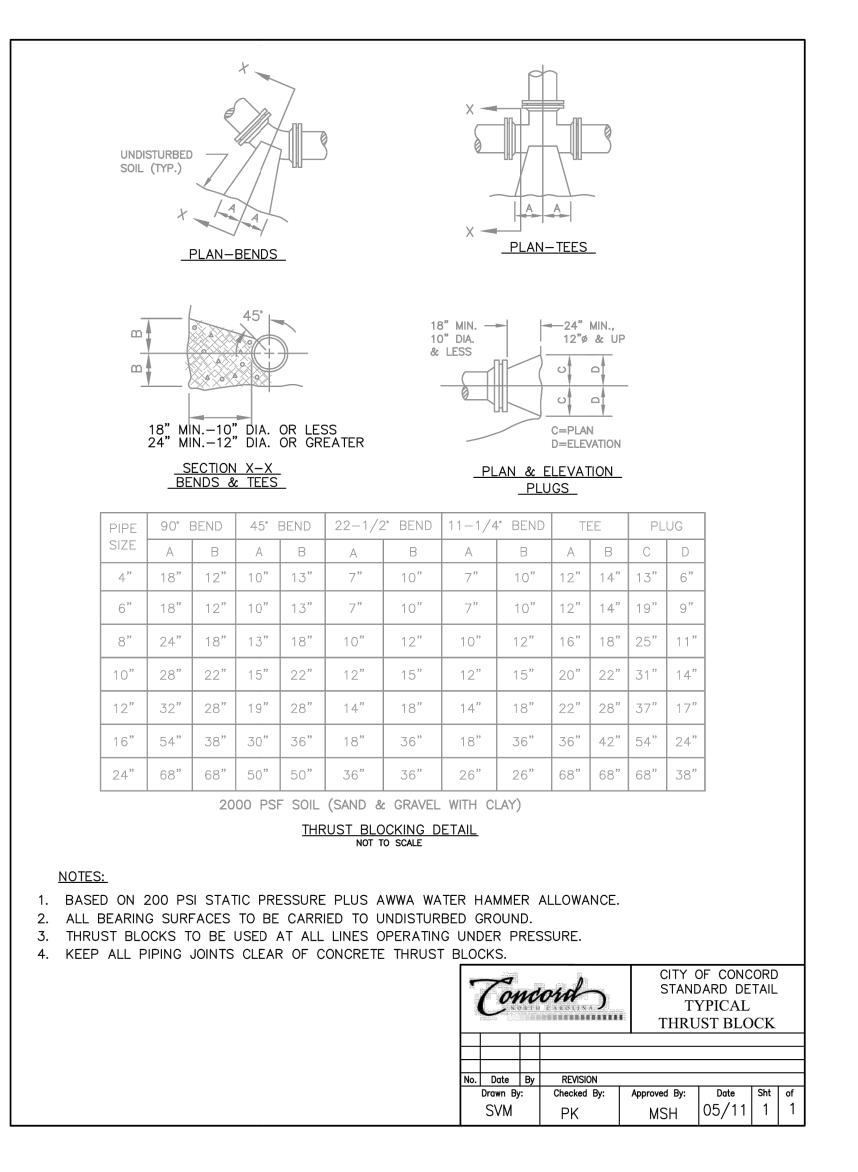
SHEET

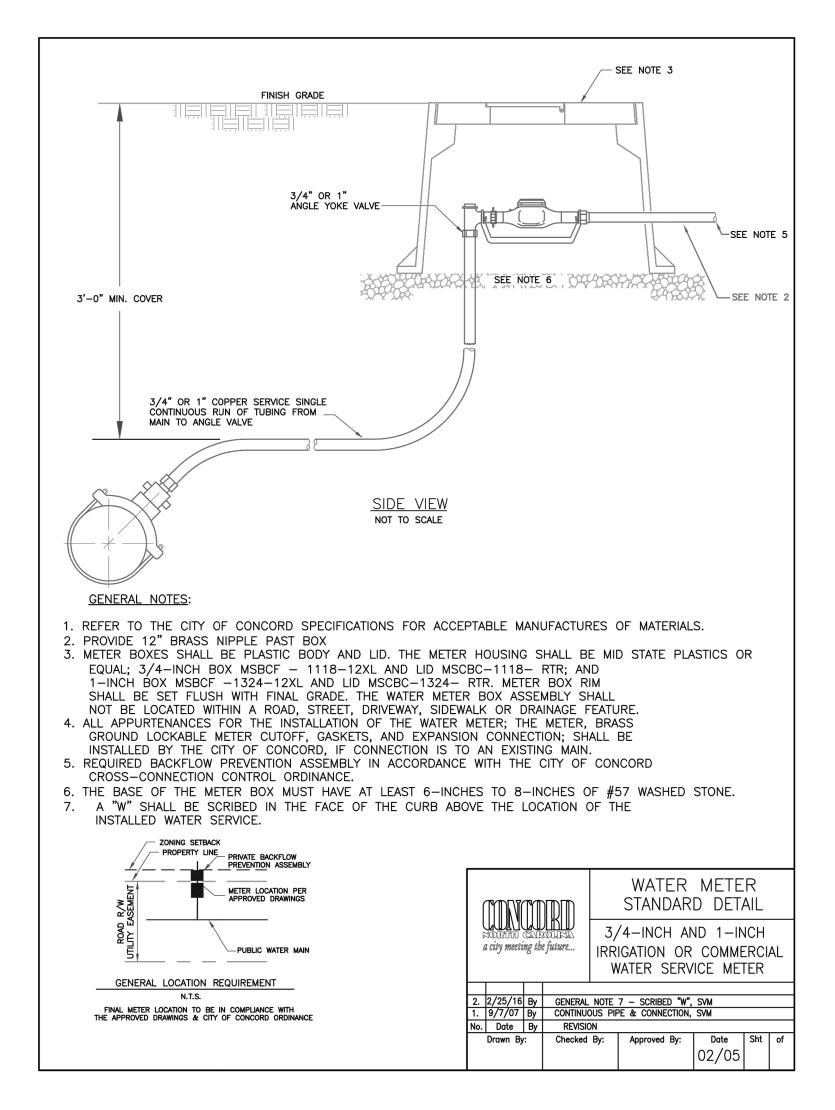
C-507

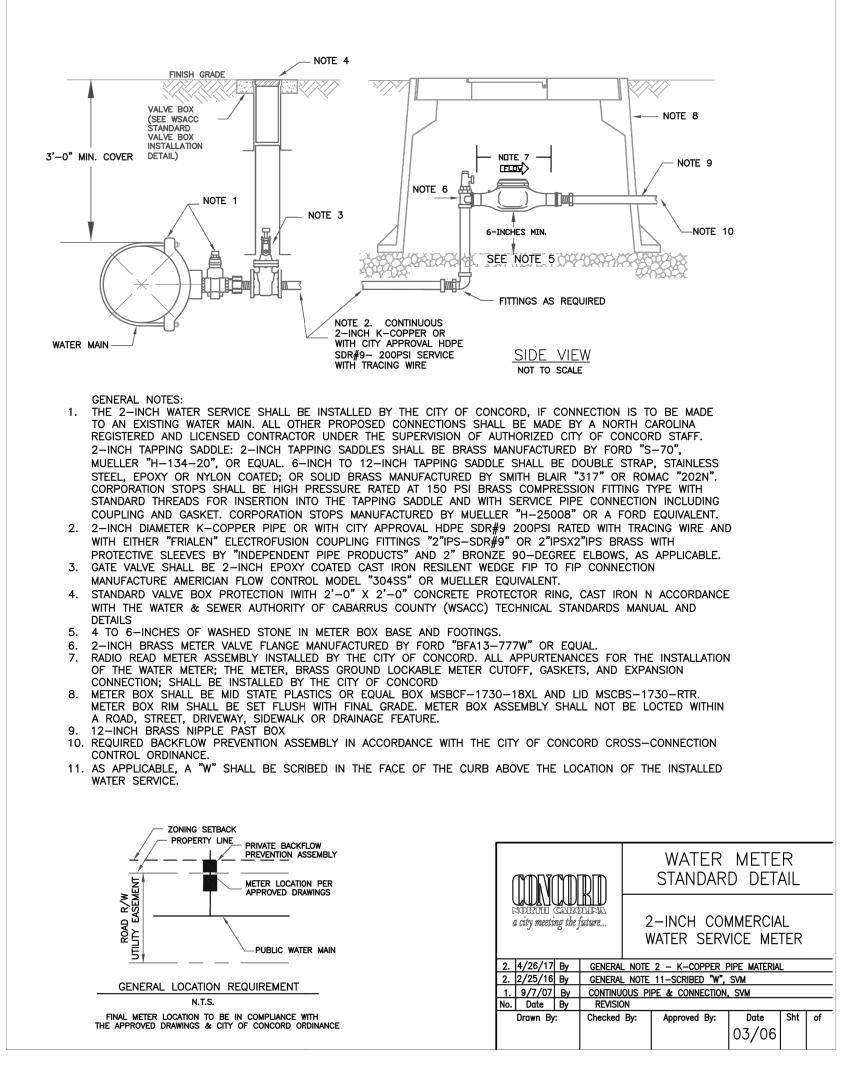


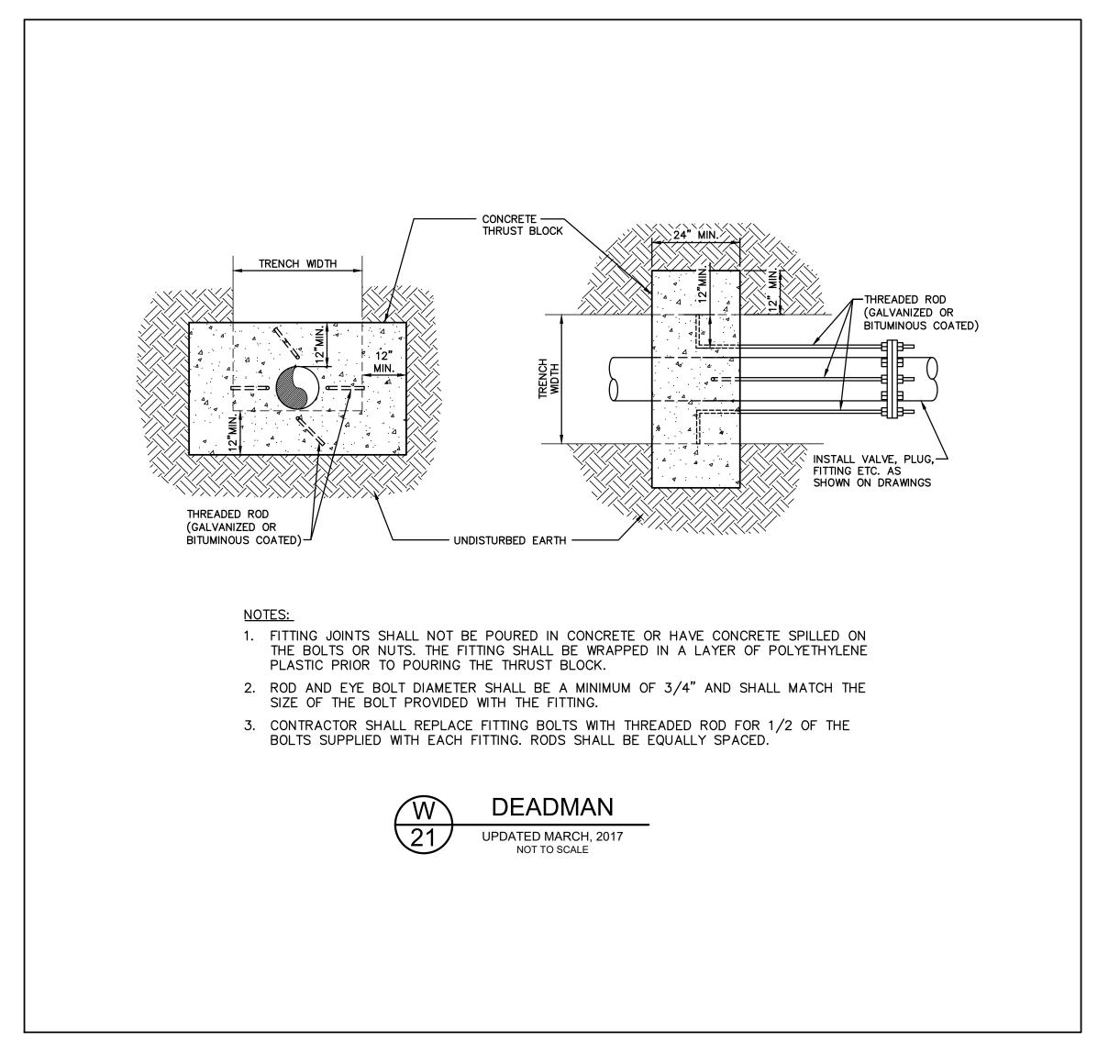


















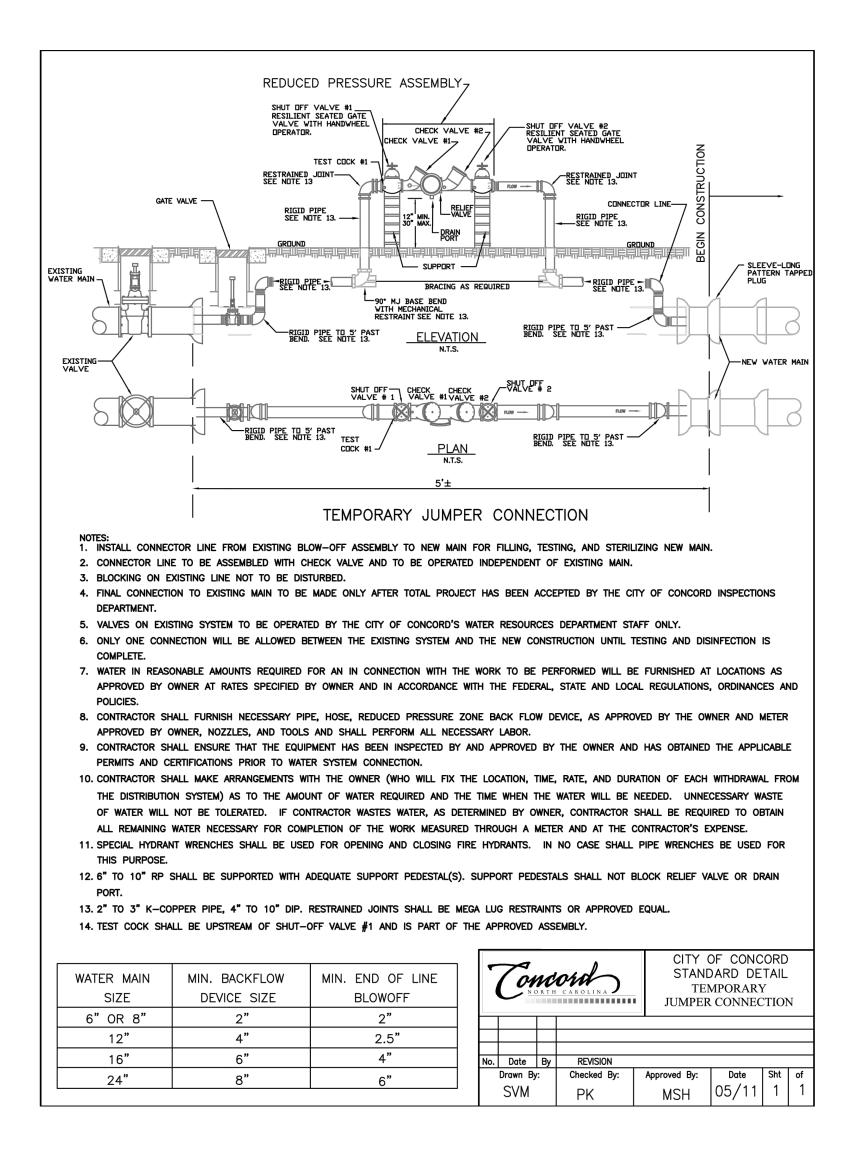


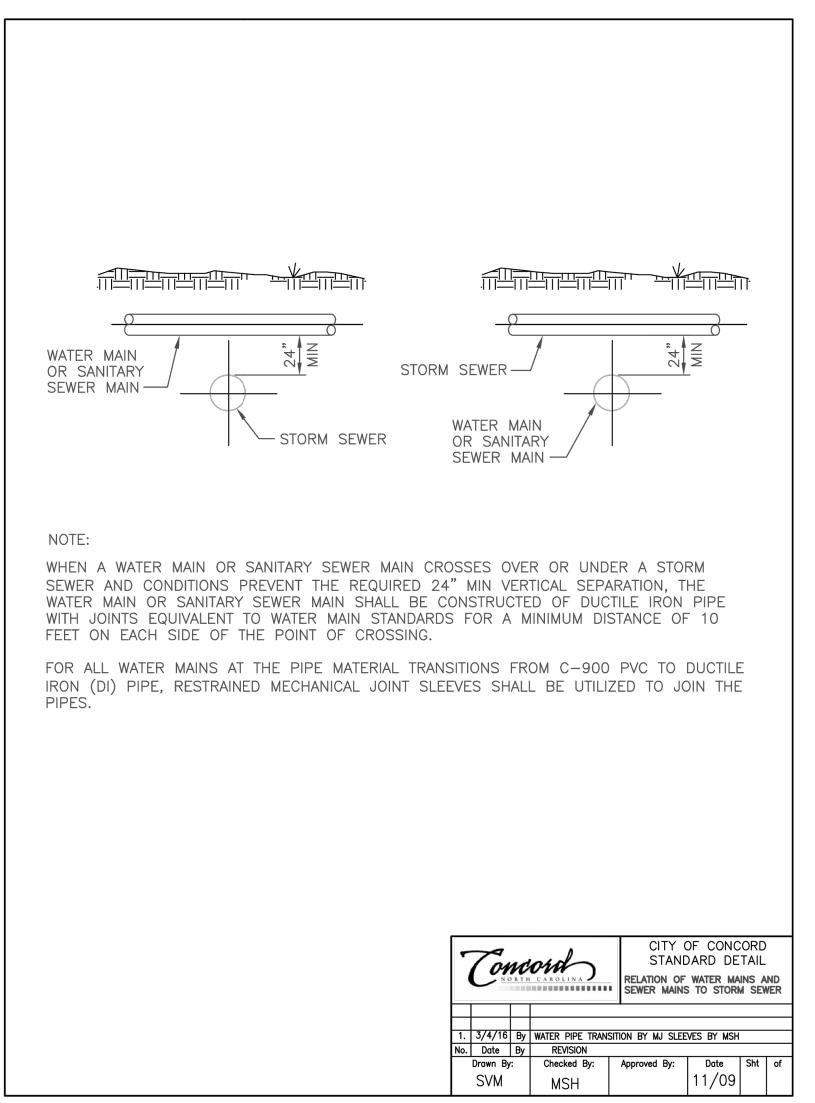
UNION STREET IMPROVEMENTS CITY OF CONCORD CABARRUS COUNTY, NORTH CAROLINA

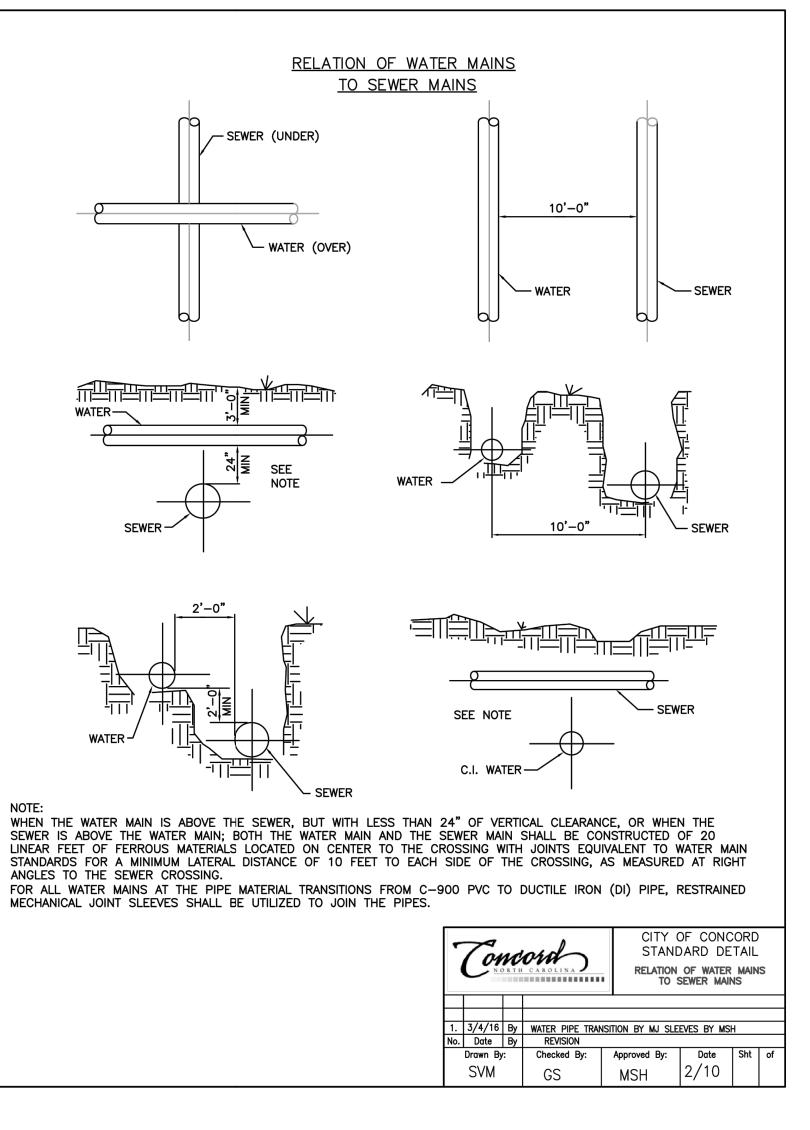
NOT TO	SCALE	STANDA	RD UTILITY DE	ETAILS
OFFICE MANAGER	DESIGNER			
D.G. CHAPMAN	M. OETTING			
PROJECT MANAGER	REVIEWER	DATE	PROJECT#	FUNDING #
M.J. NORRIS	D.G. CHAPMAN	MAY, 2021	19.01726	N/A

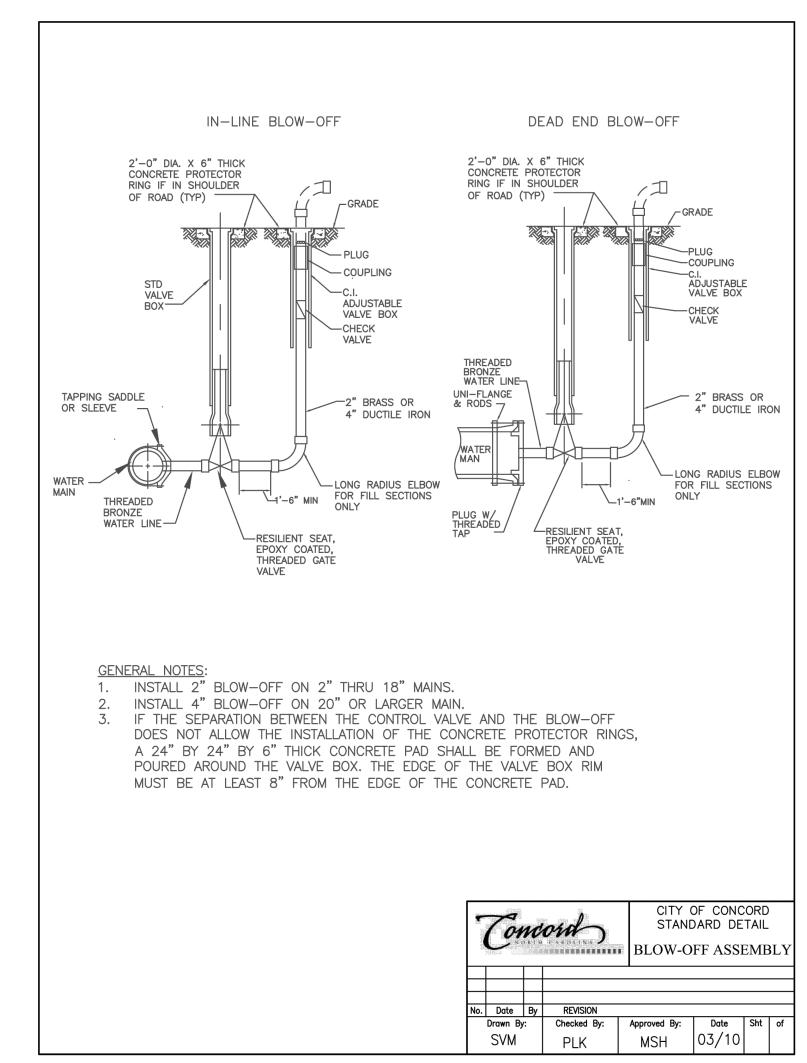
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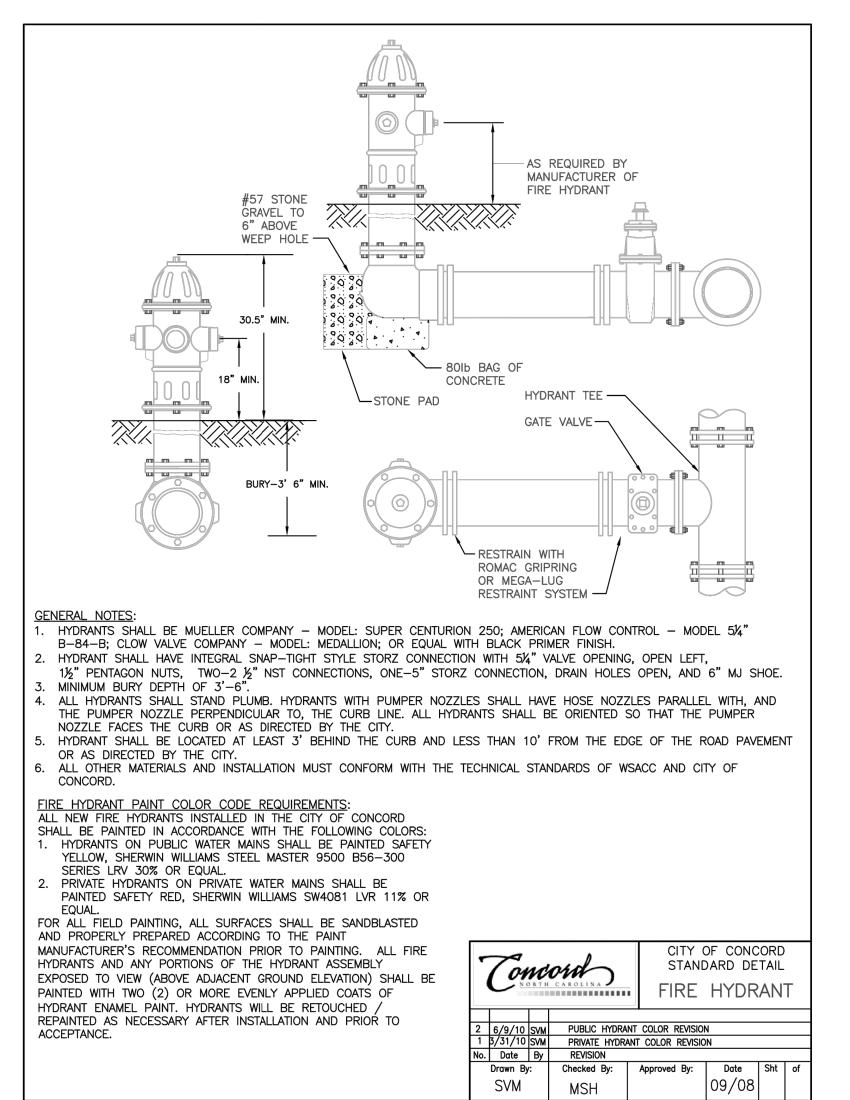
C-508

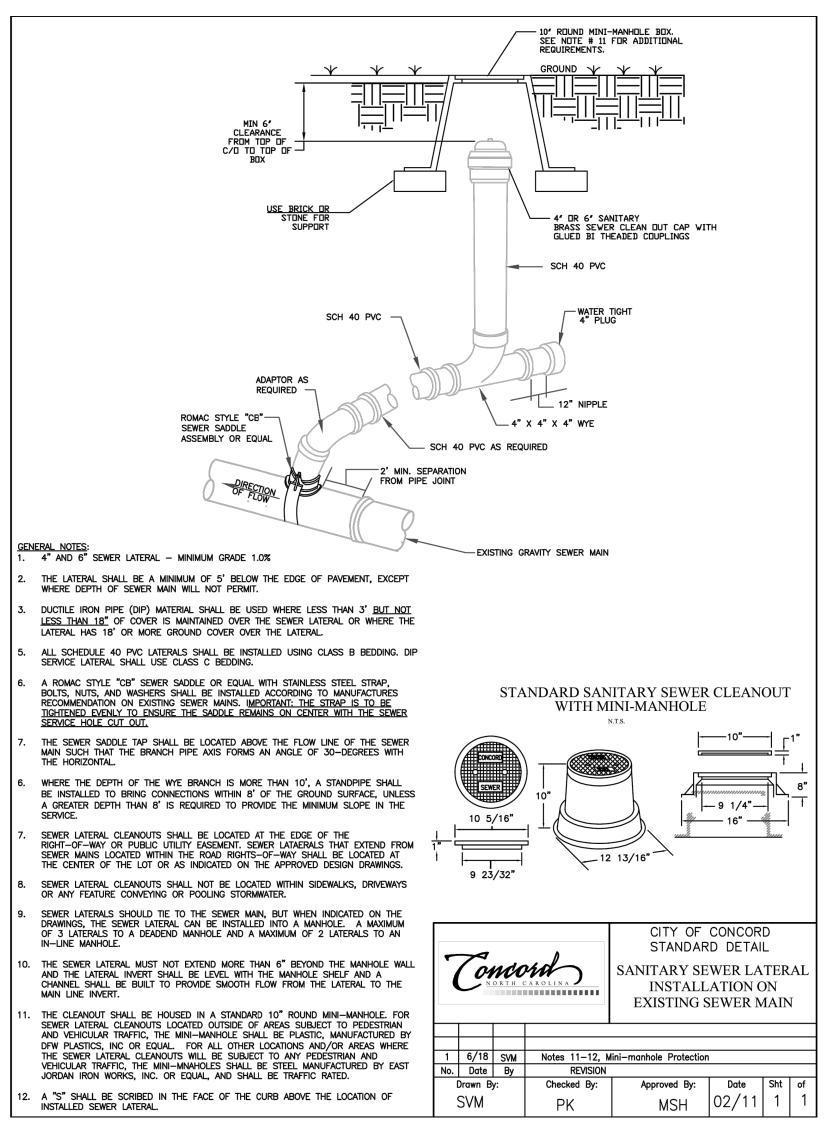


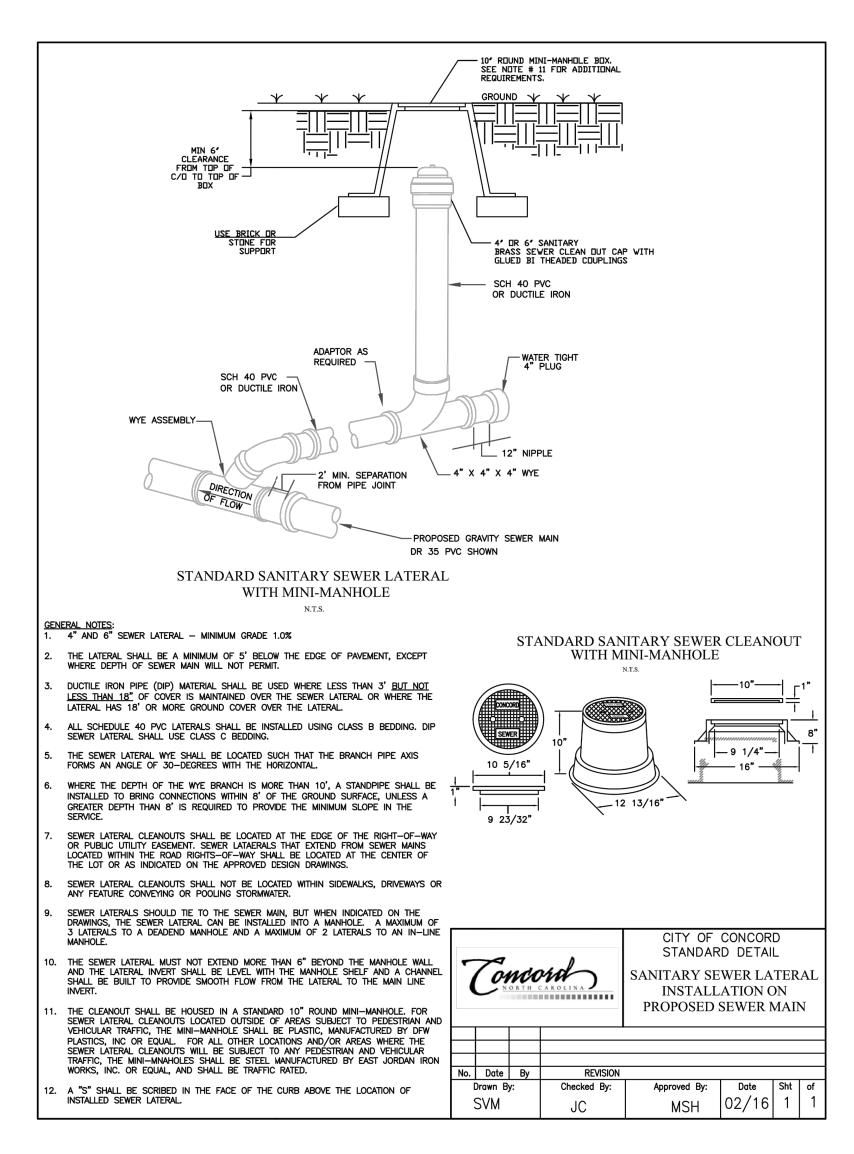


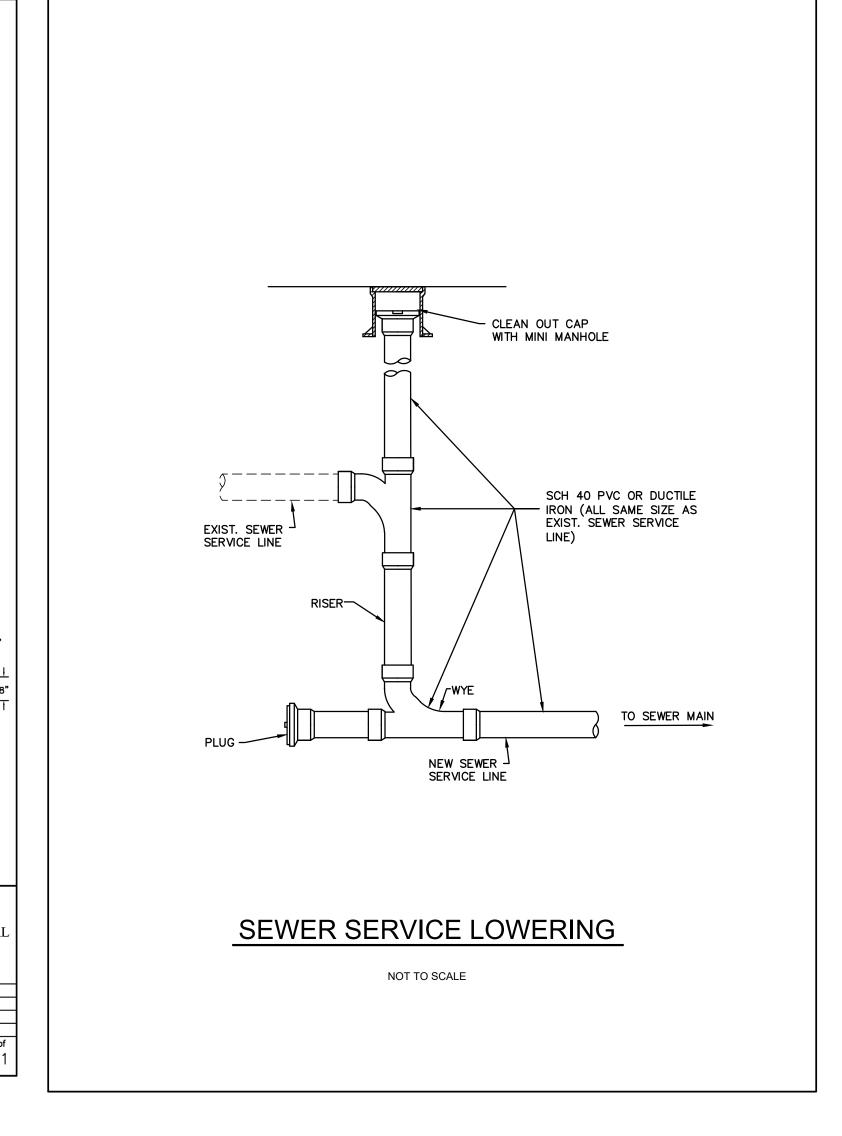


















NO. DATE

DESCRIPTION



NOT TO SCALE

STANDARD UTILITY DETAILS

DEFICE MANAGER

D.G. CHAPMAN

M. OETTING

PROJECT MANAGER

REVIEWER

D.G. CHAPMAN

MAY, 2021

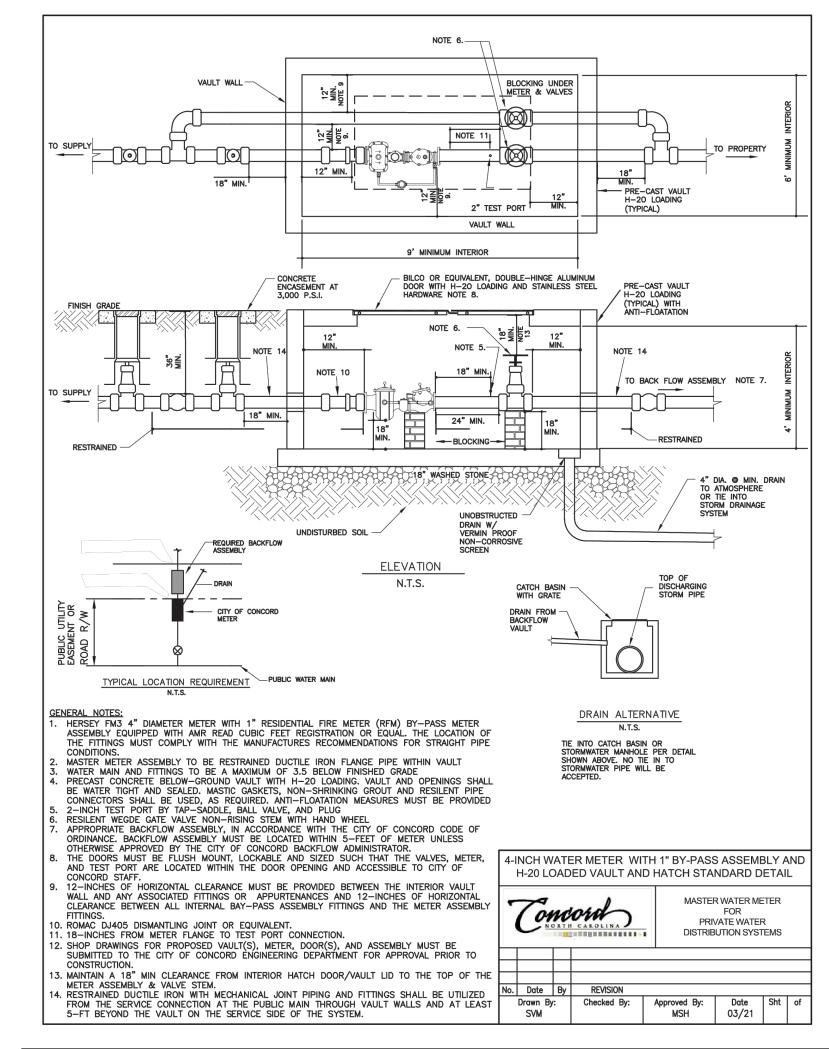
DATE

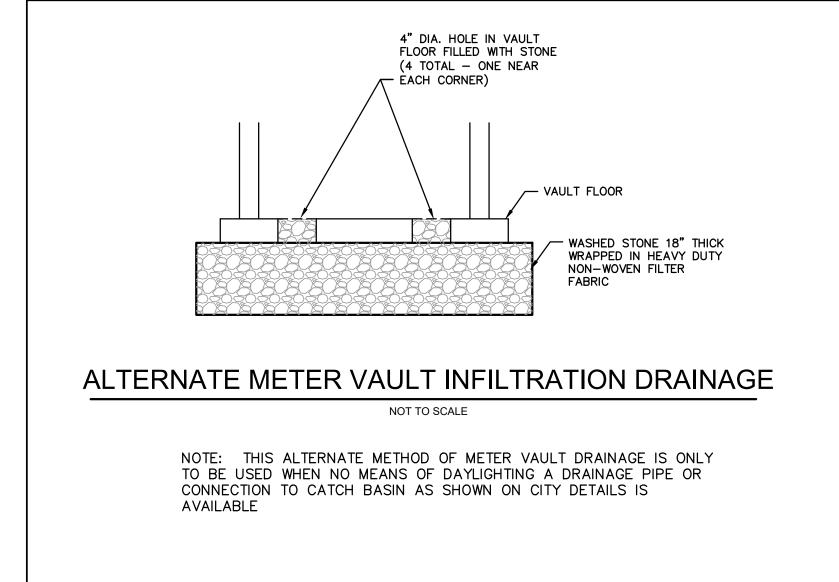
PROJECT # FUNDING #

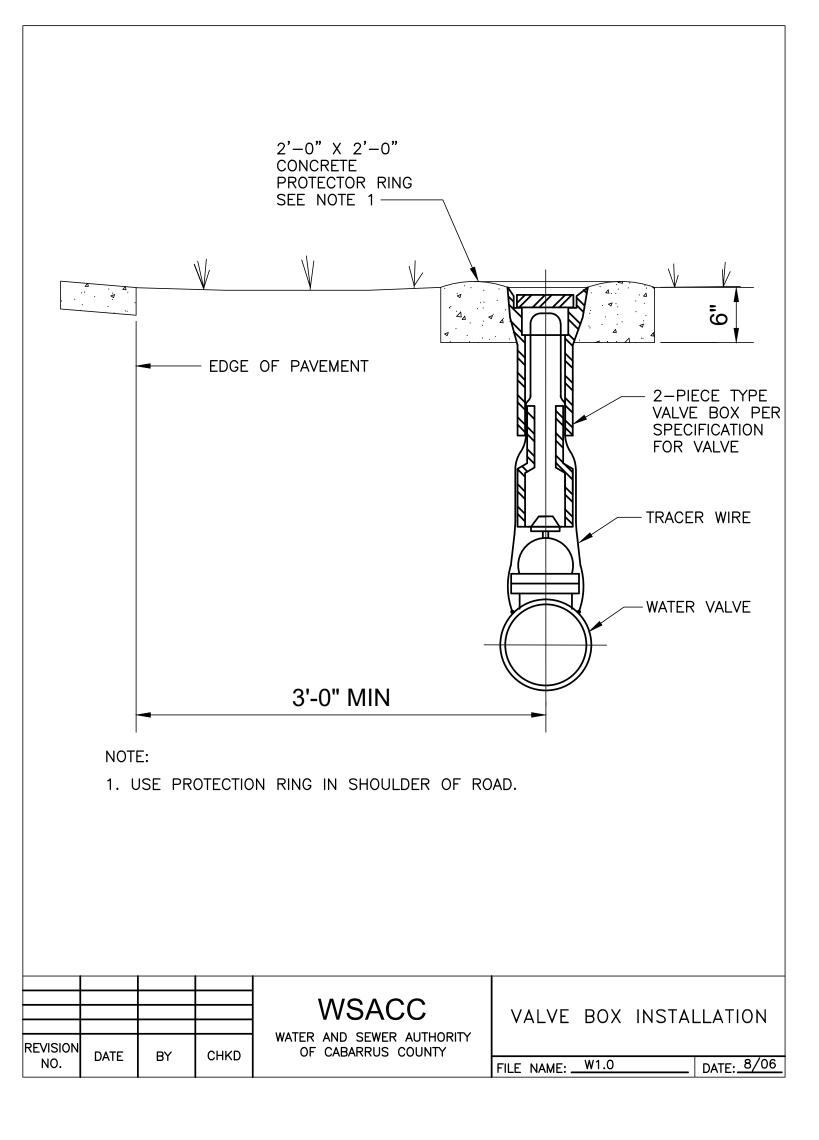
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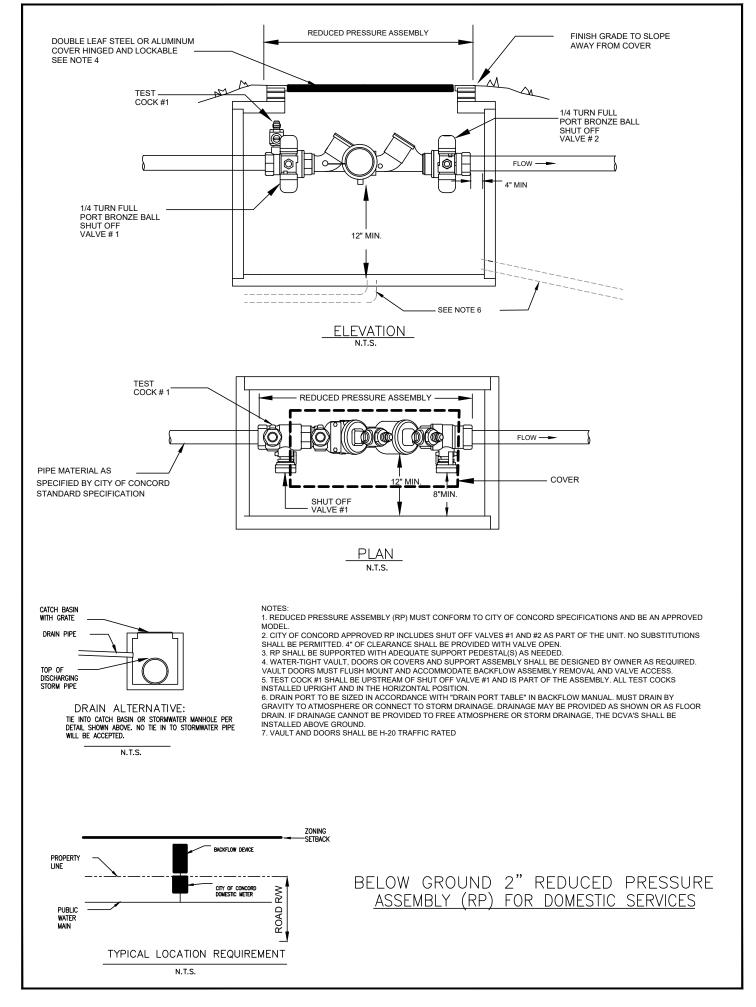
C-509

SHEET



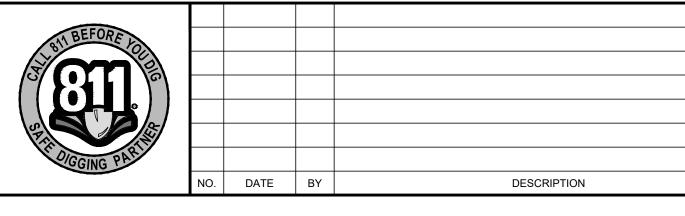












CITY OF CONCORD

CABARRUS COUNTY, NORTH CAROLINA

NOT TO SCALE

STANDARD UTILITY DETAILS

OFFICE MANAGER
D.G. CHAPMAN
M. OETTING

PROJECT MANAGER
REVIEWER
DATE
M.J. NORRIS
D.G. CHAPMAN
MAY, 2021
19.01726
N/A

SHEET

C-510



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

ROY COOPER GOVERNOR

JUL 1 9 2021

J. ERIC BOYETTE
SECRETARY

Mr. Lloyd Payne City of Concord P.O. Box 308 Concord, NC 28026

Subject: RW 16.1B NonUtility Encroachment Contract No. E101-013-21-00119

Location: SR-1002 (Cabarrus Ave)

Dear Mr. Payne:

Enclosed is an executed copy of the subject non-utility encroachment contract that has been reviewed by the appropriate authorities of the Department of Transportation's Division of Highways.

Scope of work to be performed:

The proposed installation consists of sidewalk improvements, curb, ADA ramps, storm water improvements, stamped asphalt crosswalks, grading, asphalt replacement, landscape, irrigation, and pavement markings within NCDOT right of way.

Please contact Marc Morgan at mmorgan@ncdot.gov and/or Jason Faulkner at jfaulkner@ncdot.gov or by phone at 704-983-4360 before proceeding with this encroachment to schedule a pre-construction meeting. A complete copy of this encroachment must be on site at all times during construction.

This approval is subject to the attached Special Provisions. Please reference the attached vicinity map and Plan Sheet with Typical Details that further illustrate this utility encroachment. This proposal shall conform to the new NCDOT Utilities Accommodations Manual, with strict adherence to NCDOT Standard Roadway Specification Requirements. The new Utilities Manual can be found at https://connect.ncdot.gov/municipalities/Utilities/Pages/UtilitiesManuals.aspx.

Sincerely,

Brett D. Canipe, PE Division Engineer

But D. Cape mor

mpm/jsf Attachments

Cc:

E-copy on online database

THIS AGREEMENT, made and entered into this the

of Transportation, party of the first part; and The City of Concord

DEPARTMENT OF TRANSPORTATION

-AND-

City of Concord
P.O. Box 308, NC 28026-0308

RIGHT OF WAY ENCROACHMENT AGREEMENT FOR CURB AND GUTTER, PAVEMENT WIDENING AND STORM DRAINAGE

__ day of Tuty, 20 21 ___, by and between the Department

party of the second part,

WITNESSETH

THAT WHEREAS, the party of the second part desires to encroach on the right of way of the public road designated as Route(s)

Route(s) SR 1002 Cabarrus Ave , located at the Intersection of SR 1002 Cabarrus Ave and Union St

with the construction and/or erection of: sidewalk Improvements, curb, handlcap ramps, storm water improvements, stamped asphalt crosswalks, grading, asphalt replacement, landscape, irrigation, and pavement markings

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of the first part in the exercise of authority conferred upon it by statute, is willing to permit the encroachment within the limits of the right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right and privilege to make this encroachment as shown on attached plan sheet(s), specifications and special provisions which are made a part hereof upon the following conditions, to wit:

That the said party of the second part binds and obligates himself to install the encroaching facility in such safe and proper condition that it will not interfere with or endanger travel upon said highway.

That the party of the second part agrees to provide during construction proper signs, signal lights, flagmen and other warning devices for the protection of traffic in conformance with the latest Manual on Uniform Traffic Control Devices for Streets and Highways and Amendments or Supplements thereto. Information as to the above rules and regulations may be obtained from the Division Engineer of the party of the first part.

That the party of the second part hereby agrees to indemnify and save harmless the party of the first part from all damages and claims for damage that may arise by reason of the installation and maintenance of this encroachment.

It is clearly understood by the party of the second part that the party of the first part will assume no responsibility for any damage that may be caused to such facilities, within the highway rights of way limits, in carrying out its construction.

That the party of the second part agrees to restore all areas disturbed during construction to the satisfaction of the Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during construction and maintenance to prevent eroding of soil; silting or pollution of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces or other property; or pollution of the air. There shall be compliance with applicable rules and regulations of the North Carolina Division of Environmental Management, North Carolina Sedimentation Control Commission, and with ordinances and regulations of various counties, municipalities and other official agencies relating to pollution prevention and control. When any construction operation disturbs the ground surface and existing ground cover, the party of the second part agrees to remove and replace the sod or otherwise reestablish the grass cover to meet the satisfaction of the Division Engineer of the party of the first part.

That the party of the second part agrees to assume the actual cost of any inspection of the work considered to be necessary by the Division Engineer of the party of the first part.

That the party of the second part agrees to have available at the encroaching site, at all times during construction, a copy of this agreement showing evidence of approval by the party of the first part. The party of the first part reserves the right to stop all work unless evidence of approval can be shown.

Provided the work contained in this agreement is being performed on a completed highway open to traffic; the party of the second part agrees to give written notice to the Division Engineer of the party of the first part when all work contained herein has been completed. Unless specifically requested by the party of the first part, written notice of completion of work on highway projects under construction will not be required.

That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of the first part reserves the right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to the party of the first part.

That it is agreed by both parties that this agreement shall become void if actual construction of the work contemplated herein is not begun within one (1) year from the date of authorization by the party of the first part unless written waiver is secured by the party of the second part from the party of the first part.

R/W (161B): Party of the Second Part certifies that this agreement is true and accurate copy of the form

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and year first above written.

DEPARTMENT OF TRANSPORTATION

BY:

DIVISION ENGINEER

ATTEST OR WITNESS

Lloyd Payne, City Manage

Second Party

INSTRUCTIONS

When the applicant is a corporation or a municipality, this agreement must have the corporate seal and be attested by the corporate seal and attested by the corporate seal and attested by the empowered city official, unless a waiver of corporate seal and attestation by the empowered city official is on file in the Raleigh office of the State Utilities Manager. In the space provided in this agreement for execution, the name of the corporation or municipality shall be typed above the name, and title of all persons signing the agreement should be typed directly below their signature.

When the applicant is not a corporation, then his signature must be witnessed by one person. The address should be included in this agreement and the names of all persons signing the agreement should be typed directly below their signature.

This agreement must be accompanied, in the form of an attachment, by plans or drawings showing the following applicable information:

- 1. All roadways and ramps.
- 2. Right of way lines and where applicable, the control of access lines.
- 3. Location of the proposed encroachment.
- Length and type of encroachment.
- 5. Location by highway survey station number. If station number cannot be obtained, location should be shown by distance from some identifiable point, such as a bridge, road, intersection, etc. (To assist in preparation of the encroachment plan, the Department's roadway plans may be seen at the various Highway Division Offices, or at the Raleigh office.)
- Drainage structures or bridges if affected by encroachment.
- Typical section indicating the pavement design and width, and the slopes, widths and details for either a curb and gutter or a shoulder and ditch section, whichever is applicable.
- 8. Horizontal alignment indicating general curve data, where applicable.
- Vertical alignment indicated by percent grade, P.I. station and vertical curve length, where applicable.
- 10. Amount of material to be removed and/or placed on NCDOT right of way, if applicable.
- Cross-sections of all grading operations, indicating slope ratio and reference by station where applicable.
- All pertinent drainage structures proposed. Include all hydraulic data, pipe sizes, structure details and other related information.
- 13. Erosion and sediment control.
- 14. Any special provisions or specifications as to the performance of the work or the method of construction that may be required by the Department must be shown on a separate sheet attached to encroachment agreement provided that such information cannot be shown on plans or drawings.
- The Department's Division Engineer should be given notice by the applicant prior to actual starting of installation included in this agreement.
- 16. Method of handling traffic during construction where applicable.
- 17. Scale of plans, north arrow, etc.

Workforce Safety Plan: COVID-19

WORKFORCE SAFETY PLAN FOR ENCROACHMENT ACTIVITIES: COVID-19

EFFORTS THE N.C. TRANSPORTATION INDUSTRY IS TAKING TO STOP THE SPREAD OF COVID-19

The North Carolina Department of Transportation (NCDOT) and their partners expect all parties involved in the delivery of transportation projects to abide by the guidelines issued from the Centers for Disease Control and Prevention (CDC) and the North Carolina Department of Health and Human Services (NCDHHS).

Response to COVID-19 is rapidly evolving; new information and guidelines may be issued from the CDC, NCDHHS, or other state or federal agencies. NCDOT and their partners should review the current CDC and NCDHHS guidance, including the resources listed at the end of this document, for up-to-date information on how to respond to COVID-19. Additional guidelines may be issued by state or federal agencies that should be followed in addition to the guidance included in this document.

Though certain Americans with Disabilities Act (ADA) requirements have been relaxed in response to the pandemic, employers must still maintain all information about employee illness as a confidential medical record in compliance with the ADA. If an employee is suspected of having or tests positive for COVID-19, it is essential that management keep the identity of the employee and details related to the employee's health confidential.

Below are precautions required by NCDOT and from encroaching parties and their contractors performing construction within NCDOT Rights of Way. The term employee refers to any person on a job site within NCDOT right of way for the purpose of constructing or inspecting the work related to construction of a facility under an approved encroachment agreement and where that employee may or may not be under employment by or under contract to NCDOT.

EMPLOYEE WELLNESS

- If an employee has not yet reported to work and develops any COVID-19 symptoms (i.e. fever, coughing, or shortness of breath) STAY HOME and immediately:
 - Call a health care provider
 - Self-Isolate
 - Communicate with your supervisor
 - o Remain calm and follow all instructions from your health care provider
- Employees who appear to have acute respiratory illness symptoms (i.e. cough, shortness of breath)
 upon arrival to work, or become sick during the day, should be separated from others and sent
 home immediately. The potentially affected employees should immediately follow the steps
 outlined above, which includes immediately contacting a health care provider.
- Should an employee show symptoms of acute respiratory illness or be diagnosed with COVID-19, all
 other employees who have worked in close proximity to the affected employee during the last 14

Workforce Safety Plan: COVID-19

days and all encroachment points of contact indicated at the end of this plan should be notified of potential exposure to the disease without identifying the affected employee.

- Consideration should be given to employees at "High Risk" of severe illness from COVID-19, who, per NCDHHS, include employees:
 - Over 65 years of age, OR
 - o With underlying health conditions including heart disease, lung disease, or diabetes, OR
 - With weakened immune system
- "High Risk" Employees should be given the opportunity to discuss alternate work arrangements/duties with their employer or take leave according to their company policies.
- For guidance on confirmed positive tests for COVID-19, refer to the most recent version of the "COVID-19 Guidance for Employees on Encroachment Job Sites within NCDOT Right of Way" located on last page of this plan.

PERSONAL HYGIENE

- Clean hands often by washing with soap and water for 20 seconds. If soap and water are not
 available and hands are not visibly dirty, an alcohol-based hand sanitizer that contains 60%-95%
 alcohol may be used.
- Avoid touching your eyes, nose, mouth, or other parts of your face.
- Do not breathe, cough, or sneeze on another person or into the open air. Employees should cover their noses and mouth with a tissue when coughing or sneezing (or an elbow or shoulder if no tissue is available).
- A facemask for covering nose and mouth is encouraged on the job site.
- Appropriate gloves are encouraged while performing functions of the job.

CLEANING/DISINFECTING

- Wash stations and/or hand sanitizer are encouraged on each project site.
- Appropriate cleaning staff should clean frequently touched surfaces and objects with disinfectants at a minimum of once per day.
 - Office/buildings: door knobs, light switches, phones, computers/keyboards, copy machines, elevator buttons, toilets, faucets, sinks, countertops, paper towel dispensers, desktops, handrails, folders, vending machines, counters, tables, cabinets/knobs, etc.
 - Shop Yard/Jobsite: vehicle/equipment door handles, keys, gear shifts, steering wheel/operator controls and levers, fuel pump dispensers, touch points on machinery, etc.
 - Electronic equipment: cell phones, computers, keyboards, etc.
- Appropriate cleaning staff should sanitize/disinfect facilities and work areas after persons suspected/confirmed to have COVID-19 have been in the facility or work area.

- o It is recommended to close off access to areas used by the ill persons and wait as long as practical, 24 hours if possible, before beginning cleaning and disinfection to minimize potential for exposure to respiratory droplets. Open outside doors and windows to increase air circulation in the area if possible.
- Appropriate cleaning staff should clean and disinfect all areas used by the ill persons, focusing especially on frequently touched surfaces.

GENERAL

- Increase communication measures between all parties regarding schedule, daily activities, etc. to reduce/minimize worker exposure in accordance with but not limited to the requirements below.
- Minimize on-site personnel such as subcontractors, work crews, QC personnel, and inspection staff
 to those required for that day's activities. If work is postponed or cancelled, immediately notify
 appropriate parties.
- Practice "Social Distancing" whenever feasible. Social Distancing is designed to limit the spread of a
 disease by reducing the opportunities for close contact between people. All personnel have the
 responsibility to remind each other to stay 6 feet or more apart. Examples of Social Distancing
 include:
 - Reducing face-to-face exposure by using conference calls and video conferencing
 - If an in-person meeting is absolutely required and cannot be rescheduled or attended remotely, the meeting is limited to a maximum of 10 people while maintaining Social Distancing of 6 feet or more.
 - Avoiding unnecessary travel
- Do not congregate at lunch or breaks. Bringing your lunch is encouraged.
- No communal coolers or drink stations are allowed. Supervisors should confirm with employees
 prior to beginning work for appropriate hydration and nutrition availability to employees for the
 duration of the employee's shift and without direct contact with others on the job site.
- First line of communication should be by phone, rather than in-person.
- Do not shake hands.
- Do not share iPads, tablets, pens, or clipboards for signing or any other purpose. Take pictures as proof of attendance at meetings.
- Sharing of Personal Protective Equipment (PPE) is strictly prohibited.
- Vehicles, equipment, and tools
 - Limit the number of people riding in a vehicle together.
 - Wipe down and disinfect vehicles after each trip.
 - As much as possible, do not share tools or equipment. If a tool or piece of equipment must be shared, the parts of it that are touched should be sanitized between uses.

RETURN TO WORK

- The following criteria must be followed for an employee who is tested for Covid-19, or asked to self-quarantine by health officials, or has contact with another employee with a positive test result to return to work:
 - o at least a 14-day quarantine; OR
 - o release by a health care provider.
- In accordance with CDC guidance, the following criteria must be followed for an employee with a
 positive test result to return to work:
 - at least 14 days from positive test notification; AND
 - at least 3 days (72 hours) have passed since recovery defined as resolution of fever without the use of fever-reducing medications and improvement in respiratory symptoms (e.g., cough, shortness of breath); AND
 - o at least 7 days have passed since symptoms first appeared.

NCDOT may require certification of fitness to work from a health care provider.

ADDITIONAL RESOURCES

NCDOT and their partners should review the CDC and NCDHHS resources listed below for up-to-date information on how to respond to COVID-19. Additional guidelines may be issued by state or federal agencies that should be followed in addition to the guidelines included in this document.

- NCDHHS COVID-19 Resources:
 - https://www.ncdhhs.gov/divisions/public-health/coronavirus-disease-2019-covid-19-response-north-carolina
- NCOSHR Communicable Disease Emergency Policy
 - https://oshr.nc.gov/policies-forms/workplace-wellness/communicable-disease-emergency
- OSHA Guidance on Preparing Workplaces for COVID-19
 - https://www.osha.gov/Publications/OSHA3990.pdf
- CDC COVID-19 Resources:
 - https://www.cdc.gov/coronavirus/2019-ncov/index.html

AGREEMENT

The encroaching party shall adhere to the requirements of this plan in order to continue work under their approved encroachment agreement. Violations to this plan could result in the violating entity not being allowed to continue work or all work ceasing as determined by the NCDOT District Engineer or Resident Engineer.

PROJECT POINTS OF CONTACT

Workforce Safety Plan: COVID-19

NCDOT Encroachment ID#: E101-013-21-00118

 Encroaching Party (Primary Contact)

Name: City of Concord

Contact: Sue Hyde, Engineering Director

Phone #: 704-920-5425

Primary Contractor to Encroaching Party (Point of Contact)

ivame:		 	
Phone #	#:		

	COVID-19 Guidance	2 Mars	or Employees on Encroachment Job sites within NCDOT Right of Way	
4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4			CONTACT GROUP	
Kelationsnip to Confirmed POSITIVE Test		What YOU Should Do	What your CREW Should Do Exposure within 6' and longer than 10 minutes	What PROJECT SITE Personnel Should Do No exposure within 6' and longer than 10 minutes
Employee	- 40	Notify your supervisor Self-quarantine for 14 days	Advise of POSITIVE test without identifying the affected employee* Directly exposed crew self-quarantine for 14 days Continue hygiene & disinfecting measures	Advise of POSITIVE test without identifying the affected employee* Site personnel without direct contact may continue onsite work or follow their company policy Continue hygiene & disinfecting measures
Direct Contact Interaction with an infected person within 6' and longer than 10 minutes	10 10 10 10 10 10 10 10	Self-quarantine for 14 days	Advise of POSITIVE test without identifying the affected employee* Crew may continue onsite work or follow their company policy Continue hygiene & disinfecting measures	Advise of POSITIVE test * Continue hygiene & disinfecting measures
Secondary Contact	+ + You	You may continue onsite work or follow your company policy Continue hygiene & disinfecting measures	Continue hygiene & disinfecting measures	Continue hygiene & disinfecting measures
Two or more Persons Removed from Contact	A	Continue hygiene & disinfecting measures	Continue hygiene & disinfecting measures	Continue hygiene & disinfecting measures
*Notification Protocol	NCDOT employee / agent tests POSITIVE	NCDOT District Engineer/Resident Engine Contact, CDC and, if Resident Engineer h Encroaching party representative notifies	NCDOT District Engineer/Resident Engineer notifies Encroaching Party's primary point of contact and Contractor Point of Contact, CDC and, if Resident Engineer has oversight for the job site, FHWA any Consultant Firms working for NCDOT Encroaching party representative notifies other Contractors, Sub-Contractors and Suppliers with exposed Employees	int of contact and Contractor Point of Isultant Firms working for NCDOT Uppliers with exposed Employees
(Comply with HIPAA & ADA confidentiality requirements)	Encroaching Party or Contract crew member on job site tests POSITIVE	Encroaching party representative or Cont Engineer and all other Contractors, Sub-C NCDOT notifies CDC, and as appropriate,	Encroaching party representative or Contractor point of contact notifies appropriate NCDOT District Engineer or Resident Engineer and all other Contractors, Sub-Contractors and Suppliers with exposed Employees NCDOT notifies CDC, and as appropriate, FHWA and any Consultant Firms working for NCDOT	e NCDOT District Engineer or Resident iployees or NCDOT

Pre-Construction

Contact Offices & Outside Agency issues/contacts/info

- 1. Approval may be rescinded upon failure to follow any of the provisions in this permit and may be considered a violation of the encroachment agreement.
- 2. The Encroaching party or their contractor shall provide the following notices prior to construction activity within the NCDOT Right of Way:
 - a. Three (3) business days advance phone call at telephone (704)983-4360 or email to Marc Morgan, mmorgan@ncdot.gov, or Jason Faulkner, jfaulkner@ncdot.gov, in the District Engineer's office
 - b. If the construction falls within the limits of an NCDOT managed construction project, five (5) business days advance phone call to the Resident Engineer, Mr. Chris Fine at 704 983 4380 or email to lcfine@ncdot.gov.

Failure to provide these notifications prior to beginning construction is subject to the Division Engineer's discretion to cease construction activity for this encroachment. NCDOT reserves the right to cease any construction or maintenance work associated with this installation by the encroaching party until the construction or maintenance meets the satisfaction of the Division Engineer or their representative.

- 3. Prior to beginning work, it is the requirement of the Encroaching Party to contact the appropriate Utility Companies involved and make arrangements to adjust or relocate any utilities that conflict with the proposed work.
- 4. It shall be the responsibility of the encroaching party to determine the location of utilities within the encroachment area. NCGS § 87-115 through § 87-130 of the Underground Utility Safety and Damage Prevention Act requires underground utilities to be located by calling 811 prior to construction. The encroaching party shall be responsible for notifying other utility owners and providing protection and safeguards to prevent damage or interruption to existing facilities and maintain access to them.
- 5. The encroaching party shall notify the appropriate municipal office prior to beginning any work within the municipality's limits of jurisdiction.
- 6. This installation is within the Toll NC XXX right of way. The encroaching party shall notify the North Carolina Turnpike Authority (NCTA) at telephone (919) 825-2612 or e-mail ncta_tme@ncdot.gov_at least ten (10) business days prior to beginning construction. The NCTA fiber trunk line shall be located prior to any excavation or boring within the Toll NC XXX right of way. The cost to repair or relocate any signage, cables, signals or associated equipment due to this installation shall be the responsibility of the encroaching party.
- 7. The encroaching party is made aware that the XXXXXX Expressway is a toll facility and as such, toll revenue is required to operate and maintain the facility. If any NCTA owned asset is damaged as a result of the encroaching party's construction, it shall be repaired at no cost to NCTA. Additionally, if the damage results in the failure or hindrance of NCTA to properly collect toll revenue (damaged toll fiber, road closure, safety concern, etc.) the encroaching party will be sought to reimburse NCTA for the lost revenue.

- 8. This installation is within the NCDOT Division XX Interstate Corridor right of way. The encroaching party shall notify the following at least ten (10) business days prior to beginning construction:
 NCDOT Division XX Interstate Maintenance: Name, email@ncdot.gov or by phone at XXX-XXX.
- 9. This installation is within the Mobility Partners (NCDOT Contractor) Managed I-77 Toll Corridor right of way. The encroaching party shall notify the following at least ten (10) business days prior to beginning construction:
 - a. Mobility Partners: David Hannon, <u>dhannon@i77partners.com</u> or by phone at 980-337-2396 AND documentcontrol@i77partners.com.
 - b. NCDOT Division 10 Interstate Maintenance: Michael Mariano, mamariano@ncdot.gov or by phone at 980-262-6260.
 - c. The North Carolina Turnpike Authority (NCTA) at telephone (919) 825-2612 or e-mail neta-tmc@ncdot.gov.

The NCTA fiber trunk line shall be located prior to any excavation or boring within the Toll I 77 right of way. The cost to repair or relocate any structure, signage, cables, signals or associated equipment due to this installation shall be the responsibility of the encroaching party.

- 10. If any work is within 1000 feet of a signalized intersection, the encroaching parties shall contact NC811 for a locate before any work can begin. Cost to replace or repair NCDOT signs, signals, pavement markings or associated equipment and facilities shall be the responsibility of the encroaching party.
- 11. This agreement does not authorize installations within nor encroachment onto railroad rights of way. Permits for installations within railroad right of way must be obtained from the railroad and are the responsibility of the encroaching party.
- 12. At the option of the District Engineer, a preconstruction meeting including representatives of NCDOT, the encroaching party, contractors and municipality, if applicable, shall be required. A pre-construction conference held between a municipality (or other facility owner) and a contractor without the presence of NCDOT personnel with subsequent construction commencing may be subject to NCDOT personnel ceasing any work on NCDOT right-of-way related to this encroachment until such meeting is held. Contact the District office to schedule.
- 13. At the discretion of the District Engineer, a NOTIFICATION FOR UTILITY / NON-UTILITY ENCROACHMENT WITHIN NCDOT R/W form (See corresponding attachment) with the scheduled pre-construction meeting and associated construction schedule details must be completed and submitted to the District Engineer's office a minimum of one week prior to construction.
- 14. At the discretion of the District Engineer, the encroaching party (not the utility contractor) shall make arrangements to have a qualified inspector, under the supervision of a Professional Engineer registered in North Carolina, on site at all times during construction at no cost to the NCDOT. The registered Professional Engineer shall be required to submit a signed and PE sealed certification that the utility was installed in accordance with the encroachment agreement.

Legal & Right-of-Way Issues

15. This approval and associated plans and supporting documents shall not be interpreted to allow any design change or change in the intent of the design by the Owner, Design Engineer, or any of their

- representatives. Any revisions or changes to these approved plans or intent for construction must be obtained in writing from the Division Engineer's office or their representative prior to construction or during construction if an issue arises during construction to warrant changes.
- 16. NCDOT does not guarantee the right of way on this road, nor will it be responsible for any claim for damages brought about by any property owner by reason of this installation. It is the responsibility of the encroaching party to verify the right of way.
- 17. Encroaching party shall be responsible for obtaining all necessary permanent and/or temporary construction, drainage, utility and/or sight distance easements.
- 18. All Right of Way and easements necessary for construction and maintenance shall be dedicated to NCDOT with proof of dedication furnished to the District Engineer prior to beginning work.
- 19. No commercial advertising shall be allowed within NCDOT Right of Way.
- 20. The encroaching party shall obtain proper approval from all affected pole owners prior to attachment to any pole.
- 21. The installation within the Control of Access fence shall not adversely affect the design, construction, maintenance, stability, traffic safety or operation of the controlled access highway, and the utility must be serviced without access from the through-traffic roadways or ramps.

Bonds

- 22. A Performance and Indemnity Bond in the amount of \$x,xxx.xx shall be posted with the District Engineer's Office by the Party of the Second Part prior to beginning any work within the NCDOT Right of Way. The bond shall be held for a minimum of one year after a satisfactory final inspection of the installation by NCDOT. The bond may be held for a period longer than one year after completion if, in the opinion of NCDOT, the size or complexity of the installation warrants a longer period.
- 23. The release of the bond is subject to a final inspection by NCDOT. Contact the District office to schedule a Final Inspection and to request release of the bond.

Work Zone Traffic

24. Traffic control shall be coordinated with the District Engineer's representative/inspector prior to construction.

25. WORK ZONE TRAFFIC CONTROL QUALIFICATIONS AND TRAINING PROGRAM

All personnel performing any activity inside the highway right of way are required to be familiar with the NCDOT Maintenance / Utility Traffic Control Guidelines (MUTCG). No specific training course or test is required for qualification in the Maintenance /Utility Traffic Control Guidelines (MUTCG).

All flagging, spotting, or operating Automated Flagger Assist Devices (AFAD) inside the highway right of way requires qualified and trained Work Zone Flaggers. Training for this certification is

provided by NCDOT approved training resources and by private entities that have been pre-approved to train themselves.

All personnel involved with the installation of Work Zone Traffic Control devices inside the highway right of way are required to be qualified and trained Work Zone Installers. Training for this certification is provided by NCDOT approved training resources and by private entities that have been pre-approved to train themselves.

All personnel in charge of overseeing work zone Temporary Traffic Control operations and installations inside the highway right of way are required to be qualified and trained Work Zone Supervisors. Training for this certification is provided by NCDOT approved training resources and by private entities that have been pre-approved to train themselves.

For questions and/or additional information regarding this training program please refer to https://connect.ncdot.gov/projects/WZTC/Pages/Training.aspx or call the NCDOT Work Zone Traffic Control Section (919) 814-5000.

- 26. The party of the second part shall employ traffic control measures that are in accordance with the prevailing federal, state, local, and NCDOT policies, standards, and procedures. These policies, standards, and procedures include, but are not limited to the following:
 - a. Manual on Uniform Traffic Control Devices (MUTCD) North Carolina has adopted the MUTCD to provide basic principles and guidelines for traffic control device design, application, installation, and maintenance. North Carolina uses the MUTCD as a minimum requirement where higher supplemental standards specific to North Carolina are not established. Use fundamental principles and best practices of MUTCD (Part 6, Temporary Traffic Control).
 - b. NCDOT Maintenance / Utility Traffic Control Guidelines This document enhances the fundamental principles and best practices established in MUTCD Part 6, Temporary Traffic Control, incorporating NCDOT-specific standards and details. It also covers important safety knowledge for a wide range of work zone job responsibilities.
- 27. If the Traffic Control Supervisor determines that portable concrete barrier (PCB) is required to shield a hazard within the clear zone, then PCB shall be designed and sealed by a licensed North Carolina Professional Engineer. PCB plans and design calculations shall be submitted to the District Engineer for review and approval prior to installation.
- 28. Ingress and egress shall be maintained to all businesses and dwellings affected by the project. Special attention shall be paid to police, EMS and fire stations, fire hydrants, secondary schools, and hospitals.
- 29. Traffic shall be maintained at all times. All lanes of traffic are to be open during the hours of 7:00 A.M. to 9:00 A.M. and from 4:00 P.M. to 6:00 P.M. Monday through Friday, during any time of inclement weather, **or as directed by the District Engineer**. Any violation of these hours will result in ceasing any further construction by the Encroaching Party or their contractor.
- 30. Nighttime and weekend operations will NOT be allowed unless written approval is received from the District Engineer. If nighttime or weekend work is allowed or required, all signs must be retroreflective, and a work zone lighting plan must be submitted for approval prior to construction.
- 31. Two-way traffic shall be maintained at all times unless designated by the District Engineer. Traffic shall not be rerouted or detoured without the prior written approval from the District Engineer. No utility work will be allowed on state holidays from 7:00 PM the night before through 9:00 AM the day prior to, following or during local events without prior approval from the District Engineer. If the

- construction is within 1000 feet of a school location or on a designated bus route, the construction shall be coordinated with the school start and end times to avoid traffic delays.
- 32. Work requiring lane or shoulder closures shall not be performed on both sides of the road simultaneously within the same area.
- 33. Any work requiring equipment or personnel within 5 feet of the edge of any travel lane of an undivided facility and within 10 feet of the edge of any travel lane of a divided facility shall require a lane closure with appropriate tapers per current NCDOT Roadway Standard Drawings or MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
- 34. At the discretion of the District Engineer, a traffic control plan shall be developed and submitted under the seal and signature of a Licensed North Carolina Professional Engineer prior to construction. The plan shall be specific to the site and adequately detailed. Issues such as the close proximity to intersections shall be addressed.
- 35. Temporary and final pavement markings are the responsibility of the encroaching party. Final pavement markings and sign plans shall be submitted with the encroachment request to the Division Traffic Engineer prior to construction. Final pavement markings shall be thermoplastic unless otherwise directed by the Division Traffic Engineer or District Engineer.
- 36. Any pavement markings that are damaged or obliterated shall be restored by the encroaching party at no expense to NCDOT.
- 37. Sidewalk closures shall be installed as necessary. Pedestrian traffic shall be detoured around these closures and shall be signed appropriately and in accordance with The American with Disabilities Act Accessibility Guidelines. The encroaching party must adhere to the guidelines for accommodating pedestrians in encroachment work zones as described in the NCDOT Pedestrian Work Zone Accommodations Training found at https://www.youtube.com/watch?v=AOuYa5IW3dg&feature=youtu.be

Roadside Environmental

- 38. The encroaching party shall comply with all applicable Federal, State and local environmental regulations and shall obtain all necessary Federal, State and local environmental permits, including but not limited to, those related to sediment control, stormwater, wetland, streams, endangered species and historical sites. Additional information can be obtained by contacting the NCDOT Roadside Environmental Engineer regarding the North Carolina Natural Heritage Program or the United States Fish and Wildlife Services. Contact the Division Roadside Environmental Engineer's Office at 704-244-8260.
- 39. When surface area in excess of one acre will be disturbed, the Encroacher shall submit a Sediment and Erosion Control Plan which has been approved by the appropriate regulatory agency or authority prior to beginning any work on the Right of Way. Failure to provide this information shall be grounds for suspension of operations. Proper temporary and permanent measures shall be used to control erosion and sedimentation in accordance with the approved sediment and erosion control plan.
- 40. The Verification of Compliance with Environmental Regulations (VCER-1) form is required for all non-utility encroachment agreements or any utility encroachments when land disturbance within NCDOT right of way exceeds 1 acre. The VCER-1 form must be PE sealed by a NC registered professional engineer who has verified that all appropriate environmental permits (if applicable) have been obtained and all applicable environmental regulations have been followed.

- 41. All erosion control devices and measures shall be constructed, installed, maintained, and removed by the Encroacher in accordance with all applicable Federal, State, and Local laws, regulations, ordinances, and policies. Permanent vegetation shall be established on all disturbed areas in accordance with the recommendations of the Division Roadside Environmental Engineer. All areas disturbed (shoulders, ditches, removed accesses, etc.) shall be graded and seeded in accordance with the latest *NCDOT Standards Specifications for Roads and Structures* and within 15 calendar days with an approved NCDOT seed mixture (all lawn type areas shall be maintained and reseeded as such). Seeding rates per acre shall be applied according to the Division Roadside Environmental Engineer. Any plant or vegetation in the NCDOT planted sites that is destroyed or damaged as a result of this encroachment shall be replaced with plants of like kind or similar shape.
- 42. No trees within NCDOT shall be cut without authorization from the Division Roadside Environmental Engineer. An inventory of trees measuring greater than 4 caliper inches (measured 6" above the ground) is required when trees within C/A right of way will be impacted by the encroachment installation. Mitigation is required and will be determined by the Division Roadside Environmental Engineer's Office.
- 43. Prior to installation, the Encroaching Party shall contact the District Engineer to discuss any environmental issues associated with the installation to address concerns related to the root system of trees impacted by boring or non-utility construction of sidewalk, roadway widening, etc.
- 44. The applicant is responsible for identifying project impacts to waters of the United States (wetlands, intermittent streams, perennial streams and ponds) located within the NCDOT right-of-way. The discharge of dredged or fill material into waters of the United States requires authorization from the United States Army Corps of Engineers (USACE) and certification from the North Carolina Division of Water Quality (NCDWQ). The applicant is required to obtain pertinent permits or certification from these regulatory agencies if construction of the project impacts waters of the United States within the NCDOT right-of-way. The applicant is responsible for complying with any river or stream Riparian Buffer Rule as regulated by the NCDWQ. The Rule regulates activity within a 50-foot buffer along perennial streams, intermittent streams and ponds. Additional information can be obtained by contacting the NCDWQ or the USACE.
- 45. The contractor shall not begin the construction until after the traffic control and erosion control devices have been installed to the satisfaction of the Division Engineer or their agent.
- 46. The contractor shall perform all monitoring and record keeping and any required maintenance of erosion and sediment control measures to maintain compliance with stormwater regulations.

STIP (or Division Managed) Projects

47. State Transportation Improvement Project (STIP) R-5706B is scheduled for construction. Any encroachment determined to be in conflict with the construction of this NCDOT project shall be removed and/or relocated at the encroaching party's expense.

Construction

General

- 48. An executed copy of the encroachment agreement, provisions and approved plans shall be present at the construction site at all times. If safety or traffic conditions warrant such an action, NCDOT reserves the right to further limit, restrict or suspend operations within the right of way.
- 49. The Encroaching Party and/or their Contractor shall comply with all OSHA requirements. If OSHA visits the work area associated with this encroachment, the District Office shall be notified by the encroaching party immediately if any violations are cited.
- 50. Any REVISIONS marked in RED on the attached non-PE sealed plans shall be incorporated into and made part of the approved encroachment agreement.
- 51. All disturbed areas are to be fully restored to current NCDOT minimum roadway standards or as directed by the Division Engineer or their representative. Disturbed areas within NCDOT Right-of-Way include, but not limited to, any excavation areas, pavement removal, drainage or other features.
- 52. The encroaching party shall notify the Division Engineer or their representative immediately in the event any drainage structure is blocked, disturbed or damaged. All drainage structures disturbed, damaged or blocked shall be restored to its original condition as directed by the Division Engineer or their representative.
- 53. A minimum of 5 feet clearance is required for utility installations beneath or near drainage pipes, headwalls, and a minimum of two-foot clearance below the flowline of streams. If directional drilling, a minimum ten-foot clearance distance is required from drainage structures and a minimum of 5 feet below flowline of streams.
- 54. At points where the utility is placed under existing storm drainage, the trench will be backfilled with excavatable flowable fill up to the outside diameter of the existing pipe.
- 55. Unless specified otherwise, during non-working hours, equipment shall be located away from the job site or parked as close to the right of way line as possible and be properly barricaded in order not to have any equipment obstruction within the Clear Zone. Also, during non-working hours, no parking or material storage shall be allowed along the shoulders of any state-maintained roadway.
- 56. No access to the job site, parking or material storage shall be allowed along or from the **Control of Access Roadway.**
- 57. Guardrail removed or damaged during construction shall be replaced or repaired to its original condition, meeting current NCDOT standards or as directed by the Division Engineer or their representative.
- 58. The resetting of the Control of Access fence shall be in accordance with the applicable NCDOT standard and as directed by the Division Engineer or their representative.
- 59. Right of Way monuments disturbed during construction shall be referenced by a registered Land Surveyor and reset after construction.

- 60. All Traffic signs moved during construction shall be reinstalled as soon as possible to the satisfaction of the Division Engineer or their representative.
- 61. Any utility markers, cabinets, pedestals, meter bases and services for meter reading required shall be as close to the Right of Way line as possible. If it is not feasible to install at or near Right of Way line, then written approval shall be obtained from NCDOT prior to installation.
- 62. Detection tape, where required by NCGS § 87-115 through § 87-130 of the Underground Utility Safety and Damage Prevention Act, shall be buried in the trench approximately 1 foot above the installed facility. Where conduit is installed in the right of way and is not of ferrous material, locating tape or detection wire shall be installed with the conduit.
- 63. All driveways disturbed during construction shall be returned to a state comparable with the condition of the driveways prior to construction.
- 64. Conformance with driveway permit review should be required in conjunction with this encroachment agreement. In the event there is a conflict between the driveway permit and the encroachment agreement, the District Engineer should resolve the conflict and notify the parties involved.
- 65. If the approved method of construction is unsuccessful and other means are required, prior approval must be obtained through the District Engineer before construction may continue.
- 66. The encroaching party and their construction contractor must sign and submit the NCDOT *Workforce Safety Plan for Encroachment Activities: COVID-19* form to the District Engineer prior to construction.
- 67. The attached Duke Energy response to the NCDOT *COVID-19 Workforce Safety Plan* shall be applied for all employees on the job site unless otherwise directed by the District Engineer.

Engineering

- 68. All traffic control, asphalt mixes, structures, construction, workmanship and construction methods, and materials shall be in compliance with the most-recent versions of the following resources: *ASTM Standards, Manual on Uniform Traffic Control Devices, NCDOT Utilities Accommodations Manual, NCDOT Standard Specifications for Roads and Structures, NCDOT Roadway Standard Drawings,* NCDOT *Asphalt Quality Management System* manual, and the approved plans.
- 69. Prior approval for any blasting must be obtained from the Division Engineer or their representative.
- 70. Regulator stations, risers, metering stations, cathodic test stations, and anode beds are not permitted within NCDOT right of way. Header wires are permitted.
- 71. Non-Utility Communication and Data Transmission installations (ground mounted type or Small Cell pole-mounted type) must adhere to guidelines in the Utilities Accommodations Manual and, when located within municipal jurisdictions, are subject to review and approval by municipal ordinances and any additional municipal approval for proximity to historic districts and landmarks. All wiring and related telecommunications work shall conform to the latest regulations by the Federal Communications Commission.

72. All wiring and related electrical work shall conform to the latest edition of the National Electrical Safety Code.

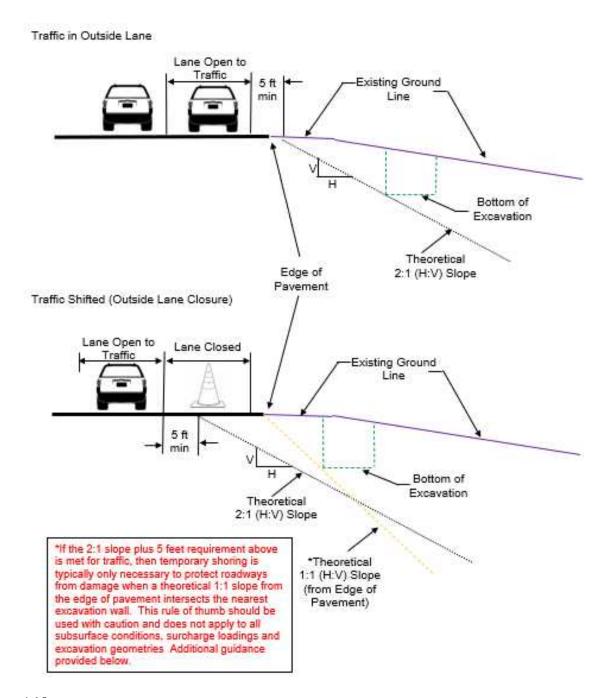
Location within R/W

- 73. All utility access points, such as manholes, vaults, handholes, splice boxes and junction boxes shall be located as close to the right of way line as possible and shall not be placed in the ditch line, side slopes of the ditches or in the pavement. All manholes, handholes, splice boxes, junction boxes and vaults and covers shall be flush with the ground when located within the vehicle clear zone. Slack loops for telecommunications in industry standard housing units shall be buried a minimum of 18 inches when buried or meet minimum NCDOT vertical and horizontal clearances when installed aerially.
- 74. Fire Hydrants shall be of the breakaway type. Hydrants shall be placed near the right of way line. In curb and gutter sections with written approval from the District, the hydrants may be placed at 6' behind the back of the curb or minimum 2' back of sidewalk.
- 75. Luminaire and/or utility poles and guy wires shall be set as close to the Right of Way line as practical and outside the Clear Zone in accordance with the latest version of the AASHTO Roadside Design Guide (See corresponding attachment) or made breakaway in accordance with the requirements of NCHRP Report 350. Any relocation of the utility poles from the original design due to Clear Zone requirements shall require a re-submittal for the utility design.
- 76. Luminaire and/or utility poles shall be set a minimum of 5'-6" behind face of any guardrail or otherwise sufficiently protected. However, standard placement may be reduced to 3'-6" behind face of guardrail when posts are spaced 3'-1 ½", or where speed limit is less than 55 MPH.
- 77. Hot box (aka ASSE 1060) or Safe-T-Cover type enclosures covering utility main pipe joints, backflow preventers, valves, vent pipes, cross connections, pumps, grinders, irrigation assemblies, transformers, generators, and other similar large appurtenances shall be located outside sight distance triangles and off of the NCDOT Right-of-Way.
- 78. Sprinkler heads shall be located a minimum of 10 feet from the edge of pavement, edge of shoulder, or back of curb whichever is greater and shall be directed so that water does not spray or drain on the roadway surface, sidewalk, or passing vehicles at any time. Upon completion of the installation and prior to activation of the system, the Encroacher shall contact the District Engineer to schedule a test of the system to verify the spray pattern. Sprinkler systems shall not be operated during periods of high wind or freezing weather, or to the extent that the subgrade adjacent to the pavement structure becomes saturated. NCDOT reserves the right to require immediate termination and removal of any sprinkler system which in its judgement and opinion adversely affects safety, maintenance, or operation of the roadway.

Excavation

79. Excavation material shall not be placed on pavement.

- 80. It is the responsibility of the encroaching party or their contractor to prevent any mud/dirt from tracking onto the roadway. Any dirt which may collect on the roadway pavement from equipment and/or truck traffic on site shall be immediately removed to avoid any unsafe traffic conditions.
- 81. The utility shall be installed within 5 feet of the right of way line and outside the 5-foot minimum from travel lane plus theoretical 2:1 slope from the edge of pavement to the bottom of the nearest excavation wall for temporary shoring. Temporary shoring is required when a theoretical 2:1 slope from the bottom of excavation will intersect the existing ground line less than 5 feet from the outside edge of an open travel lane as shown in the figure below or when a theoretical 2:1 slope from the bottom of excavation will intersect any existing structure, support, utility, property, etc. to be protected.



If the 2:1 slope plus 5 feet requirement above is met for traffic, then temporary shoring is typically only necessary to protect roadways from damage when a theoretical 1:1 slope from the edge of pavement intersects the nearest excavation wall. This rule of thumb should be used with caution and does not apply to all subsurface conditions, surcharge loadings and excavation geometries. Situations where this 1:1 slope is not recommended include groundwater depth is above bottom of excavation or excavation is deeper than 10 feet or in Temporary shoring may be avoided by locating trenches, bore pits, and other excavations far enough away from the open travel lane, edge of pavement and any existing structure, support, utility, property, etc. to be protected.

Temporary shoring shall be designed and constructed in accordance with current NCDOT Standard Temporary Shoring provisions (refer to

https://connect.ncdot.gov/resources/Specifications/Pages/2018-Specifications-and-Special-Provisions.aspx and see SP11 R002

- a. Temporary excavation shoring, such as sheet piling, shall be installed. The design of the shoring shall include the effects of traffic loads. The shoring system shall be designed and sealed by a licensed North Carolina Professional Engineer. Shoring plans and design calculations shall be submitted to the Division Engineer for review and approval prior to construction. (See NCDOT *Utilities Accommodations Manual* for more information on requirements for shoring plans, design calculations, and subsurface investigation report.) Trench boxes shall not be accepted as temporary shoring and will not be approved for use in instances where shoring is required to protect the highway, drainage structure, and/or supporting pavement or structure foundation.
- b. All trench excavation inside the limits of the theoretical two-to-one slope plus 5 feet requirement, as defined by the policy, shall be completely backfilled and compacted at the end of each construction day. No portion of the trench shall be left open overnight. Any excavation that is not backfilled by the end of the workday must address any safety and traveling public concerns including accommodations for bicycles, pedestrians and persons with disabilities.
- c. The trench backfill material shall meet the Statewide Borrow Criteria. The trench shall be backfilled in accordance with Section 300-7 of the latest *NCDOT Standard Specifications for Roads and Structures*, which basically requires the backfill material to be placed in layers not to exceed 6 inches loose and compacted to at least 95% of the density obtained by compacting a sample in accordance with AASHTO T99 as modified by DOT.
- d. At the discretion of the Division Engineer, a qualified NCDOT inspector shall be on the site at all times during construction. The encroaching party shall reimburse NCDOT for the cost of providing the inspector. If NCDOT cannot supply an inspector, the encroaching party (not the utility contractor) should make arrangements to have a qualified inspector, under the supervision of a licensed North Carolina Professional Engineer, on the site at all times. The Professional Registered Engineer shall certify that the utility was installed in accordance with the encroachment agreement and that the backfill material meets the Statewide Borrow Criteria.
- e. The length of parallel excavation shall be limited to the length necessary to install and backfill one joint of pipe at a time, not to exceed twenty-five (25) feet.
- 82. All material to a depth of 8 inches below the finished surface of the subgrade shall be compacted to a density equal to at least 100% of that obtained by compacting a sample of the material in accordance with AASHTO T99 as modified by the Department. The subgrade shall be compacted at a moisture content which is approximately that required to produce the maximum density indicated by the above test method. The contractor shall dry or add moisture to the subgrade when required to provide a uniformly compacted and acceptable subgrade. The option to backfill any trenches with dirt or either #57 stone or #78 stone with consolidation with a plate tamp and without a conventional density test may be pursued with the written consent of the District Engineer. If this option is exercised, then roadway ABC stone and asphalt repair as required will also be specified by the District Engineer.

Directional bore

- 83. Boring equipment will be provided of a type and size to facilitate boring in the local geologic conditions and shall be able to facilitate the encroachment work.
- 84. When Horizontal Directional Drilling (HDD) is used, the following stipulations apply:
 - a. Use drilling fluids as appropriate for the type soils but use of water alone is prohibited. Pump drilling fluids only while drilling or reaming. Directional boring using jetting with a Bentonite (or equivalent material) slurry is recommended. Monitor flow rates to match the amount leaving the bore hole and do not increase pressure or flow to free stuck drill heads, reamers or piping. Open cutting to retrieve stuck drill heads is not allowed without prior permission from the District Engineer.
 - b. The minimum depth shall adhere to the table below for transverse (under non-controlled access, partial controlled access, or limited controlled access roadway) installations and refers to maximum diameter of hole drilled and not the dimension of the carrier or encasement pipe.

<u>Diameter of Drilled Hole</u> (Backream)	Minimum Depth of Cover		
2" to 6"	5 feet		
>6" to 15"	12 times hole diameter (e.g. 6-inch hole means 6 feet minimum depth)		
>15" to 36"	15 feet or greater		

- c. Under fully controlled access roadway installations, the minimum depth for transverse crossings shall be 15 feet under any pavement (ramps or thru lanes)
- d. An overbore (backream diameter) shall not be more than 1.5 times the outside diameter of the pipe or encasement under any highway for pipes 12 inches in diameter or less. For pipes with outer diameter larger than 12 inches, the overbore may be no larger than outer diameter of pipe plus 6 inches. An overbore exceeding 1.5 times greater than the outside diameter of the pipe or encasement may be considered if the encroachment agreement includes a statement signed and sealed by a licensed North Carolina Professional Engineer indicating that an overbore in excess of 1.5 times the outside diameter of the pipe or encasement will appropriately arch and no damage will be done to the pavement or sub-grade.
- e. Directional boring is allowed beneath embankment material in naturally occurring soil.
- f. Any parallel installation utilizing the directional boring method shall be made at a minimum depth of five (5') feet (cover) below the ground surface and outside the theoretical 1:1 slope from the existing edge of pavement except where the parallel installation crosses a paved roadway.
- g. All directional bores shall maintain ten (10) feet minimum (clear) distance from the nearest part of any structure, including but not limited to bridges, footings, pipe culverts or box culverts. Directional bores are not allowed beneath bridge footings, culvert wingwall footings, slope protection or retaining walls.
- h. The tip of the drill string shall have a cutter head.
- i. Detection wire shall be installed with non-ferrous material.
- j. HDPE pipe installed by directional boring shall not be connected to existing pipe or fittings for one (1) week from the time of installation to allow tensional stresses to relax.

Aerial clearances

- 85. Vertical clearance of overhead power and communication lines shall meet the National Electrical Safety Code requirements except the minimum vertical clearance shall be 18' for crossings over NCDOT roadways (24' over Fully Controlled Access roadways) and 16' for parallel installations.
- 86. In relation to the bridge, the utility line shall be located with minimum clearances as indicated on the attachment for NCDOT Required Clearances for Aerial Installations by Encroachment Near Bridge Structures.

Pavement Detail and Repair

- 87. The paving of this roadway shall be in accordance with the latest version of NCDOT Standard Specifications, Sections 610, 1012 and 1020. The Contractor shall follow all procedures of the Quality Management System (QMS) for asphalt pavement Maintenance Version (see https://connect.ncdot.gov/resources/Materials/MaterialsResources/2018%20QMS%20Asphalt%20Manual.pdf). The Contractor must adhere to all testing requirements and quality control requirements specified. The Contractor shall contact the NCDOT Division QA Supervisor prior to producing plant mix and make the Supervisor aware that the mix is being produced for a future NCDOT road. Contact the District Engineer to determine the NCDOT Division QA Supervisor. Only NCDOT approved mix designs will be acceptable. A Quality Control Plan shall be submitted (as Directed by the District Engineer) to the District Engineer's Office prior to asphalt production utilizing form QMS-MV1. Failing mixes and/or densities are subject to penalties including monetary payments or removal and replacement. To minimize traffic queuing in construction areas, the possibility of traffic detours may be considered when working on high traffic routes even if traffic control is used. The District Engineer may require traffic detours.
- 88. When paving beyond utility installation is involved, a Roadway certification report sealed by a Professional Engineer shall be submitted to the District Engineer's office indicating the following:
 - Pavement thickness by type
 - Pavement density, core and/or test locations
 - Base thickness
 - Base density
 - Subgrade density

Test frequency and method shall be in conformance with the NCDOT *Materials and Tests Manual*. Test must be performed by a Certified Technician including name and Certification number on report.

89. "Potholing" pavement cores to expose existing utilities shall be made with an 18" diameter keyhole pavement core. Pavement core locations shall not be placed in the wheel path whenever possible. Vacuum excavation shall be utilized to expose underground utilities. Pavement cores shall be repaired within the same working day. The pavement core shall be retained and reused to fill the core hole.

The excavation shall be backfilled and compacted with select material to the bottom of the existing pavement structure or as indicated by the District Engineer. The retained core shall be placed in the hole and secured with a waterproof, mechanical joint. If the pavement core is damaged and cannot be re-used, the core may be replaced with the surface mix, S9.5C. The asphalt patch shall match the thickness of the existing asphalt or four inches, whichever is greater. All materials must be listed on the NCDOT Approved Products List (APL) found at:

- 90. The minimum pavement design for pavement repair shall be according to NCDOT Standard Drawing 654.01
 - (https://connect.ncdot.gov/resources/Specifications/2018StandardRdwyDrawings/Division%2006%2 OAsphalt%20Bases%20and%20Pavements.pdf) and shall include a mechanical overlay extent to be a minimum of 25 feet each side of the pavement repair area OR as directed by the District Engineer.
- 91. Pavement cuts shall be repaired the same day the cuts are made unless an asphalt patch cannot be accomplished the same day due to material availability or time restrictions. When the asphalt patch is not feasible, the following apply:
 - a. The pavement cut shall be filled to the surface with ABC stone or Flowable Fill per NCDOT's Standards and Specifications.
 - b. Once the cut is filled, a minimum ¾-inch steel plate shall be placed and pinned to prevent moving. Plates shall be designed large enough to span a minimum of 1-foot on all sides on the pavement cut.
 - c. When flowable fill is used, it shall cure for 72 hours prior to any asphalt material placement. Flowable fill bleed water shall not be present during paving operations. Paving shall not cause damage (shoving, distortion, pumping, etc.) to the flowable fill.
 - d. Install and leave "BUMP" signs according to MUTCD until the steel plate has been removed. Once the flowable fill has cured, remove the steel plate, and mill/fill according to the directions of the District Engineer.
 - e. All pavement cuts must be sealed with NCDOT approved sealant to prevent future pavement separation or cracking.
- 92. Any pavement damaged because of settlement of the pavement or damaged by equipment used to perform encroachment work, shall be re-surfaced to the satisfaction of the District Engineer. This may include the removal of pavement and a 50' mechanical overlay. All pavement work and pavement markings (temporary and final) are the responsibility of the Encroaching Party.

Post Construction

Close out/Inspection

- 93. The Encroaching party shall notify the District Engineer's office within 2 business days after construction is complete. The District Engineer may perform a construction inspection. Any deficiencies may be noted and reported to the encroaching party to make immediate repairs or resolve any issues to restore the right-of-way to a similar condition prior to construction, including pavement, signage, traffic signals, pavement markings, drainage, structures/pipes, or other highway design features.
- 94. At the discretion of the District Engineer, a final inspection report may be provided to the encroaching party upon satisfactory completion of the work.
- 95. A written acknowledgement of the completed work by the District Engineer's office begins the oneyear warranty period associated with the performance bond.

- 96. If the actual construction differs from the approved plans associated with this encroachment, a copy of "as-built" plans shall be submitted to the District Engineer's office in a PDF format and in a current ESRI GIS format within 4 weeks of construction.
- 97. The encroaching party shall provide the North Carolina Turnpike Authority (NCTA) with an electronic copy of coordinate correct as-built plans within two weeks of installation completion. Failure to provide the as-built plans may jeopardize future approvals within NCTA right of way.
- 98. A copy (in PDF format) of the completed ground water analysis shall be given to the District Engineer, including detailed drawings of the "as-built" wells showing location, depth and water level in well.

ATTACHMENT FORM

NOTIFICATION FOR UTILITY / NON-UTILITY ENCROACHMENT WITHIN NCDOT R/W

Instructions for use:

This form must be completed in its entirety and submitted <u>directly to the designated personnel in the District Engineer's office via email, fax or hand delivery a minimum of one week prior to construction for the encroachment.</u> If the designated NCDOT personnel names are unknown by the person completing this form, please contact the District Engineer's office to determine that contact info.

ngineer's office to determine that contact info.	-, F
Date: Submitted by I	Name:
To: District Personnel Name: District Personnel Email: District Fax No.:	
This notification is to inform you that we (enwork on the following project in a minimum	croaching party or their contractor) will begin construction of one week.
Encroachment number (assigned by NCDOT) for the project:	
Construction start date:	
Approximate ending date:	
Contact NCDOT inspector a minimum of 72 District Engineer's office or other location as	hrs. in advance to set-up Preconstruction meeting in the directed by the District Engineer
Preconstruction meeting date & time:	
Preconstruction meeting address:	
Type of project:	
Contact Info for this project:	, ,
Contractor Company Name:	NCDOT Utility Inspector Name:
Contractor Contact Name:	NCDOT Utility Inspector Phone:
Contractor Phone Number:	NCDOT Utility Inspector Email:
 Contractor Email:	NCDOT Utility Project Manager Name:
	NCDOT Utility Project Manager Phone:
	NCDOT Utility Project Manager Email:

NCDOT Hold Harmless Declaration for Private Facility FORM

Private Facility Encroachment Hold Harmless Declaration

Encroachment Agreement Second Party:	Encroachment Number:
	County:
save harmless the North Carolina Department overburdening of right of way easements careful and the carolina Department of the ca	eferenced encroachment agreement agrees to indemnify and ent of Transportation from all claims of liability for the aused by the installation of private facilities owned by the party pproval of the above-referenced encroachment agreement.
Second Party:	Attest or Witness:
Date:	

Published by NCDOT Utilities Unit 7/17/2017 Separate Form to be signed by each property owner affected by the installation.

Clear - Zone Table

TABLE 3.1 (Cont'd)

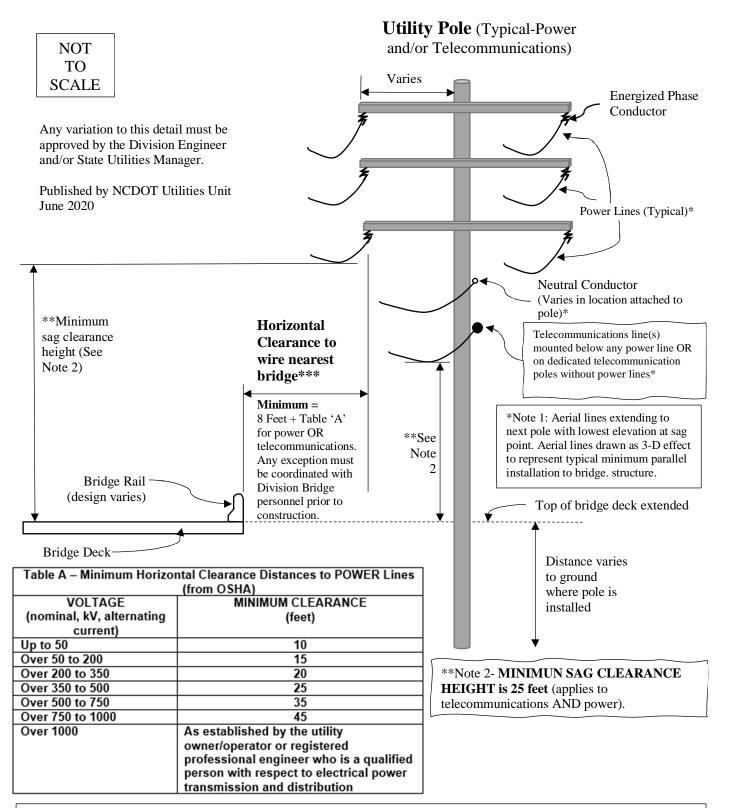
[U.S. Customary Units]

DESIGN	DESIGN	F	FORESLOPES	3		BACKSLOPES	3
SPEED	ADT	IV:6H or flatter	1V:5H TO 1V:4H	1V:3H	1V:3H	1V:5H TO 1V:4H	IV:6H or flatter
40 mph	UNDER 750	7 – 10	7-10	**	7 – 10	7 - 10	7-10
or	750 - 1500	10 - 12	12 – 14	**	10 – 12	10-12	10-12
less	1500 - 6000	12-14	14-16	**	12 - 14	12-14	12 - 14
	OVER 6000	14-16 .	16-18	••	14 – 16	14-16	14-16
45-50	UNDER 750	10-12	12 – 14	**	8 – 10	8 – 10	10-12
mph	750 - 1500	14 – 16	16-20	••	10 - 12	12-14	14-16
	1500 - 6000	16 – 18	20 - 26	**	12 – 14	14-16	16-18
	OVER 6000	20 - 22	24 - 28	**	14 – 16	18-20	20 - 22
55 mph	UNDER 750	12 – 14	14 – 18	**	8 – 10	10-12	10 - 12
	750 - 1500	16 - 18	20 – 24	**	10 - 12	14-16	16-18
	1500 - 6000	20 - 22	24 - 30	**	14 – 16	16 - 18	20 - 22
	OVER 6000	22 - 24	26 - 32 *	**	16 – 18	20-22	22 - 24
60 mph	UNDER 750	16-18	20 – 24	**	10 – 12	12 – 14	14 – 16
	750 1500	20 - 24	26 - 32 *	**	12 - 14	16 - 18	20 - 22
	1500 - 6000	26 - 30	32 - 40 *	**	14 – 18	18 - 22	24 - 26
	OVER 6000	30 - 32 *	36 - 44 *	**	20 - 22	24 – 26	26-28
65-70	UNDER 750	18 - 20	20 - 26	**	10-12	14 16	14-16
mph	750 - 1500	24 - 26	28 - 36 *	**	12 – 16	18 – 20	20-22
	1500 - 6000	28 - 32 *	34 - 42 *	**	16-20	22 - 24	26-28
	OVER 6000	30 - 34 *	38 - 46 *	**	22-24	26 - 30	28-30

^{*} Where a site specific investigation indicates a high probability of continuing crashes, or such occurrences are indicated by crash history, the designer may provide clear-zone distances greater than the clear-zone shown in Table 3.1. Clear zones may be limited to 30 ft for practicality and to provide a consistent roadway template if previous experience with similar projects or designs indicates satisfactory performance.

^{**} Since recovery is less likely on the unshielded, traversable 1V:3H slopes, fixed objects should not be present in the vicinity of the toe of these slopes. Recovery of high-speed vehicles that encroach beyond the edge of the shoulder may be expected to occur beyond the toe of slope. Determination of the width of the recovery area at the toe of slope should take into consideration right-of-way availability, environmental concerns, economic factors, safety needs, and crash histories. Also, the distance between the edge of the through traveled lane and the beginning of the IV:3H slope should influence the recovery area provided at the toe of slope. While the application may be limited by several factors, the foreslope parameters which may enter into determining a maximum desirable recovery area are illustrated in Figure 3.2.

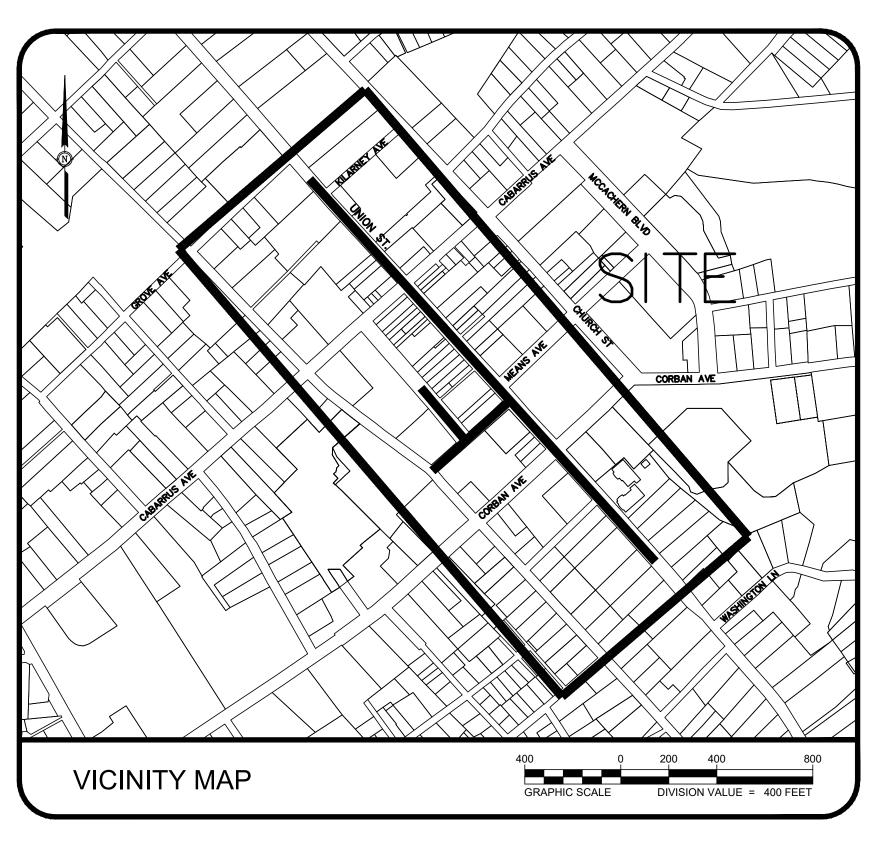
NCDOT Required Clearances for Aerial Installations Near Bridge Structures



***Note 3: HORIZONTAL CLEARANCE EXCEPTION. If vertical sag clearance height for power above bridge deck is ≥ 45 feet AND voltage is ≤ 350kV, then Minimum Horizontal Clearance may be reduced to 3 feet. Any telecommunications attachment to power pole allowed in this exception must have a minimum 25 feet sag clearance height above bridge deck.

UNION STREET IMPROVEMENTS CITY OF CONCORD

CABARRUS COUNTY, NORTH CAROLINA



JULY 2021

SCHEDULE OF DRAWINGS

G-001..... COVER SHEET

G-002..... GENERAL NOTES AND LEGENDS

G-003.... SEQUENCING

G-004..... OVERALL PROJECT SHEET INDEX

CE-101-107. . . . EXISTING CONDITIONS - A THRU G

CD-101-107. . . . DEMOLITION PLAN - A THRU G

C-101-107. SITE PLAN - A THRU G

C-108-114. . . . LAYOUT PLAN - A THRU G

C-201-207. GRADING, DRAINAGE, & EROSION CONTROL - A THRU G

C-301.....UTILITY NOTES AND LEGEND

C-302-305. PROPOSED WATER LINE PLAN - PROFILE AREA - A THRU D

C-306 PROPOSED WATER LINE ALONG MEANS AVE. AND CABARRUS AVE.

C-307......WATER LINE ENLARGEMENTS

C-308-312.... PROPOSED SANITARY SEWER PLAN - PROFILE AREA - A THRU E

E-001.....ELECTRICAL LEGEND, NOTES, SCHEDULES AND ABBREVIATIONS

, (351(21)) (1101(3

ED-100.... ELECTRICAL OVERALL DEMOLITION PLAN

ED-101-105. . . . ELECTRICAL DEMOLITION PLAN - A THRU D, F

E-100.....ELECTRICAL OVERALL SITE PLAN

E-101-105. ELECTRICAL SITE PLAN - A THRU D, F

E-501-502 ELECTRICAL DETAILS

E-601.....ELECTRICAL SCHEDULES AND DIAGRAMS

L-101-106 LANDSCAPE PLAN - A THRU F

I-101-105 IRRIGATION PLAN - A THRU E

C-501-510 DETAILS





100% DESIGN
REVIEW. NOT
FOR CONSTRUCTION

2. CONTRACTOR SHALL REPAIR ALL DISTURBED AREAS TO EQUAL OR BETTER CONDITION THAN THE ORIGINAL SITE OR AS NOTED.

3. LOCATIONS OF EXISTING UTILITIES AS SHOWN ARE APPROXIMATE ONLY. EXACT LOCATIONS ARE TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR. AT LEAST THREE DAYS PRIOR TO CONSTRUCTION CONTRACTOR MUST NOTIFY EXISTING UTILITY OWNERS. CALL BEFORE YOU DIG, NORTH CAROLINA ONE CALL (1-800-632-4949).

4. ALL WORK NEAR AND AROUND WATERWAYS MUST CONFORM TO THE RULES OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY.

5. CONTRACTOR MUST PROVIDE EROSION CONTROL DEVICES TO CONTROL RUNOFF FROM THE CONSTRUCTION SITE. CONTRACTOR WILL BE RESPONSIBLE FOR ANY FINES THAT MAY BE LEVIED DUE TO POLLUTION CREATED DURING CONSTRUCTION.

6. CONTRACTOR SHALL FOLLOW ALL FEDERAL, STATE, AND LOCAL REGULATIONS PERTAINING TO CONSTRUCTION OPERATIONS.

7. CONTRACTOR SHALL NOTIFY THE PROPER LOCAL AUTHORITIES 24 HOURS PRIOR TO ANY ROAD BEING CLOSED FOR CONSTRUCTION, INCLUDING BUT NOT LIMITED TO THE LOCAL NEWSPAPER, RADIO STATION, FIRE DEPARTMENT, COUNTY SHERIFF'S DEPARTMENT, AMBULANCE, AND THE COUNTY EMERGENCY MANAGEMENT AGENCY. ALL TRAFFIC CONTROL SHALL CONFORM TO THE REQUIREMENTS OF THE NORTH CAROLINA DEPARTMENT OF

8. ALL FENCES DAMAGED DURING CONSTRUCTION SHALL BE REPLACED WITH LIKE MATERIAL IN A WORKMANLIKE MANNER AND IN ACCORDANCE WITH STANDARD FENCE CONSTRUCTION PRACTICES AT THE CONTRACTOR'S EXPENSE.

9. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING ROADS DURING CONSTRUCTION AND SHALL REPAIR ROADS PER REQUIREMENTS OF THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION. NO OPEN CUTS OF EXISTING ROADS SHALL BE ALLOWED EXCEPT WHERE INDICATED ON THE DRAWINGS OR WHERE SPECIFIC PERMISSION IS GRANTED BY THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION. SAND OR A SIMILAR MATERIAL APPROVED BY THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION SHALL BE PLACED AS A PROTECTIVE BARRIER BETWEEN TRACK EQUIPMENT AND THE ROAD AND CLEANED UP PROPERLY AFTER CONSTRUCTION.

10. THE PROJECT SITE IS NOT IN A FLOOD ZONE.

11. ANY DISCREPANCIES FOUND IN THE FIELD SHALL BE CALLED TO THE ATTENTION OF THE OWNER/ENGINEER/DESIGNER PRIOR TO PROCEEDING WITH ANY WORK.

12. HATCHING OF HARD SURFACE MATERIALS SUCH AS CONCRETE ARE FOR GENERAL INFORMATION PURPOSES. IN NO INSTANCE IS A UTILITY LID, COVER OR ACCESS POINT TO BE COVERED OVER AND CONCEALED BY THE PROPOSED SURFACE MATERIAL. ANY HIDDEN UTILITY BOXES, COVERS, ETC DISCOVERED DURING CONSTRUCTION SHALL BE ADJUSTED TO MATCH PROPOSED GRADE ELEVATIONS.

13. THE ENGINEER MAY MAKE MINOR GRADE CHANGES AS REQUIRED IN THE FIELD WITHOUT EFFECTING THE LUMP SUM PRICE FOR UNCLASSIFIED EXCAVATION.

14. UNLESS OTHERWISE STATED, ALL FILL AREAS SHALL BE CONSTRUCTED IN LAYERS OF 8" MAXIMUM THICKNESS WITH WATER ADDED OR SOIL CONDITIONED TO THE OPTIMUM MOISTURE CONTENT AS DETERMINED BY THE ENGINEER AND COMPACTED WITH A SHEEP'S FOOT ROLLER TO A COMPACTION EQUAL TO OR GREATER THAN 95% OF THE DENSITY OBTAINED BY COMPACTING A SAMPLE OF THE MATERIAL IN ACCORDANCE WITH THE STANDARD PROCTOR METHOD OF MOISTURE DENSITY RELATIONSHIP TEST, ASTM D698 OR AASHTO-99 UNLESS SPECIFIED IN OTHER SPECIFICATIONS.

15. ENTIRE AREA TO BE GRADED SHALL BE CLEARED AND GRUBBED. NO FILL SHALL BE PLACED ON ANY AREA NOT CLEARED OR GRUBBED.

16. ALL SOIL EROSION CONTROL MEASURES REQUIRED BY THE GRADING PLAN SHALL BE INSTALLED PRIOR TO GRADING, CLEARING OR GRUBBING. ALL EROSION CONTROL DEVICES SUCH AS SILT FENCES, ETC., SHALL BE MAINTAINED IN WORKABLE CONDITION FOR THE LIFE OF THE PROJECT AND SHALL BE REMOVED AT THE COMPLETION OF THE PROJECT ONLY ON THE ENGINEER'S APPROVAL. PAYMENT SHALL BE CONSIDERED INCIDENTAL TO CLEARING AND GRUBBING. IF DURING THE LIFE OF THE PROJECT, A STORM CAUSES SOIL EROSION WHICH CHANGES FINISH GRADES OR CREATES "GULLIES" AND "WASHED AREAS", THESE SHALL BE REPAIRED AT NO ADDITIONAL COST AND ALL SILT WASHED OFF OF THE PROJECT SITE ONTO ADJACENT PROPERTY SHALL BE REMOVED AS DIRECTED BY THE ENGINEER AT NO EXTRA COST. THE CONTRACTOR SHALL ADHERE TO ANY APPROVED EROSION CONTROL PLANS WHETHER INDICATED IN THE CONSTRUCTION PLANS OR UNDER SEPARATE COVER.

17. DISPOSABLE MATERIAL

A. CLEARING AND GRUBBING WASTES SHALL BE REMOVED FROM THE SITE AND PROPERLY DISPOSED OF BY THE CONTRACTOR AT HIS EXPENSE, UNLESS SPECIFIED OTHERWISE.

B. SOLID WASTES TO BE REMOVED, SUCH AS SIDEWALKS, CURBS, PAVEMENT, ETC., MUST BE DISPOSED OF OFF SITE AND IN A RESPONSIBLE MANNER AND IN ACCORDANCE WITH ALL APPLICABLE LAWS, BY THE CONTRACTOR. THE CONTRACTOR SHALL REMOVE THIS WASTE FROM THE SITE AND PROPERLY DISPOSE OF IT AT THEIR OWN EXPENSE.

C. ABANDONED UTILITIES SUCH AS CULVERTS, WATER PIPE, HYDRANTS, CASTINGS, PIPE APPURTENANCES, UTILITY POLES, ETC., SHALL BE THE PROPERTY OF THE SPECIFIED UTILITY AGENCY, OR COMPANY HAVING JURISDICTION. BEFORE THE CONTRACTOR CAN REMOVE, DESTROY, SALVAGE, REUSE, SELL OR STORE FOR HIS OWN USE ANY ABANDONED UTILITY, HE MUST PRESENT TO THE OWNER WRITTEN PERMISSION FROM THE UTILITY INVOLVED.

18. IN THE EVENT EXCESSIVE GROUNDWATER OR SPRINGS ARE ENCOUNTERED WITHIN THE LIMITS OF CONSTRUCTION, THE CONTRACTOR SHALL INSTALL NECESSARY UNDER DRAINS AND STONE AS DIRECTED BY THE ENGINEER, ALL WORK SHALL BE PAID BASED UPON UNIT BIDS UNLESS SPECIFIED OTHERWISE. THE CONTRACTOR IS RESPONSIBLE FOR THE COORDINATION OF ADJUSTMENT OF ALL UTILITY SURFACE ACCESSES WHETHER HE PERFORMS THE WORK OR A UTILITY COMPANY PERFORMS THE WORK.

19. THE CONTRACTOR SHALL CONTROL ALL "DUST" BY PERIODIC WATERING AND SHALL PROVIDE ACCESS AT ALL TIMES FOR PROPERTY OWNERS WITHIN THE PROJECT AREA AND FOR EMERGENCY VEHICLES. ALL OPEN DITCHES AND HAZARDOUS AREAS SHALL BE CLEARLY MARKED IN ACCORDANCE WITH THE SPECIFICATIONS.

20. ALL DISTURBED AREAS TO RECEIVE PERMANENT SEEDING. FINISHED SURFACES SHALL BE TO GRADE AND SMOOTH, FREE OF ALL ROCKS LARGER THAN 2", EQUIPMENT TRACKS, DIRT CLODS, BUMPS, RIDGES AND GOUGES PRIOR TO SEEDING. THE SURFACE SHALL BE LOOSENED TO A DEPTH OF ± 2 "-3" TO ACCEPT SEED. THE CONTRACTOR SHALL NOT PROCEED WITH SEEDING OPERATIONS WITHOUT FIRST OBTAINING THE ENGINEER'S APPROVAL OF THE GRADED SURFACE.

21. ALL IMPROVEMENTS AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH NORTH CAROLINA STATE STANDARDS. ALL IMPROVEMENTS SHALL COMPLY WITH THE CITY OF CONCORD DEVELOPMENT STANDARDS.

22. THE GENERAL CONTRACTOR SHALL CONTACT ALL OWNERS OF EASEMENTS, UTILITIES AND RIGHT OF WAYS, PUBLIC OR PRIVATE, PRIOR TO WORKING IN THESE AREAS.

23. ALL UTILITIES OR STRUCTURES NOT DESIGNATED FOR REMOVAL OR MODIFICATION ARE TO REMAIN AND SHALL BE PROTECTED BY THE CONTRACTOR DURING CONSTRUCTION AND REMAIN IN WORKING ORDER.

24. ALL DEMOLITION WORK SHALL BE PERFORMED WITH "DUE CARE AND DILIGENCE" SO AS TO PREVENT THE ARBITRARY DESTRUCTION OR INTERRUPTION OF CONCEALED UTILITIES WHICH ARE INTENDED TO REMAIN IN USE AND THE ROUTING OF WHICH COULD NOT BE DETERMINED UNTIL DEMOLITION WAS STARTED. ALL SUCH DISCOVERIES OF UTILITIES DURING THE DEMOLITION PROCESS WHICH ARE IN A LOCATION DIFFERENT FROM THAT INDICATED, OR ARE UNIDENTIFIED, SHALL BE REPORTED TO THE ENGINEER BEFORE REMOVAL.

25. ANY EXISTING ASPHALT, DESIGNATED TO REMAIN, THAT IS DAMAGED DURING DEMOLITION AND CONSTRUCTION SHALL BE REPAIRED AT NO COST TO THE OWNER.

26. ANY NOTE, OR REFERENCE TO AN ELEMENT, WHICH DOES NOT SPECIFY ACTION BY THE CONTRACTOR SHALL BE CONSTRUED AS INFORMATION 27. THE GENERAL CONTRACTOR IS TO CONTACT AND COORDINATE WITH ALL APPROPRIATE PUBLIC AND PRIVATE UTILITY COMPANIES PRIOR TO ANY

DEMOLITION OR RELOCATION OF EXISTING UTILITIES. IT IS THE GENERAL CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ALL UTILITIES HAVE BEEN

PROPERLY CAPPED OFF OR RELOCATED. 28. PROTECT ALL ADJACENT PROPERTIES, THE GENERAL PUBLIC, AND ALL THE OWNER'S FACILITIES FROM DAMAGE. THE CONTRACTOR SHALL REPAIR ANY DAMAGE IMMEDIATELY AND SHALL MAKE REPAIRS AT THE CONTRACTOR'S EXPENSE.

29. CONTRACTOR SHALL HOLD HARMLESS THE OWNER FOR DAMAGES OR OTHER ACCIDENTS WHICH OCCUR DURING THESE CONSTRUCTION ACTIVITIES. 30. TREES AND LANDSCAPING NOT DESIGNATED FOR REMOVAL SHALL BE PROTECTED DURING CONSTRUCTION.

31. CONTRACTOR SHALL BE RESPONSIBLE FOR SCHEDULING AND COORDINATION OF ALL ILLUSTRATED CONSTRUCTION ACTIVITIES AT THE JOB SITE. 32. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE RULES AND REGULATIONS GOVERNING THE CONSTRUCTION INDUSTRY, INCLUDING BUT

33. CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING ENGINEER PRIOR TO ANY LOCATION/ADJUSTMENTS OF EXISTING VAULTS (REGARDLESS OF FUNCTION), METER BOXES, FIRE HYDRANTS, CLEAN OUTS, MANHOLES, ETC.

34. UNDER ABSOLUTELY NO CIRCUMSTANCES SHALL ANY UNMANNED EXCAVATION BE LEFT OPEN OR UNPROTECTED DURING NON-WORKING HOURS. UTILIZE SIGNS, BARRICADES, ETC. TO ENSURE THE SAFETY OF THE GENERAL PUBLIC.

NORTH CAROLINA LAND QUALITY SECTION **EROSION CONTROL NOTES**

GENERAL: ALL EROSION CONTROL MEASURES ARE TO BE PERFORMED IN STRICT ACCORDANCE WITH REQUIREMENTS OF THE NORTH CAROLINA DIVISION OF ENERGY, MINERAL, AND LAND RESOURCES (NCDEMLR). THE FOLLOWING CONSTRUCTION SEQUENCE SHALL BE COMPLIED WITH FOR 1. CONTRACTOR SHALL ATTEND THE PRE-CONSTRUCTION MEETING WITH THE CIVIL ENGINEER (OR LOCAL JURISDICTION) PRIOR TO BEGINNING

2. IDENTIFY WORK LIMITS BEFORE CONSTRUCTION ACTIVITY BEGINS.

CONSTRUCTION.

LEGEND

R/W - RIGHT OF WAY

CP - CALCULATED POINT

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING ALL RECORDS REQUIRED BY NCDEMLR FOR THE INSTALLATION AND MAINTENANCE OF THE SITE EROSION CONTROL.

4. INSTALL EROSION CONTROL MEASURES PER THE PLAN AND AS AS REQUIRED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF ENERGY, MINERAL AND LAND RESOURCES, LAND QUALITY SECTION.

5. CONTRACTOR TO UTILIZE MUD MATS FOR CONSTRUCTION ENTRANCE(S) AND ADJUST AS ACTIVE CONSTRUCTION AREAS SHIFT.

6. CONTRACTOR TO INSTALL SILT SAKS ON THE FIRST RECEIVING DOWNSTREAM INLET STRUCTURES OUTSIDE OF THE PROJECT AREA. CONTRACTOR TO INSTALL WATTLES AROUND ACTIVE CONSTRUCTION AREAS AND ENSURE ALL STORMWATER LEAVING THE CONSTRUCTION SITE PASSES THROUGH AN EROSION CONTROL DEVICE. ANY PUMPING OF WATER FROM UTILITY TRENCHES MUST PASS THROUGH AN EROSION CONTROL DEVICE. DEWATERING BAGS/SEDIMENT FILTER BAGS MAY BE USED TO FILTER STORMWATER FROM TRENCHING ACTIVITIES.

7. PROCEED WITH CONSTRUCTION AS GUIDED BY THE CONSTRUCTION SEQUENCE.

TC - TERRA COTTA □ LIGHT POLE → - SIGNAL BOX □ − ELECTRIC MANHOLE TELEPHONE MANHOLE ∀ − FIRE HYDRANT – IRRIGATION CONTROL VALVE SS - SANITARY SEWER MANHOLE – SANITARY SEWER CLEANOUT ⊕ - STORM MANHOLE □ − YARD INLET ■ - CATCH BASIN □ DROP INLET — MAILBOX ____s__ APPROXIMATE LOCATION OF EXISTING SEWER LINES _____G___G___APPROXIMATE LOCATION OF EXISTING GAS LINES

——— FO ——— FO ———— APPROXIMATE LOCATION OF UNDERGROUND FIRER OPTIC

GROUND STABILIZATION AND MATERIALS HANDLING PRACTICES FOR COMPLIANCE WITH

plementing the details and specifications on this plan sheet will result in the construction activity being considered compliant with the Ground Stabilization and Materials Handling sections of the NCG01 Construction General Permit (Sections E and F, respectively). The permittee shall comply with the Erosion and Sediment Control plan approved by the delegated authority having jurisdiction. All details and specifications shown on this sheet may not apply depending on site conditions and the delegated authority having jurisdiction.

SECTION E: GROUND STABILIZATION Required Ground Stabilization Timeframes

		equired diodila stabil	iization mineralies
Site Area Description		Stabilize within this many calendar days after ceasing land disturbance	Timeframe variations
(a)	Perimeter dikes, swales, ditches, and perimeter slopes	7	None
(b)	High Quality Water (HQW) Zones	7	None
(c)	Slopes steeper than 3:1	7	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed
(d)	Slopes 3:1 to 4:1	14	-7 days for slopes greater than 50' in length and with slopes steeper than 4:1 -7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed
(e)	Areas with slopes flatter than 4:1	14	 -7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zone -10 days for Falls Lake Watershed unless there is zero slope

Note: After the permanent cessation of construction activities, any areas with temporary ground stabilization shall be converted to permanent ground stabilization as soon as practicable but in no case longer than 90 calendar days after the last land disturbing activity. Temporary ground stabilization shall be maintained in a manner to render the surface stable against accelerated erosion until permanent ground stabilization is achieved.

GROUND STABILIZATION SPECIFICATION

- Stabilize the ground sufficiently so that rain will not dislodge the soil. Use one of the techniques in the table below: Temporary Stabilization other mulches and tackifiers
- Hydroseeding Rolled erosion control products with or without temporary grass seed Plastic sheeting
- Permanent Stabilization • Temporary grass seed covered with straw or | • Permanent grass seed covered with straw or other mulches and tackifiers • Geotextile fabrics such as permanent soil reinforcement matting Hydroseeding Appropriately applied straw or other mulch
 Shrubs or other permanent plantings covered • Uniform and evenly distributed ground cover sufficient to restrain erosion

retaining walls

• Structural methods such as concrete, asphalt or

• Rolled erosion control products with grass seed POLYACRYLAMIDES (PAMS) AND FLOCCULANT

or surrounded by secondary containment structures.

- Select flocculants that are appropriate for the soils being exposed during construction, selecting from the NC DWR List of Approved PAMS/Flocculants. Apply flocculants at or before the inlets to Erosion and Sediment Control Measures.
- Apply flocculants at the concentrations specified in the NC DWR List of Approved PAMS/Flocculants and in accordance with the manufacturer's instructions. Provide ponding area for containment of treated Stormwater before discharging

EQUIPMENT AND VEHICLE MAINTENANCE

- Maintain vehicles and equipment to prevent discharge of fluids. 2. Provide drip pans under any stored equipment. 3. Identify leaks and repair as soon as feasible, or remove leaking equipment from the
- 4. Collect all spent fluids, store in separate containers and properly dispose as hazardous waste (recycle when possible).
- Remove leaking vehicles and construction equipment from service until the problem has been corrected. Bring used fuels, lubricants, coolants, hydraulic fluids and other petroleum products
- to a recycling or disposal center that handles these materials.
- LITTER, BUILDING MATERIAL AND LAND CLEARING WASTE Never bury or burn waste. Place litter and debris in approved waste containers. Provide a sufficient number and size of waste containers (e.g dumpster, trash
- receptacle) on site to contain construction and domestic wastes. Locate waste containers at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available. Locate waste containers on areas that do not receive substantial amounts of runoff

from upland areas and does not drain directly to a storm drain, stream or wetland.

- Cover waste containers at the end of each workday and before storm events or provide secondary containment. Repair or replace damaged waste containers. Anchor all lightweight items in waste containers during times of high winds.
- Empty waste containers as needed to prevent overflow. Clean up immediately if containers overflow. Dispose waste off-site at an approved disposal facility.
- 9. On business days, clean up and dispose of waste in designated waste containers.

PAINT AND OTHER LIQUID WASTE

- . Do not dump paint and other liquid waste into storm drains, streams or wetlands. Locate paint washouts at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available. Contain liquid wastes in a controlled area.
- 4. Containment must be labeled, sized and placed appropriately for the needs of site. Prevent the discharge of soaps, solvents, detergents and other liquid wastes from construction sites.

- Install portable toilets on level ground, at least 50 feet away from storm drains, streams or wetlands unless there is no alternative reasonably available. If 50 foot offset is not attainable, provide relocation of portable toilet behind silt fence or place on a gravel pad and surround with sand bags. Provide staking or anchoring of portable toilets during periods of high winds or in high
- foot traffic areas. Monitor portable toilets for leaking and properly dispose of any leaked material. Utilize a licensed sanitary waste hauler to remove leaking portable toilets and replace with properly operating unit

EARTHEN STOCKPILE MANAGEMENT

- Show stockpile locations on plans. Locate earthen-material stockpile areas at least 50 feet away from storm drain inlets, sediment basins, perimeter sediment controls and surface waters unless it can be shown no other alternatives are reasonably
- Protect stockpile with silt fence installed along toe of slope with a minimum offset of five feet from the toe of stockpile Provide stable stone access point when feasible
- Stabilize stockpile within the timeframes provided on this sheet and in accordance with the approved plan and any additional requirements. Soil stabilization is defined as vegetative, physical or chemical coverage techniques that will restrain accelerated erosion on disturbed soils for temporary or permanent control needs.

CLEARLY MARKED SIGNAGE NOTING DEVICE (18"X24" MIN.) 2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75K OF THE STRUCTURES CAPACITY. 3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MANGED WITH SIGNAGE NOTING DEVICE. ABOVE GRADE WASHOUT STRUCTURE

NOT LIMITED TOO THOSE PERTAINING TO TRAVELING OPERATIONS AND OSHA.

CONCRETE WASHOUTS Do not discharge concrete or cement slurry from the site. Dispose of, or recycle settled, hardened concrete residue in accordance with local and state solid waste regulations and at an approved facility. Manage washout from mortar mixers in accordance with the above item and in

addition place the mixer and associated materials on impervious barrier and within lot perimeter silt fence. Install temporary concrete washouts per local requirements, where applicable. If an alternate method or product is to be used, contact your approval authority for review and approval. If local standard details are not available, use one of the two types of temporary concrete washouts provided on this detail.

Do not use concrete washouts for dewatering or storing defective curb or sidewalk sections. Stormwater accumulated within the washout may not be pumped into or discharged to the storm drain system or receiving surface waters. Liquid waste must be pumped out and removed from project. Locate washouts at least 50 feet from storm drain inlets and surface waters unless it

can be shown that no other alternatives are reasonably available. At a minimum, install protection of storm drain inlet(s) closest to the washout which could receive spills or overflow. Locate washouts in an easily accessible area, on level ground and install a stone

entrance pad in front of the washout. Additional controls may be required by the approving authority. Install at least one sign directing concrete trucks to the washout within the project limits. Post signage on the washout itself to identify this location.

Remove leavings from the washout when at approximately 75% capacity to limit

overflow events. Replace the tarp, sand bags or other temporary structural

components when no longer functional. When utilizing alternative or proprietary products, follow manufacturer's instructions. At the completion of the concrete work, remove remaining leavings and dispose of in an approved disposal facility. Fill pit, if applicable, and stabilize any disturbance caused by removal of washout.

HERBICIDES, PESTICIDES AND RODENTICIDES

Do not stockpile these materials onsite.

- Store and apply herbicides, pesticides and rodenticides in accordance with label Store herbicides, pesticides and rodenticides in their original containers with the label, which lists directions for use, ingredients and first aid steps in case of
- Do not store herbicides, pesticides and rodenticides in areas where flooding is possible or where they may spill or leak into wells, stormwater drains, ground water or surface water. If a spill occurs, clean area immediately.

AZARDOUS AND TOXIC WASTE

Create designated hazardous waste collection areas on-site. Place hazardous waste containers under cover or in secondary containment. Do not store hazardous chemicals, drums or bagged materials directly on the ground.

SELF-INSPECTION, RECORDKEEPING AND REPORTING Self-inspections are required during normal business hours in accordance with the table below. When adverse weather or site conditions would cause the safety of the inspection personnel to be in jeopardy, the inspection may be delayed until the next business day on which it is safe to perform the inspection. In addition, when a storm event of equal to or greater than 1.0 inch occurs outside of normal business hours, the self-inspection shall be performed upon the commencement of the next business day. Any time when inspections were delayed shall be noted in the Inspection Record.

Frequency

Inspect	(during normal	Inspection records must include:		
	business hours)			
(1) Rain gauge maintained in	Daily	Daily rainfall amounts. If no daily rain gauge observations are made during weekend or		
good working		holiday periods, and no individual-day rainfall information is		
order		available, record the cumulative rain measurement for those un-		
		attended days (and this will determine if a site inspection is		
		needed). Days on which no rainfall occurred shall be recorded as		
		"zero." The permittee may use another rain-monitoring device		
		approved by the Division.		
(2) E&SC	At least once per	1. Identification of the measures inspected,		
Measures	7 calendar days	2. Date and time of the inspection,		
	and within 24	3. Name of the person performing the inspection,		
	hours of a rain	4. Indication of whether the measures were operating		
	event > 1.0 inch in 24 hours	properly,		
	24 Hours	Description of maintenance needs for the measure, Description, evidence, and date of corrective actions taken.		
(3) Stormwater	At least once per	Identification of the discharge outfalls inspected,		
discharge	7 calendar days	Date and time of the inspection,		
outfalls (SDOs)	and within 24	Name of the person performing the inspection,		
	hours of a rain	4. Evidence of indicators of stormwater pollution such as oil		
	event > 1.0 inch in	sheen, floating or suspended solids or discoloration,		
	24 hours	5. Indication of visible sediment leaving the site,		
		6. Description, evidence, and date of corrective actions taken.		
(4) Perimeter of	At least once per	If visible sedimentation is found outside site limits, then a record		
site	7 calendar days	of the following shall be made:		
	and within 24	1. Actions taken to clean up or stabilize the sediment that has left		
	hours of a rain	the site limits,		
	event ≥ 1.0 inch in	2. Description, evidence, and date of corrective actions taken, and		
	24 hours	An explanation as to the actions taken to control future releases.		
(5) Streams or	At least once per	If the stream or wetland has increased visible sedimentation or a		
wetlands onsite	7 calendar days	stream has visible increased turbidity from the construction		
or offsite	and within 24	activity, then a record of the following shall be made:		
(where	hours of a rain	Description, evidence and date of corrective actions taken, and		
accessible)	event > 1.0 inch in	2. Records of the required reports to the appropriate Division		
,	24 hours	Regional Office per Part III, Section C, Item (2)(a) of this permit		
		of this permit.		
(6) Ground	After each phase	The phase of grading (installation of perimeter E&SC		
stabilization	of grading	measures, clearing and grubbing, installation of storm		
measures		drainage facilities, completion of all land-disturbing		
		activity, construction or redevelopment, permanent		
		ground cover).		
		Documentation that the required ground stabilization		
		measures have been provided within the required		
		timeframe or an assurance that they will be provided as		
		soon as possible.		

NOTE: The rain inspection resets the required 7 calendar day inspection requirement.

described: Item to Document Documentation Requirements (a) Each E&SC Measure has been installed | Initial and date each E&SC Measure on a copy and does not significantly deviate from the do locations, dimensions and relative elevations | and sign an inspection report that lists each shown on the approved E&SC Plan. E&SC Measure shown on the approved E&SC Plan. This documentation is required upon the initial installation of the E&SC Measures or if the E&SC Measures are modified after initial (b) A phase of grading has been completed. Initial and date a copy of the approved E&SC Plan or complete, date and sign an inspection report to indicate completion of the construction phase. (c) Ground cover is located and installed Initial and date a copy of the approved E&SC in accordance with the approved E&SC Plan or complete, date and sign an inspection report to indicate compliance with approved round cover specifications. (d) The maintenance and repair Complete, date and sign an inspection report. requirements for all E&SC Measures have been performed. (e) Corrective actions have been taken Initial and date a copy of the approved E&SC to E&SC Measures. Plan or complete, date and sign an inspection report to indicate the completion of the corrective action.

SELF-INSPECTION, RECORDKEEPING AND REPORTING

The approved E&SC plan as well as any approved deviation shall be kept on the site. The

approved E&SC plan must be kept up-to-date throughout the coverage under this permit.

The following items pertaining to the E&SC plan shall be documented in the manner

L. E&SC Plan Documentation

2. Additional Documentation In addition to the E&SC Plan documents above, the following items shall be kept on the and available for agency inspectors at all times during normal business hours, unless the Division provides a site-specific exemption based on unique site conditions that make this requirement not practical: (a) This general permit as well as the certificate of coverage, after it is received. (b) Records of inspections made during the previous 30 days. The permittee shall record

the required observations on the Inspection Record Form provided by the Division or a similar inspection form that includes all the required elements. Use of electronically-available records in lieu of the required paper copies will be allowed if shown to provide equal access and utility as the hard-copy records. All data used to complete the Notice of Intent and older inspection records shall be maintained for a period of three years after project completion and made available

		nust be reported
		port the following occurrences:
(a) \	Visible sedime	nt deposition in a stream or wetland.
(b) (Oil spills if:	
•	They are 25	gallons or more,
•	They are less	than 25 gallons but cannot be cleaned up within 24 hours,
•	They cause s	heen on surface waters (regardless of volume), or
•	They are wit	hin 100 feet of surface waters (regardless of volume).
C	of the Clean W	eardous substances in excess of reportable quantities under Section 31 ater Act (Ref: 40 CFR 110.3 and 40 CFR 117.3) or Section 102 of CERCL (02.4) or G.S. 143-215.85.
(b) A	Anticipated by	passes and unanticipated bypasses.
• •	Noncompliancenvironment.	e with the conditions of this permit that may endanger health or the
othe repo	r requirement	pecomes aware of an occurrence that must be reported, he shall conta- vision regional office within the timeframes and in accordance with the s listed below. Occurrences outside normal business hours may also be vision's Emergency Response personnel at (800) 662-7956, (800) 733-3300.
other repor 858-0	r requirement rted to the Div 0368 or (919)	vision regional office within the timeframes and in accordance with the slisted below. Occurrences outside normal business hours may also be rision's Emergency Response personnel at (800) 662-7956, (800) 733-3300. Reporting Timeframes (After Discovery) and Other Requirements
Occur (a) Vis	r requirement rted to the Div 0368 or (919)	vision regional office within the timeframes and in accordance with the solisted below. Occurrences outside normal business hours may also be rision's Emergency Response personnel at (800) 662-7956, (800) 733-3300. Reporting Timeframes (After Discovery) and Other Requirements • Within 24 hours, an oral or electronic notification. • Within 7 calendar days, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis.
Occur (a) Vis	r requirement rted to the Div 0368 or (919) rrence sible sediment sition in a	vision regional office within the timeframes and in accordance with the solisted below. Occurrences outside normal business hours may also be rision's Emergency Response personnel at (800) 662-7956, (800) 733-3300. Reporting Timeframes (After Discovery) and Other Requirements • Within 24 hours, an oral or electronic notification. • Within 7 calendar days, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. • If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff
Occur (a) Vis depos strear	r requirement rted to the Div 0368 or (919) rrence sible sediment sition in a m or wetland	 vision regional office within the timeframes and in accordance with the solisted below. Occurrences outside normal business hours may also be dision's Emergency Response personnel at (800) 662-7956, (800) 733-3300. Reporting Timeframes (After Discovery) and Other Requirements Within 24 hours, an oral or electronic notification. Within 7 calendar days, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions. Within 24 hours, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and
Occur (a) Vis depos strear	r requirement rted to the Div 0368 or (919) rrence sible sediment sition in a m or wetland	vision regional office within the timeframes and in accordance with the solisted below. Occurrences outside normal business hours may also be prision's Emergency Response personnel at (800) 662-7956, (800) 733-3300. Reporting Timeframes (After Discovery) and Other Requirements • Within 24 hours, an oral or electronic notification. • Within 7 calendar days, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. • If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions. • Within 24 hours, an oral or electronic notification. The notification
Occur (a) Vis depos stream (b) Oi releas hazam substa 1(b)-((c) An bypas	r requirement rted to the Div 0368 or (919) rrence sible sediment sition in a m or wetland I spills and se of dous ances per Item	 vision regional office within the timeframes and in accordance with the solisted below. Occurrences outside normal business hours may also be dision's Emergency Response personnel at (800) 662-7956, (800) 733-3300. Reporting Timeframes (After Discovery) and Other Requirements Within 24 hours, an oral or electronic notification. Within 7 calendar days, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions. Within 24 hours, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and
Occur (a) Vis depos stream (b) Oi releas hazam substa 1(b)-(c) An bypas 122.4 (d) Un bypas	r requirement rted to the Div 0368 or (919) rrence sible sediment sition in a m or wetland I spills and se of dous ances per Item c) above sicipated sees [40 CFR 1(m)(3)] manticipated sees [40 CFR	 Reporting Timeframes (After Discovery) and Other Requirements Within 24 hours, an oral or electronic notification. Within 7 calendar days, a report that contains a simpaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions. Within 24 hours, an oral or electronic notification. Within 7 calendar days, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions. Within 24 hours, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and location of the spill or release. A report at least ten days before the date of the bypass, if possible. The report shall include an evaluation of the anticipated quality and effect of the bypass. Within 24 hours, an oral or electronic notification. Within 7 calendar days, a report that includes an evaluation of the
Occur (a) Vis depos stream (b) Oi releas hazam substa 1(b)-(c) An bypas 122.4 (d) Un bypas 122.4	r requirement rted to the Div 0368 or (919) rrence sible sediment sition in a m or wetland I spills and se of dous ances per Item c) above sticipated sees [40 CFR 1(m)(3)] manticipated	 Vision regional office within the timeframes and in accordance with the solisted below. Occurrences outside normal business hours may also be dision's Emergency Response personnel at (800) 662-7956, (800) 733-3300. Reporting Timeframes (After Discovery) and Other Requirements Within 24 hours, an oral or electronic notification. Within 7 calendar days, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions. Within 24 hours, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and location of the spill or release. A report at least ten days before the date of the bypass, if possible. The report shall include an evaluation of the anticipated quality and effect of the bypass. Within 24 hours, an oral or electronic notification. Within 7 calendar days, a report that includes an evaluation of the quality and effect of the bypass.
Occur (a) Vis depos stream (b) Oi releas hazam substa 1(b)-(c) An bypas 122.4 (d) Un bypas 122.4 (e) No with t	r requirement rted to the Div 0368 or (919) rrence sible sediment sition in a m or wetland I spills and se of dous ances per Item c) above sicipated sees [40 CFR 1(m)(3)] manticipated sees [40 CFR 1(m)(3)] compliance the conditions	 Vision regional office within the timeframes and in accordance with the solisted below. Occurrences outside normal business hours may also be dision's Emergency Response personnel at (800) 662-7956, (800) 733-3300. Reporting Timeframes (After Discovery) and Other Requirements Within 24 hours, an oral or electronic notification. Within 7 calendar days, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions. Within 24 hours, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and location of the spill or release. A report at least ten days before the date of the bypass, if possible. The report shall include an evaluation of the anticipated quality and effect of the bypass. Within 24 hours, an oral or electronic notification. Within 7 calendar days, a report that includes an evaluation of the quality and effect of the bypass.
(b) Oi releas hazard substation (c) An bypas 122.4 (d) Ur bypas 122.4 (e) No with tof this	r requirement rted to the Div 0368 or (919) rrence sible sediment sition in a m or wetland I spills and se of dous ances per Item c) above sicipated sess [40 CFR 1(m)(3)] manticipated sess [40 CFR 1(m)(3)] che conditions s permit that	vision regional office within the timeframes and in accordance with the solisted below. Occurrences outside normal business hours may also be ision's Emergency Response personnel at (800) 662-7956, (800) 733-3300. Reporting Timeframes (After Discovery) and Other Requirements • Within 24 hours, an oral or electronic notification. • Within 7 calendar days, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. • If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions. • Within 24 hours, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and location of the spill or release. • A report at least ten days before the date of the bypass, if possible. The report shall include an evaluation of the anticipated quality and effect of the bypass. • Within 24 hours, an oral or electronic notification. • Within 7 calendar days, a report that includes an evaluation of the quality and effect of the bypass. • Within 24 hours, an oral or electronic notification. • Within 7 calendar days, a report that contains a description of the noncompliance, and its causes; the period of noncompliance,
Occur (a) Vis depos stream (b) Oi releas hazam substa 1(b)-(i (c) An bypas 122.4 (d) Un bypas 122.4 (e) No with t of this may e	r requirement rted to the Div 0368 or (919) rrence sible sediment sition in a m or wetland I spills and se of dous ances per Item c) above sicipated sees [40 CFR 1(m)(3)] manticipated sees [40 CFR 1(m)(3)] compliance the conditions	Reporting Timeframes (After Discovery) and Other Requirements Within 24 hours, an oral or electronic notification. Within 7 calendar days, a report that contains a description of the sediment and actions or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions. Within 24 hours, an oral or electronic notification. Within 7 calendar days, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions. Within 24 hours, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and location of the spill or release. A report at least ten days before the date of the bypass, if possible. The report shall include an evaluation of the anticipated quality and effect of the bypass. Within 24 hours, an oral or electronic notification. Within 7 calendar days, a report that includes an evaluation of the quality and effect of the bypass. Within 7 calendar days, a report that contains a description of the

SELF-INSPECTION, RECORDKEEPING AND REPORTING

NCG01 GROUND STABILIZATION AND MATERIALS HANDLING

EFFECTIVE: 04/01/19

NCG01 SELF-INSPECTION, RECORDKEEPING AND REPORTING

upon request. [40 CFR 122.41]

EFFECTIVE: 04/01/19

Division staff may waive the requirement for a written report on a

case-by-case basis

100% DESIGN REVIEW. NOT FOR CONSTRUCTION



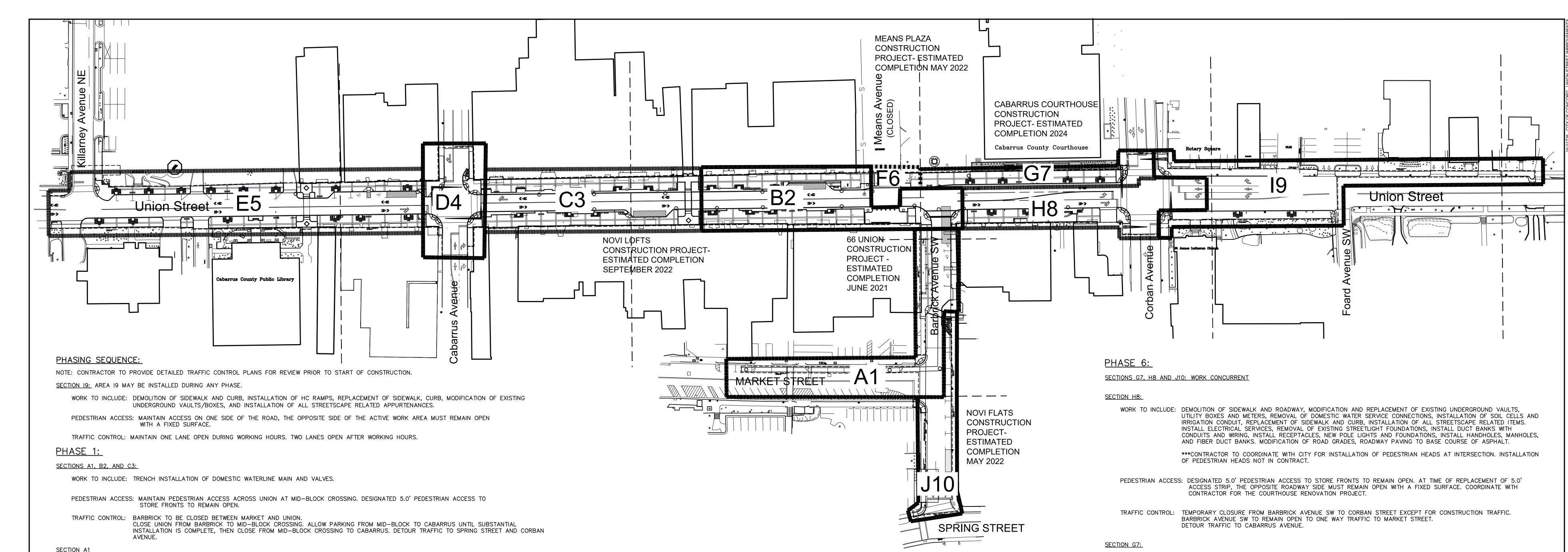


NO.	DATE	BY	DESCRIPTION	

UNION STREET IMPROVEMENTS CITY OF CONCORD CABARRUS COUNTY, NORTH CAROLINA

NOT TO	SCALE	GENERAL	NOTES AND L	LEGENDS
OFFICE MANAGER	DESIGNER			
D.G. CHAPMAN C.L. CRANWILL				
PROJECT MANAGER	REVIEWER	DATE	PROJECT#	FUNDING #
M.J. NORRIS	B. ROARK	JULY 2021	19.01726	N/A

SHEET G-002



SECTION A1

WORK TO INCLUDE: INSTALLATION OF STORMWATER PIPING. DEMOLITION OF SIDEWALK AND ROADWAY, MODIFICATION AND REPLACEMENT OF EXISTING UNDERGROUND VAULTS, UTILITY BOXES AND METERS, REMOVAL AND REPLACEMENT OF SANITARY SEWER SERVICES, REMOVAL AND REPLACEMENT OF DOMESTIC WATER SERVICE CONNECTIONS, REPLACEMENT OF SIDEWALK, INSTALLATION OF ALL STREETSCAPE RELATED ITEMS, INSTALL DUCT BANKS WITH CONDUITS AND WIRING, INSTALL RECEPTACLES, NEW POLE LIGHTS AND FOUNDATIONS, INSTALL HANDHOLES, AND MANHOLES, MODIFICATION OF ROAD GRADES, AND ROADWAY PAVING TO BASE COURSE OF ASPHALT.

PEDESTRIAN ACCESS: DESIGNATED 5.0' PEDESTRIAN ACCESS TO STORE FRONTS TO REMAIN OPEN. AT TIME OF REPLACEMENT OF 5.0' ACCESS STRIP, THE OPPOSITE SIDE OF ACTIVE WORK AREAS MUST REMAIN OPEN WITH A FIXED SURFACE.

TRAFFIC CONTROL: ONE LANE OF TRAFFIC TO REMAIN OPEN DURING WORK HOURS ON MARKET STREET. NO ON STREET PARKING, UTILIZE AREA TO MAINTAIN TWO WAY TRAFFIC AFTER WORK HOURS. CONTRACTOR TO WORK WITH ADJACENT BUSINESSES TO KEEP ACCESS TO PARKING AREAS. BARBRICK TO BE CLOSED BETWEEN MARKET AND UNION.

PHASE 2:

SECTIONS D4, E5, AND H8

SECTION D4:

WORK TO INCLUDE: TRENCH INSTALLATION OF WATERLINE MAIN AND VALVES.

TRAFFIC CONTROL: INTERSECTION OF UNION AND CABARRUS TO BE TEMPORARILY CLOSED FOR TRENCHING ACTIVITIES AND REOPENED FOR TRAFFIC. DETOUR TRAFFIC TO CORBAN AVENUE.

SECTION E5: WORK TO PROCEED AFTER INTERSECTION OF CABARRUS AND UNION IS REOPENED

WORK TO INCLUDE: TRENCH INSTALLATION OF WATERLINE MAIN, SERVICES, AND VALVES.

TRAFFIC CONTROL: UNION STREET FROM KILLARNEY AVENUE NE TO CABARRUS AVENUE TO BE TO BE TEMPORARILY CLOSED FOR TRENCHING ACTIVITIES DURING THE DAY AND REOPENED TO TRAFFIC AFTER WORK HOURS AND WEEKENDS. DETOUR TRAFFIC TO SPRING STREET AND CHURCH STREET.

SECTION H8: WORK TO PROCEED AFTER INTERSECTION OF CABARRUS AND UNION IS REOPENED

WORK TO INCLUDE: TRENCH INSTALLATION OF WATERLINE MAIN, SERVICES AND VALVES.

TRAFFIC CONTROL: UNION FROM BARBRICK TO WATERLINE CONNECTIONS AT CORBAN INTERSECTION, TO BE CLOSED TO PUBLIC USE AND ONE LANE TO REMAIN OPEN FOR CONSTRUCTION TRAFFIC. DURING WORK HOURS FOR TRENCHING ACTIVITIES DURING THE DAY AND REOPENED TO TRAFFIC AFTER WORK HOURS AND WEEKENDS. TEMPORARY CLOSURE OF UNION AND CORBAN INTERSECTION DURING THE DAY AND REOPENED AFTER WORK HOURS. DETOUR TRAFFIC TO CABARRUS AVENUE.

PHASE 3:

SECTIONS A1, B2, C3, F6, G7 AND H8:

SECTIONS A1, B2 AND C3:

WORK TO INCLUDE: DEMOLITION OF SIDEWALK AND ROADWAY, MODIFICATION AND REPLACEMENT OF EXISTING UNDERGROUND VAULTS, UTILITY BOXES AND METERS, REMOVAL AND REPLACEMENT OF SANITARY SEWER SERVICES, INSTALLATION AND REMOVAL OF DOMESTIC WATER SERVICE CONNECTIONS, REPLACEMENT OF SIDEWALK AND CURB, INSTALL SOIL CELLS AND IRRIGATION CONDUIT, INSTALLATION OF ALL STREETSCAPE RELATED ITEMS. INSTALL ELECTRICAL SERVICE, REMOVAL OF EXISTING STREETLIGHT FOUNDATIONS, INSTALL DUCT BANKS WITH CONDUITS AND WIRING, INSTALL RECEPTACLES, NEW POLE LIGHTS AND FOUNDATIONS, INSTALL HANDHOLES, MANHOLES, AND FIBER DUCT BANKS. INSTALLATION OF STORM DRAINAGE AFTER WATER MAIN AND ALL PROPOSED SERVICE CONNECTIONS ARE OPERATIONAL AND EXISTING WATERLINES HAVE HAVE BEEN REMOVED, MODIFICATION OF ROAD GRADES, ROADWAY PAVING TO BASE COURSE OF ASPHALT.

SECTIONS F6, G7 AND H8:

WORK TO INCLUDE: COMPLETE INSTALLATION OF STORMWATER PIPING, AFTER PROPOSED WATERLINE AND SERVICES ARE ACTIVE. REMOVAL OF ANY INACTIVE WATERLINES THAT ARE IN CONFLICT WITH THE STORMWATER INSTALLATION.

PEDESTRIAN ACCESS: DESIGNATED 5.0' PEDESTRIAN ACCESS TO STORE FRONTS TO REMAIN OPEN. AT TIME OF REPLACEMENT OF 5.0' ACCESS STRIP, THE OPPOSITE SIDE OF ACTIVE WORK AREAS MUST REMAIN OPEN WITH A FIXED SURFACE. MID BLOCK PEDESTRIAN ACCESS TO REMAIN OPEN AS LONG AS POSSIBLE THEN ROUTE PEDESTRIANS TO INTERSECTIONS FOR UNION STREET AND CABARRUS AVENUE AND UNION STREET AND CORBAN AVENUE FOR CROSSINGS.

TRAFFIC CONTROL: CLOSE UNION FROM BARBRICK TO INTERSECTION OF UNION STREET AND CABARRUS AVENUE. BARBRICK AVENUE SW TO CORBAN AVENUE TO REMAIN OPEN FOR CONSTRUCTION TRAFFIC TO COURTHOUSE DETOUR TRAFFIC TO SPRING STREET.

PHASE 4:

SECTION D4 AND E5:

SECTION D4:

WORK TO INCLUDE: DEMOLITION OF SIDEWALK AND ROADWAY, MODIFICATION AND REPLACEMENT OF EXISTING UNDERGROUND VAULTS, UTILITY BOXES AND METERS, INSTALLATION OF SANITARY SEWER, REMOVAL AND ABANDONMENT OF EXISTING SANITARY SEWER, REMOVAL OF EXISTING WATER MAINS, REPLACEMENT OF SIDEWALK AND CURB, INSTALL SOIL CELLS AND IRRIGATION CONDUIT, INSTALLATION OF ALL STREETSCAPE RELATED ITEMS. INSTALL ELECTRICAL SERVICE, REMOVAL OF EXISTING STREETLIGHT FOUNDATIONS, INSTALL DUCT BANKS WITH CONDUITS AND WIRING, INSTALL RECEPTACLES, NEW POLE LIGHTS AND FOUNDATIONS, INSTALL HANDHOLES, MANHOLES, AND FIBER DUCT BANKS. INSTALLATION OF STORM DRAINAGE AFTER WATER MAIN AND ALL PROPOSED SERVICE CONNECTIONS ARE OPERATIONAL. MODIFICATION OF ROAD GRADES, ROADWAY PAVING TO BASE COURSE OF ASPHALT.

***CONTRACTOR TO COORDINATE WITH CITY FOR INSTALLATION OF MAST ARM POLE AND PEDESTRIAN HEADS AT INTERSECTION.

SECTION E5:

WORK TO INCLUDE: INSTALLATION OF STORMWATER PIPES AND STRUCTURES

INSTALLATION OF PEDESTRIAN HEADS NOT IN CONTRACT.

PEDESTRIAN ACCESS: MAINTAIN ACCESS ON ONE SIDE OF THE ROAD, THE OPPOSITE SIDE OF ACTIVE WORK AREAS MUST REMAIN OPEN WITH A FIXED SURFACE.

TRAFFIC CONTROL: INTERSECTION OF UNION STREET AND CABARRUS AVENUE CLOSED. ALLOW ACCESS FROM KILLARNEY AVENUE NE TO CHURCH DRIVEWAY ENTRANCE. DETOUR TRAFFIC TO SPRING STREET AND CORBAN AVENUE.

PHASE 5:

SECTION E5:

WORK TO INCLUDE: DEMOLITION OF SIDEWALK AND ROADWAY, MODIFICATION AND REPLACEMENT OF EXISTING UNDERGROUND VAULTS, UTILITY BOXES AND METERS, INSTALLATION OF SOIL CELLS, REPLACEMENT OF SIDEWALK AND CURB, SOIL CELLS, IRRIGATION CONDUIT, INSTALLATION OF ALL STREETSCAPE RELATED ITEMS. INSTALL ELECTRICAL SERVICES, REMOVAL OF STREETLIGHT FOUNDATIONS. INSTALL DUCT BANKS WITH CONDUITS AND WIRING, INSTALL RECEPTACLES, NEW POLE LIGHTS AND FOUNDATIONS, INSTALL HANDHOLES, MANHOLES, AND FIBER DUCT BANKS, INSTALLATION OF STORM DRAINAGE AFTER WATER MAIN AND ALL PROPOSED SERVICE CONNECTIONS ARE OPERATIONAL. MODIFICATION OF ROAD GRADES, ROADWAY PAVING TO BASE COURSE OF ASPHALT.

PEDESTRIAN ACCESS: MAINTAIN ACCESS ON ONE SIDE OF THE ROAD, THE OPPOSITE SIDE OF ACTIVE WORK AREAS MUST REMAIN OPEN WITH A FIXED SURFACE.

TRAFFIC CONTROL: ROAD CLOSURE FROM KILLARNEY AVENUE NE TO CABARRUS AVENUE. DETOUR TRAFFIC TO CABARRUS AVENUE.

WORK TO INCLUDE: MODIFICATION OF ROADWAY GRADES, INSTALLATION OF UNDERGROUND UTILITIES, AND INSTALLATION OF TEMPORARY BASE COURSE OF ASPHALT. ALL OTHER INSTALLATION OF DESIGN FEATURES, EXCEPT UNDERGROUND UTILITIES, TO BE INSTALLED AT END OF COURTHOUSE RENOVATION IN 2024 - NOT IN CONTRACT.

TRAFFIC CONTROL: TEMPORARY CLOSURE FROM BARBRICK AVENUE SW AND CORBAN AVENUE. DETOUR TRAFFIC TO CABARRUS AVENUE.

SECTION J10:

PHASE TO BE SCHEDULED WHEN NOVI LOFTS HAS COMPLETED CONSTRUCTION AND BARBRICK IS NO LONGER BEING USED FOR CONSTRUCTION ACCESS - EXPECTED COMPLETION MAY 2022.

WORK TO INCLUDE: DEMOLITION OF SIDEWALK, REPLACEMENT OF SIDEWALK, MODIFICATION OF EXISTING UNDERGROUND VAULTS, INSTALLATION OF ALL STREETSCAPE RELATED ITEMS.

PEDESTRIAN ACCESS: MAINTAIN ACCESS ON ONE SIDE OF THE ROAD, THE OPPOSITE SIDE MUST REMAIN OPEN WITH A FIXED SURFACE.

TRAFFIC CONTROL: MAINTAIN ONE LANE OPEN TO FROM MARKET STREET TO SPRING DURING WORKING HOURS. TEMPORARY CLOSURE FOR INSTALLATION OF CROSSWALK PAVERS. OPEN LANES TO SPRING STREET AFTER WORK HOURS. NO PUBLIC PARKING.

PHASE 7:

SECTION F6:

PHASE TO BE SCHEDULED WHEN MEANS PLAZA IS NO LONGER BEING UTILIZED AS A CONSTRUCTION ENTRANCE FOR THE COURTHOUSE RENOVATION PROJECT. EXPECTED COMPLETION SPRING OF 2022.

WORK TO INCLUDE: DEMOLITION OF SIDEWALK AND ROADWAY, MODIFICATION AND REPLACEMENT OF EXISTING UNDERGROUND VAULTS. UTILITY BOXES AND METERS, INSTALLATION OF SOIL CELLS, IRRIGATION CONDUIT, REPLACEMENT OF SIDEWALK AND CURB, INSTALLATION OF ALL STREETSCAPE RELATED ITEMS. INSTALL ELECTRICAL SERVICE AT REMOVAL OF EXISTING LIGHTING AND FOUNDATIONS ALONG SECTION, INSTALL DUCT BANKS WITH CONDUITS AND WIRING, INSTALL RECEPTACLES, NEW POLE LIGHTS AND FOUNDATIONS, INSTALL HANDHOLES, MANHOLES, AND FIBER DUCT BANKS. INSTALLATION OF STORM DRAINAGE AFTER WATER MAIN AND ALL PROPOSED SERVICE CONNECTIONS ARE OPERATIONAL. MODIFICATION OF ROAD GRADES.

PEDESTRIAN ACCESS: MAINTAIN ACCESS ON ONE SIDE OF THE ROAD, THE OPPOSITE SIDE OF ACTIVE WORK AREA MUST REMAIN OPEN WITH A FIXED SURFACE.

TRAFFIC CONTROL: MAINTAIN ONE LANE OPEN TO MARKET DURING WORKING HOURS. TEMPORARY CLOSURE OF UNION FOR INSTALLATION OF PAVERS. DETOUR TRAFFIC TO MARKET.

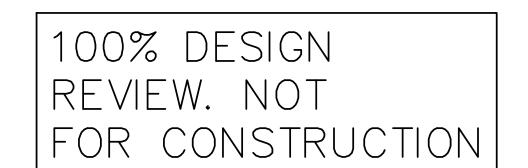
PHASE 8:

ALL SECTIONS:

WORK TO INCLUDE: ROADWAY PAVING FOR SURFACE COURSE OF ASPHALT, STRIPING, LANDSCAPE INSTALLATION, IRRIGATION, SITE FURNITURE, PUNCH LIST, AND FINAL CLEAN UP.

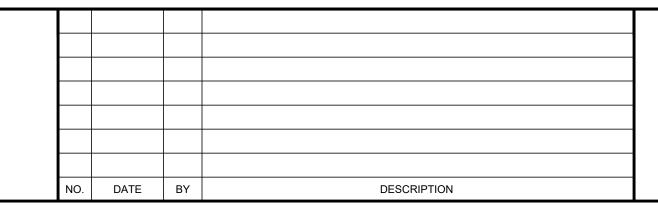
TRAFFIC CONTROL: ONE LANE OPEN DURING WORK HOURS DETOURS TO BE PROVIDED BY CONTRACTOR DURING PAVING OPERATIONS TWO LANES OPEN DURING NON WORK HOURS

NO PUBLIC PARKING









UNION STREET IMPROVEMENTS CITY OF CONCORD CABARRUS COUNTY, NORTH CAROLINA

NOT TO SCALE					SHE
NOTIC		SEQUENCING			
FFICE MANAGER	DESIGNER				
D.G. CHAPMAN C.L. CRANWILL					U ⁻ U
ROJECT MANAGER	REVIEWER	DATE	PROJECT#	FUNDING #	
M.J. NORRIS	B. ROARK	JULY 2021	19.01726	N/A	

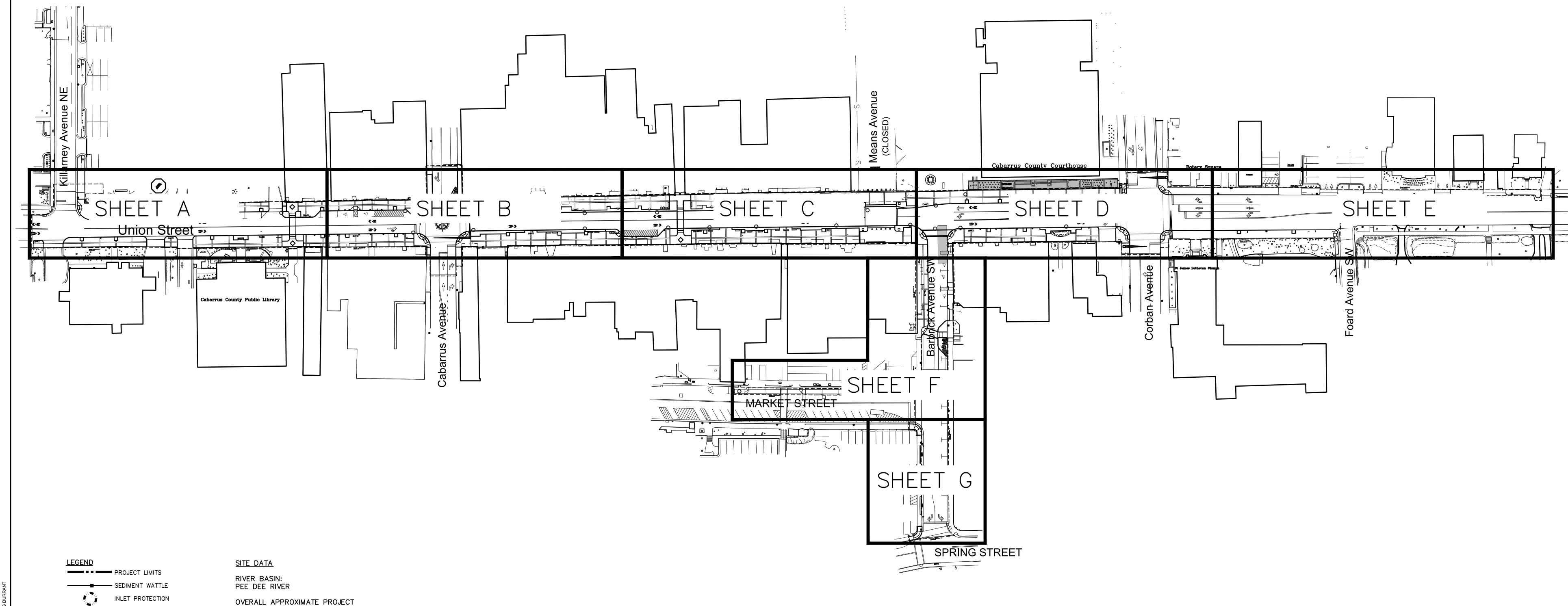
APPROVED FOR CONSTRUCTION

APPROVED FOR CONSTRUCTION

APPROVED FOR CONSTRUCTION

APPROVED FOR CONSTRUCTION

SPECIFICATIONS. DURING CONSTRUCTION REVISIONS MAY BE NEEDED AT THE DISCRETION OF THE NCDOT INSPECTOR.



BW BOTTOM OF WALL
TW TOP OF WALL

BOTTOM OF CURB

TOP OF CURB

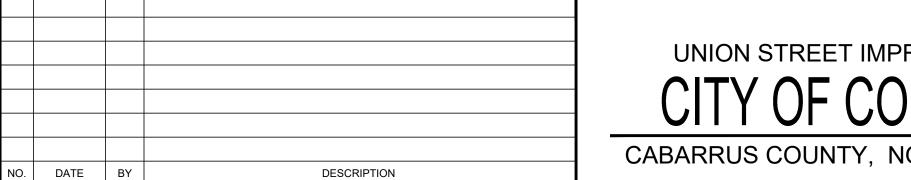
LIMITS/DISTURBED ACREAGE: 2.18 ACRES.
PERMITTED DISTURBED AREA 3.5 ACRES.
MUNICIPALITY:

CITY OF CONCORD

100% DESIGN
REVIEW. NOT
FOR CONSTRUCTION







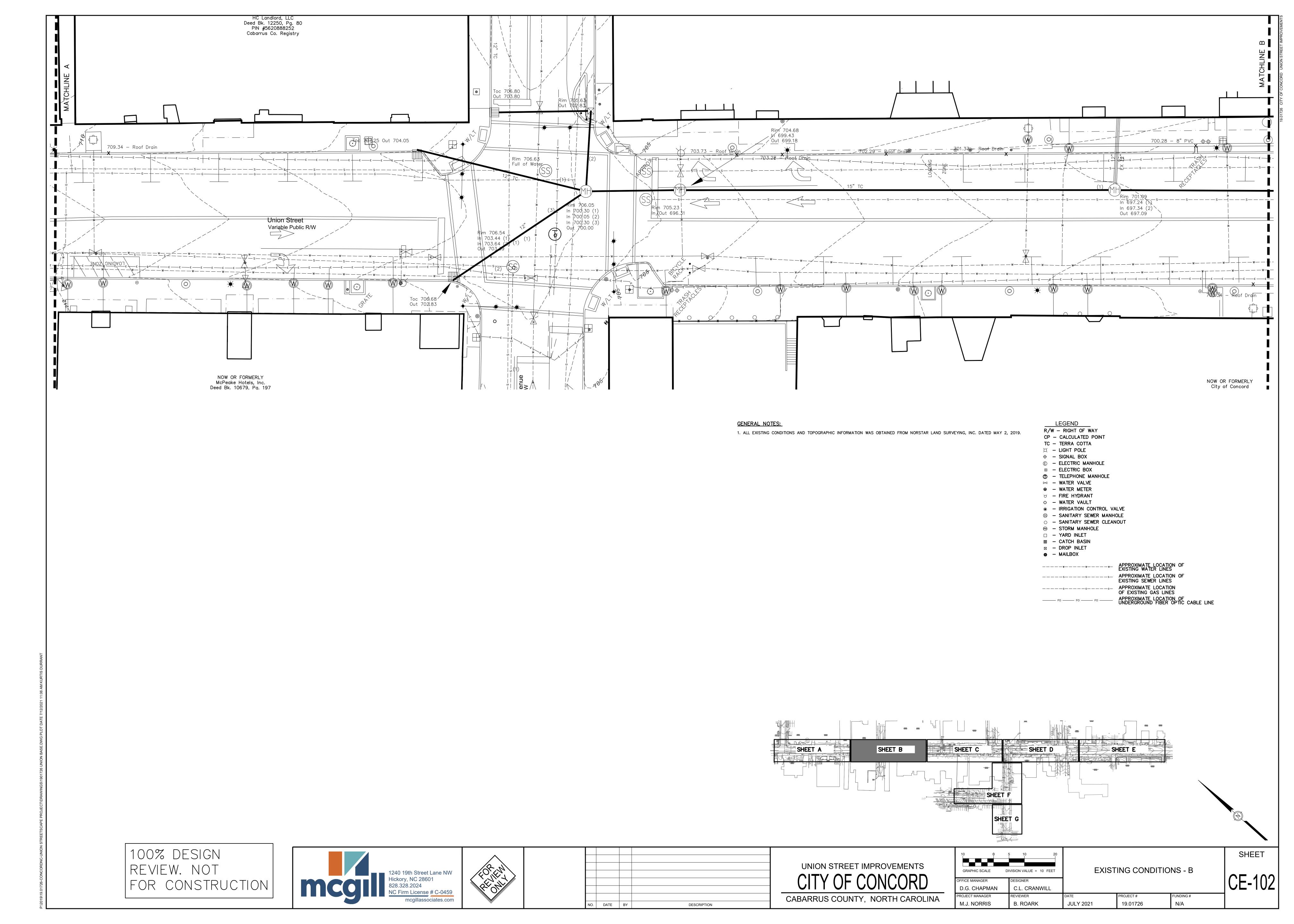
UNION STREET IMPROVEMENTS	ГОИ
CITY OF CONCORD	OFFICE MANAGER D.G. CHAPMAN
ABARRUS COUNTY, NORTH CAROLINA	PROJECT MANAGER M.J. NORRIS

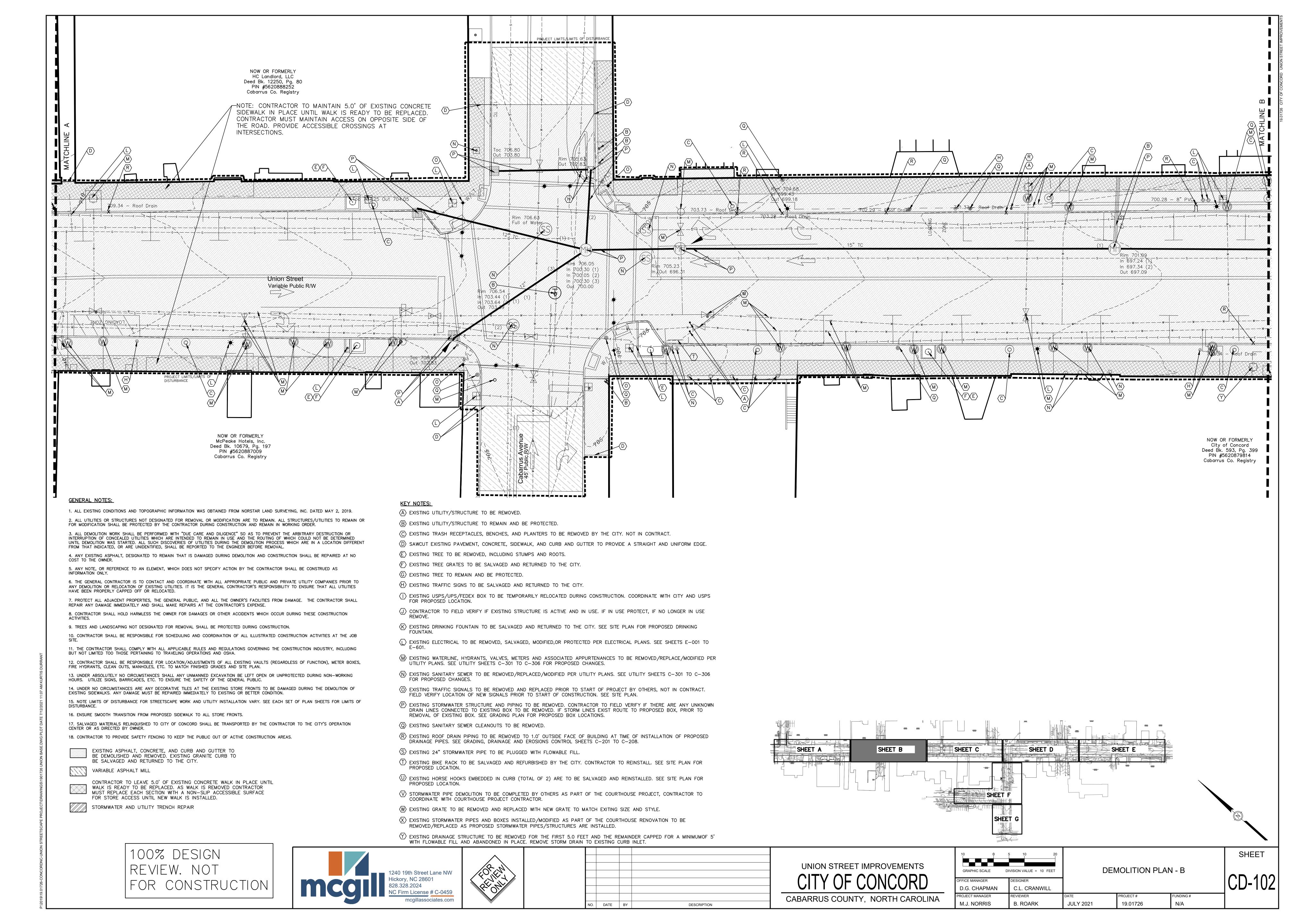
NOT TO	SCALE	OVERALL PROJECT SHEET INDEX
MANAGER	DESIGNER	
. CHAPMAN	C.L. CRANWILL	

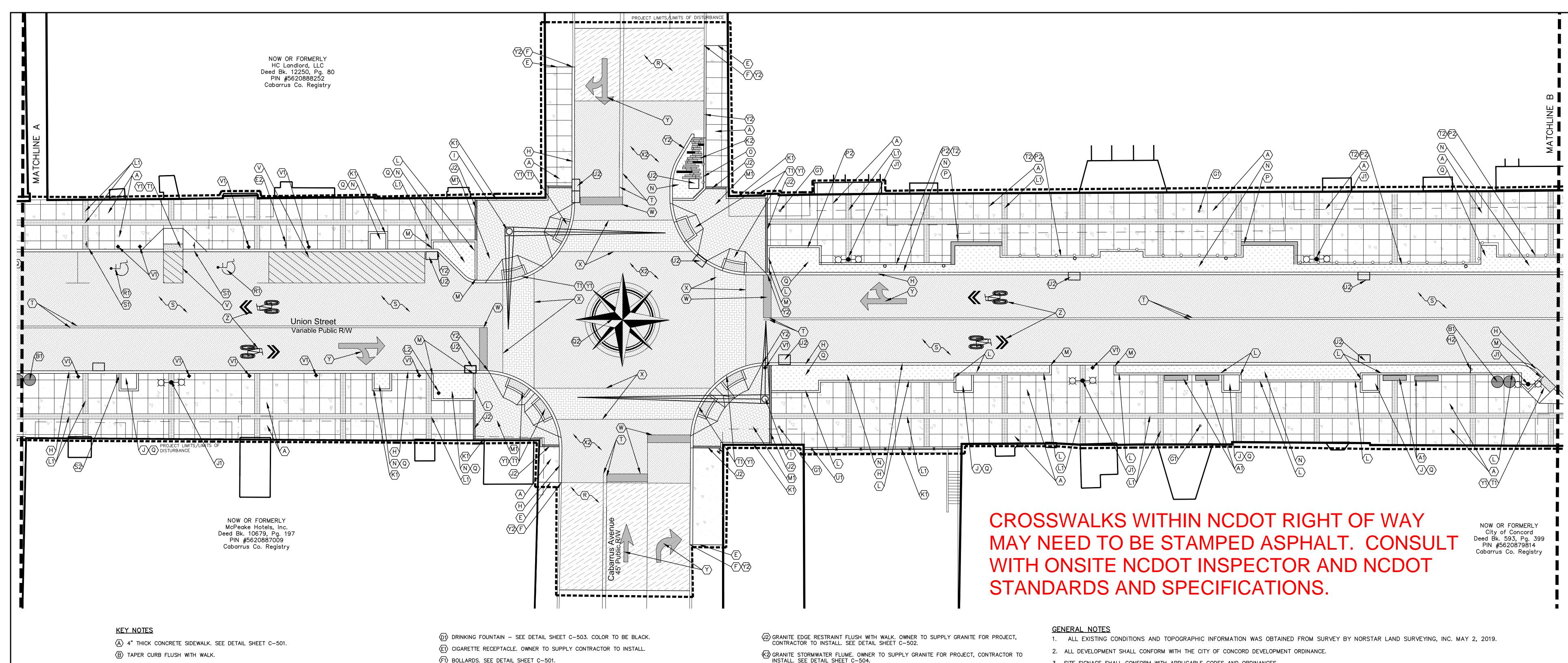
JULY 2021

G-004

SHEET







- (C) CONCRETE DRIVE APRON. GENERAL CONTRACTOR TO MATCH EXISTING ELEVATIONS AND ENSURE SMOOTH TRANSITION TO EXISTING DRIVES AND STREET. SEE CONCRETE SECTION DETAIL SHEET C-501.
- (D) 6" CONCRETE DRIVE SECTION. SEE DETAIL SHEET C-501.
- (E) MATCH EXISTING SURFACE WITH SMOOTH TRANSITION, USE ISOLATION JOINT AT INTERFACE OF EXISTING AND PROPOSED SIDEWALKS AND VERTICAL SURFACES.
- (F) TIE PROPOSED CURB TO EXISTING CURB AND/OR CURB AND GUTTER WITH SMOOTH TRANSITION. USE CONSTRUCTION JOINT AT INTERFACE OF EXISTING AND PROPOSED. TAPER PROPOSED CURB AS NECESSARY TO
- (G) 30" CURB AND GUTTER. NOTE HEIGHT OF CURB VARIES. SEE GRADING PLAN. SEE DETAIL SHEET C-501.
- (H) 8" STAND UP CURB. SEE DETAIL SHEET C-501.
- (I) TRAFFIC SIGNAL INSTALLED BY OTHERS AFTER SURVEY WAS COMPLETED. CONTRACTOR TO FIELD VERIFY LOCATIONS AND NOTIFY ENGINEER/LANDSCAPE ARCHITECT IF LOCATIONS DIFFER FROM THOSE SHOWN ON PLANS, CONTRACTOR TO COORDINATE WITH CITY FOR INSTALLATION OF PEDESTRIAN HEADS TO BE INSTALLED DURING THE STREETSCAPE CONSTRUCTION..
- (J) 4'X4' TREE GRATE AND FRAME WITH CONCRETE EDGE RESTRAINT. SEE DETAIL SHEET C-503.
- (K) EXISTING TREE TO BE PROTECTED.
- (L) 3" CONCRETE LANDSCAPE EDGE WITH DRAINAGE SLOTS. SEE DETAIL SHEET C-501.
- M TAPER LANDSCAPE EDGING FLUSH IN 6". ALL LANDSCAPE EDGING ADJOINING CURB AT ROADWAY SHOULD BE TAPERED FLUSH.
- N LANDSCAPE AREA. SEE LANDSCAPE SHEETS L-101 TO L-106.
- (O) ELECTRICAL PANEL AND DIGITAL DISPLAY. SEE ELECTRICAL SHEETS E101-E107.
- P SEAT WALL. SEE DETAIL SHEET C-501
- SOIL CELLS. SEE SHEETS I-101 TO I-104 AND LANDSCAPE SHEETS L-101 TO L-106 FOR TREE LOCATIONS.
- R VARIABLE ASPHALT OVERLAY. SEE DETAIL SHEET C-501.
- S FULL DEPTH ASPHALT PAVING. SEE DETAIL SHEET C-501.
- 4" CENTER LINE, YELLOW THERMOPLASTIC PAINT, 120 MILS. SEE DETAIL SHEET C-506.
- 4" PAVEMENT STRIPE, WHITE THERMOPLASTIC PAINT, 120 MILS. SEE DETAIL SHEET C-506. √ 4" PAVEMENT STRIPE, WHITE THERMOPLASTIC PAINT, 90 MILS (TYPICAL). SEE DETAIL SHEET C-506.
- W 24" WIDE STOP BAR, WHITE THERMOPLASTIC PAINT, 120 MILS. EXTEND ACROSS LANE WIDTH. SEE DETAIL SHEET C-506.
- STAMPED ASPHALT CROSSWALK WITH 8" WHITE THERMOPLASTIC STRIPE, 120 MILS. SEE DETAIL SHEET C-504.
- TRAFFIC ARROWS AND SYMBOLS, WHITE THERMOPLASTIC PAINT, 90 MILS. SEE DETAIL SHEET DETAIL SHEET
- BICYCLE SHARED LANE MARKINGS, WHITE THERMOPLASTIC PAINT, 90 MILS. SEE DETAIL SHEET C-503.
- BENCH. OWNER TO PROVIDE AND CONTRACTOR TO INSTALL.
- (B) TRASH/RECYCLING RECEPTACLES. OWNER TO PROVIDE AND CONTRACTOR TO INSTALL.
- RELOCATED BIKE RACK.

- (F1) BOLLARDS. SEE DETAIL SHEET C-501.
- 1) BRONZE CAROLINA THREAD TRAIL TRAIL MARKERS. TRAIL MARKERS TO BE MORTARED IN PLACE AND FLUSH WITH PROPOSED CONCRETE SIDEWALK. SEE DETAIL SHEET C-504.
- (H1) BRONZE DOWNTOWN GREENWAY LOOP TRAIL MARKERS. TRAIL MARKERS TO BE MORTARED IN PLACE AND FLUSH WITH PROPOSED CONCRETE SIDEWALK. SEE DETAIL SHEET C-504.
- (11) RELOCATED USPS/UPS/FEDEX BOX.
- (J1) PROPOSED LIGHT POLE/LIGHTED BOLLARD.. SEE ELECTRICAL SHEETS E-001 TO E-107.
- (K1) 6" CONCRETE EDGE RESTRAINT, FLUSH WITH WALK. SEE DETAIL SHEET C-502.
- (L1) BRICK BAND PINEHALL BRICK PATHWAY RED. SEE DETAIL SHEET C-502.
- MI) BRICK PAVERS PINEHALL BRICK PATHWAY AUTUMN, HERRINGBONE PATTERN, HEAVY DUTY. SEE DETAIL
- (N1) BRICK PAVERS PINEHALL BRICK PATHWAY AUTUMN, HERRINGBONE PATTERN, LIGHT DUTY. SEE DETAIL
- (01) PLAZA PAVERS, PINEHALL BRICK PATHWAY AUTUMN, HERRINGBONE PATTERN STREET SECTION. SEE
- P1 BRICK PAVER CROSSWALK WITH 8" CONCRETE EDGE RESTRAINT. 8" WHITE THERMOPLASTIC STRIPE, 120 MILS, PAVER TO BE PINEHALL BRICK PATHWAY RED. SEE DETAIL SHEET C-504.
- (Q1) 18" CONCRETE GRADE BEAM. SEE DETAIL SHEET C-502.
- (R1) HC PARKING. SEE DETAIL SHEET C-503.

DETAIL SHEET C-502.

- $\langle {
 m S1}
 angle$ HC PARKING SIGN. SEE DETAIL SHEET C-503.
- (T1) HC RAMP, LAYOUT OF RAMPS VARY. SEE DETAIL SHEET C-503.
- (U1) WOOD FENCE. SEE DETAILS SHEET C-501.
- (V1) FLAG HOLDER, 2" SCHEDULE 40 PVC SLEEVE SET IN CONCRETE. 6" DEPTH. SEE DETAIL SHEET C-506.
- (WI) HORSE HOOKS, DECORATIVE HORSESHOES AND GRANITE PLAQUE. HORSESHOES TO BE SET FLUSH WITH PROPOSED CONCRETE SIDEWALK. SEE DETAIL SHEET C-506.
- X1) STORMWATER TRENCH REPAIR. SEE DETAIL SHEET C-504.
- (Y1) BRICK RED COMPOSITE DETECTABLE WARNING PLATE, SET IN CONCRETE. 6" CONCRETE BAND AROUND DOME INSET. SEE HANDICAP DETAIL SHEET C-503.
- (Z1) CONCRETE STAIR WITH HANDRAIL. SEE DETAIL SHEET C-502.
- (A) CONCRETE STAIR AND RAMP STORE ENTRANCE ACCESS. SEE DETAIL SHEET C-502.
- © RELOCATED WAYFINDING SIGN, SALVAGED REINSTALL. CONTRACTOR TO PROVIDE SIGNED AND SEALED STRUCTURAL DRAWINGS FOR FOOTING AND POLE INSTALLATION.
- ♠⇒ STREET SIGN. SEE SIGN INSTALLATION DETAIL SHEET C-503.
- (E2) LOADING ZONE SIGN. SEE SIGN INSTALLATION DETAIL SHEET C-503. (F2) ADOPT A STREET SIGN. SEE SIGN INSTALLATION DETAIL SHEET C-503.
- © CONCORD HISTORIC DISTRICT SIGN. SEE SIGN INSTALLATION DETAIL SHEET C-503.
- (H2) ORIGINAL CITY LIMIT SIGN. SEE SIGN INSTALLATION DETAIL SHEET C-503. $\langle 12 \rangle$ HISTORICAL SIGN. SEE SIGN INSTALLATION DETAIL SHEET C-503.

(L2) PROPOSED FUTURE CLOCK, CLOCK NOT IN CONTRACT. SEE ELECTRICAL PLANS FOR CONDUIT

(M2) MOSAIC LIGHT STRUCTURES. SEE ELECTRICAL PLANS PROVIDED BY THE CITY. (N2) GRANITE MARKER FOR ORIGINAL SURVEYORS STONE. SEE DETAIL SHEET C-506 (02) CONCRETE EDGE RESTRAINT TO MATCH LOCATION AND WIDTH OF PROPOSED PLAZA CONCRETE

BANDS. VERIFY LOCATION OF BANDS WITH CURRENT SET OF COURTHOUSE RENOVATION PLANS BY KIMLEY HORN. PLANS TO BE PROVIDED BY THE CITY.

(2) MONOLITHIC RETAINING WALL WITH LANDSCAPE CURB OR METAL RAILING. SEE DETAIL SHEET

(Q2) THERMOPLASTIC COMPASS SYMBOL, 120 MIL. SEE DETAIL SHEET C-506. (R2) HC RAMP WITH HANDRAILS. SEE DETAILS SHEET C-503.

\$2 PUBLIC PARKING DIRECTION SIGN. SEE DETAIL SHEET C-503. (T2) 18" METAL RAILING/TREE GUARD TO BE PROVIDED BY THE OWNER AND CONTRACTOR INSTALLED.

(U2) STORMWATER STRUCTURE. SEE GRADING, DRAINAGE AND EROSION CONTROL PLANS.

⟨V2⟩ RIGHT TURN PROHIBITED SIGN. SEE DETAIL SHEET C-503. ⟨w²⟩ 6" STAND UP CURB. SEE DETAIL SHEET C-501.

(2) NCDOT ASPHALT PAVING. SEE DETAIL SHEET C-501. ⟨Y2⟩ NCDOT 8" STAND UP CURB. SEE DETAIL SHEET C-501.

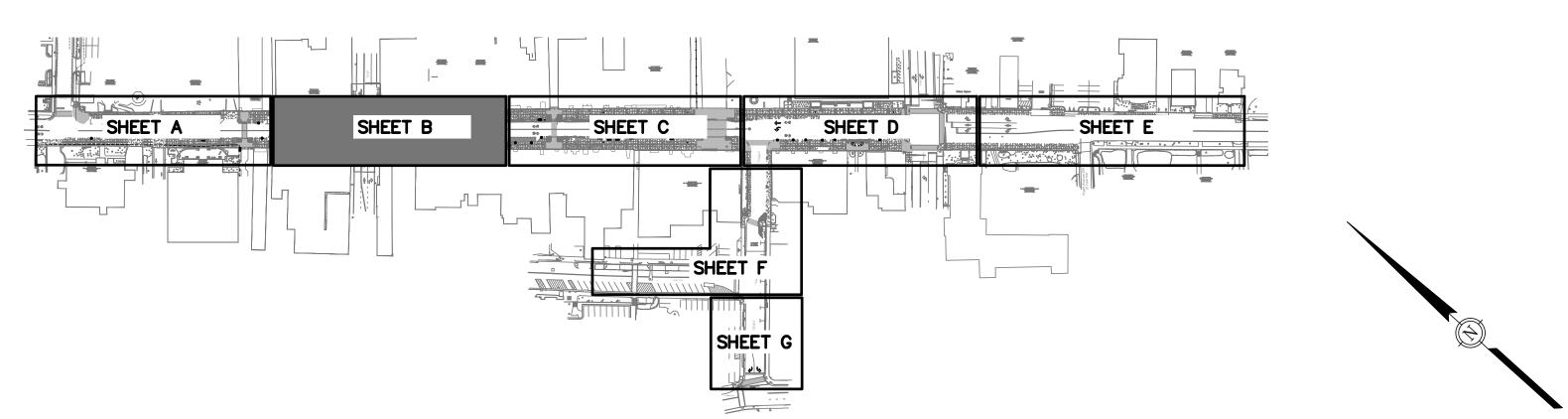
- 3. SITE SIGNAGE SHALL CONFORM WITH APPLICABLE CODES AND ORDINANCES.
- 4. ALL PAINT STRIPING, PAVEMENT MARKINGS, AND SIGNAGE SHALL CONFORM TO THE LATEST "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" AND CITY OF CONCORD STANDARDS.
- 5. ALL DIMENSIONS ARE FACE OF CURB, EDGE OF PAVEMENT AND FACE OF WALL, UNLESS OTHERWISE NOTED.
- 6. THIS SITE IS NOT LOCATED IN ANY FLOOD ZONE.
- 7. ALL IMPROVEMENTS AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH NORTH CAROLINA STATE STANDARDS. ALL IMPROVEMENTS SHALL COMPLY WITH THE CITY OF CONCORD STANDARDS FOR STORM DRAINAGE, SIGNAGE, LANDSCAPE, PLANTING, UTILITY AND PARKING REQUIREMENTS. . ANY DISCREPANCIES FOUND IN THE FIELD SHALL BE CALLED TO THE ATTENTION OF THE OWNER/ENGINEER/DESIGNER PRIOR TO PROCEEDING WITH ANY WORK.

9. THE GENERAL CONTRACTOR SHALL CONTACT ALL OWNERS OF EASEMENTS, UTILITIES AND RIGHT OF WAYS, PUBLIC OR PRIVATE, PRIOR TO WORKING IN THESE AREAS. 10. HATCHING OF HARD SURFACE MATERIALS SUCH AS BRICK AND CONCRETE ARE FOR GENERAL INFORMATION PURPOSES. IN NO INSTANCE IS A

UTILITY LID, COVER OR ACCESS POINT TO BE COVERED OVER AND CONCEALED BY THE PROPOSED SURFACE MATERIAL. ANY HIDDEN UTILITY BOXES, COVERS, ETC DISCOVERED DURING CONSTRUCTION SHALL BE ADJUSTED TO MATCH PROPOSED GRADE ELEVATIONS.

11. PROVIDE CONSTRUCTION JOINTS AT ALL INTERFACES BETWEEN PROPOSED AND EXISTING SURFACES/BUILDINGS. ALL CONSTRUCTION JOINTS ARE TO BE SEALED.

- 12. ENSURE SMOOTH TRANSITION FROM PROPOSED SIDEWALK TO ALL STORE FRONTS
- 13. ALL UTILITY BOXES AND TREE GRATES ARE TO BE ALIGNED WITH PROPOSED CONCRETE SCORING PATTERN.
- 14. NOTE LIMITS OF DISTURBANCE FOR STREETSCAPE WORK AND UTILITY INSTALLATION VARY. SEE EACH SET OF PLANS FOR LIMITS OF DISTURBANCE. 15. CONTRACTOR MUST PROVIDE SECURE, NON-SLIP ADA ACCESSIBLE SURFACES/STRUCTURES AND MAINTAIN ACCESS TO BUSINESSES DURING
- 16. CONTRACTOR TO PROVIDE MINIMUM OF FOUR PROJECT IDENTIFICATION SIGNS.



100% DESIGN REVIEW. NOT FOR CONSTRUCTION



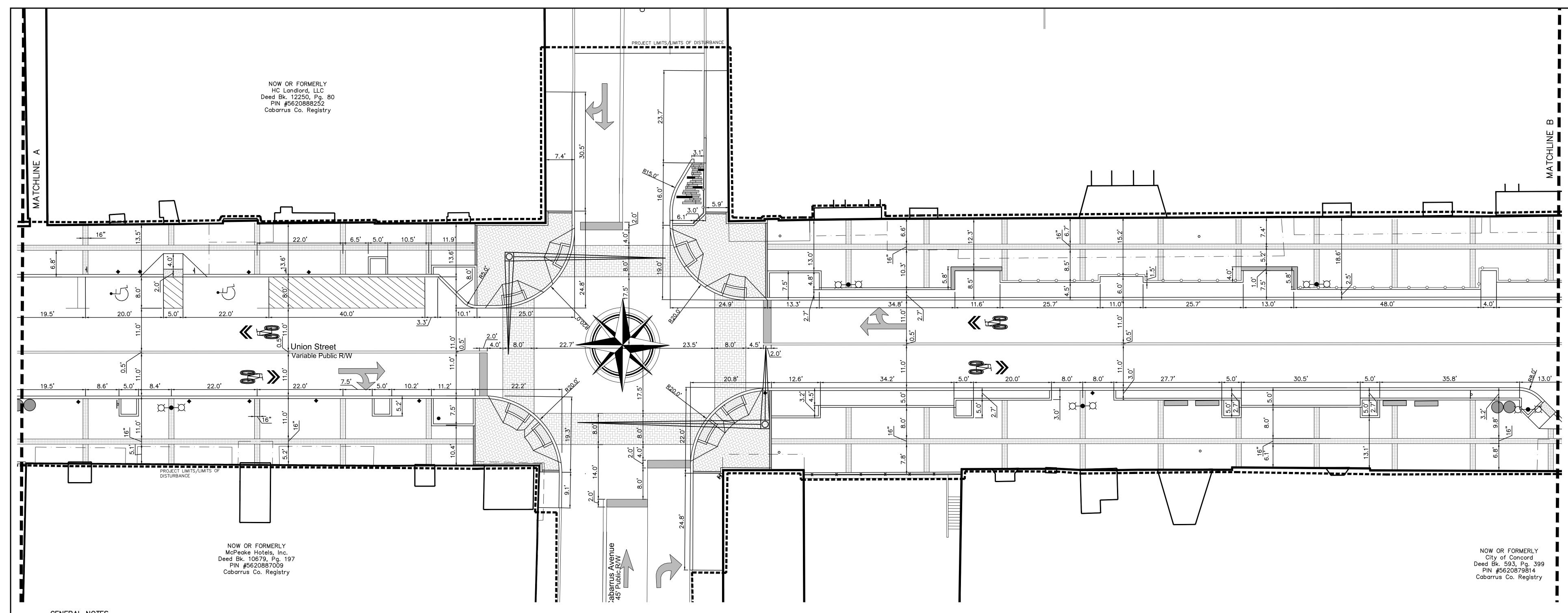




UNION STREET IMPROVEMENTS CITY OF CONCORD CABARRUS COUNTY, NORTH CAROLINA

SITE PLAN - B GRAPHIC SCALE DIVISION VALUE = 10 FEET FFICE MANAGER D.G. CHAPMAN C.L. CRANWILL ROJECT MANAGER B. ROARK 19.01726 M.J. NORRIS JULY 2021

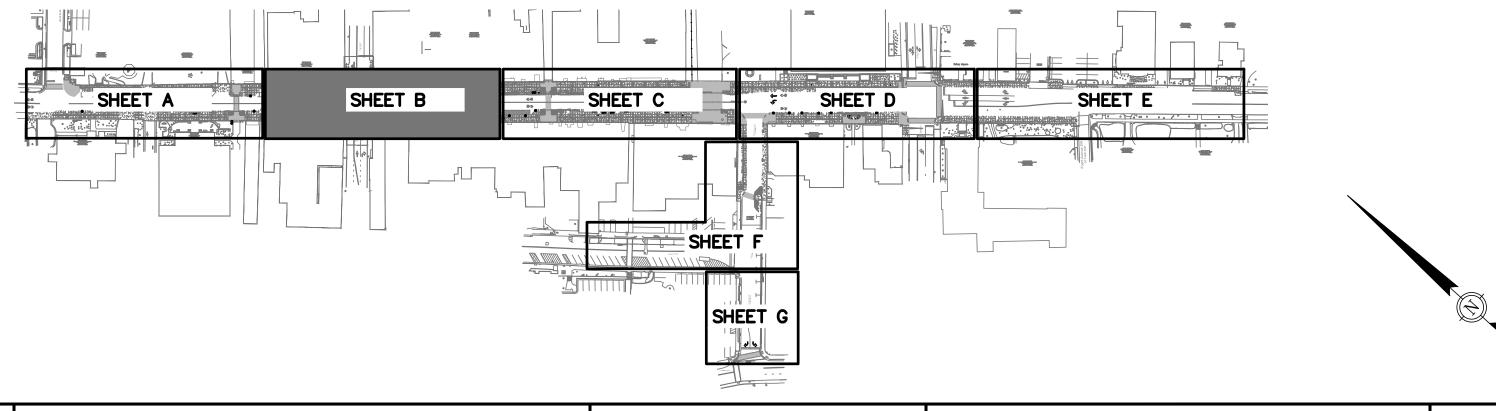
SHEET C-102



GENERAL NOTES

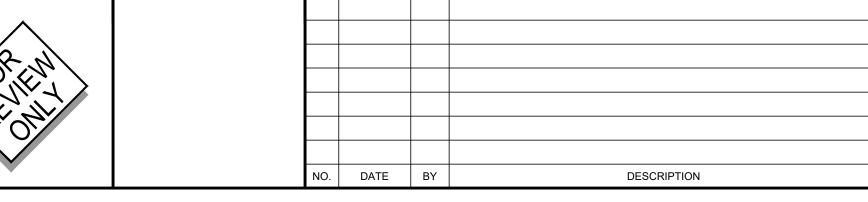
- 1. ALL EXISTING CONDITIONS AND TOPOGRAPHIC INFORMATION WAS OBTAINED FROM SURVEY BY NORSTAR LAND SURVEYING, INC. MAY 2, 2019.
- 2. ALL DEVELOPMENT SHALL CONFORM WITH THE CITY OF CONCORD DEVELOPMENT ORDINANCE.
- 3. SITE SIGNAGE SHALL CONFORM WITH APPLICABLE CODES AND ORDINANCES.
- 4. ALL PAINT STRIPING, PAVEMENT MARKINGS, AND SIGNAGE SHALL CONFORM TO THE LATEST "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" AND CITY OF CONCORD STANDARDS.
- 5. ALL DIMENSIONS ARE FACE OF CURB, EDGE OF PAVEMENT AND FACE OF WALL, UNLESS OTHERWISE
- 6. THIS SITE IS NOT LOCATED IN ANY FLOOD ZONE.
- 7. ALL IMPROVEMENTS AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH NORTH CAROLINA STATE STANDARDS. ALL IMPROVEMENTS SHALL COMPLY WITH THE CITY OF CONCORD STANDARDS FOR STORM DRAINAGE, SIGNAGE, LANDSCAPE, PLANTING, UTILITY AND PARKING REQUIREMENTS.
- 8. ANY DISCREPANCIES FOUND IN THE FIELD SHALL BE CALLED TO THE ATTENTION OF THE OWNER/ENGINEER/DESIGNER PRIOR TO PROCEEDING WITH ANY WORK.
- 9. THE GENERAL CONTRACTOR SHALL CONTACT ALL OWNERS OF EASEMENTS, UTILITIES AND RIGHT OF WAYS, PUBLIC OR PRIVATE, PRIOR TO WORKING IN THESE AREAS.
- 10. HATCHING OF HARD SURFACE MATERIALS SUCH AS BRICK AND CONCRETE ARE FOR GENERAL INFORMATION PURPOSES. IN NO INSTANCE IS A UTILITY LID, COVER OR ACCESS POINT TO BE COVERED OVER AND CONCEALED BY THE PROPOSED SURFACE MATERIAL. ANY HIDDEN UTILITY BOXES, COVERS, ETC DISCOVERED DURING CONSTRUCTION SHALL BE ADJUSTED TO MATCH PROPOSED GRADE ELEVATIONS.
- 11. PROVIDE CONSTRUCTION JOINTS AT ALL INTERFACES BETWEEN PROPOSED AND EXISTING SURFACES/BUILDINGS. ALL CONSTRUCTION JOINTS ARE TO BE SEALED.
- 12. ENSURE SMOOTH TRANSITION FROM PROPOSED SIDEWALK TO ALL STORE FRONTS
- 13. ALL UTILITY BOXES AND TREE GRATES ARE TO BE ALIGNED WITH PROPOSED CONCRETE SCORING
- 14. NOTE LIMITS OF DISTURBANCE FOR STREETSCAPE WORK AND UTILITY INSTALLATION VARY. SEE EACH SET OF PLANS FOR LIMITS OF DISTURBANCE.
- 15. CONTRACTOR MUST PROVIDE SECURE, NON-SLIP ADA ACCESSIBLE SURFACES/STRUCTURES AND MAINTAIN ACCESS TO BUSINESSES DURING CONSTRUCTION.
- 16. CONTRACTOR TO PROVIDE MINIMUM OF FOUR PROJECT IDENTIFICATION SIGNS.

CROSSWALKS WITHIN NCDOT RIGHT OF WAY MAY NEED TO BE STAMPED ASPHALT. CONSULT WITH ONSITE NCDOT INSPECTOR AND NCDOT STANDARDS AND SPECIFICATIONS.



100% DESIGN REVIEW. NOT FOR CONSTRUCTION

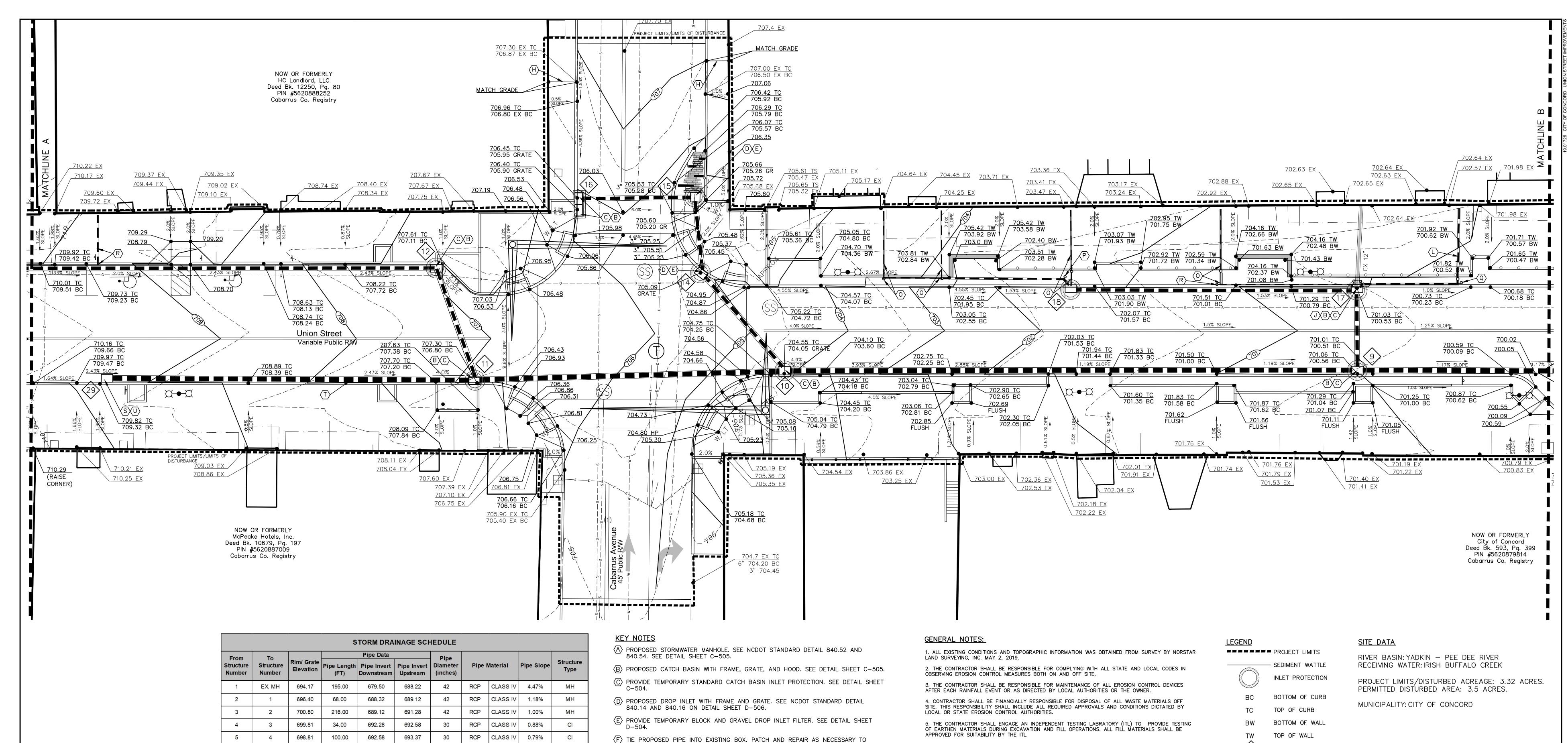


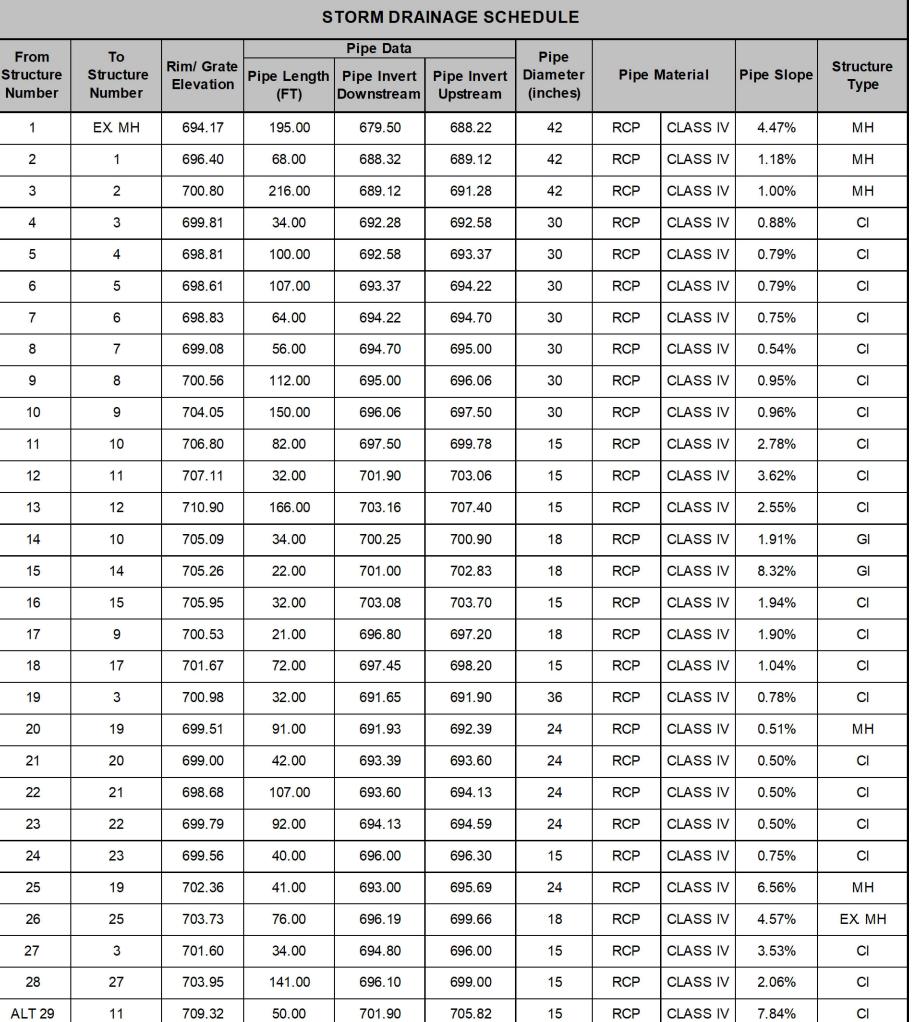


UNION STREET IMPROVEMENTS CITY OF CONCORD CABARRUS COUNTY, NORTH CAROLINA

LAYOUT PLAN - B C-109 D.G. CHAPMAN C.L. CRANWILL M.J. NORRIS B. ROARK JULY 2021 19.01726

SHEET





- (F) TIE PROPOSED PIPE INTO EXISTING BOX. PATCH AND REPAIR AS NECESSARY TO ENSURE SEALED CONNECTION.
- (G) SILT SAK. SEE DETAIL SHEET C-504.
- (H) MATCH EXISTING GRADE WITH SMOOTH TRANSITION.
- (1) PROPOSED 3" SCHEDULE 40 PVC ROOF DRAIN TO DAYLIGHT AT LOCATIONS SHOWN. (J) CONNECT PROPOSED BOX TO EX. PIPE. VERIFY INVERTS OF EXISTING PIPE PRIOR TO
- BOX INSTALLATION.

(K) PROPOSED 3" ROOF DRAIN CLEANOUT. SEE DETAIL SHEET C-504.

- SHOWN. PROVIDE 2" AIR GAP BETWEEN PIPE EXIT AND TOP OF 10" NYOPLAST DRAIN. CONNECT 10" DROP IN DRAIN TO PROPOSED BOX AS SHOWN, MIN. SLOPE 2%. PROVIDE CLEANOUTS AS SHOWN.
- $\langle M \rangle$ SEDIMENT WATTLE. SEE DETAILS SHEET C-504.
- (N) PROPOSED 3" AND 6" SCHEDULE 40 PVC DRAINS FROM EXISTING UTILITY BOX TO TIE TO PROPOSED STORM STRUCTURE.
- (O) PROPOSED 3" SCHEDULE 40 PVC ROOF DRAIN TO DAYLIGHT AT WALL LOCATION SHOWN. PROVIDE 2" AIR GAP BETWEEN PIPE EXIT AND TOP OF 6" DROP IN NYOPLAST DRAIN. CONNECT 6" DROP IN DRAINS TO PROPOSED BOX AS SHOWN, MIN SLOPE 2%. PROVIDE CLEANOUTS AS SHOWN.
- (P) PROPOSED 6" ROOF DRAIN CLEANOUT. SEE DETAIL SHEET C-504.
- $\langle Q \rangle$ PROPOSED 8" ROOF DRAIN CLEANOUT. SEE DETAIL SHEET C-504.
- $\langle \mathbb{R}
 angle$ PROPOSED 3" SCHEDULE 40 PVC ROOF DRAIN TO DAYLIGHT TO CURB. PROVIDE CLEANOUTS AS SHOWN.
- S ADD ALTERNATE #1 CATCH BASIN WITH FRAME, GRATE, AND HOOD. SEE DETAIL
- ADD ALTERNATE #1 15" CLASS IV RCP.
- (U) ADD ALTERNATE #1 PROVIDE TEMPORARY STANDARD CATCH BASIN INLET PROTECTION. SEE DETAIL SHEET C-504.
- W MUD MAT TO BE INSTALLED AS TEMPORARY CONSTRUCTION ENTRANCE AND RELOCATED AS NECESSARY TO ACTIVE CONSTRUCTION AREAS.

NO. DATE

6. SEED ALL DISTURBED AREAS UTILIZING A FESCUE BLEND (MIN. 2 REBEL, JAGUAR, FALCON) APPLICATION RATE OF SEED PER AAN STANDARDS. ALL FERTILIZER AND LIME AS RECOMMENDED BY 7. ALL SPOT ELEVATIONS AT CURB ARE AT TOP FACE OF CURB. ALL OTHER SPOT ELEVATIONS ARE AT SLAB GRADE OR AS INDICATED.

STOPPAGE OF WORK EACH DAY. SEE DETAIL SHEET C-504. 9. CONTRACTOR TO ENSURE POSITIVE DRAINAGE ON ALL SURFACES. NOTIFY ENGINEER/LANDSCAPE ARCHITECT PRIOR TO INSTALLATION OF ANY PAVING/SURFACES IF ON SITE CONDITIONS ARE FIELD DETERMINED NOT TO PROVIDE POSITIVE DRAINAGE.

8. ALL OPEN STORM DRAIN PIPES SHALL BE PROTECTED WITH STONE FILTER PROTECTION AFTER

10. CONTRACTOR TO INSTALL SILK SAK EROSION PROTECTION AS SHOWN ON THE DRAWINGS AND ON THE FIRST DOWNSTREAM INLET STRUCTURES OUTSIDE OF THE PROJECT AREA RECEIVING RUNOFF FROM THE ACTIVE CONSTRUCTION AREA. AS WORK IS PHASED, CONTRACTOR TO UTILIZE WATTLES AS APPLICABLE AROUND THE OPEN WORK AREA TO DISCHARGE THE STORM WATER. DEWATERING BAGS/SEDIMENT FILTER BAGS MAY BE USED TO FILETER STORMWATER FROM TRENCHING ACTIVITIES. UNDER NO CIRCUMSTANCE IS UNTREATED WATER TO BE RELEASED FROM THE WORK AREA WITHOUT PASSING THROUGH AN EROSION CONTROL DEVICE. 11. PROJECT IS BID UNCLASSIFIED

STORMWATER STRUCTURE ID

SHEET A SHEET B SHEET C SHEET E

100% DESIGN REVIEW. NOT FOR CONSTRUCTION





UNION STREET IMPROVEMENTS CITY OF CONCORD CABARRUS COUNTY, NORTH CAROLINA

DESCRIPTION

GRAPHIC SCALE DIVISION VALUE = 10 FEET FFICE MANAGER D.G. CHAPMAN C.L. CRANWILL ROJECT MANAGER **JULY 2021** 19.01726 B. ROARK M.J. NORRIS

GRADING, DRAINAGE, & **EROSION CONTROL - B**

FUNDING #

N/A

C-202

SHEET

GENERAL UTILITY NOTES:

- 1. LOCATIONS OF EXISTING UTILITIES AS SHOWN ARE APPROXIMATE, AND ARE SHOWN ACCORDING TO A SITE SURVEY PROVIDED BY NORSTAR LAND SURVEYING, INC., UTILITY MAPS PROVIDED BY THE CITY OF CONCORD, AND SEWER TV INSPECTION RECORDS PROVIDED BY THE CITY OF CONCORD. EXACT LOCATIONS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR. CALL BEFORE YOU DIG, NORTH CAROLINA ONE CALL (1-800-632-4949).
- 2. ALL PROPOSED DOMESTIC WATER SERVICES SHALL BE 2-INCH TYPE K COPPER UNLESS NOTED OTHERWISE. NEW DOMESTIC WATER SERVICES SHALL BE CONNECTED TO EXISTING SERVICES USING APPROPRIATE COUPLINGS.
- 3. EXACT LOCATION AND SIZE OF FIRE SPRINKLER SERVICE LINES IS UNKNOWN. THE CONTRACTOR SHALL NOTIFY THE CITY OF CONCORD WATER RESOURCES. ENGINEERING. AND FIRE DEPARTMENTS OF THE LOCATION AND SIZE OF ANY FIRE SPRINKLER LINES DISCOVERED DURING PROJECT EXCAVATION WHICH ARE NOT SHOWN ON THE PLANS AND SHALL COORDINATE TIE-OVER OF EXISTING FIRE SPRINKLER LINES WITH THESE DEPARTMENTS PRIOR TO EXECUTING TIE-OVER WORK. EXISTING FIRE SPRINKLER LINES SHALL BE REPLACED AND CONNECTED TO THE NEW WATER MAIN USING DUCTILE IRON PIPE OF LIKE SIZE AS THE EXISTING FIRE SPRINKLER SERVICE PIPE. ACCORDING TO THE CITY OF CONCORD FIRE DEPARTMENT, THE FOLLOWING PROPERTIES HAVE FIRE SPRINKLER SYSTEMS: * 9 NORTH UNION STREET
- * 14 NORTH UNION STREET * 30 NORTH UNION STREET
- * 11 SOUTH UNION STREET
- * 30 SOUTH UNION STREET * 57 SOUTH UNION STREET

BREATHING EQUIPMENT.

- 4. NEW AND REPLACEMENT SEWER SERVICE LINES ARE TO BE CONSTRUCTED USING C-900 DR-14 PVC PIPE OF LIKE SIZE AS THE EXISTING SEWER SERVICE LINES, WITH THE MINIMUM SIZE BEING 4" DIAMETER. ALL SEWER LATERAL CLEANOUTS SHALL BE HOUSED IN A TRAFFIC RATED STEEL MINI-MANHOLE (REFER TO DETAIL C-509).
- 5. THE CONTRACTOR SHALL REPORT ANY UNKNOWN WATER AND SEWER SERVICE LINES TO THE CITY OF CONCORD UPON DISCOVERY AND COORDINATE WITH THE CITY OF CONCORD REGARDING REPLACEMENT OR DISCONNECTION/ABANDONMENT/REMOVAL OF UNKNOWN SERVICE LINES.
- 6. THE CONTRACTOR SHALL FIELD VERIFY ALL PROPOSED MANHOLE TOP ELEVATIONS AND EXISTING MANHOLE INVERTS PRIOR TO CONSTRUCTION AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES. CONTRACTOR SHALL ADJUST ALL PROPOSED SEWER STRUCTURES TO MATCH FINISHED PAVEMENT ELEVATIONS. COSTS OF ADJUSTING STRUCTURE TOPS SHALL BE CONSIDERED INCIDENTAL TO OTHER WORK ON THE PROJECT.
- 7. UTILITY SERVICE AND FIRE WATER COVERAGE IS TO BE MAINTAINED THROUGHOUT PROJECT CONSTRUCTION EXCEPT FOR BRIEF PERIODS DURING TIE-OVER OF MAINS AND SERVICE LINES. THE CONTRACTOR SHALL PROVIDE TEMPORARY VALVES, FITTINGS, AND CONNECTIONS TO MAINTAIN UTILITY SERVICE AND TO ACCOMMODATE PROJECT PHASING.
- 8. ALL CONNECTIONS TO EXISTING WATER LINES 4-INCHES AND LARGER SHALL BE ACCOMPLISHED USING MECHANICAL SLEEVES WITH RESTRAINED JOINTS.
- 9. THE CONTRACTOR SHALL MAINTAIN SEWAGE FLOW IN SEWER SYSTEM AT ALL TIMES AND SHALL PROVIDE BYPASS PUMPING AND/OR PIPING AS REQUIRED. THE CONTRACTOR SHALL SUBMIT A SEWER BYPASS PLAN TO THE CITY ENGINEERING DEPARTMENT FOR APPROVAL PRIOR TO INSTALLATION. NO SANITARY SEWER OVERFLOWS ARE PERMITTED.
- 10. THE CONTRACTOR SHALL COORDINATE WATER LINE ISOLATION WITH THE DESIGNATED CITY OF CONCORD INSPECTOR.
- 11. METER BOXES AND METER BOX LIDS SHALL BE TRAFFIC RATED AND INSTALLED FLUSH WITH THE FINAL GRADE.
- 12. METER VAULTS, METER BOXES, PRV BOXES, AND OTHER WATER RELATED APPURTENANCES SHALL NOT BE INSTALLED IN BRICK PAVER BAND AREAS.
- 13. THE CONTRACTOR SHALL COORDINATE THE LOCATIONS OF TEMPORARY JUMPER CONNECTION ASSEMBLIES AND BLOW-OFFS WITH THE CITY OF CONCORD DESIGNATED INSPECTOR. THE LOCATION OF THE TEMPORARY JUMPER CONNECTION ASSEMBLIES AND BLOW-OFF ASSEMBLIES MUST NOT IMPEDE VEHICULAR AND PEDESTRIAN TRAFFIC AND OTHER UTILITY RELOCATION WORK. WHERE POSSIBLE, THE PROPOSED HYDRANTS AND/OR EXISTING HYDRANTS SHOULD BE UTILIZED FOR FLUSHING IN LIEU OF TEMPORARY BLOW-OFF ASSEMBLIES. THE CONTRACTOR SHALL ALSO COORDINATE LOCATIONS FOR TEMPORARY JUMPER ASSEMBLIES AND BLOW-OFFS WITHIN CABARRUS ROAD RIGHT OF WAY WITH NCDOT.
- 14. THE CONTRACTOR SHALL COORDINATE ALL WORK WITHIN 5' OF GAS LINES WITH DOMINION ENERGY PRIOR TO BEGINNING WORK.
- 15. REFER TO SHEET G-003 FOR SEQUENCING AND TRAFFIC CONTROL INFORMATION. THE CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL PLANS AND COORDINATE TRAFFIC CONTROL WITH THE CITY OF CONCORD AND NCDOT AS APPLICABLE PRIOR TO CLOSING ANY STREET ROAD, OR SIDEWALK.

SPECIAL REQUIREMENTS FOR ASBESTOS CEMENT PIPE

CONSTRUCTION ACTIVITIES WILL REQUIRE CUTTING, MODIFYING, REMOVAL, AND DISPOSAL OF EXISTING ASBESTOS CEMENT (AC) PIPE. WHERE RECORDS ARE AVAILABLE, EXISTING AC PIPE MATERIALS ARE LABELED ON THE PLANS. THE CONTRACTOR SHALL ANTICIPATE ENCOUNTERING AC PIPE THAT MAY NOT BE LABELED. ALL EXISTING AC PIPE SHOWN "TO BE ABANDONED" SHALL BE ABANDONED IN PLACE UNLESS SPECIFICALLY LABELED TO BE REMOVED. AC PIPE TO BE ABANDONED IN PLACE SHALL NOT BE CRUSHED BY MACHINERY. IF AC PIPE IS CRUSHED, THE SITE SHALL BE CONSIDERED A REGULATED ASBESTOS CONTAINING MATERIALS (RACM) SITE AND CONSIDERED AN ACTIVE WASTE DISPOSAL SITE. THE CRUSHED PIPE AND CONTAMINATED SOIL SHALL BE REMOVED, HANDLED, AND DISPOSED BY A LICENSED ASBESTOS REMOVAL CONTRACTOR FOLLOWING REQUIRED PROTOCOLS FOR HANDLING AND DISPOSAL OF ASBESTOS. WHERE EXCAVATIONS OR GRADING REQUIRED FOR CONSTRUCTION EXPOSES EXISTING AC PIPES, THE WORK SITE SHALL BE MARKED WITH SIGNAGE WARNING OF ASBESTOS. EXPOSED PIPE, WHETHER INTACT OR NOT, SHALL BE HANDLED AND DISPOSED OF BY A LICENSED ASBESTOS REMOVAL CONTRACTOR. ALL WORK REQUIRING HANDLING, REMOVAL, OR DISPOSAL OF AC PIPE SHALL BE DONE IN STRICT ACCORDANCE WITH NCGS CHAPTER 130A PUBLIC HEALTH ARTICLE 19: ASBESTOS HAZARD MANAGEMENT PROGRAM.

WORKER TRAINING AND WORKPLACE RULES AND PROCEDURES SHALL MEET THE MINIMUM REQUIREMENTS OF NC AND FEDERAL OSHA RULES. WHERE THE WORK REQUIRES CONNECTING INTO EXISTING AC PIPING, THE FOLLOWING REQUIREMENTS SHALL APPLY:

- A. ALL PERSONNEL INVOLVED IN THE WORK SHALL RECEIVE TRAINING IN PROPER PROCEDURES FOR HANDLING AND WORKING WITH AC PIPE B. ALL PERSONNEL SHALL BE EQUIPPED WITH APPROVED PERSONAL PROTECTIVE EQUIPMENT (PPE) INCLUDING SHOES, CLOTHING, AND
- C. THE CONTRACTOR SHALL DESIGNATE A "PERSON IN CHARGE" WHO SHALL BE PRESENT AT ALL TIMES WHEN AC PIPE IS BEING MODIFIED. D. ALL PIPE CUTTING SHALL BE BY APPROVED "SNAP CUTTERS". THE USE OF SAWS OR GRINDERS EMPLOYING CARBIDE BLADES IS STRICTLY PROHIBITED.
- E. COMPRESSED AIR SHALL NEVER BE USED TO BLOW OR CLEAN PIPE CUTS WHERE NEW PIPES ARE TO BE CONNECTED TO EXISTING AC
- F. MODIFIED WATER CONTAINING SURFACTANTS SHALL BE USED TO LUBRICATE AND WET ALL PIPE CUTS TO MINIMIZE PRODUCTION OF DUST. G. WORK SITES SHALL BE ROPED OFF AND SIGNS WARNING OF ASBESTOS SHALL BE POSTED.
- H. ALL SECTIONS OF AC PIPE CUT FOR CONNECTIONS OF NEW PIPING SHALL BE REMOVED FROM THE EXCAVATION, DOUBLE BAGGED IN HEAVY PLASTIC WRAP, LABELED AS "ASBESTOS" AND PLACED IN A SECURE STORAGE AREA PENDING TRANSPORT AND DISPOSAL TO A LICENSED ASBESTOS DISPOSAL LANDFILL.
- I. WHERE THE WORK REQUIRES PREPARING THE CUT END OF AN EXISTING AC PIPE FOR CONNECTION OF A NEW PIPE, ONLY TOOLS APPROVED FOR THIS WORK SHALL BE USED. PIPE SHALL BE CONTINUOUSLY LUBRICATED WITH "MODIFIED WATER" TO LIMIT DUST. J. CLEAN UP AT WORK SITES SHALL NEVER EMPLOY COMPRESSED AIR, BLOWERS, MECHANICAL BROOMS, OR OTHER DEVICES THAT WILL PRODUCE DUST.
- K. AT THE END OF EACH WORK DAY WHERE AC PIPE IS CUT, HANDLED, MODIFIED, OR REMOVED, ALL WORKERS' PERSONAL PROTECTION EQUIPMENT (PPE) SHALL BE STORED AT A SUITABLE LOCATION FOR CLEANING, DECONTAMINATION DISPOSAL, OR FUTURE USE. WORKERS INVOLVED IN CUTTING, REMOVAL, AND DISPOSAL OF AC PIPE SHALL NOT BE ALLOWED TO REMOVE PPE FROM THE WORK SITE
- L. REFER TO PROJECT SPECIFICATIONS AND SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION.

100% SUBMITTAL FOR REVIEW, NOT FOR CONSTRUCTION







DATE **DESCRIPTION**

UNION STREET IMPROVEMENTS

CITY OF CONCORE CABARRUS COUNTY, NORTH CAROLINA

DIVISION VALUE = 10 FEET FICE MANAGER D.G. CHAPMAN M. OETTING ROJECT MANAGER M.J. NORRIS D.G. CHAPMAN

____ w ____ w ___

____FW ___FW __

UTILITY NOTES AND LEGEND

19.01726

MAY, 2021

N/A

C-301

SHEET

CITY OF CONCORD UTILITY NOTES:

- 1. PER CITY OF CONCORD CODE OF ORDINANCE CHAPTER 62, ARTICLE 3, SECTION 62-98 (2) ALL MATERIALS, EQUIPMENT, LABOR, AND WORKMANSHIP ASSOCIATED WITH PUBLIC WATER AND /OR SEWER EXTENSION AND/OR MODIFICATION SHALL BE IN ACCORDANCE WITH AND SUBJECT TO THE WATER AND SEWER AUTHORITY OF CABARRUS COUNTY'S STANDARD SPECIFICATIONS; THE CITY OF CONCORD'S ORDINANCES, POLICIES, AND STANDARD SPECIFICATIONS, AND THE NORTH CAROLINA ADMINISTRATIVE CODE FOR WASTEWATER COLLECTION AND WATER DISTRIBUTION SYSTEMS. IN THE EVENT OF CONFLICT BETWEEN THE WATER AND SEWER AUTHORITY OF CABARRUS COUNTY'S STANDARD SPECIFICATIONS; THE CITY OF CONCORD'S ORDINANCES, POLICIES, AND STANDARD SPECIFICATIONS, OR THE NORTH CAROLINA ADMINISTRATIVE CODE, THE MORE RESTRICTIVE REQUIREMENTS SHALL APPLY.
- 2. REVIEW AND APPROVAL OF THE PLANS DOES NOT RELIEVE THE OWNER, CONTRACTOR, OR DEVELOPER FROM MEETING THE REQUIREMENTS OF THE CITY OF CONCORD'S OR CABARRUS COUNTY ORDINANCES, POLICIES, AND STANDARD SPECIFICATIONS, (AS APPLICABLE), CONCORD WATER & SEWER POLICIES AND TECHNICAL SPECIFICATIONS, THE "STANDARD SPECIFICATION FOR WASTEWATER COLLECTION & WASTE DISTRIBUTION FOR CABARRUS COUNTY (WSACC MANUAL) AND ANY OTHER LOCAL, STATE, AND FEDERAL REGULATIONS & APPROVALS.
- 3. THE CONTRACTOR MUST CONTACT THE CITY OF CONCORD ENGINEERING CONSTRUCTION MANAGER AT 704-920-5425 AT LEAST 24-HOURS PRIOR TO INITIATING ANY CONSTRUCTION ACTIVITY.
- 4. THE EXISTING WATER MAIN VALVE RIMS AND STEMS AND THE EXISTING SEWER MAIN MANHOLES RIMS ARE TO BE RAISED OR LOWERED TO FINAL GRADE, AS APPLICABLE AND AT LEAST 3-FT OF GROUND COVER IS TO BE MAINTAINED OVER THE EXISTING UTILITIES AT ALL TIMES PER THE CITY OF CONCORD CODE OF ORDINANCE CHAPTER 62, ARTICLE 3, SECTION 62-98.
- 5. CONCORD CODE OF ORDINANCES CHAPTER 62, ARTICLE II WATER AND SEWER SERVICE, SEC. 62-34(I) THE CUSTOMER SHALL BE RESPONSIBLE FOR INSTALLING THE NECESSARY APPROVED DEVICE(S) TO MAKE ANY ADJUSTMENTS TO THE WATER PRESSURE SUPPLIED BY CONCORD UTILITIES AND SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL SUCH DEVICES."
- 6. PER THE CITY OF CONCORD CODE OF ORDINANCE CHAPTER 62, ARTICLE 3, SECTION 62-98- THE FOLLOWING MINIMUM SEPARATIONS MUST BE INDICATED, UNLESS OTHERWISE APPROVED BY THE CITY. * A MINIMUM HORIZONTAL SEPARATION OF FIVE FEET SHALL BE MAINTAINED BETWEEN ANY TYPE OF MAINTENANCE OBSTRUCTION AND THE CITY'S WATER DISTRIBUTION LINES, WASTEWATER COLLECTION LINES, AND ASSOCIATED APPURTENANCES, UNLESS AN EXCEPTION IS GRANTED. GREATER SEPARATION DISTANCES MAY BE REQUIRED AS SPECIFIED BY FEDERAL, STATE, OR
- * A MINIMUM VERTICAL SEPARATION OF TWO FEET SHALL BE MAINTAINED BETWEEN ANY TYPE OF MAINTENANCE OBSTRUCTION, INCLUDING BUT NOT LIMITED TO ANY OTHER UTILITY PROVIDER'S LINES OR EQUIPMENT, AND THE CITY WATER DISTRIBUTION LINES, WASTEWATER COLLECTION LINES, AND ASSOCIATED APPURTENANCES, UNLESS AN EXCEPTION IS GRANTED. IF AN EXCEPTION IS GRANTED, A MINIMUM VERTICAL SEPARATION OF ONE FOOT MUST BE MAINTAINED AND THE CITY WATER DISTRIBUTION LINES, WASTEWATER COLLECTION LINES, AND ASSOCIATED APPURTENANCES SHALL BE CONSTRUCTED OF DUCTILE IRON PIPE OR AN APPROVED FERROUS MATERIAL WITH JOINTS THAT ARE EQUIVALENT TO POTABLE WATER MAIN STANDARDS FOR A DISTANCE OF TEN FEET ON EITHER SIDE OF THE POINT OF CROSSING. GREATER SEPARATION DISTANCES MAY BE REQUIRED AS SPECIFIED BY
- FEDERAL, STATE, OR LOCAL REGULATIONS. * A MINIMUM HORIZONTAL SEPARATION OF TEN FEET SHALL BE MAINTAINED BETWEEN THE CITY WATER DISTRIBUTION SYSTEM AND WASTEWATER COLLECTION LINES, AND ASSOCIATED APPURTENANCES, UNLESS AN EXCEPTION IS GRANTED.
- 7. CONTRACTOR SHALL OBTAIN REQUIRED PLUMBING PERMITS AND PAY APPLICABLE PLUMBING PERMITTING CHARGES AND FEES; AND COMPLY WITH THE REQUIRED PLUMBING CODE IN ASSOCIATION WITH ESTABLISHING THE WATER AND SEWER SERVICE CONNECTIONS TO THE PUBLIC MAINS.
- 8. THE DURATION OF ANY SERVICE DISRUPTION SHALL BE MINIMIZED. THE CONTRACTOR SHALL NOTIFY THE CITY OF CONCORD ENGINEERING CONSTRUCTION MANAGER, GARY STANSBURY, AT 704-920-5425 AT LEAST 48 HOURS IN ADVANCE OF ANY SCHEDULED SERVICE DISRUPTION. PROVIDE NOTICE ON A CITY APPROVED FORM TO CITY OF CONCORD CUSTOMERS SPECIFYING THE DAY AND DURATION OF ANY SCHEDULE DISRUPTION, INCLUDE APPROPRIATE CITY CONTACT NUMBERS
- 9. THE CONTRACTOR SHALL PROVIDE TEMPORARY POTABLE WATER SUPPLIES TO CITY OF CONCORD CUSTOMERS WHEN THE DRUATION OF WATER SERVICE DISRUPTION EXCEEDS 6 HOURS OR AS DIRECTED BY THE DESIGNATED CITY INSPECTOR. THIS PROVISION IS CONSIDERED INCIDENTAL TO THE WATER LINE. NO ADDITIONAL PAYMENT WILL BE MADE.

————s———s—

—————s————s—

LITH ITIES I ECENID

RESTRAINED JOINT WATER LINE

DOMESTIC WATER SERVICE LINE

FIRE WATER SERVICE LINE

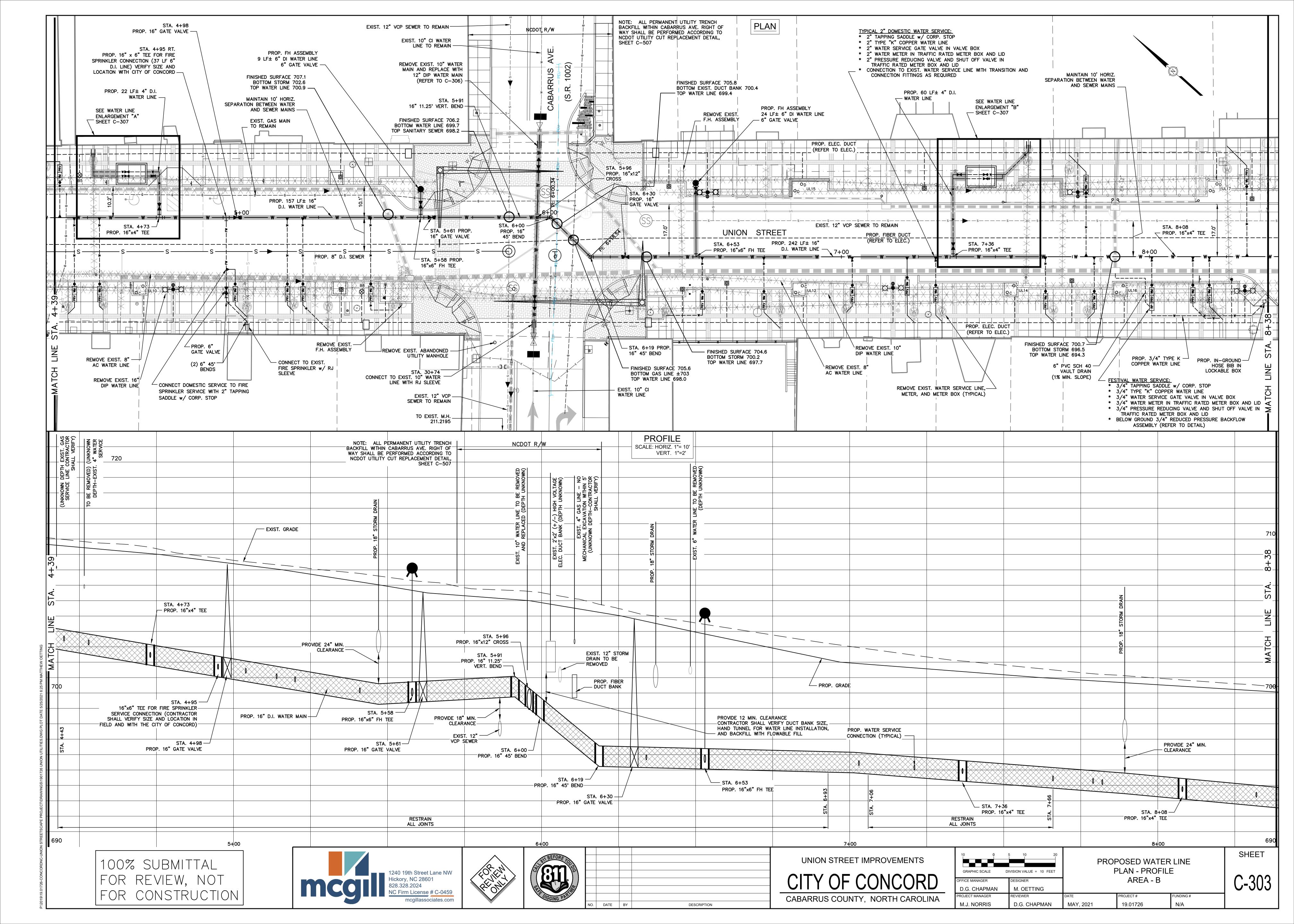
EXISTING UTILITY LINE

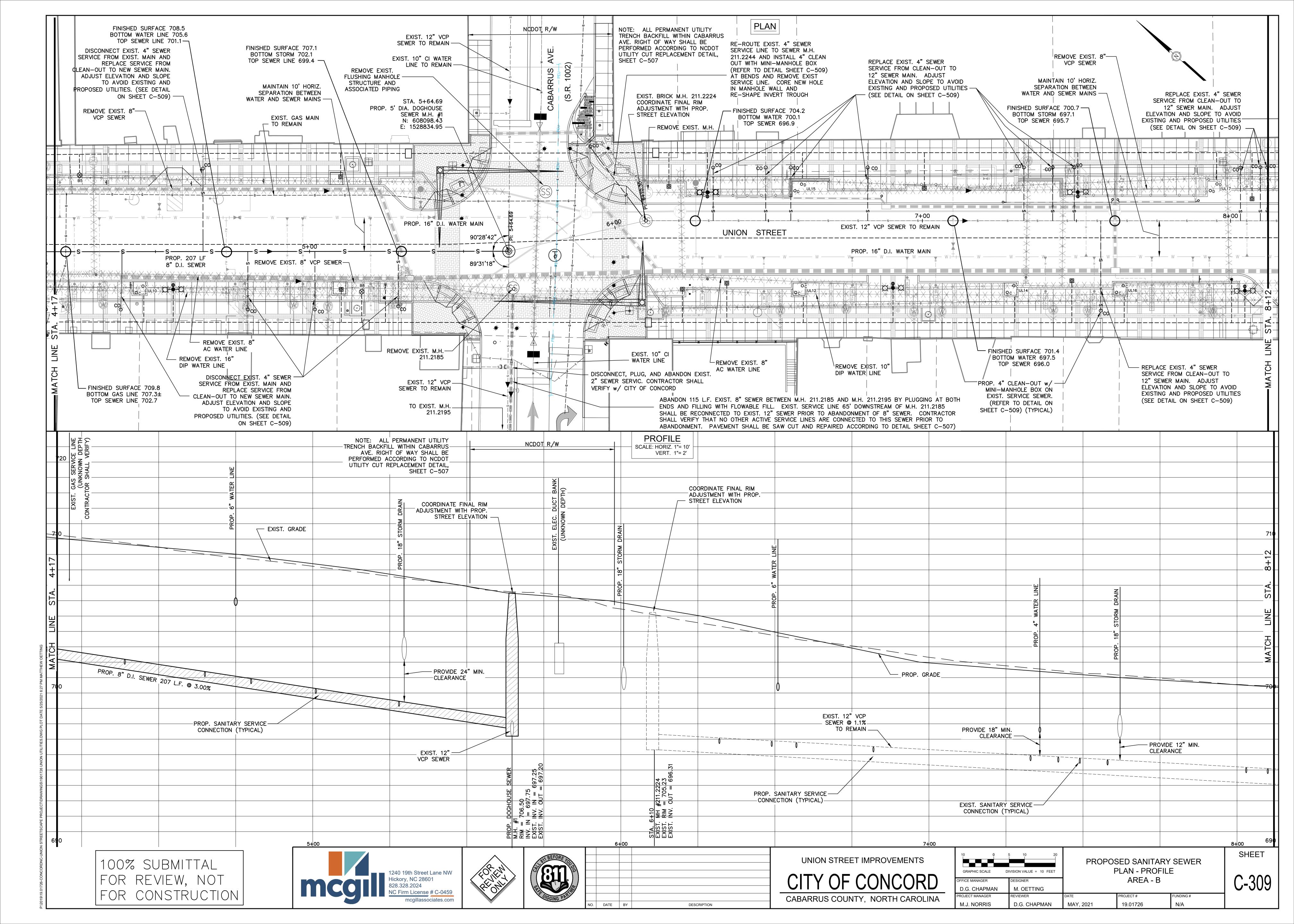
TO BE REMOVED

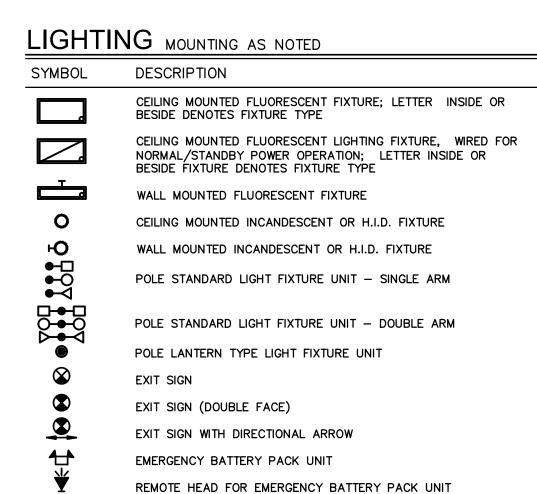
FLOWABLE FILL, AND ABANDONED

JIILITIES LEGEND	
	PROPOSED
SEWER MANHOLE	
SEWER CLEAN-OUT WITH MINI-MANHOLE (REFER TO DETAIL SHEET C-509)	oco
FIRE HYDRANT	A
GATE VALVE	H
END CAP	3
MECHANICAL JOINT CONNECTION SLEEVE	=
2" WATER METER IN TRAFFIC RATED METER BOX AND LID (REFER TO DETAIL SHEET <u>C-508</u>)	W
2" PRESSURE REDUCING VALVE AND SHUT-OFF VALVE IN TRAFFIC RATED METER BOX AND LID	PRV
BELOW GROUND REDUCED PRESSURE BACKFLOW ASSEMBLY (REFER TO DETAIL SHEET C-510)	RP
AIR RELEASE VALVE IN METER BOX (REFER TO DETAIL SHEET C-508)	ARV
2" WATER SERVICE GATE VALVE IN VALVE BOX (REFER TO DETAIL SHEET C-508)	•
2" TAPPING SADDLE WITH CORPORATION STOP (REFER TO DETAIL SHEET C-508)	•
IN-GROUND HOSE BIB IN LOCKABLE BOX	
EXIST. UTILITY TO BE CAPPED AND ABANDONED	J C
SEWER LINE	s
SEWER SERVICE LINE	ss
WATER LINE	w w
DECTRAINED JOINT WATER LINE	14/

EXIST. UTILITY TO BE PLUGGED, FILLED WITH







SWITCHING

<u> </u>	CHING					
SYMBOL	MOUNTING	DESCRIPTION				
S	48"AFF	SWITCH, SINGLE POLE				
S ₂	48"AFF	SWITCH, DOUBLE POLE				
S ₃	48"AFF	SWITCH, 3-WAY				
\mathbf{S}_4	48"AFF	SWITCH, 4-WAY				
\mathbf{S}_{DM}	48"AFF	SWITCH, DIMMER				
$S_{ riangle}$	48"AFF	SWITCH WITH PILOT LIGHT				
$\mathbf{S}_{\mathbb{M}}$	48"AFF	SWITCH, MANUAL MOTOR STARTER, RATING AND THERMAL OVERLOADS TO MATCH MOTOR NAME PLATE DATA				
\mathbf{S}_{MI}	48"AFF	SWITCH, MANUAL MOTOR STARTER WITH IVORY, ILLUMINATED HANDLE				
\mathbf{S}_{MP}	48"AFF	SWITCH, MANUAL MOTOR STARTER WITH PILOT LIGHT				
$\mathbf{S}_{ op}$	48"AFF	MANUAL MOTOR STARTER SWITCH FRACTIONAL HORSEPOWER				
	AS NOTED	PHOTOELECTRIC CONTROL				
$\square_{_{R1}}$	48"AFF	LIGHTING CONTACTOR				
111	DE:	SIGNATION				
LC-1		LIGHTING CONTACTOR REMOTE PUSH-BUTTON "ON-OFF" CONTROL				
	REI	PRESENTS LIGHTING CONTACTOR BEING CONTROLLED				
DS	AS NOTED	DOOR SWITCH				
MC	AS NOTED	MOTION CONTROL				
M	CEILING	MOTION SENSOR				

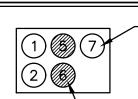
PANELBOARDS

SYMBOL	MOUNTING	DESCRIPTION
	TOP BREAKER 6'-0"AFF	NEW PANELBOARD - SURFACE MOUNTED
	TOP BREAKER 6'-0"AFF	NEW PANELBOARD - FLUSH MOUNTED
		EXISTING PANELBOARD - SURFACE MOUNTED
		EXISTING PANELBOARD - FLUSH MOUNTED

OCCUPANCY SENSOR

DUCTBANK SYMBOL KEY

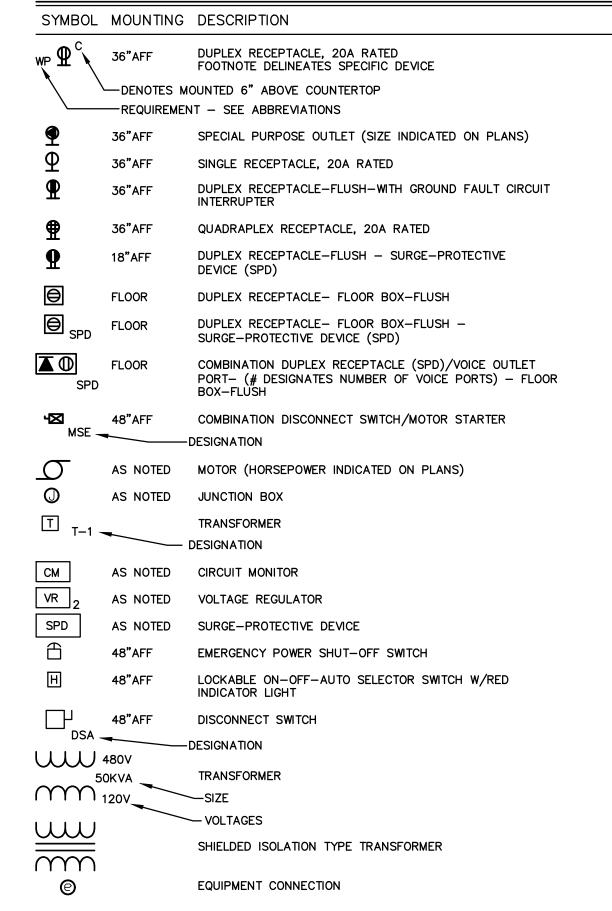
NEW CONDUIT, TYP.



EXISTING CONDUIT, TYP. NOTE: REFER TO DUCTBANK SCHEDULE & PLANS

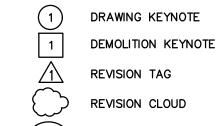
FOR EXACT NUMBER & SIZE OF CONDUITS.

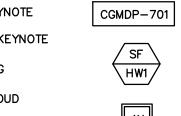
POWER



TYPICAL ANNOTATION

INSTRUMENTATION TAG



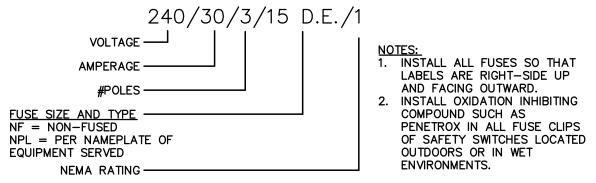




PROCESS EQUIPMENT TAG

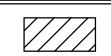


SAFETY SWITCH DESIGNATOR



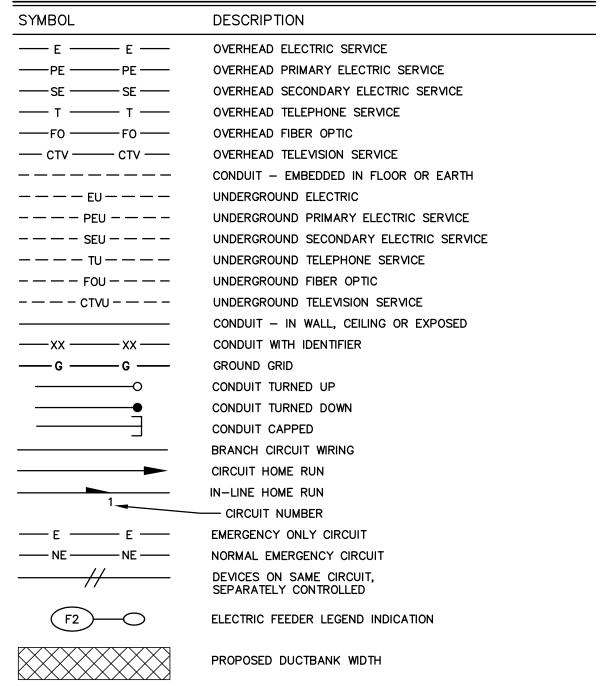
SAFETY SWITCH

PROPOSED DEMOLITION LEGEND



TO BE DEMOLISHED AND REMOVED

CONDUIT FEEDERS AND BRANCH CIRCUITS



ARREVIATIONS

A OR AMP	AMPERE	H.I.D.	HIGH INTENSITY DISCHARGE	Р	# OF POLES IN CIRCUIT BREAKER
A.C.	ALTERNATING CURRENT	HP	HORSEPOWER	PH OR Ø	 PHASE
AF	FRAME AMPERE	H.P.S.	HIGH PRESSURE PUMP STATION	РМ	POWER MONITOR
A.F.F.	ABOVE FINISHED FLOOR	HSPS	HIGH SERVICE PUMP STATION	PMT	PAD MOUNTED TRANSFORMER
A.F.G.	ABOVE FINISHED GRADE	HVAC	HEAT-VENT-AIR CONDITIONING	PNL	PANEL
A.I.C.	AMPERE INTERRUPTING CURRENT	I.G.	ISOLATED GROUND	PSI	POUNDS PER SQUARE INCH
AS	AMMETER SELECTOR SWITCH	I.D.	INNER DIAMETER	PT	POTENTIAL TRANSFORMER
AT	TRIP AMPERE	IMC	INTERMEDIATE METAL CONDUIT	PVC	POLYVINYL CHLORIDE
ATL	ACROSS-THE-LINE	IND.	INDUSTRIAL	REPL	REPLACE
A.T.S.	AUTOMATIC TRANSFER SWITCH	JB	JUNCTION BOX	QTY.	QUANTITY
AUTO	AUTOMATIC	J.I.C.	JOINT INDUSTRIAL COUNCIL	RGS	RIGID GALVANIZED STEEL
AWG	AMERICAN WIRE GAUGE	KA	KILOAMPERE	RVSS	REDUCED VOLTAGE SOLID STATE
B.F.G.	BELOW FINISHED GRADE	KCMIL	1000 CIRCULAR MILS	SC	SURGE CAPACITOR
BLDG.	BUILDING	KV	KILOVOLT	SCC	SYSTEM CONTROL CENTER
C OR COND.	CONDUIT	KVA	KILOVOLT AMPERE	SER	SERVICE ENTRANCE RATED
СВ	CIRCUIT BREAKER	KW	KILOWATT	SM	SUB-METER
CKT	CIRCUIT	LA	LIGHTNING ARRESTOR	SP	SPARE
CP	CONTROL PANEL	LC	LIGHTING CONTACTOR	SPD	SURGE-PROTECTIVE DEVICE
CPT	CONTROL PANEL TRANSFORMER	LTG	LIGHTING	S.S.	STAINLESS STEEL
CR	CONTROL RELAY	MAX	MAXIMUM	SWBD	SWTCHBOARD
DESIG	DESIGNATION	MCB	MAIN CIRCUIT BREAKER	TBA	TO BE ABANDONED
DIA.	DIAMETER	mA	MILI-AMP	TBR	TO BE REMOVED
DIV.	DIVISION	MC	MANUFACTURER'S CABLE	TCC	TELECOMMUNICATIONS CLOSET
DPDT	DOUBLE POLE, DOUBLE THROW	MCC	MOTOR CONTROL CENTER	TDC	TELECOMMUNICATIONS DISTRIBUTION CLOS
DS	DISCONNECT SWITCH	MFR	MANUFACTURER	TYP.	TYPICAL
E.C.	ELECTRICAL CONTRACTOR	MIN.	MINIMUM	UE	UNDERGROUND ELECTRIC
ЕНН	ELECTRIC HANDHOLE	M.L.O.	MAIN LUG ONLY	UH	UNIT HEATER
ЕМН	ELECTRIC MANHOLE	M.O.D.	MOTOR OPERATED DAMPER	UL	UNDERWRITERS LABORATORY
<u>-</u> P	EXPLOSION PROOF	MS	MOTOR STARTER	U.O.N.	UNLESS OTHERWISE NOTED
EUH	ELECTRIC UNIT HEATER	MTD.	MOUNTED	UT	UNDERGROUND TELEPHONE
E.W.	EACH WAY	N/A	NOT APPLICABLE	UV	ULTRAVIOLET
EX	EXISTING TO REMAIN	N.C.	NORMALLY CLOSED	V	VOLT
EXH	EXHAUST FAN	NEC	NATIONAL ELECTRICAL CODE	VAC	VOLTS ALTERNATING CIRCUIT
FU	FUSE	NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION	VFD	VARIABLE FREQUENCY DRIVE
FRE	FIBERGLASS REINFORCED EPOXY	NID	NETWORK INTERFACE DEVICE (4 POSITION)	VS	VOLTMETER SELECTOR SWITCH
G.C.	GENERAL CONTRACTOR	N.O.	NORMALLY OPEN	W	WIRE
GEN	GENERATOR	NO.	NUMBER	W/	WITH
GFCI	GROUND FAULT CIRCUIT INTERRUPTER	NPT	NOMINAL PIPE THREADS	wP	WEATHERPROOF
GND. OR GRD.	GROUND	OE	OVERHEAD ELECTRIC	XFMR	TRANSFORMER

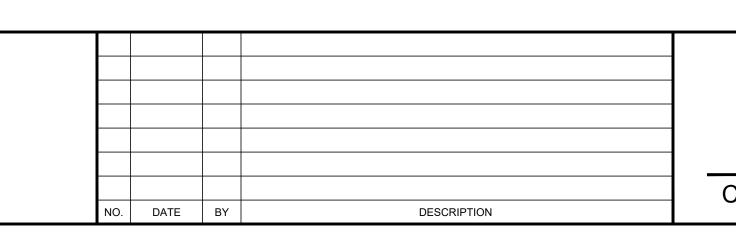
GENERAL NOTES:

- A. DRAWINGS ARE DIAGRAMMATIC IN NATURE, CONTRACTOR SHALL VERIFY DIMENSIONS PRIOR TO INSTALLATION. CONTRACTOR SHALL COORDINATE ALL WORK WITH OTHER DIVISION TRADES TO PROVIDE A COMPLETE AND OPERABLE SYSTEM. LOCATE FIXTURES, DEVICES, ETC. IN ORDER TO AVOID INTERFERENCES.
- B. ALL WORK SHALL BE PERFORMED AS REQUIRED BY APPLICABLE SECTION OF THE NATIONAL ELECTRICAL CODE, LATEST EDITION, AND
- ALL GOVERNING LOCAL CODES, LAWS, AND/OR REGULATIONS. C. SYSTEM AND EQUIPMENT GROUNDING CONTINUITY SHALL BE ASSURED AS REQUIRED BY APPLICABLE SECTIONS OF THE NATIONAL
- ELECTRICAL CODE. D. ALL WIRING SHALL BE TYPE "THHN-THWN" U.O.N.; MINIMUM WIRING SHALL BE #12 (POWER WIRE). ALL WIRE SHALL BE COPPER. MINIMUM CONDUIT SIZE FOR METALLIC CONDUIT TO BE 3/4" AND 1" FOR PVC.
- E. ALL CIRCUIT PROTECTIVE DEVICES SHALL HAVE THE REQUIRED RATING INTERRUPTING CAPACITY EQUAL TO OR GREATER THAN THE AVAILABLE SHORT-CIRCUIT CURRENT AT ITS SUPPLY TERMINAL; MINIMUM INTERRUPTING CAPACITY. SHALL BE 10,000 AMPS, SYMMETRICAL A.I.C. FOR 120/208V SYSTEMS AND 14,000 AMPS, SYMMETRICAL A.I.C. FOR 277/480V SYSTEMS. REFER TO PANEL
- F. ALL OUTDOOR EXPOSED CONDUIT TO BE RIGID GALVANIZED STEEL. TRANSITION FROM UNDERGROUND TO EXPOSED SHALL BE RIGID
- G. ALL UNDERGROUND CONDUITS TO BE SCHEDULE 40 PVC UNLESS OTHERWISE INDICATED. ALL CONDUITS SHALL INCLUDE A NYLON

100% SUBMITTAL FOR REVIEW, NOT FOR CONSTRUCTION







UNION STREET IMPROVEMENTS CITY OF CONCORD CABARRUS COUNTY, NORTH CAROLINA

N.HUFFMAN

P.FISHER

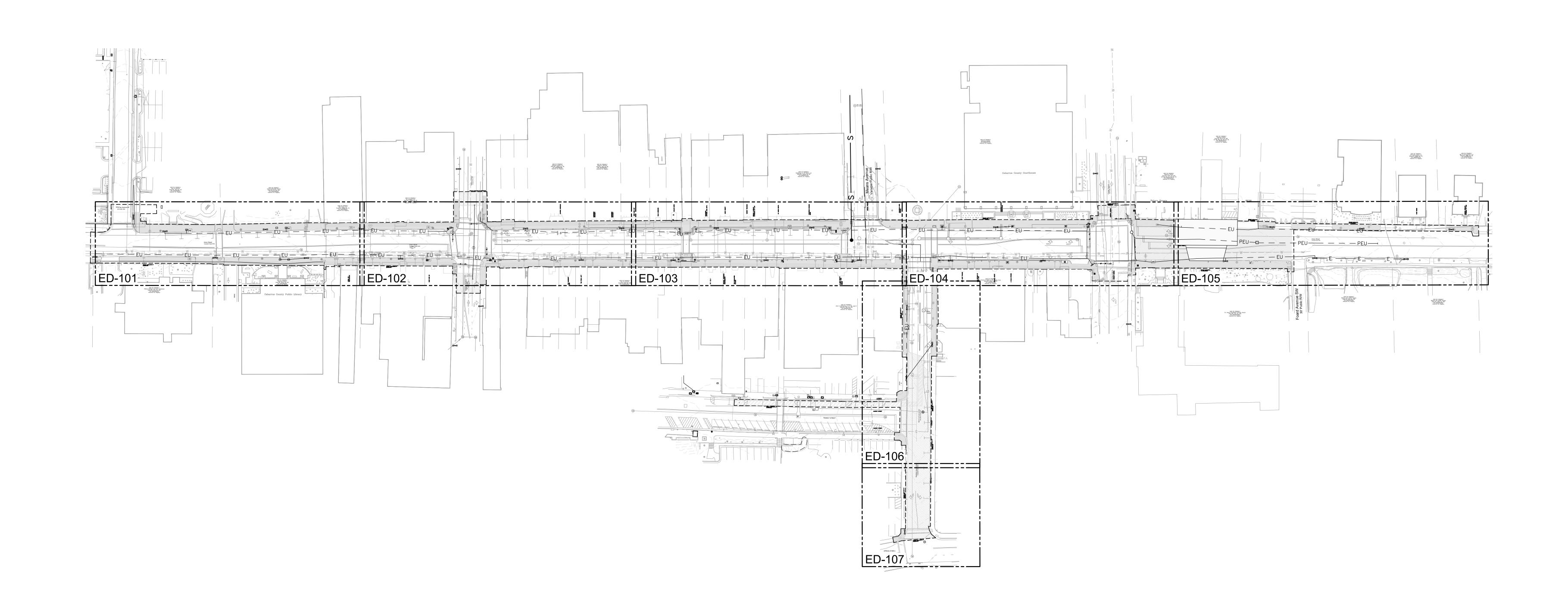
NOT TO	SCALE	ELECTRICAL LEGEND, NOTES, SCHEDULES, AND ABBREVIATIONS
OFFICE MANAGER	DESIGNER	,
D.G. CHAPMAN W.FLEMING		

MAY 2021

19.01726

E-001

SHEET



DESCRIPTION

NO. DATE BY

SHEET

ED-100

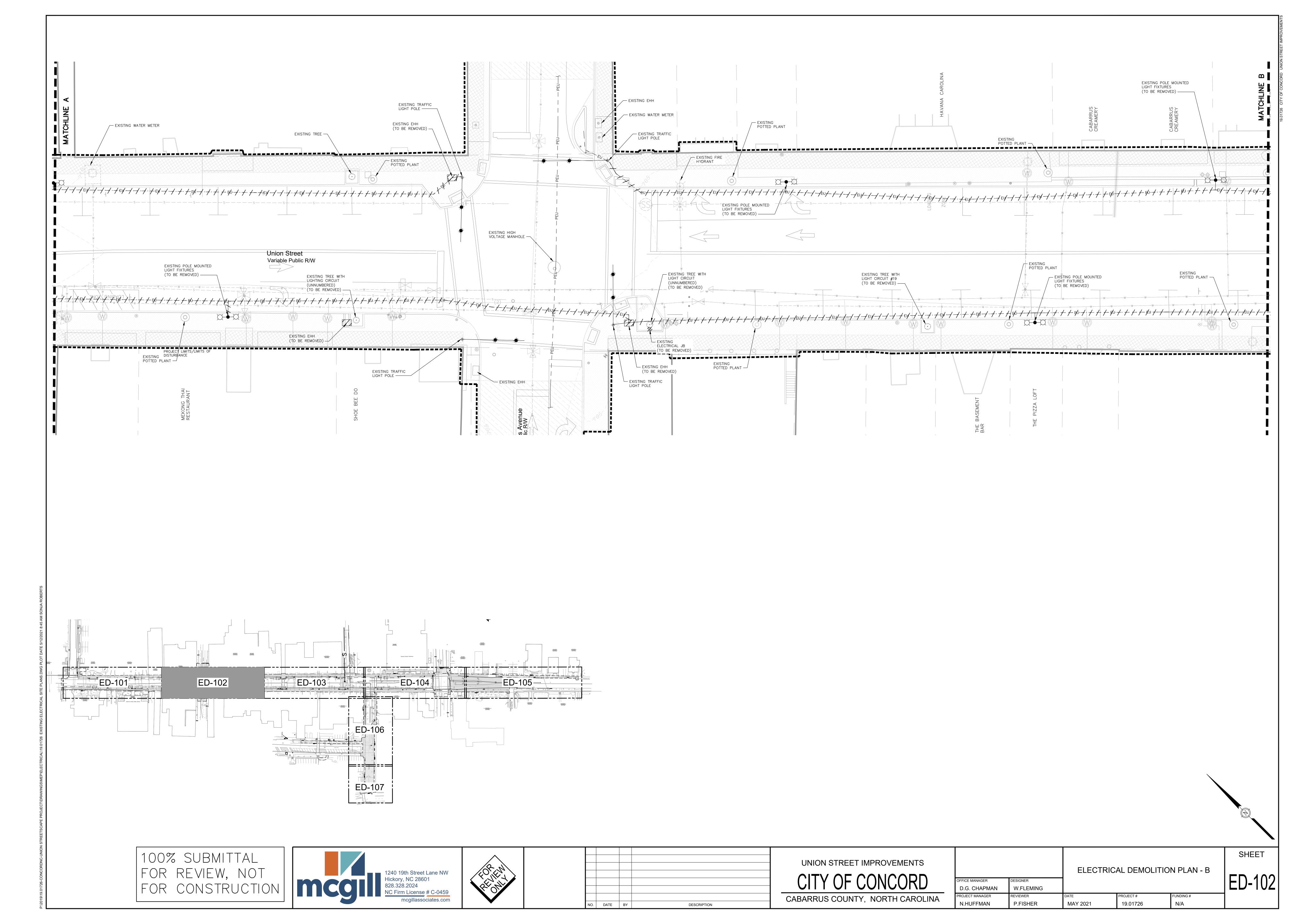


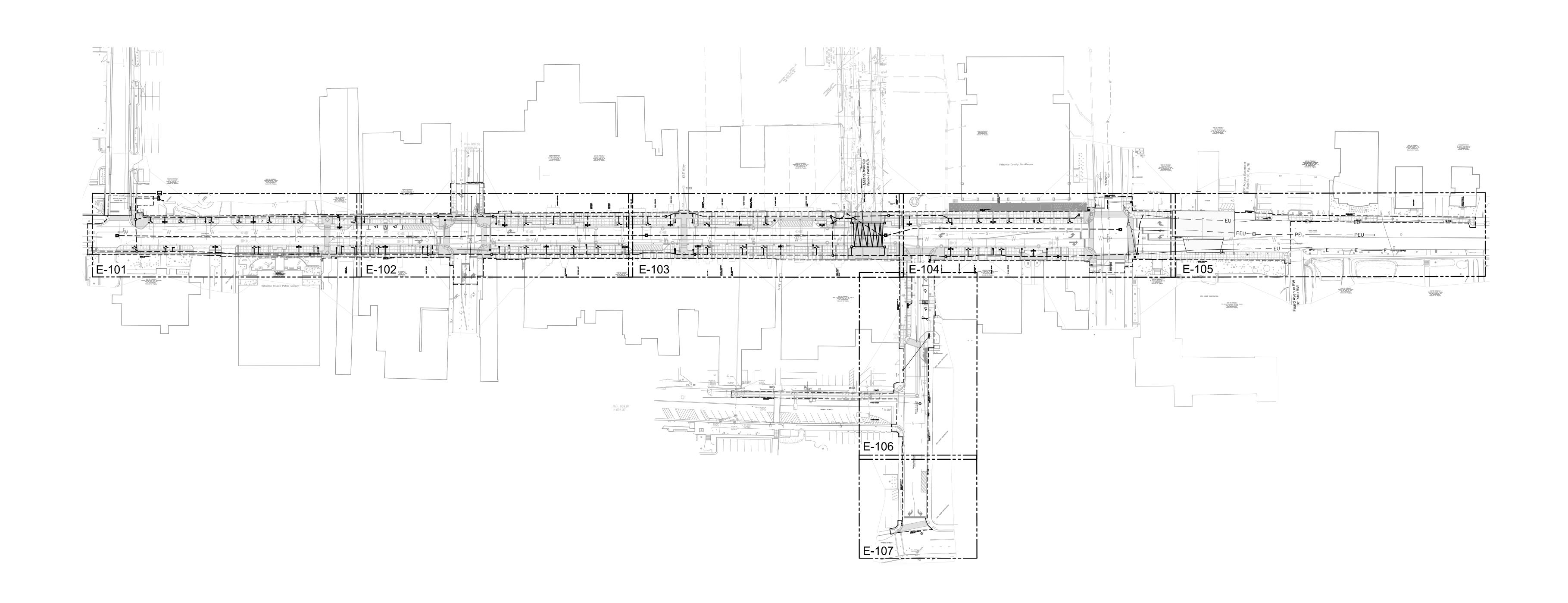


UNION STREET IMPROVEMENTS
CITY OF CONCORD
CABARRUS COUNTY, NORTH CAROL

D.G. CHAPMAN

N.HUFFMAN



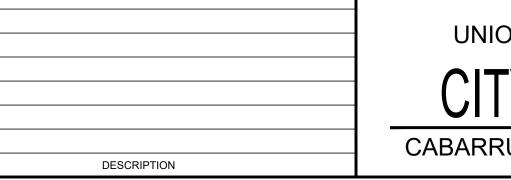


100% SUBMITTAL
FOR REVIEW, NOT
FOR CONSTRUCTION





NO. DATE BY





10 GRAPHIC SCALE			0 ALUE = 10	20 FEET		ELEC
OFFICE MANAGER D.G. CHAPM	1AN	DESIGN W.FI	ER L EMING			
PROJECT MANAGE	R	REVIEW	ER		DATE	

P.FISHER

N.HUFFMAN

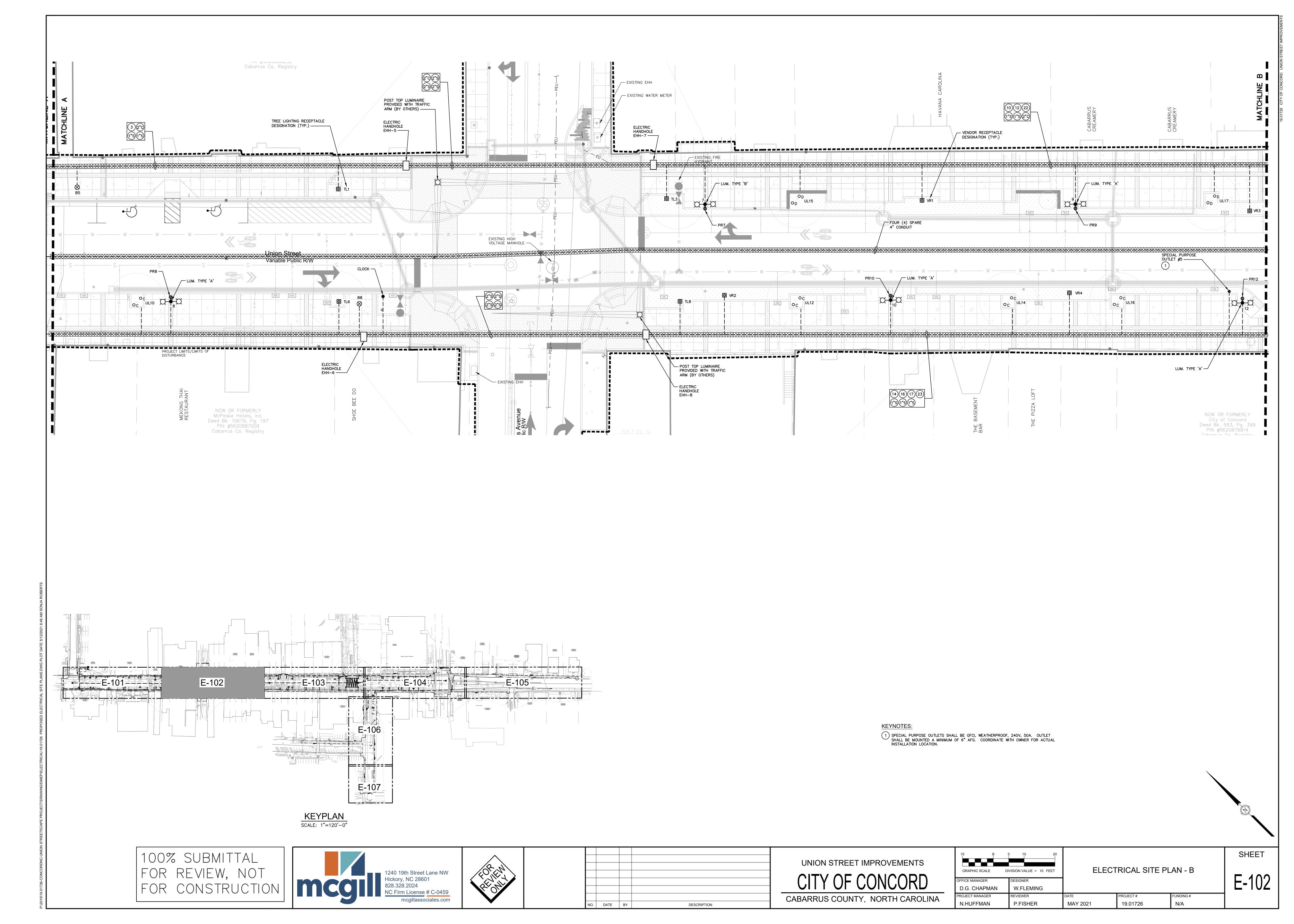
ECTRICAL OVERALL SITE PLAN

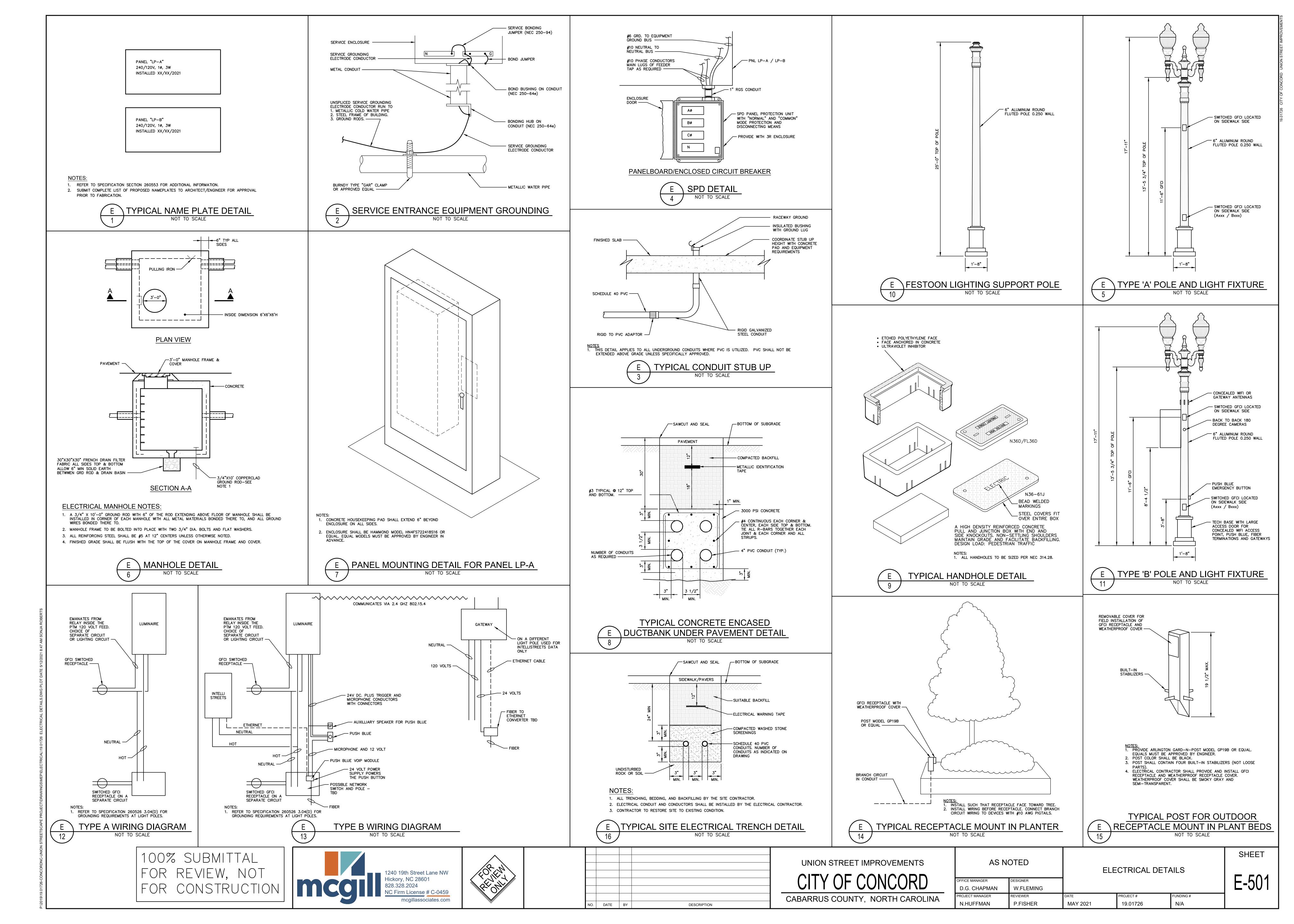
19.01726

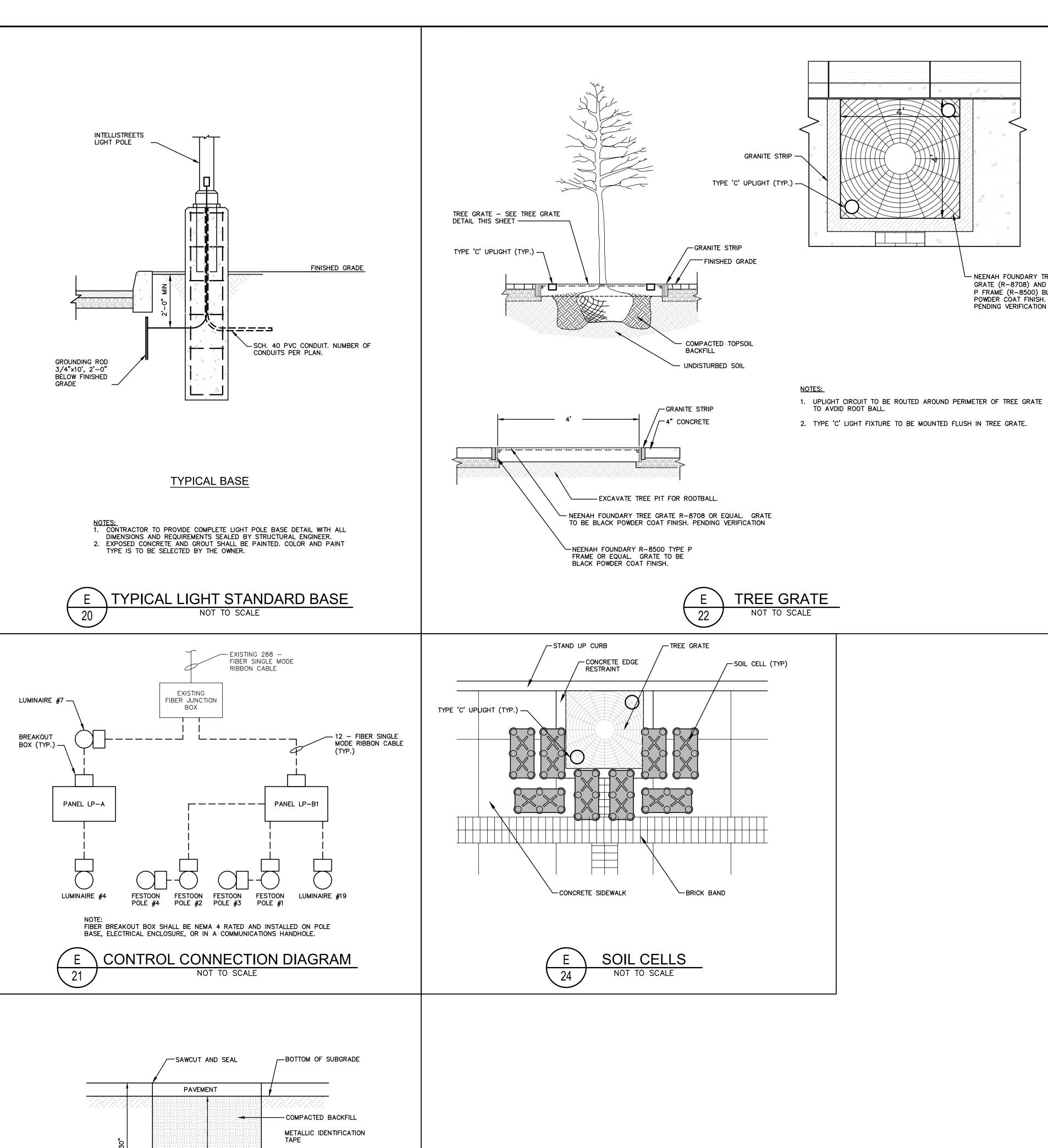
MAY 2021

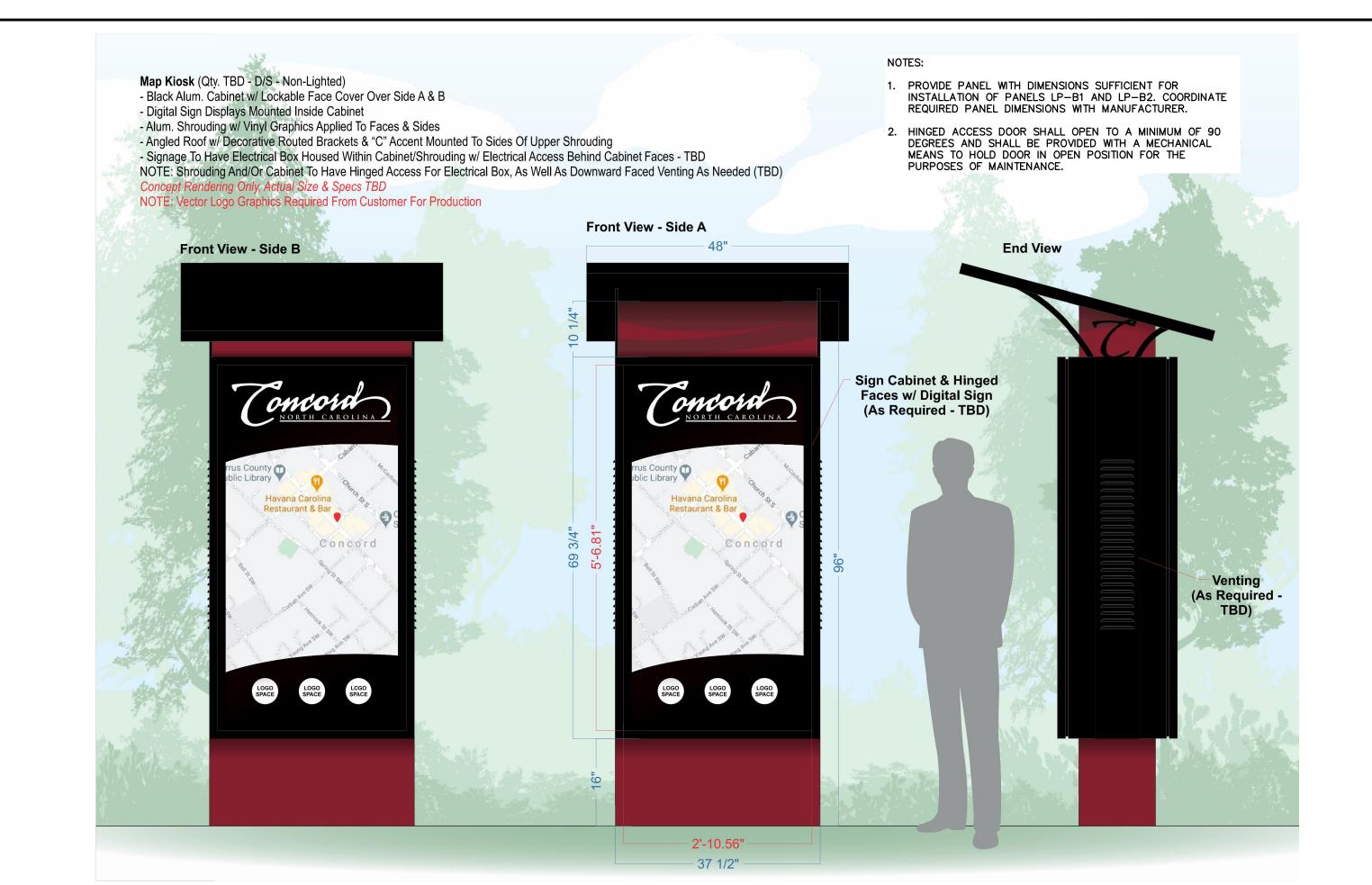
E-100

SHEET

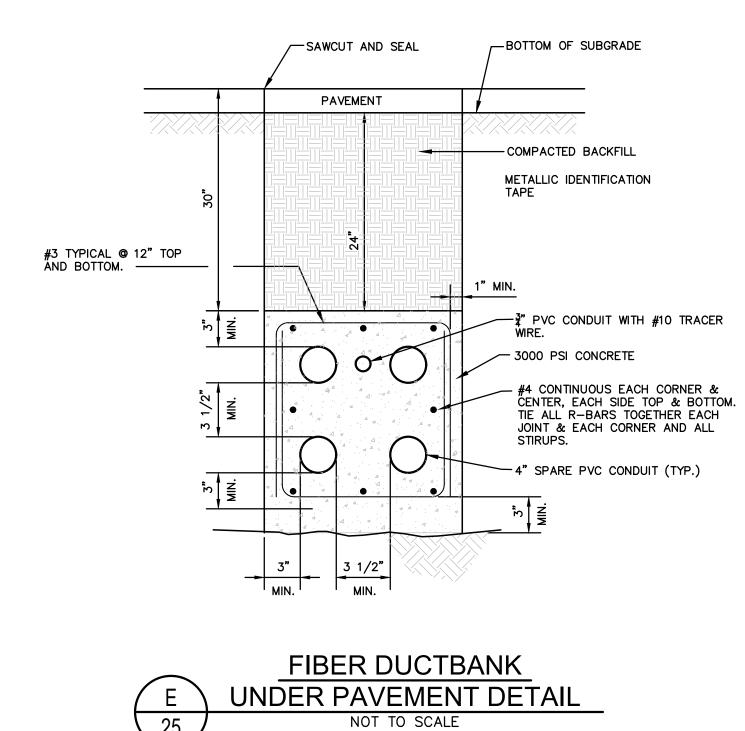








KIOSK PANEL NOT TO SCALE



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				_
				CAB
NO.	DATE	BY	DESCRIPTION	

NEENAH FOUNDARY TREE
GRATE (R-8708) AND TYPE
P FRAME (R-8500) BLACK
POWDER COAT FINISH.

PENDING VERIFICATION

UNION STREET IMPROVEMENTS
CITY OF CONCORD
CABARRUS COUNTY, NORTH CAROLINA

AS NOTED		ELE	SHEET		
OFFICE MANAGER D.G. CHAPMAN	DESIGNER W.FLEMING				E-502
PROJECT MANAGER N.HUFFMAN	REVIEWER P.FISHER	MAY 2021	PROJECT# 19.01726	FUNDING # N/A	

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CITY OF CONCORD 2
ELECTRIC SERVICE

METERBASE

PANEL LP-B1

PANEL LP-B2

PROPOSED ONE-LINE-B

NOT TO SCALE

NOTES

(BY CONTRACTOR)

NEMA 3R SERVICE RATED

NEMA 3R

- EXISTING HANDHOLE

- MAIN BONDING JUMPER

NO. 1/0 AWG

SPD

240/120, 3W, 1ø

MOUNTED ON UTILITY TRANSFORMER

3#500, EXISTING CONDUIT

3#500, 3 1/2" C —

GROUND RODS MINIMUM 10' APART

#1/0 GROUNDING ELECTRODE CONDUCTOR

IN 1 1/4" C ———

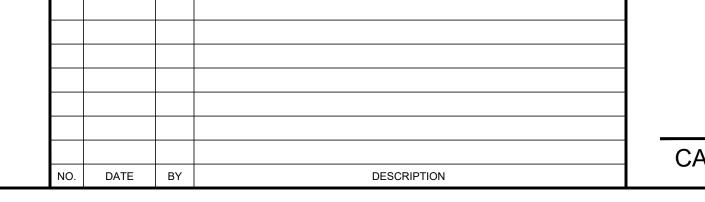
3/4"x10' COPPER CLAD

STEEL GROUND ROD

LOAD

ENCLOSURE ---







ELECTRICAL SCHEDULES AND DIAGRAMS			
7			
DATE	PROJECT#	FUNDING #	
MAY 2021 19.01726 N/A			
	DATE	AND DIAGRAMS DATE PROJECT #	

SHEET E-601

1	20	50	1	2#8	#12	1"	600V	LP-A-1	PR1, B1, PR3, B3, PR5, B5		
2	20	35	1	2#10	#12	1"	600V	LP-A-3	UL 1,3,5,7		
3	20	50	1	2#8	#12	1"	600V	LP-A-5	UL 9,11,13, TL1		
4	20	50	1	2#8	#12	1"	600V	LP-A-7	PR2, B2, PR4, B4, PR6		
5	20	65	1	2#6	#12	1"	600V	LP-A-9	B6, PR8, B8		
6	20	50	1	2#8	#12	1"	600V	LP-A-11	UL 2,4,6, TL2,4		
7	20	65	1	2#6	#12	1"	600V	LP-A-13	UL8,10, TL6		
8	20	50	1	2#8	#12	1"	600V	LP-A-2,4	Lights 1,3,5		
9	20	65	1	2#6	#12	1"	600V	LP-A-6,8	Lights 2,4,6,8		
10	20	65	1	2#6	#12	1"	600V	LP-B1-1	PR7, VR1, PR9, VR3, PR11		
11	20	50	1	2#8	#12	1"	600V	LP-B1-3	VR5, PR13, VR7, PR15		
12	20	65	1	2#6	#12	1"	600V	LP-B1-5	TL3, UL15,17,19, TL5		
13	20	35	1	2#10	#12	1"	600V	LP-B1-7	TL7, UL21,23		
14	20	65	1	2#6	#12	1"	600V	LP-B1-9	VR2, PR10, VR4, PR12		
15	20	50	1	2#8	#12	1"	600V	LP-B1-11	PR14, VR6, PR16, VR8		
16	20	65	1	2#6	#12	1"	600V	LP-B1-13	TL8, UL12,14,16, TL10		
17	20	35	1	2#10	#12	1"	600V	LP-B1-15	TL12, UL18,20,22,24		
18	20	50	1	2#8	#12	1"	600V	LP-B1-17	PR17, B7, PR19, B9		
19	20	50	1	2#8	#12	1"	600V	LP-B1-19	UL 25,27,29,31,33		
20	20	65	1	2#6	#12	1"	600V	LP-B1-21	PR22, PR21, PR18, B10, PR20,		
21	20	65	1	2#6	#12	1"	600V	LP-B1-23	UL 26,28, TL 14,16		
22	30	65	1	2#6	#12	1"	600V	LP-B1-2,4	Lights 7,9,11,13,15		
23	20	65	1	2#6	#12	1"	600V	LP-B1-6,8	Lights 10,12,14,16		
24	20	50	1	2#8	#12	1"	600V	LP-B1-10,12	Lights 17,19		
25	20	50	1	2#8	#12	1"	600V	LP-B1-14,16	Lights 18,20,21,22		
26											
27	20	25	1	2#12	#12	1"	600V	LP-A-19	Clock		
28	50	65	1	3#6	#10	1"	600V	LP-A-10,12	Special Outlet 1		
29	50	65	1	3#6	#10	1"	600V	LP-B2-1,3	Special Outlet 2		
30	50	65	1	3#6	#10	1"	600V	LP-B2-5,7	Special Outlet 3		
31	50	65	1	3#6	#10	1"	600V	LP-B2-9,11	Special Outlet 4		
32	50	65	1	3#6	#10	1"	600V	LP-B2-13,15	Special Outlet 5		
33	50	65	1	3#6	#10	1"	600V	LP-B2-17,19	Special Outlet 6		
	20	25						LP-B1-18	Festoon Pole #1		
34	20	25	1	6#12	#12	1"	600V	LP-B1-20	Festoon Pole #1	THREE CIRCUITS IN	
	20	25						LP-B1-22	Festoon Pole #1	SINGLE CONDUIT	
	20	25						LP-B1-24	Festoon Pole #2		
35	20	25	1	6#12	#12	1"	600V	LP-B1-26	Festoon Pole #2	THREE CIRCUITS IN	
	20	25						LP-B1-28	Festoon Pole #2	SINGLE CONDUIT	
	20	25						LP-B1-30	Festoon Pole #3		
36	20	25		1 6#12	#12	1"	600V	LP-B1-32	Festoon Pole #3	THREE CIRCUITS IN	
	20	25						LP-B1-34	Festoon Pole #3	SINGLE CONDUIT	
	20	25						LP-B1-36	Festoon Pole #4		
37	20	25	1	6#12	#12	1"	600V	LP-B1-38	Festoon Pole #4	THREE CIRCUITS IN	
	20	25						LP-B1-40	Festoon Pole #4	SINGLE CONDUIT	
						I			. 20000 0.0		

FEEDER SCHEDULE

CLASS

CIRCUIT

GROUND CONDUIT VOLTAGE

CITY OF CONCORD 1

SERVICE RATED

NO. 1/0 AWG

SPD

- MAIN BONDING JUMPER

240/120, 3W, 1ø

METERBASE

PANEL LP-A

PROPOSED ONE-LINE-A

NOT TO SCALE

(BY CONTRACTOR)

SERVICE CONDUCTORS

3#500, 3 1/2" C —

GROUND RODS

MINIMUM 10' APART

BY UTILITY (CONDUIT BY CONTRACTOR) ——

#1/0 GROUNDING ELECTRODE CONDUCTOR

IN 1 1/4" C ———

STEEL GROUND ROD

3/4"x10' COPPER CLAD

OCPD CO

CONDUCTOR RATING NO. OF PARALLEL SETS

PHASE/ NEUTRAL

TYPE	MANUFACTURER			CAT	ALOG NU	JMBER		NO.	LAMPS TYPE WATTS		INPUT WATTS	MT. HEIGHT	REMARKS VOLTS		
Α	Illuminating Concepts			910 Intellist	reets 3A	3A-1R-35T MDL-03, A-1R-35T MDL-03 SLA /GFI, NA		19	LED	40	92	14'	HISTORIC LED MULTI-MEDIA POST TOP LUMINAIRE ASSEMBLY WITH EMBEDDED TECHNOLOGY, HISTORIC LED SLAVE POST TOP LUMINAIRES MATCHING THAT ARE NON- INTELLISTREETS, SWITCHED RECEPTACLE - FOR POLE MOUNTING OF OUTLET - 2 PER POLE, HISTORIC POLE - 14 FOOT TALL 6" DIAMETER STRAIGHT FLUTED, TWIN ARM HISTORIC SIDE MOUNT (OWNER FURNISHED)		
В	Illuminating Concepts	A-1130A - 9°	10 Intel	llistreets 3A- IS-LED-BAI	-1R-351	-03 driver-MASTER, 「MDL-03 SLAVE, IS-P [*] ot, IS-GW, DUAL PORT 4,, NA	PTM — C360, MANAGED,	3	LED	40	657		HISTORIC LED MULTI-MEDIA POST TOP LUMINAIRE ASSEMBLY WITH EMBEDDED TECHNOLOGY, HISTORIC LED SLAVE POST TOP LUMINAIRES MATCHING THAT ARE NON- INTELLISTREETS, INTELLISTREETS MULTI-MEDIA HOUSING WITH TWO 180 DEGREE CAMERAS AND MOUNTING ARM, INSTALL CAMERAS IN I-SLOT, NOTIFICATION BUTTON WITH TWO WAY HANDS FREE TALK AND INTELLISTREETS CONNECTIONS FOR ALERTS, 24" X 48" DOUBLE SIDED LED BANNER WITH 4MM PITCH, AUTO-DIM, CLOUD BASED SOFTWARE, i-SLOT INSERTS INTO POLE FOR CAMERAS, GATEWAYS AND PUSH BLUE,GATEWAY FOR MULTI-MEDIA ECM - 4G - EXCLUDES MODEM, MODEM FOR EITHER MULTI-MEDIA - OR - ON OFF DIM CELLULAR - 4G, SWITCHED RECEPTACLE - FOR POLE MOUNTING OF OUTLET - 2 PER POLE, HISTORIC POLE - 14 FOOT TALL 6" DIAMETER STRAIGHT FLUTED, TWIN ARM HISTORIC SIDE MOUNT (OWNER FURNISHED)		
С	Targetti We—ef (or Equal)		L2-40- 21			LED		14 18	FLUSH IN TREE GRATE	UP LIGHTING 120					
D	Hadco (or Equal)		I-19WATT			LED		19	GROUND LEVEL	UP LIGHTING 120					
	BUS AMP PHASE NEMA TYPE	1 3R	. A.I.C WIRE _	3		BREAKER 400A VOLTAGE 240/120	-						LOCATION <u>ELECTRICAL KIOSK</u> NEMA TYPE <u>3R</u> NOTE: FEED-THRU LUGS.	GE 2	
R I	LOAD (KW) WIRE A B NO SIZE		COND SIZE	GND. SIZE SIZE	WIRE NO	LOAD (KW) BREAKER A B POLES AMP	DESCR	RIPTION	СКТ			СКТ	DESCRIPTION BREAKER LOAD (KW) WIRE GND. COND GND. WIRE LOAD (I AMP POLES A B NO SIZE SIZE SIZE SIZE SIZE SIZE NO A	B POLI	BREAKEI LES AI
	0.7 2 10	12 1	1	12 10	3	0.8 2 20	1			2		1 F	PR7, VR1, PR9, VR3, PR11 20 1 0.48 2 8 12 1 1 10 6 3 1.8	2	
	- 					 	LIGHT	S 1,3,	5	\vdash		 - - 		-	-

VR5, PR13, VR7, PR15

TL3, UL15,17,19, TL5

TL7, UL21,23

VR2, PR10, VR4, PR12

PR14, VR6, PR16, VR8

TL8, UL12,14,16, TL10

TL12, UL18,20,22,24

PR17, B7, PR19, B9

UL 25,27,29,31,33

UL 26,28, TL 14,16

SPARE

SPARE

SPARE SPARE

SPARE

TVSS (150kA)

SUB-TOTAL LOAD KW

20 1 0.54 2 10 12

20 1 0.54 2 8 12 1

20 1 1.32 2 10 12 1

20 1 1.56 2 8 12 1

30 2 - 3 10 10 3/4

4.56 6.48

20 1 1.32 2 10 12

21 PR22, PR21, PR18, B10, PR20, 20 1 0.66 2 8 12 1

20 1 1.08 2 8

LUMINAIRE SCHEDULE

	PANEL MOUNTING		•	PHASE	400A 1			22,000		MAIN B	REAK VOLT		$\overline{}$	00A 0/120	<u>.</u>				
	LOCATION	I ELECT	RICAL (CABINI	ET	. NEM	IA TYPE	3R	-										
СКТ	DESCRIPTION	BREA		 		WIRE		GND.	COND	COND	GND.	WIRE		LOAD (KW)				DESCRIPTION	СКТ
1	PR1, B1, PR3, B3, PR5, B5	20	POLES 1	0.7	В	NO 2	SIZE 10	SIZE 12	SIZE 1	SIZE 1	SIZE 12	SIZE 10	NO 3	0.8	В	POLES 2	20		2
3	UL 1,3,5,7	20	1 1	0.7	0.5	2	10	12	1	<u>'</u>	12	10	3	0.0	0.8		20	LIGHTS 1,3,5	4
5	UL 9,11,13, TL1	20	1	0.5	0.5	2	10	12	1	1	12	8	3	1.4	0.0	2	20		6
7	PR2, B2, PR4, B4, PR6	20	1	0.5	0.5	2	10	12	1		12			17	1.4			LIGHTS 2,4,6,8	8
9	B6, PR8, B8	20	1	0.4	0.0	2	10	12	1	1	10	8	3	1.4	····	2	50		10
11	UL 2,4,6, TL 2,4	20	1	0.1	0.5	2	10	12	1		10				1.4	 		SPECIAL PURPOSE OUTLET 1	12
13	UL 8,10 TL6	20	1	0.5	0.0	2	12	12	3/4	1				0.4		2	50		14
15	GAZEBO LIGHTING *	20	1		_	2	12	12	3/4						0.4	 		SPARE	16
17	MONUMENT LIGHTING *	20	1	_		2	12	12	3/4					_		2	20		18
19	CLOCK	20	1		0.2	2	12	12	3/4						_			SPARE	20
21	SPARE	20	1	-						1				_		2	20		22
23	SPARE	20	1		-										_			SPARE	24
25	SPARE	20	1	-										-		2	20		26
27	SPARE	20	1		-										-			SPARE	28
29	SPARE	20	1	-										-		2	20		30
31	SPARE	20	1		-										-			SPARE	32
33	SPARE	20	1	-										-		2	20		34
35	SPARE	20	1		-										-			SPARE	36
37	SPARE	20	1	-										-		1	20	SPARE	38
39	SPARE	20	1		-					3/4	10	10	3		-	2	30		40
41	SPARE	20	1	-										-				TVSS (150kA)	42
		1	1	T			<u> </u>		<u> </u>		laua = a		5 1011						
SUB-TOTAL LOAD KW 2.1 1.8										SUB-TOTAL LO		4.1 6.2							

*	INDICATES EXISTIN	CIRCUIT	RECONNECTED	IN	NEW	PANEL.	EXTEND	CIRCUIT	AS NECESSARY.	•

	PANE MOUNTIN LOCATIO	•	US AMP PHASE //A TYPE	•		MIN. A.I.C. WIRE	MAIN BREAKER MOLTAGE 240)/120							
СКТ	DESCRIPTION	BREAKER		LOAD	(KW)	W	/IRE	GND.	COND	COND	GND.	WIRE		LOAD	(KW)	BRE	AKER	DESCRIPTION	
+		AMP	POLES		В	NO	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	NO	Α	В	POLES	AMP		\dashv
1	SPECIAL PURPOSE OUTLET 2	50	2	1.44		3	8	10	1					-		1	20	SPARE	
3					1.44		10		1						-	1	20	SPARE	_
5	SPECIAL PURPOSE	50	2	1.44		3	10	10	1					-		1	20	SPARE	
7	OUTLET 3				1.44		8		1						-	1	20	SPARE	
9	CDECIAL DUBDOCE	50	2	1.44		3	8	10	1					-		1	20	SPARE	
11	SPECIAL PURPOSE OUTLET 4				1.44		10		1						-	1	20	SPARE	
13		50	2	1.44		3	10	10	1					-		1	20	SPARE	
15	SPECIAL PURPOSE OUTLET 5				1.44		10		1						-	1	20	SPARE	
17		50	2	1.44		3	10	10	1					-		1	20	SPARE	
19	SPECIAL PURPOSE OUTLET 6				1.44		10		1						-	1	20	SPARE	
21	SPACE - PFFB																	SPACE - PFFB	
23	SPACE - PFFB																	SPACE - PFFB	
25	SPACE - PFFB																	SPACE - PFFB	
27	SPACE - PFFB																	SPACE - PFFB	
29	SPACE - PFFB																	SPACE - PFFB	
31	SPACE - PFFB																	SPACE - PFFB	
33	SPACE - PFFB																	SPACE - PFFB	
35	SPACE - PFFB																	SPACE - PFFB	
37	SPACE - PFFB																	SPACE - PFFB	
39	SPACE - PFFB	+	1															SPACE - PFFB	\dashv
41	SPACE - PFFB	+																SPACE - PFFB	
	SPACE - PFFB		<u> </u>				1	<u> </u>		1	<u> </u>	<u> </u>				<u> </u>		SPACE - PFFB	

KEYNOTES:
1) COORDINATE ELECTRICAL SERVICE WITH ELECTRIC UTILITY. SERVICE CONDUCTOR BY ELECTRIC UTILITY. CONTRACTOR TO PROVIDE AND INSTALL 3 1/2" CONDUCTORS.
WITH PULL CORDS FOR SERVICE CONDUCTORS.

3 1.44 2 20

1.44

12 12 2 0.36 1 20

12 | 12 | 2 | 0.36 | 1 | 20 |

12 12 2 0.36 1 20

12 | 12 | 2 | 0.36 | 1 | 20 |

12 | 12 | 2 | 0.36 | 1 | 20 |

12 | 12 | 2 | 0.36 | 1 | 20 |

12 | 12 | 2 | 0.36 | 1 | 20 |

12 | 12 | 2 | 0.36 | 1 | 20 |

 SUB-TOTAL LOAD KW
 7.08
 7.08

 TOTAL LOAD KW
 11.6
 13.6

12 2 0.36 1 20

DESCRIPTION

Lights 7,9,11,13,15

Lights 10,12,14,16

Lights 17,19

Lights 18,20,21,22

FESTOON POLE 1

FESTOON POLE 1

FESTOON POLE 1

FESTOON POLE 2

FESTOON POLE 2

FESTOON POLE 2

FESTOON POLE 3

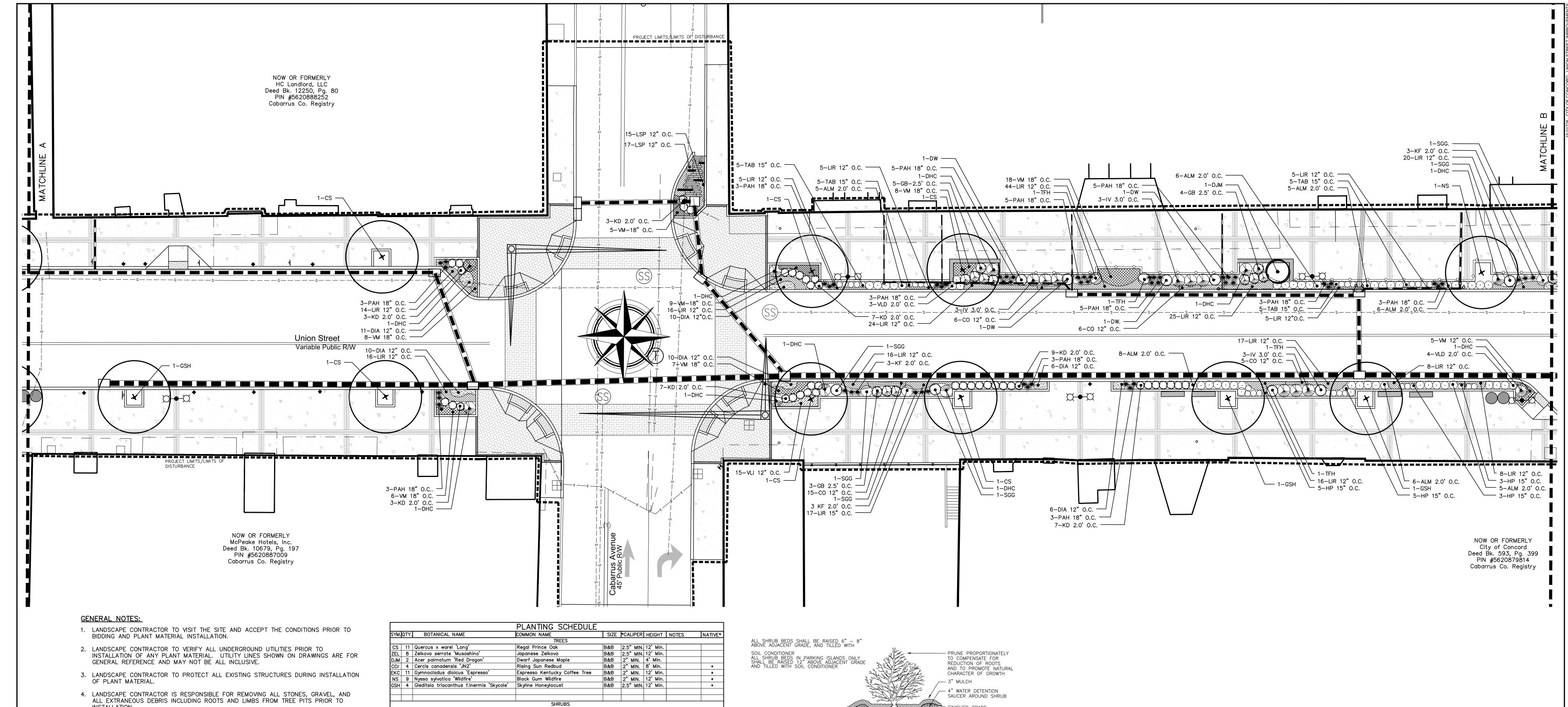
FESTOON POLE 3

FESTOON POLE 3 FESTOON POLE 4

FESTOON POLE 4

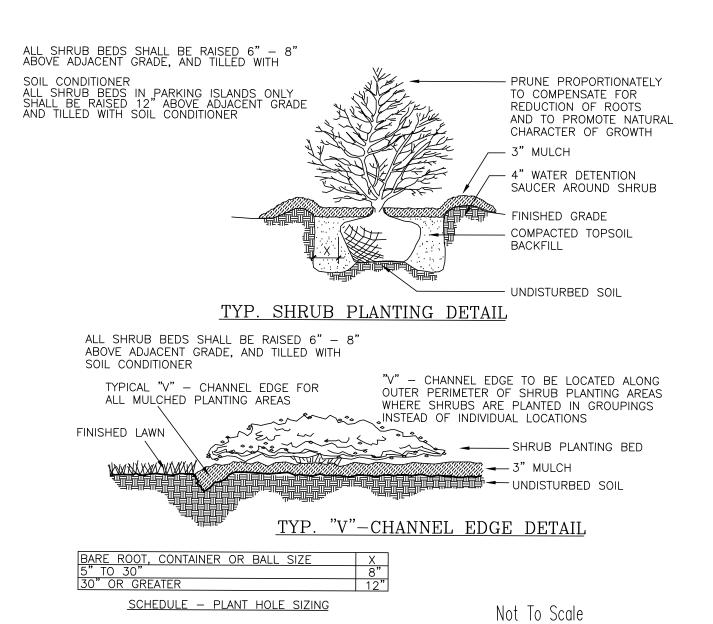
FESTOON POLE 4

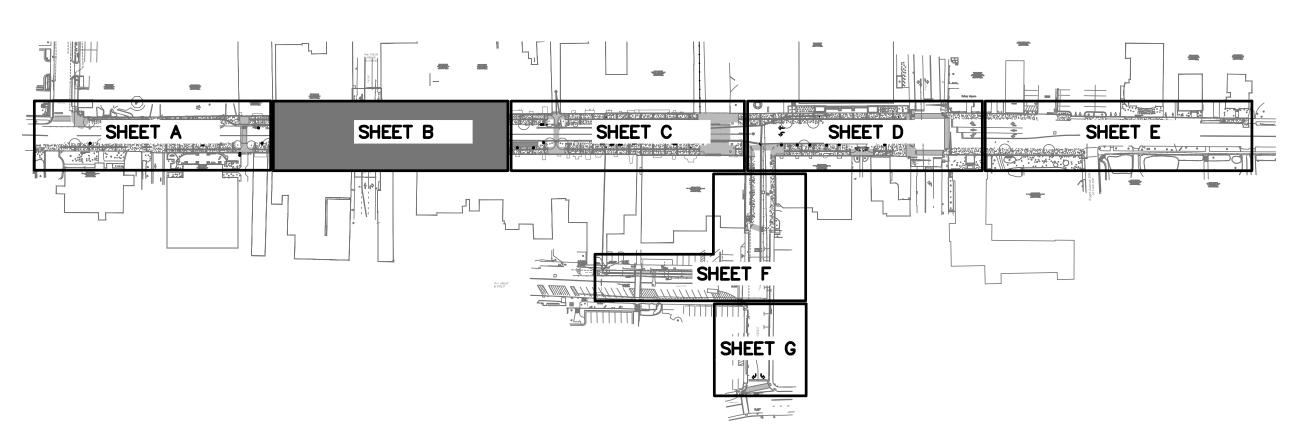
⁽²⁾ COORDINATE ELECTRICAL SERVICE WITH ELECTRIC UTILITY.



- INSTALLATION.
- 5. ALL PLANT BEDS TO BE COVERED WITH 3" CLEAN TRIPLE SHRED HARDWOOD MULCH IMMEDIATELY AFTER PLANTING.
- 6. TOP 6" OF ALL BEDS TO BE TILLED AND AMENDED WITH ORGANIC MATTER. TOP 6" OF TREE PITS TO BE AMENDED WITH ORGANIC MATTER AND WORKED INTO BACKFILL.
- 7. LANDSCAPE CONTRACTOR SHALL FURNISH ALL QUANTITIES NECESSARY TO COMPLETE PLANTINGS AS SHOWN/LOCATED ON DRAWINGS. QUANTITIES SHOWN ON PLANT LIST ARE FOR CONVENIENCE OF CONTRACTORS AND ARE BELIEVED TO BE SUBSTANTIALLY CORRECT, BUT ACCURACY OF QUANTITIES IN LIST IS NOT GUARANTEED.
- 8. LANDSCAPE CONTRACTOR TO GUARANTEE ALL PLANT MATERIAL AND WORK FOR A PERIOD OF ONE YEAR FROM ACCEPTANCE OF WORK BY OWNER.
- 9. ANY PLANT MATERIAL SUBSTITUTIONS OR ADJUSTMENTS ARE TO BE REQUESTED IN WRITING TO THE OWNER. NO SUBSTITUTIONS WILL BE PERMITTED WITHOUT WRITTEN NOTICE BY THE OWNER.
- 10. ALL PLANT MATERIAL TO CONFORM TO THE CURRENT EDITION OF "AMERICAN STANDARD FOR NURSERY STOCK".
- 11. ALL TREES TO BE LIMBED UP TO 6' MINIMUM CLEAR HEIGHT.
- 12. ALL TREES SHALL BE SPECIMEN QUALITY AND WELL SHAPED.
- 13. ALL TREES OF THE SAME VARIETY SHALL MATCH IN SHAPE, FORM AND SIZE WHERE THEY ARE TO BE INSTALLED IN GROUPS, ROWS, OR AS STREET TREES.

SYM.	QTY.	BOTANICAL NAME	PLANTING SCHEDULE	SIZE	*CALIPER	HEIGHT	NOTES	NATIVE*
•			TREES	•	•		•	•
cs	11	Quercus x warei 'Long'	Regal Prince Oak	B&B	2.5" MIN.	12' Min.		
ZEL	8	Zelkova serrate 'Musashino'	Japanese Zelkova	B&B	2.5" MIN.	12' Min.		
ΟЈМ	2	Acer palmatum 'Red Dragon'	Dwarf Japanese Maple	B&B		4' Min.		
CCr	4	Cercis canadensis 'JN2'	Rising Sun Redbud	B&B		8' Min.		*
EKC	11	Gymnocladus dioicus 'Espresso'	Espresso Kentucky Coffee Tree	В&В		12' Min.		*
NS	9	Nyssa sylvatica 'Wildfire'	Black Gum Wildfire	В&В		12' Min.		*
GSH	4	Gleditsia triacanthus f.inermis 'Skycole'	Skyline Honeylocust	В&В	2.5" MIN.	12' Min.		*
			SHRUBS		1		· I	
SGG	14	Spiraea betulifolia 'Glow Girl'	Birchleaf Spiraea	3 Gal		15" Min.		*
GB		llex glabra 'Gem box'	Gem Box Inkberry Holly	1 Gal		10" Min.		*
		Thuja occidentalis 'Anna Van Vloten'	Anna's Magic Ball Arborvitae	1 Gal		8" Min.		*
IV		Itea Virginica 'Henry's Garnet'	Virginia Sweetspire	1 Gal		8" Min.		*
LPP	6	Loropetalum chinense 'Peack'	Purple Pixie Weeping Loropetalum	3 Gal		8" Min.		
	-	Aronia melonocarpa 'Low scape Mound'	Chokeberry	1 Gal		6" Min.		*
		Viburnum cassinoides 'Lil Ditty'	Witherod Viburnum	1 Gal		8" Min.		*
		Chamaecyparis obtusa 'Nana Gracilis'	Dwarf Hinoiki Cypress	3 Gal		18" Min.		
		Cornus sericea 'Kelseyi'	Kelsey's Dwarf Red-Osier Dogwood	1 Gal		12" Min.		*
DW		Distylium hybrid 'BLDY01'	Jewel Box Distylium	3 Gal		12" Min.		
TFH		Hydrangea Paniculata 'Limelight'	Treeform Limelight Hydrangea	7 Gal		48" Min		
		ORNAM	ENTAL GRASSES/PERENNIALS/GROUN	DCOVER	RS			
KF	71	Calamagrostis acutiflora 'Karl Foerster'	Feather Reed Grass	1 Gal				
		Pennisetum alopecuroides 'Hameln'	Dwarf Fountain Grass	1 Gal				
HP	50	Heuchera micrantha 'Palace Purple'	Heuchera Palace Purple	1 Gal				
		Coreposis	Tickseed	Quart				*
		Dianthus gratianopolitanus 'Firewitch'	Firewitch Dianthus	Quart				
VLI	128	Liriope muscari 'Variegata'	Variegated Liriope	4"				
LIR	733	Liriope muscari 'Royal Purple'	Liriope	4"				
VM	287	Vinca Minor	Littleleaf Periwinkle	4"				
LSP	122	Liriope spicata	Creeping lilly turf	4"				
60 5	SF A	L NNUALS	1					
		· · · · · · · · · · · · · · · ·						





100% DESIGN REVIEW. NOT FOR CONSTRUCTION



(FOIENT)	
Kr. OK	
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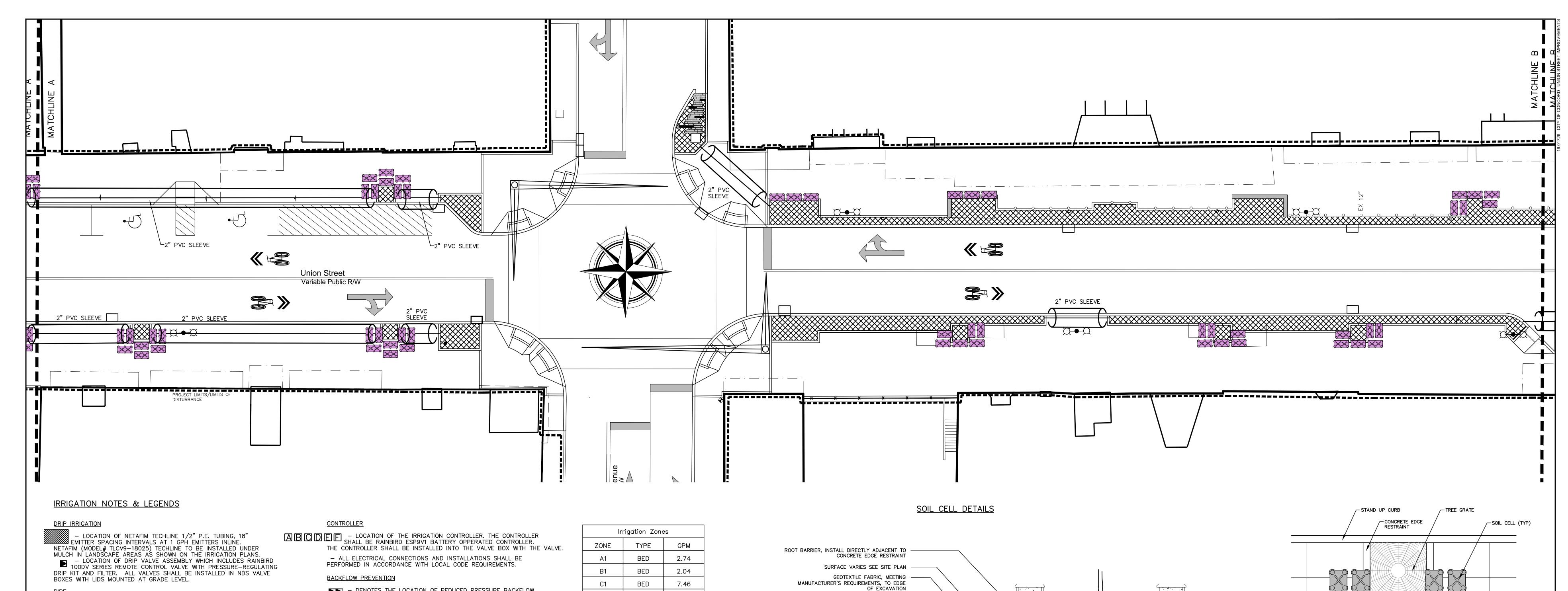
NO. DATE

UNION STREET IMPROVEMENTS	
CITY OF CONCORD	C
CABARRUS COUNTY, NORTH CAROLINA	F

0 5 10 20 RAPHIC SCALE DIVISION VALUE = 10 FEET		LANDSCAPE PLAN - B				
ICE MANAGER	DESIGNER					
.G. CHAPMAN	C.L. CRANWILL					
JECT MANAGER	REVIEWER	DATE	PROJECT#	FUNDING #		
.J. NORRIS	B. ROARK	JULY 2021	19.01726	N/A		

SHEET

L-102



- DENOTES ROUTE OF PR200 PVC LATERAL PIPING. SIZE OF LATERAL PIPING SHALL BE AS NOTED BELOW. MINIMUM DEPTH OF COVER OVER LATERAL PIPING TO BE 12". LATERAL PIPING SIZING SCHEDULE

SUMMATION OF GALLONAGE DEMAND ON THE PARTICULAR BRANCHES OF PIPE WITHIN A CONTROL SECTION SHALL BE DETERMINED BY USING THE GPM FOR A NOZZLE BASED ON A 50 PSI BASE OF HEAD PRESSURE AND FULL RADIUS AT THAT PRESSURE AS REPORTED IN THE RAINBIRD 2021 IRRIGATION PRODUCTS CATALOG. PIPE SIZES FOR THE LATERALS SHALL BE AS FOLLOWS:

ZERO TO FIFTEEN GPM ACCUMULATED FLOW USE 1" PR200 PVC PIPE GREATER THAN FIFTEEN UP TO THIRTY-FIVE GPM USE 1-1/2" PR200 PVC PIPE

FRICTION LOSS ALLOWANCES FOR THIS PROJECT HAVE BEEN DETERMINED USING THE ABOVE FLOW RANGES AND DEMANDS. - DENOTES ROUTE OF PR200 MAIN LINE PIPING. SIZE OF PIPE TO BE 1-1/2". MINIMUM DEPTH OF COVER OVER MAINLINE PIPING TO BE 18". - PIPING SHALL BE PR200 SOLVENT WELD PVC PIPE WITH SCHEDULE 40 PVC SOLVENT WELD FITTINGS UNLESS OTHERWISE NOTED. ALL PIPING RUNS SHALL BE "SNAKED" IN THE TRENCH DURING INSTALLATION TO PREVENT EXCESSIVE STRAIN DUE TO THERMAL EXPANSION OR CONTRACTION.

- THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO AVOID DAMAGING PLANTINGS (INCLUDING ROOTS) DURING INSTALLATION OF THE IRRIGATION SYSTEM AND SHALL COORDINATE HIS EFFORTS WITH THE LANDSCAPER AND LANDSCAPE ARCHITECT SO AS TO OPTIMIZE THE EFFICIENCY AND THE AESTHETIC QUALITY OF THE INSTALLATION.

- THE IRRIGATION CONTRACTOR SHALL ADJUST THE RADIUS AND THROW

OF EACH SPRINKLER HEAD TO PROVIDE OPTIMUM COVERAGE WHILE MINIMIZING OVERSPRAY ONTO HARDSCAPES OR BUILDINGS. ADJUST HEADS TO ELIMINATE DRY SPOTS. - APPROXIMATE ARC AND RADIUS OF INDIVIDUAL SPRINKLER HEAD COVERAGE SHALL BE AS ILLUSTRATED. INDIVIDUAL HEAD OR NOZZLE MODEL NUMBERS MAY BE DEPENDENT UPON THESE SPECIFIC CHARACTERISTICS.

- ALL 24 V.A.C. CONTROL WIRING SHALL BE SINGLE STRAND COPPER

24 VAC CONTROL WIRING

WIRE WITH POLYETHYLENE PE DIRECT BURIAL INSULATION RATED FOR 300 V.A.C. VALVE "COMMON" WIRES SHALL HAVE WHITE INSULATION WHILE VALVE "HOT" WIRES SHALL HAVE INSULATION RED IN COLOR. THE "COMMON" WIRES SHALL BE #14 AWG. "HOT" WIRES SHALL BE #14 AWG. VALVE WIRING SHALL FOLLÖW MAINLINE PIPING WHERE FEASIBLE AND SHALL BE LAID IN A COMMON TRENCHLINE WITH THE MAINLINE PIPING AND IN THE BOTTOM OF THE TRENCH. WIRING SHALL BE "BUNDLED" AND TAPED AT INTERVALS OF APPROXIMATELY TEN FEET ALL WIRING SHALL BE INSTALLED IN ACCORDANCE WITH LOCAL CODE REQUIREMENTS. - WIRE SPLICES SHALL BE KEPT TO AN ABSOLUTE MINIMUM. WHERE MAJOR CONCENTRATIONS OF SPLICES ARE NECESSARY SAID SPLICES SHALL BE PLACED IN A NDS VALVE BOX, WITH AN NDS COVER INSTALLED AT GRADE LEVEL. SPLICES AT VALVE LOCATIONS SHALL BE MADE INSIDE OF THE VALVE BOX. ALL SPLICE LOCATIONS SHALL BE NOTED ON THE AS BUILT PLAN. - WIRE RUNS SHALL BE INSTALLED WITH ENOUGH SLACK AND/OR OCCASIONAL EXPANSION LOOPS TO PREVENT EXCESSIVE STRAIN DUE TO THERMAL CONTRACTION. - ALL WIRE SPLICES SHALL BE MADE USING UL APPROVED DIRECT BURIAL CONNECTORS AND WATERPROOFING MATERIALS. ALL ELECTRICAL

WORK SHALL BE INSTALLED ACCORDING TO CODE.

- DENOTES THE LOCATION OF REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY. THE BACKFLOW SHALL BE THE CONTRACTOR'S RESPONSIBILITY. THE BACKFLOW SHALL BE 3/4" IN SIZE. THE BACKFLOW ASSEMBLY SHALL BE INSTALLED DOWNSTREAM OF THE IRRIGATION METER AS SHOWN ON THE LAYOUT. THE UNIT MUST BE INSTALLED IN ACCORDANCE WITH ALL LOCAL AND STATE CODE REQUIREMENTS AND SHALL HAVE APPROVED COVER.

WATER SUPPLY

(M) - DENOTES THE PROPOSED LOCATION OF THE IRRIGATION METER. THE METER SHALL BE THE GENERAL CONTRACTOR'S RESPONSIBILITY. THE METER SHALL BE 3/4" IN SIZE. SINCE THE WATER SUPPLY FOR THE SYSTEM SHALL BE POTABLE WATER, THE CONTRACTOR WILL BE REQUIRED TO INSTALL BACKFLOW PREVENTION DEVICE WHICH WILL BE LOCATED DOWNSTREAM OF THE IRRIGATION METER AS NOTED ON PLAN.

- THE IRRIGATION SYSTEM SHALL BE CAPABLE OF DELIVERING 30 GPM MAXIMUM WITH ONE STATION OPERATING WITH 50 PSI AT THE BASE OF THE HEAD FOR OPTIMUM PERFORMANCE OF THE IRRIGATION SYSTEM AS DESIGNED AND SPECIFIED.

* NOTE * - IF THE WATER SUPPLY IS NOT CAPABLE OF THE DESIGNED CAPACITY (FLOW AND/OR PRESSURE), THE IRRIGATION SYSTEM WILL NEED TO BE REDESIGNED, WHICH MAY ALTER THE IRRIGATION MATERIAL ESTIMATE.

<u>SLEEVING</u>

- DENOTES LOCATION OF PVC SLEEVES FOR $ldsymbol{\bot}$ RRIGATION PIPING. SIZE OF SLEEVES TO BE AS NOTED. - WHERE IRRIGATION PIPING CROSSES SIDEWALKS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PLACING A SLEEVE 2 SIZES LARGER THAN THE PIPE THAT IS CROSSING,

- THE IRRIGATION CONTRACTOR SHALL COORDINATE THE INSTALLATION OF THE IRRIGATION SYSTEM WITH THE LANDSCAPE CONTRACTOR TO INSURE PROPER INSTALLATION OF BOTH THE IRRIGATION SYSTEM WITH THE LANDSCAPE AND HARDSCAPE.

NOTE: THE IRRIGATION SYSTEM IS DISPLAYED SCHEMATIC IN NATURE. THE IRRIGATION CONTRACTOR MAY BE REQUIRED TO MAKE MINOR ADJUSTMENTS IN THE FIELD. THESE MINOR ADJUSTMENTS SHALL BE MADE AT NO ADDITIONAL COST TO THE OWNER BUT SHALL BE MADE ONLY AFTER NOTIFICATION IS MADE TO THE OWNER OR HIS REPRESENTATIVE.

- THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE SITE SO THAT HE IS AWARE OF ANY SPECIAL CONDITIONS WHICH EXIST THAT MAY AFFECT HIS BID PROPOSAL AND SHALL THEREAFTER BE RESPONSIBLE FOR ALL COST INCURRED IN RELATION TO THE INSTALLATION.

- THIS DESIGN IS BASED ON THE SITE INFORMATION AND/OR DRAWINGS SUPPLIED BY THE CLIENT OF RECORD WITH DESIGN CRITERIA BEING SET BY THE CLIENT AND/OR PROJECT OWNER (I.E. AREA TO BE IRRIGATED, MANUFACTURER'S EQUIPMENT TO BE EMPLOYED, WATER SOURCE (LOCATION, FLOW & PRESSURE) CAPACITIES, ELECTRICAL POWER AVAILABILITY FOR IRRIGATION SYSTEM USE, ETC.). SMITH TURF & IRRIGATION BEARS NO RESPONSIBILITY OR LIABILITY FOR ANY ERRORS IN DESIGN OR APPLICATION WHICH MIGHT ARISE DUE TO INACCURACIES IN THE ABOVE REFERENCED INFORMATION SUPPLIED TO SMITH TURF & IRRIGATION IN RELATION TO THIS SPECIFIC PROJECT UNLESS OTHERWISE NOTED.

1240 19th Street Lane NW

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mcgillassociates.com

Hickory, NC 28601

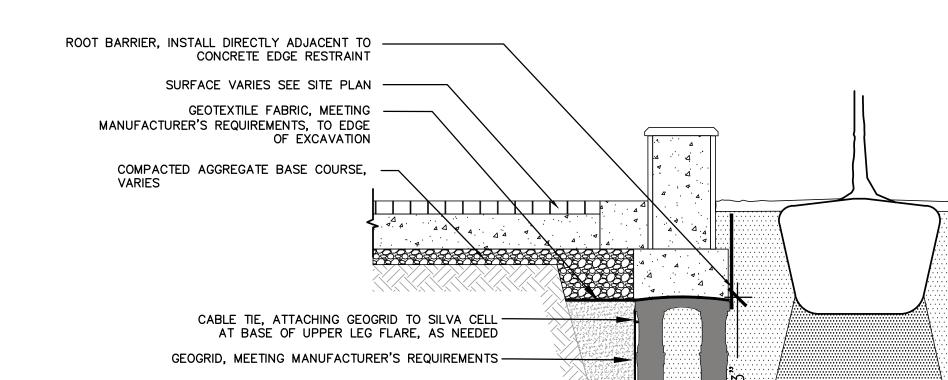
828.328.2024

Irrigation Zones								
ZONE	TYPE	GPM						
A1	BED	2.74						
B1	BED	2.04						
C1	BED	7.46						
D1	BED	4.7						
E1	BED	11.1						
F1	BED	3.28						
Total		31.32						

MAINLINE/LATERAL SHOWN ON PLAN IS DIAGRAMMATIC FOR CLARITY. ALL MAINLINE, LATERAL AND VALVES SHALL BE FIELD LOCATED OUTSIDE OF HARDSCAPE, FENCES AND OTHER UTILITIES.

NOTE

WHERE IRRIGATION MAINLINE/LATERAL LINE CROSSES HARDSCAPE THERE SHALL BE A SLEEVE 2 SIZES BIGGER. NOT ALL SLEEVES ARE SHOWN FOR CLARITY REASONS.



SOIL CELLS NOT TO SCALE

- CONCRETE SIDEWALK

— ROOT BARRIER, INSTALL DIRECTLY ADJACENT TO

DEEPROOT UB 12-2 ROOT BARRIER, INSTALL ----DIRECTLY ADJACENT TO CONCRETE EDGE RESTRAINT CONCRETE EDGE RESTRAINT MANUFACTURER'S REQUIREMENTS, TO EDGE OF EXCAVATION

SURFACE VARIES SEE SITE PLAN -----GEOTEXTILE FABRIC, MEETING ----CABLE TIE, ATTACHING GEOGRID TO SILVA CELL AT BASE OF UPPER LEG FLARE, AS NEEDED GEOGRID, MEETING MANUFACTURER'S REQUIREMENTS-COMPACTED BACKFILL, PER PROJECT SPECIFICATIONS -ANCHORING SPIKES, CONTACT DEEPROOT -- PLANTING SOIL BELOW ROOT BALL, COMPACTED WELL TO PREVENT SETTLING GEOTEXTILE FABRIC, PLACED ABOVE SUBGRADE ——

COMPACTED BACKFILL, PER PROJECT SPECIFICATIONS —

ANCHORING SPIKES, CONTACT DEEPROOT-

PLACED IN LIFTS AND WALK-IN COMPACTED TO 75-85% PROCTOR

FOR ALTERNATIVE

GEOTEXTILE FABRIC, PLACED ABOVE SUBGRADE -

PLANTING SOIL, PER PROJECT SPECIFICATIONS, -

4" MIN AGGREGATE SUB BASE, COMPACTED —

TO 95% PROCTOR

SUBGRADE, COMPACTED-

NOT TO SCALE CONCRETE WALL — MONOLITHIC RETAINING WALL — GEOTEXTILE FABRIC TO EDGE OF EXCAVATION - AGGREGATE BASE, DEPTH YARIES CABLE TIE, ATTACHING GEOGRID TO SILVA CELL AT BASE OF UPPER LEG FLARE, AS NEEDED - GEOGRID, MEETING MANUFACTURER'S REQUIREMENTS - COMPACTED BACKFILL, PER PROJECT SPECIFICATIONS - GEOTEXTILE FABRIC, PLACED ABOVE PLANTING SOIL BELOW ROOT — BALL, COMPACTED WELL TO PREVENT SETTLING 4" MIN AGGREGATE SUB BASE, COMPACTED TO 95% PROCTOR — PLANTING SOIL, PER PROJECT SPECIFICATIONS,
PLACED IN LIFTS AND WALK—IN COMPACTED TO 75—85%

SOIL CELL AT MONOLITHIC WALL

NOT TO SCALE

C.L. CRANWILL

B. ROARK

IRRIGATION PLAN - B

UNDING #

N/A

100% DESIGN REVIEW. NOT FOR CONSTRUCTION



NO. DATE BY DESCRIPTION

PLANTING SOIL, PER PROJECT SPECIFICATIONS, -

PLACED IN LIFTS AND WALK-IN COMPACTED TO 75-85% PROCTOR

TO 95% PROCTOR

SOIL CELL: TREE GRATE /OPEN PLANTER

NOT TO SCALE

SUBGRADE, COMPACTED-

UNION STREET IMPROVEMENTS

CABARRUS COUNTY, NORTH CAROLINA

GRAPHIC SCALE DIVISION VALUE = 10 FEET FFICE MANAGER D.G. CHAPMAN ROJECT MANAGER

M.J. NORRIS

— PLANTING SOIL BELOW ROOT

PREVENT SETTLING

SOIL CELL AT SEAT WALL

BALL, COMPACTED WELL TO

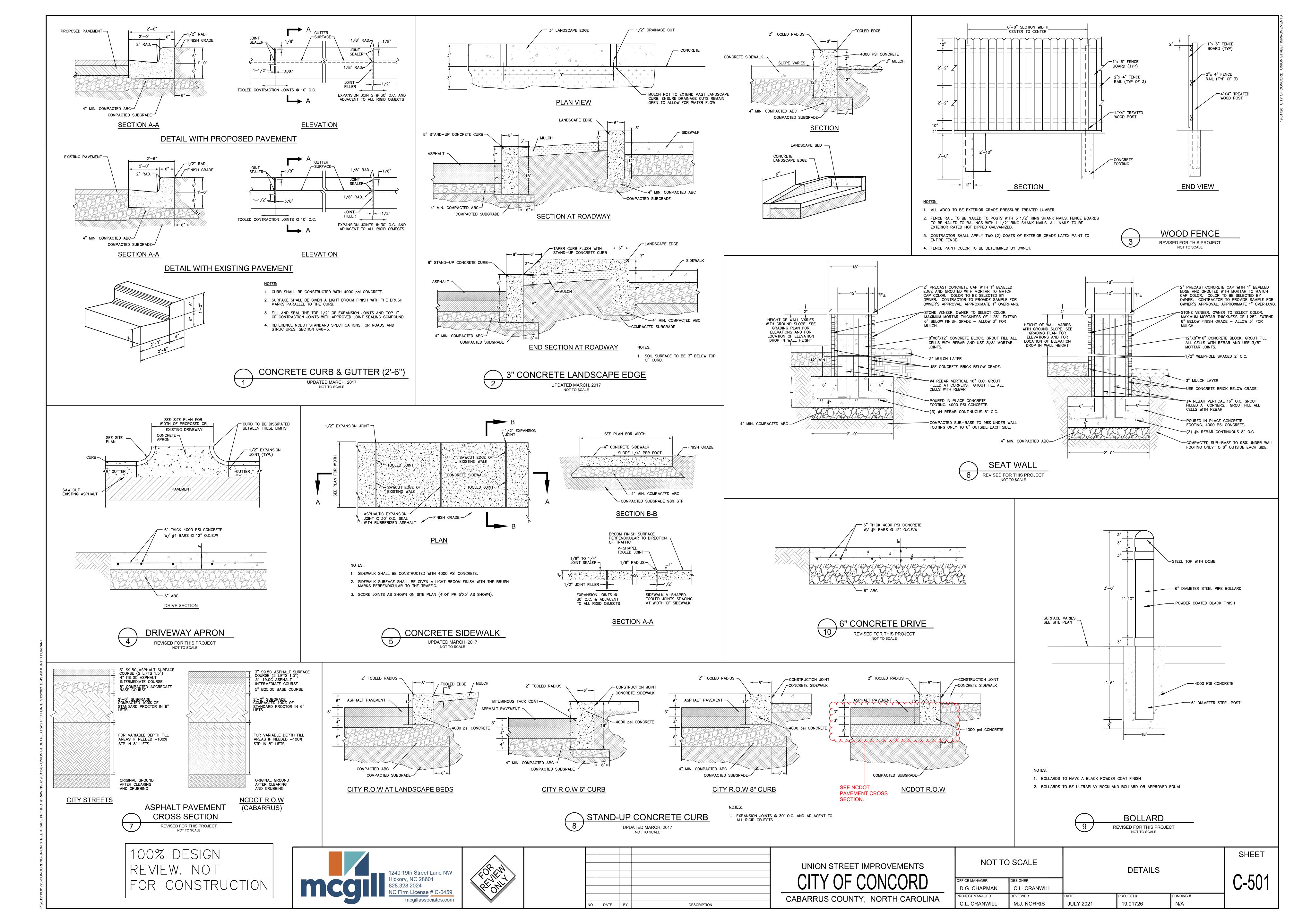
JULY 2021

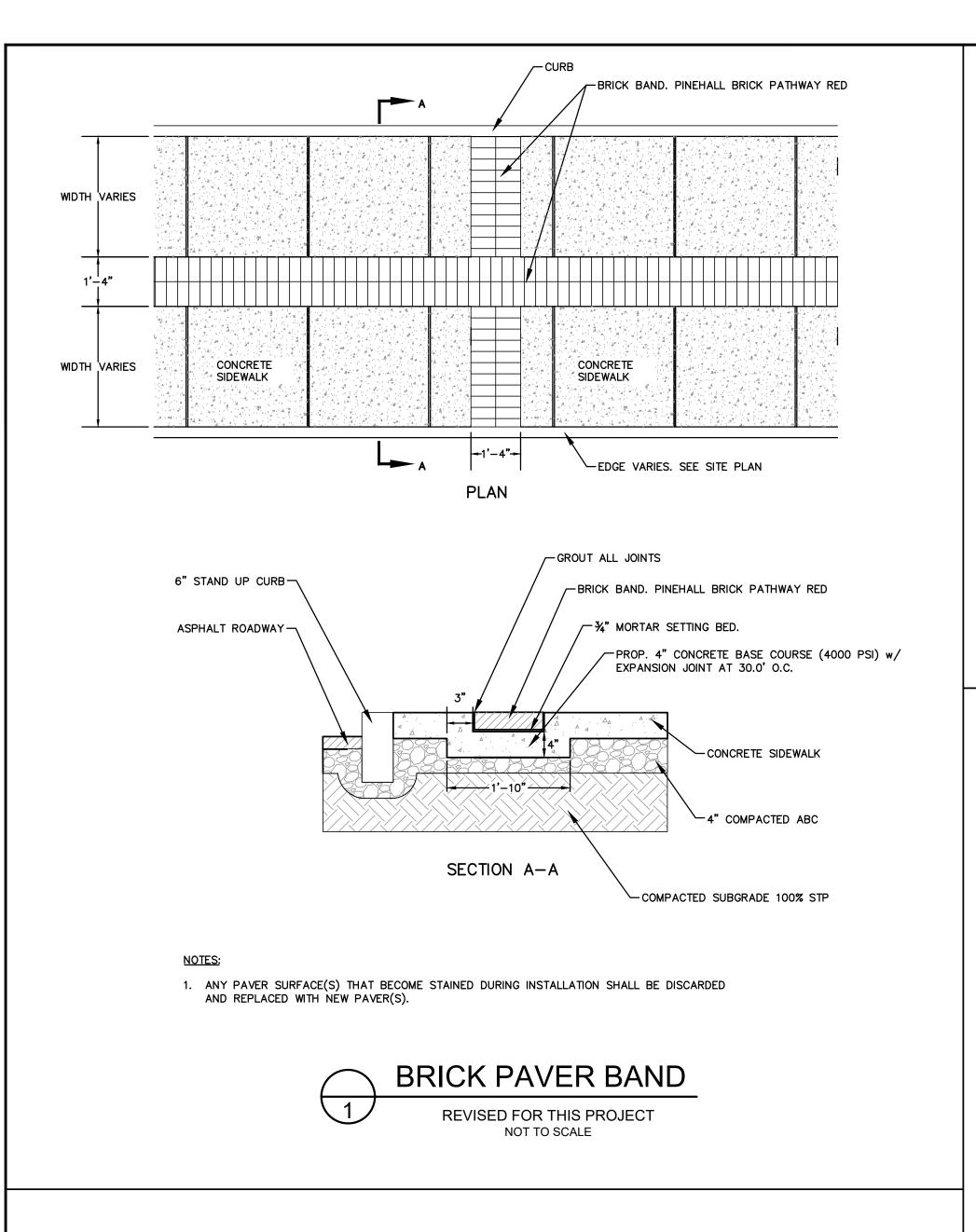
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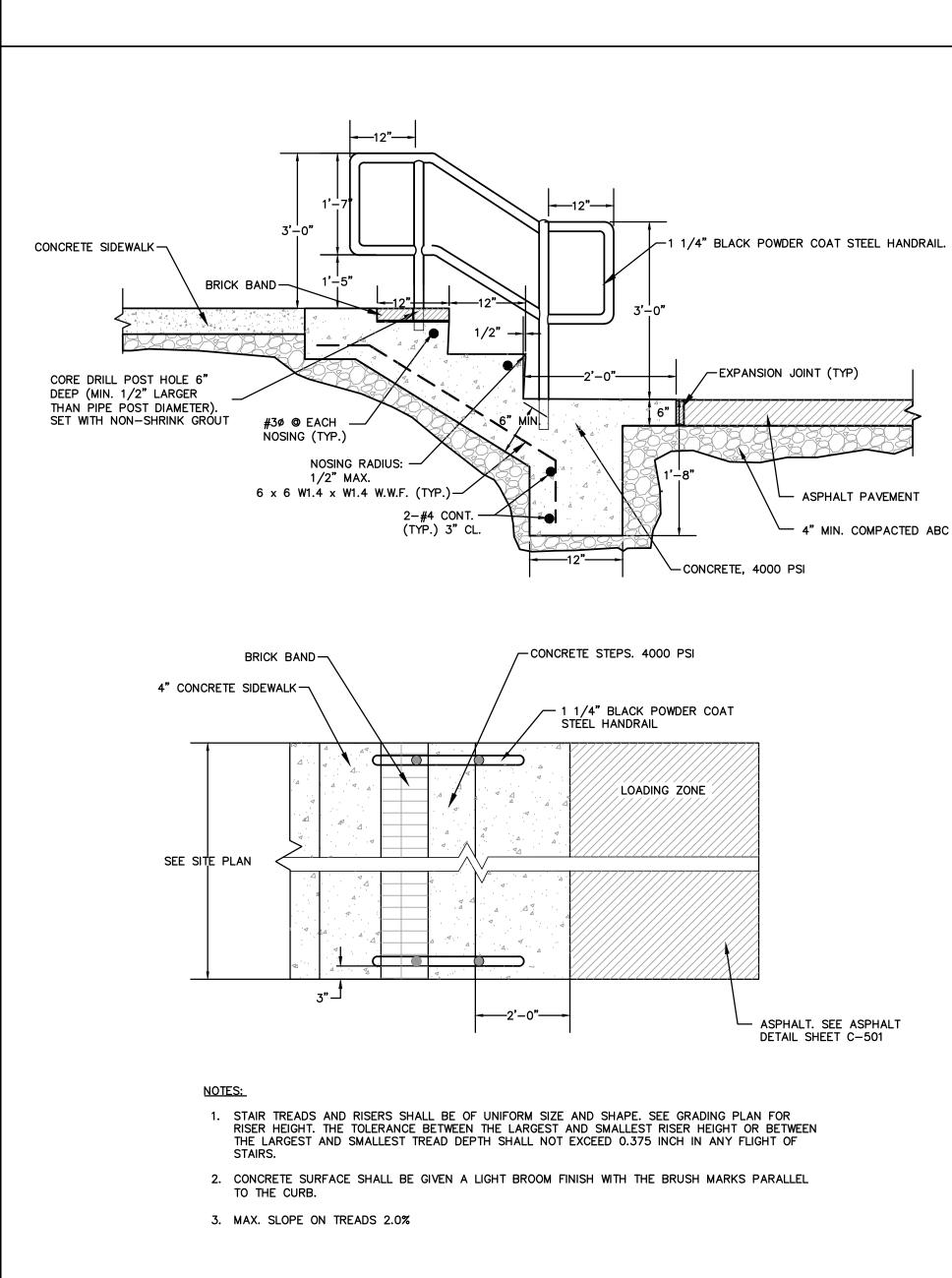
-SUBGRADE, COMPACTED

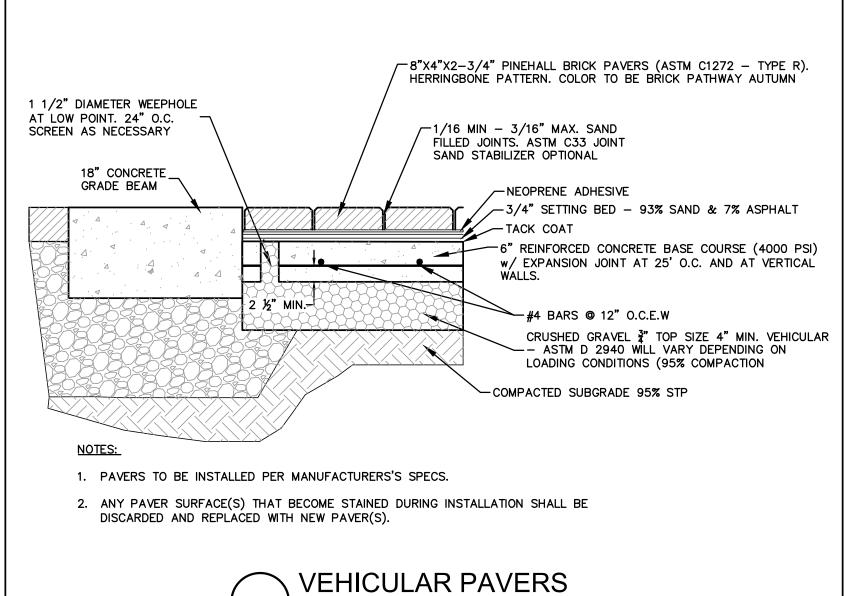
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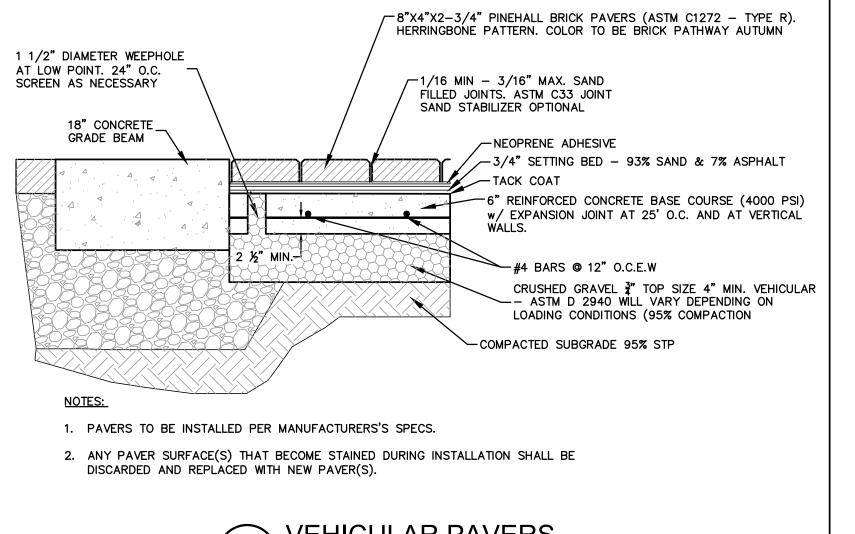
SHEET











REVISED FOR THIS PROJECT

NOT TO SCALE

FINISHED SURFACE VARIES SEE SITE PLAN FOR ADJOINING SURFACES. 1/16" MIN - 3/16" MAX. POLYMERIC SAND FILLED JOINTS. BASE EXTENDS BEYOND PAVEMENT EDGE EQUAL TO ∕-3/4" SAND SETTING BED DEPTH OF BASE, BACK FILL CONFORMING TO ASTM C33 EDGE RESTRAINT WITH GRAVEL. COMPACTED AS REQUIRED. 1" DIAMETER WEEPHOLE (DRAINAGE) AT LOWEST POINT 24" O.C. PERMEABLE GEOTEXTILE INSTALLED OVER OPENING TO KEEP SAND OUT OF WEEPHOLE. FILL WEEPHOLE WITH PEA GRAVEL. COMPACTED SUBGRADE 100% STP-4" COMPACTED ABC-PROP. 4" FIBER REINFORCED CONCRETE BASE COURSE (4000 PSI) w/ EXPANSION JOINT AT 30.0' O.C. AND AT VERTICAL WALLS. NOTES:

-PAVERS. SEE SITE AND GRADING PLANS FOR DESIGN

PATTERN, PAVER SELECTION, COLOR AND SLOPES.

1. PAVERS TO BE INSTALLED PER MANUFACTURERS'S SPECS.

EDGE RESTRAINT VARIES.

SEE SITE PLAN.

2. ANY PAVER SURFACE(S) THAT BECOME STAINED DURING INSTALLATION SHALL BE DISCARDED AND REPLACED WITH NEW PAVER(S).

> FLEXIBLE PAVER OVER **RIGID BASE - LIGHT DUTY**

> > REVISED FOR THIS PROJECT

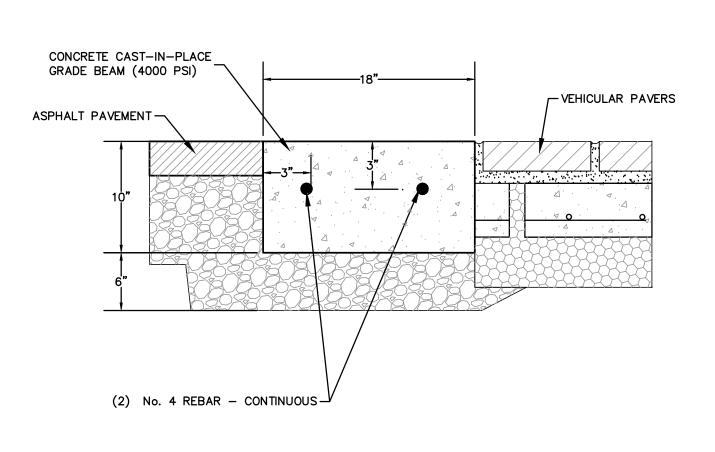
NOT TO SCALE

EDGE RESTRAINT VARIES ----—— 1/16" MIN — 3/16" MAX. POLYMERIC SEE SITE PLAN SAND FILLED JOINTS. FINISHED SURFACE VARIES SEE -SITE PLAN FOR ADJOINING — PAVERS. SEE SITE AND GRADING SURFACES. PLANS FOR DESIGN PATTERN, PAVER SELECTION, COLOR AND SLOPES. BASE EXTENDS BEYOND PAVEMENT EDGE EQUAL TO DEPTH OF BASE. BACK FILL 3/4" SAND SETTING BED EDGE RESTRAINT WITH GRAVEL. CONFORMING TO ASTM C33 STANDARDS. SCREED AND COMPACTED AS REQUIRED. PROP. 6" REINFORCED CONCRETE 1" DIAMETER WEEPHOLE (DRAINAGE) AT LOWEST POINT 24" O.C. PERMEABLE BASE COURSE (4000 PSI) w/ EXPANSION JOINT AT 25' O.C. AND GEOTEXTILE INSTALLED OVER OPENING TO AT VERTICAL WALLS. KEEP SAND OUT OF WEEPHOLE. FILL WEEPHOLE WITH PEA GRAVEL. - 4" COMPACTED ABC └─#4 REBAR 12" O.C.E.W. --- COMPACTED SUBGRADE 100% STP 1. PAVERS TO BE INSTALLED PER MANUFACTURERS'S SPECS.

2. ANY PAVER SURFACE(S) THAT BECOME STAINED DURING INSTALLATION SHALL BE DISCARDED AND REPLACED WITH NEW PAVER(S).

> FLEXIBLE PAVER OVER RIGID **BASE - HEAVY DUTY**

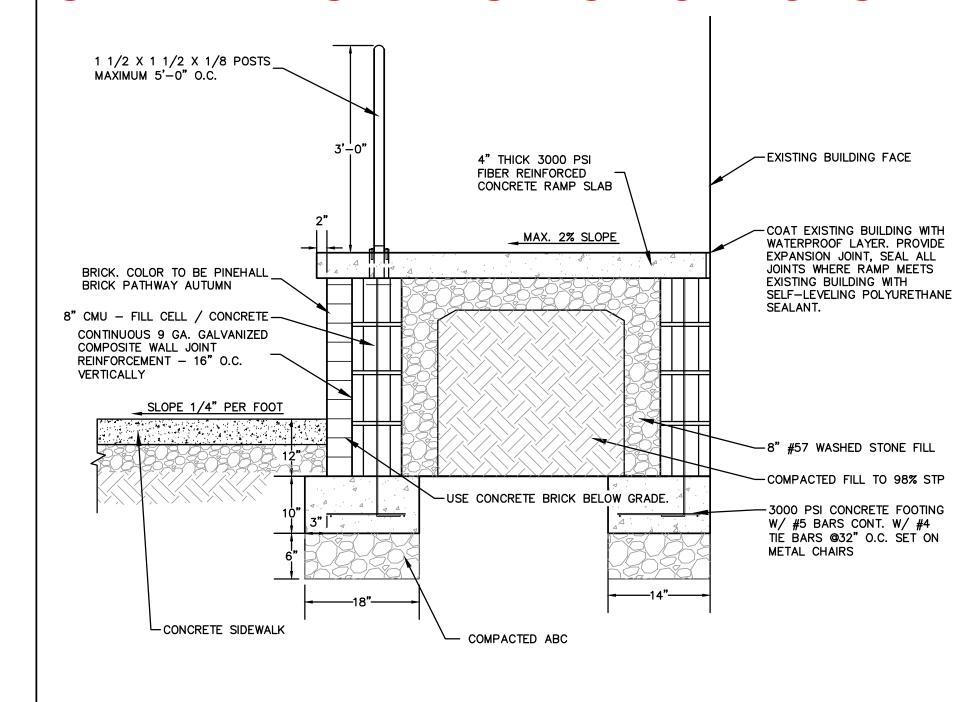
> > REVISED FOR THIS PROJECT NOT TO SCALE

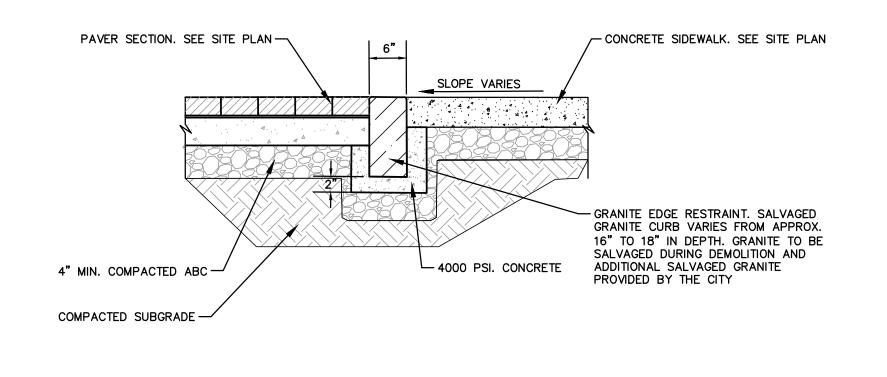


- 1. EXISTING "ABC" IN ROADWAY MAY BE USED AS BASE COURSE AFTER COMPACTING TO ACHIEVE 100% PROCTOR. LOCALIZED UNDERCUTTING AND REPAIR SHALL BE REQUIRED WHERE PROOFROLLING RESULTS IN PUMPING OR AS DIRECTED BY THE INSPECTOR. TESTING OF SUBGRADE/"CABC" COMPACTION SHALL BE REQUIRED.
- EXISTING ROADWAY PAVING SHALL BE SAW-CUT TO RECEIVE PLACEMENT OF GRADE BEAMS. A THREE-DAY CURING PERIOD SHALL BE REQUIRED FOR GRADE BEAMS PRIOR TO REMOVAL OF REMAINING BITUMINOUS PAVING. BASE BELOW GRADE BEAMS SHALL BE COMPACTED TO 100% PROCTOR.

18" CONCRETE GRADE BEAM REVISED FOR THIS PROJECT

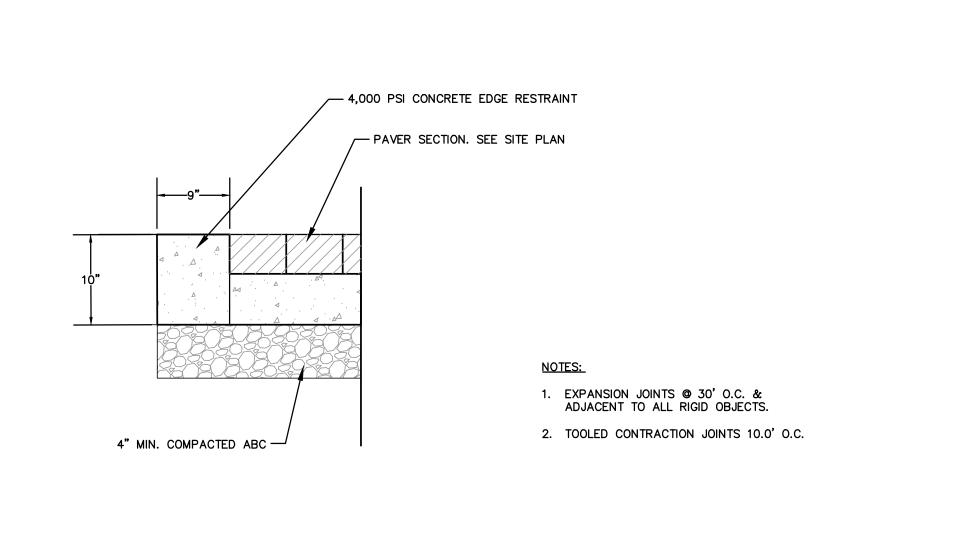
CROSSWALKS WITHIN NCDOT RIGHT OF WAY MAY NEED TO BE STAMPED ASPHALT. CONSULT WITH ONSITE NCDOT INSPECTOR AND NCDOT STANDARDS AND SPECIFICATIONS.



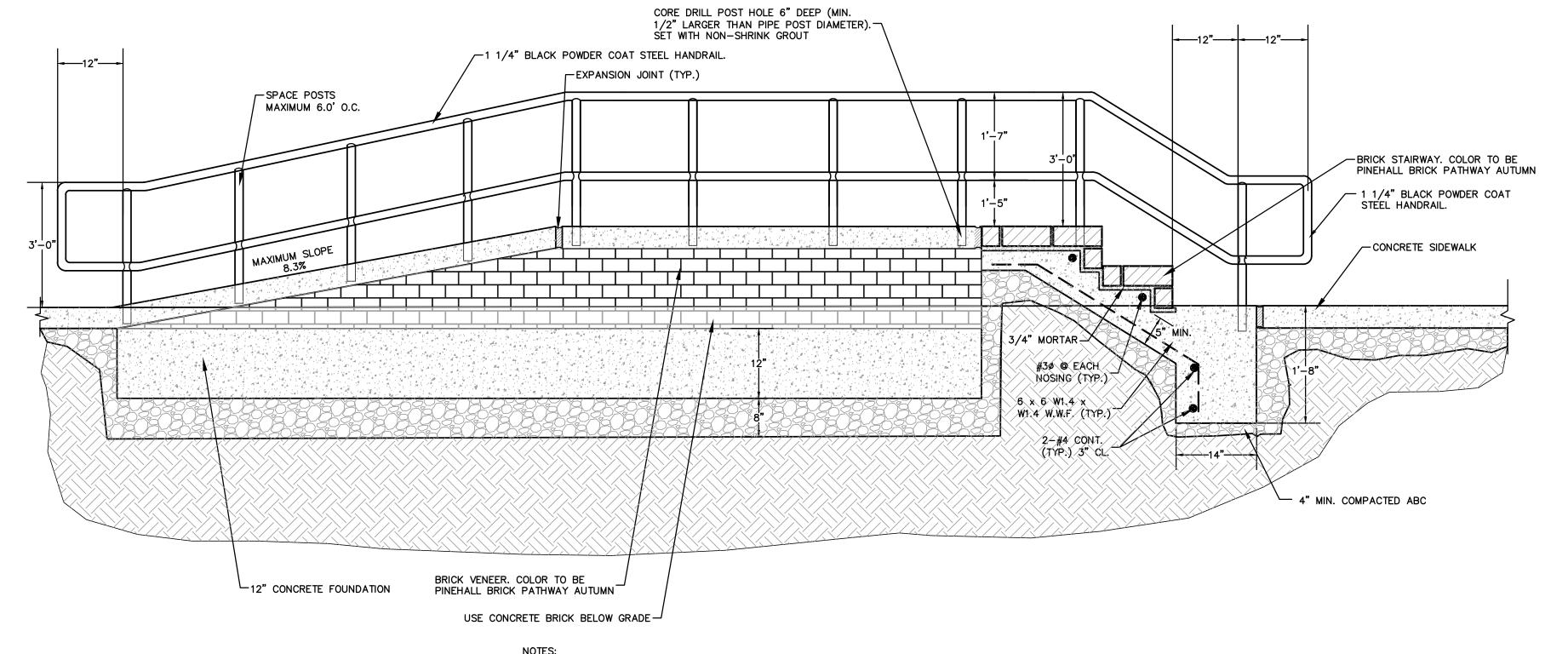


- 1. GRANITE TO BE SUPPLIED BY THE OWNER.
- 2. THE GRANITE SHALL BE SOUND AND DURABLE AND FREE FROM SEAMS WHICH COULD IMPAIR THE STRUCTURAL STABILITY. THE EDGE RESTRAINT SHALL BE STRAIGHT FROM END TO END WITH A VARIANCE OF NO MORE THAN 3/16" IN EITHER DIRECTION. QUARRY DRILL HOLES OR OTHER IMPERFECTIONS WILL NOT BE ACCEPTED. THE ENDS SHALL BE PERPENDICULAR TO THE TOP. THE ENDS SHALL ALIGN SO THAT NO SPACE GREATER THAN 1/4" IS CREATED BETWEEN THE ENDS.
- 3. THE GRANITE EDGE RESTRAINT SHALL BE CLEANED OR PROTECTED FROM CONCRETE SPLASH AT ALL TIMES.









1. STAIR TREADS AND RISERS SHALL BE OF UNIFORM SIZE AND SHAPE. SEE GRADING PLAN FOR RISER HEIGHT. THE TOLERANCE BETWEEN THE LARGEST AND SMALLEST 2. CONCRETE SURFACE SHALL BE GIVEN A LIGHT BROOM FINISH WITH THE BRUSH MARKS PERPENDICULAR TO THE CURB.

3. MAX. SLOPE ON TREADS 2.0%

CONCRETE STEPS AND RAMP STORE ACCESS

100% DESIGN REVIEW. NOT FOR CONSTRUCTION

CONCRETE STEPS AND PIPE RAILING DETAIL

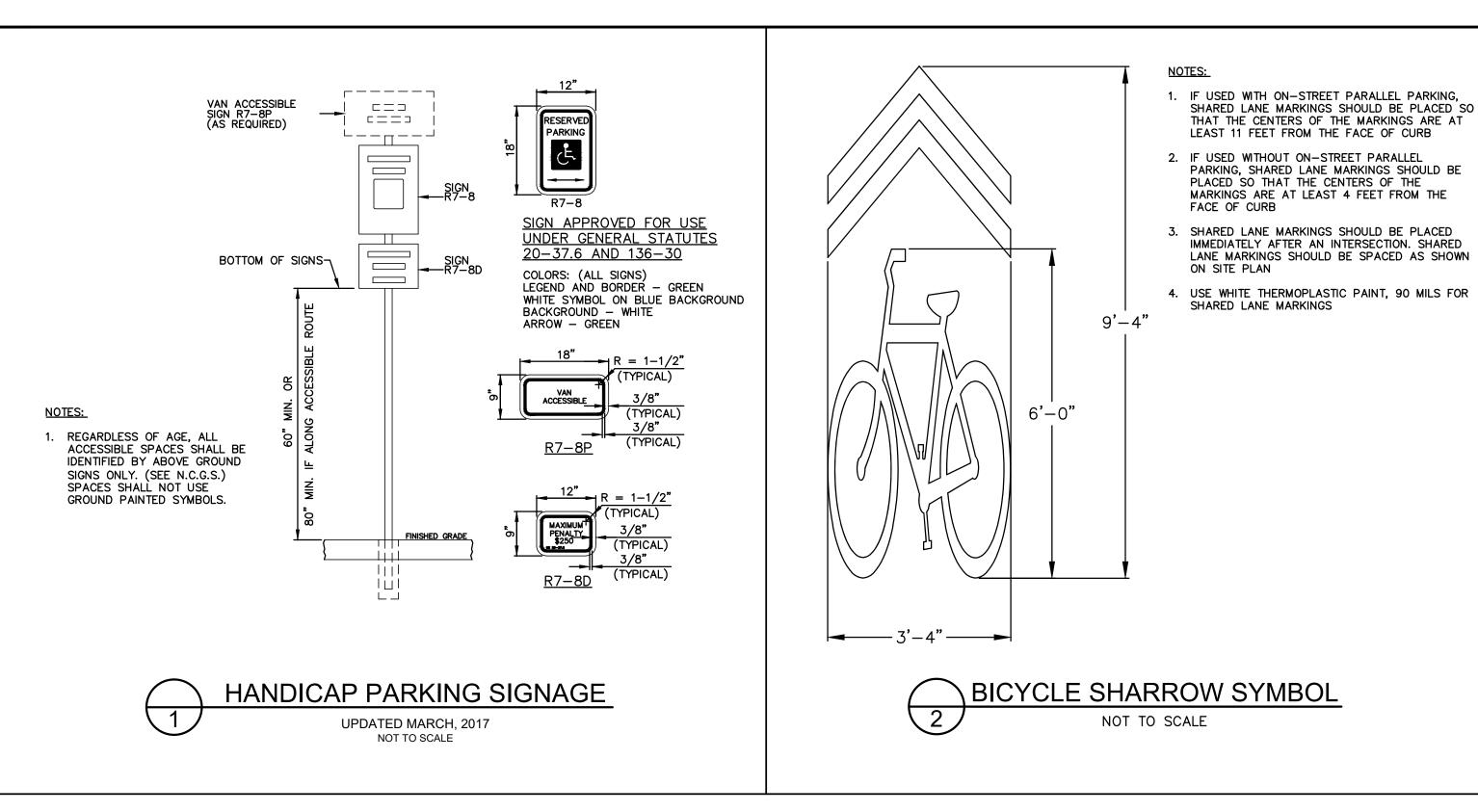


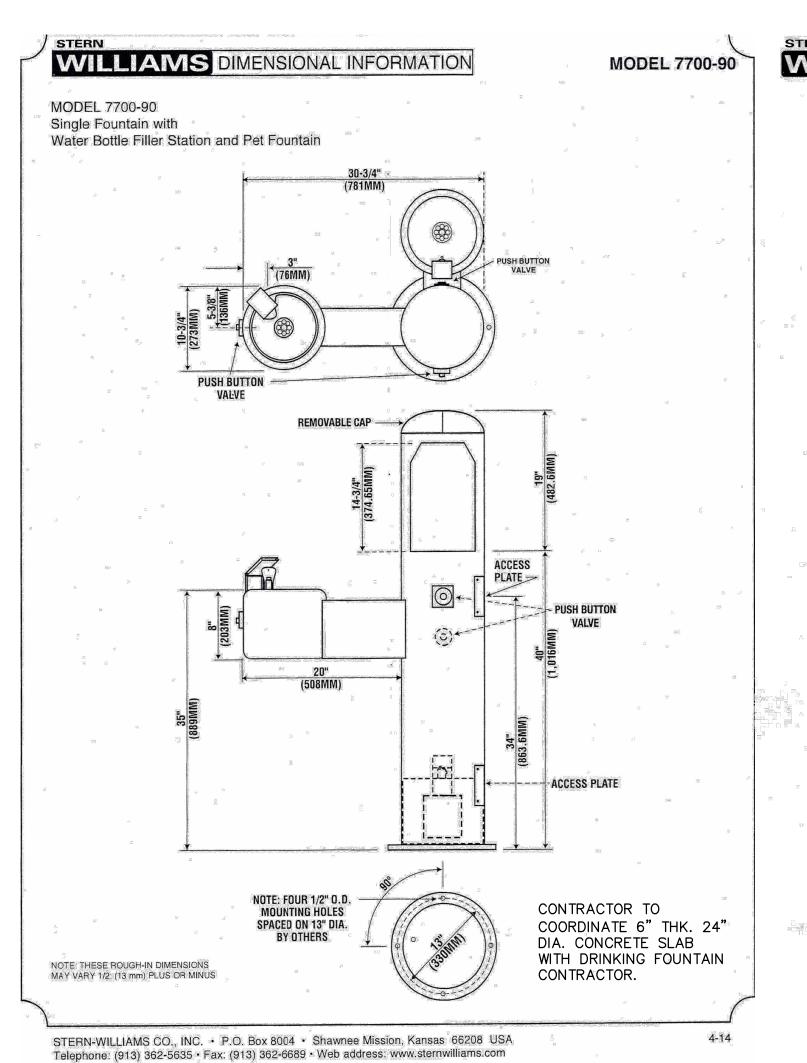


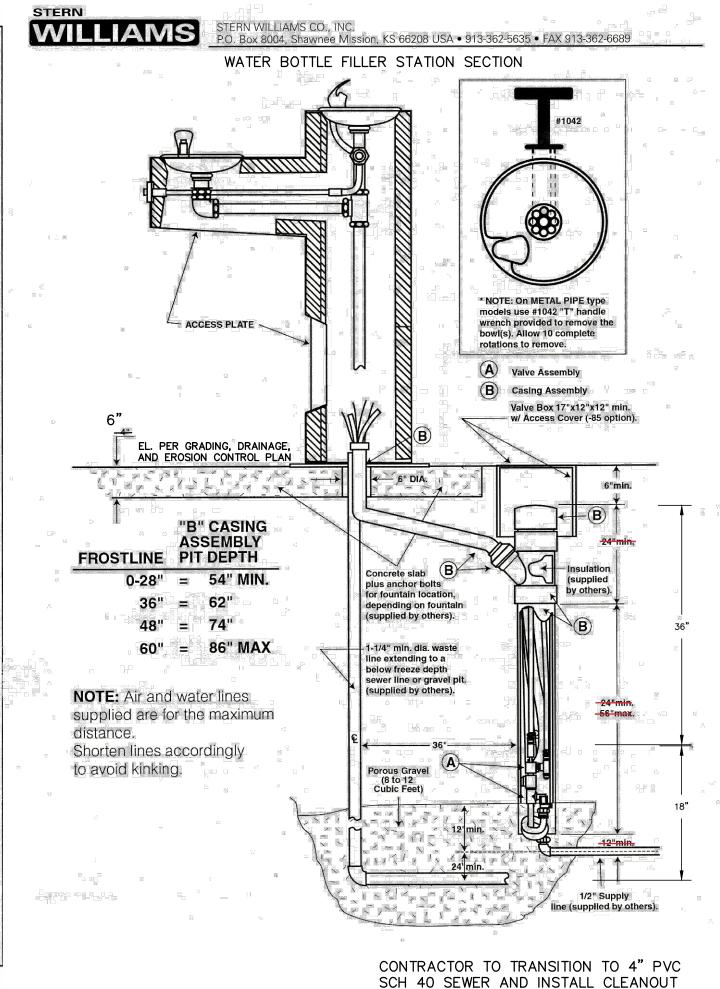
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NO.	DATE	BY	DESCRIPTION	

UNION STREET IMPROVEMENTS CITY OF CONCORD CABARRUS COUNTY, NORTH CAROLINA

NOT TO	SCALE		SHEET		
ICE MANAGER	DESIGNER				
.G. CHAPMAN	C.L. CRANWILL		0-002		
JECT MANAGER	REVIEWER	DATE	PROJECT#	FUNDING #	
.L. CRANWILL	M.J. NORRIS	JULY 2021	19.01726	N/A	







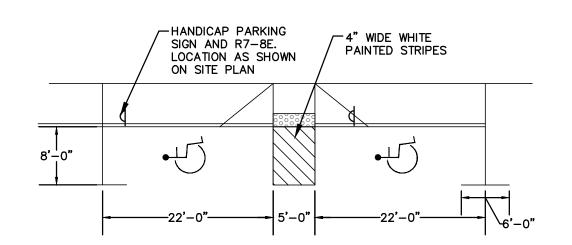
WITH P-TRAP WITHIN 3 FEET OF

DRINKING WATER FOUNTAIN



MODIFIED FOR PROJECT

NOT TO SCALE

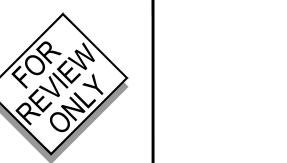


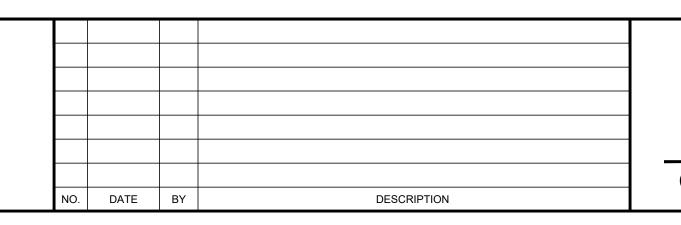
- 1. REGARDLESS OF AGE, ALL ACCESSIBLE SPACES SHALL BE IDENTIFIED BY ABOVE- GROUND SIGNS ONLY. (SEE N.C.G.S.)
- 2. GROUND-PAINTED SYMBOLS TO BE WHITE THERMOPLASTIC 90 MIL.
- 3. ACCESSIBLE SPACES ARE REQUIRED TO BE STRIPED OFF ONLY; BLUE COLORING IS NOT NECESSARY NOR
- 4. STRIPING IS WHITE ON DARK PAVEMENT; BLACK ON LIGHT PAVEMENT. (N.C.D.O.T.)
- 5. SEE GRADING PLAN FOR SLOPE. EXISTING ROAD GRADES VARY.



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1. EXCAVATE TREE PIT AREA TO DEPTH OF R-8500 TYPE P FRAME.

3. PLACE BOTH NEENAH FOUNDARY TREE GRATE R-8708 HALVES

4. CONTRACTOR TO PROVIDE TREE GRATES FOR ALL EXISTING AND

6. TOP OF ROOTBALL TO BE 2" MAX. FROM BOTTOM OF TREE GRATE.

TREE GRATE

7 REVISED FOR THIS PROJECT

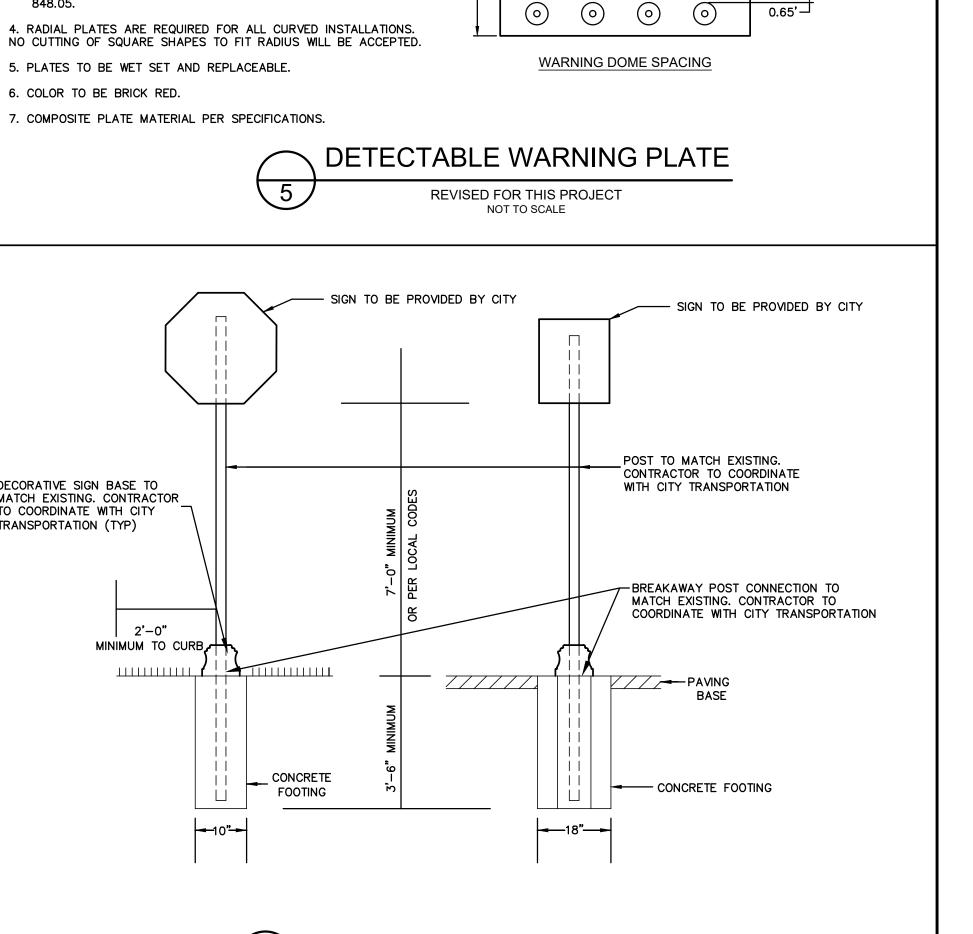
GRADE PER MANUFACTURER'S RECOMMENDATIONS.

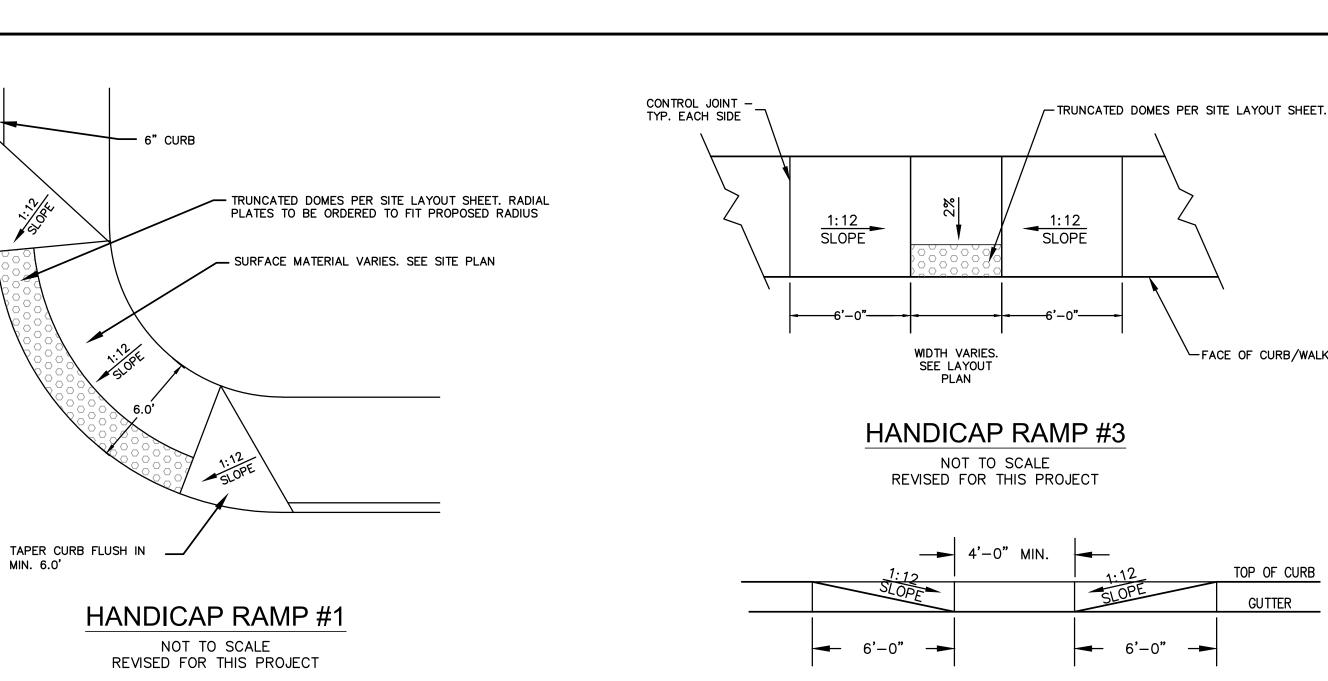
5. PLACE SETTING BED AND PAVERS/CONCRETE SIDEWALK.

WITHIN THE FRAME.

PROPOSED TREE WELLS.

2. PLACE R-8500 TYPE P FRAME IN EXCAVATION AND SET AT PROPER





CONCRETE EDGE RESTRAINT -

-CONCRETE EDGE RESTRAINT

FINISHED GRADE

COMPACTED TOPSOIL

UNDISTURBED SOIL

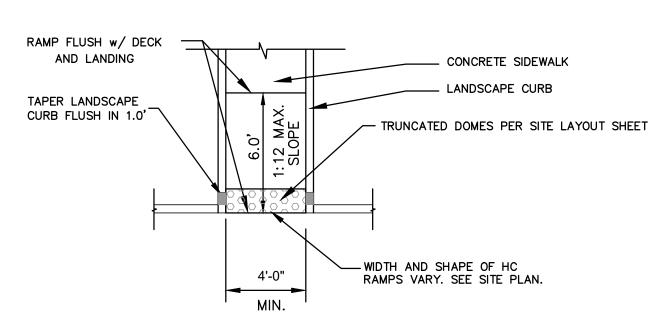
__4" CONCRETE

NEENAH FOUNDARY TREE GRATE R-8708. GRATE TO BE 48"X48" W/20" DIAMETER OPENING AND 2 LIGHT OPENINGS.

GRATE TO BE BLACK POWDER COAT FINISH.

NEENAH FOUNDARY R-8500 TYPE P FRAME OR EQUAL. GRATE TO BE BLACK POWDER COAT FINISH.

UP LIGHT-



HANDICAP RAMP #2 NOT TO SCALE

REVISED FOR THIS PROJECT

TREE GRATE ----

NEENAH FOUNDRY R-8500

SEE SOIL CELL INSTALLATION INFORMATION_ SHEETS I-101 THRU I-104

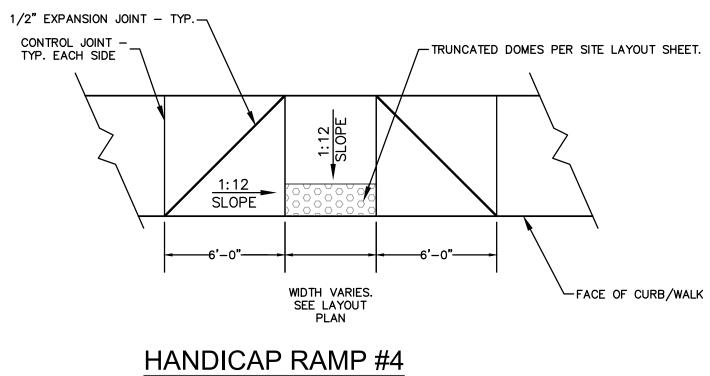
TYPE P GRATE FRAME

A. LOCATION OF HANDICAP RAMPS: 1. ALL ACCESSIBLE RAMPS TO COMPLY WITH CURRENT N.C. BUILDING CODE VOLUME IBC 2015 ACCESSIBILITY 2. NO SLOPE SHALL EXCEED 1"= 1' (1:12) ON THE RAMPS.

3. IN NO CASE SHALL THE WIDTH OF A WHEELCHAIR RAMPS BE LESS THAN 48" (4'-0"). WIDTHS MAY EXCEED 4. A 1/2" EXPANSION JOINT WILL BE REQUIRED WHERE THE CONCRETE WHEELCHAIR RAMP JOINS ANY RIGID PAVEMENT OR STRUCTURE. 5. ALL CONCRETE TO BE 4000 PSI AT 28 DAYS. RAMP TO BE PLACED ON MIN. 4" AGGREGATE BASE COURSE.

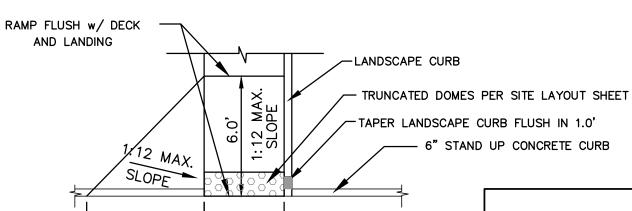
1. SEE SITE PLAN FOR SURFACE TREATMENTS AT HC RAMPS AND REFER TO RELATED PAVING DETAILS AS REFERENCED IN KEY NOTES.





NOT TO SCALE

REVISED FOR THIS PROJECT



-NEENAH FOUNDARY TREE

GRATE R-8708 48"X48" W/

20" DIAMETER OPENING AND

2 LIGHT OPENINGS. TYPE P FRAME (R-8500) BLACK

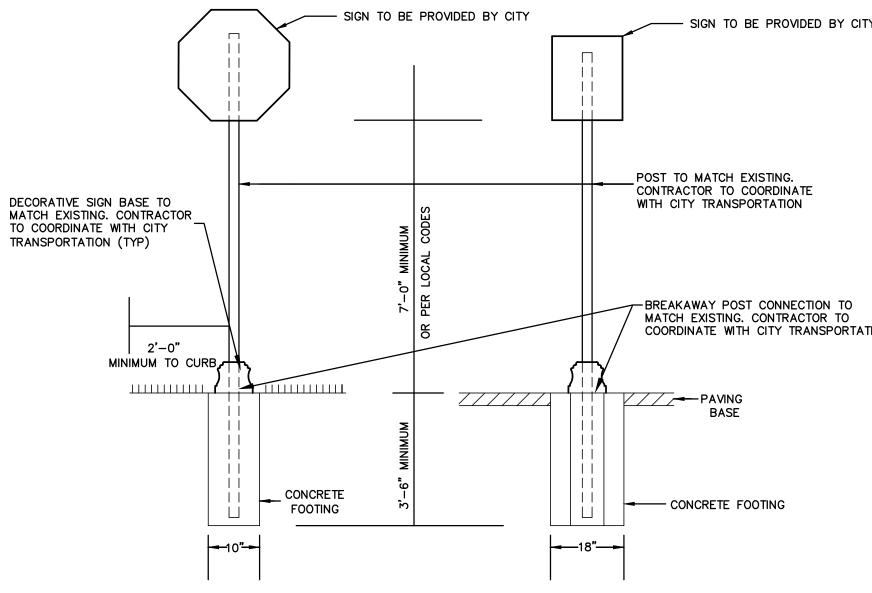
POWDER COAT FINISH.

FACE OF CURB/WALK

TOP OF CURB

HANDICAP RAMP #5 NOT TO SCALE

5. PLATES TO BE WET SET AND REPLACEABLE.





NOT TO SCALE **DETAILS** FFICE MANAGER D.G. CHAPMAN C.L. CRANWILL ROJECT MANAGER

M.J. NORRIS

SHEET C-503

WIDTH VARIES. SEE LAYOUT WARNING DOME SECTION 1. DETECTABLE WARNING DOMES WILL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN ON THE PLANS. 2. DETECTABLE WARNING DOMES WILL CONTRAST VISIBILITY WITH REVISED FOR THIS PROJECT ADJOINING SURFACE, EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT SEQUENCE COVERING THE ENTIRE RAMP. 3. FOR ADDITIONAL NOTES AND INFORMATION, SEE NCDOT STD 4. RADIAL PLATES ARE REQUIRED FOR ALL CURVED INSTALLATIONS. NO CUTTING OF SQUARE SHAPES TO FIT RADIUS WILL BE ACCEPTED.

1 1/4" BLACK POWDER COAT STEEL HANDRAIL.

RETURN HANDRAIL EXTENSION AT 90°-

PLAN VIEW

STEEL HANDRAIL (TYP.)-

TRUNCATED DOMES PER

RAMP FLUSH w/

TAPER LANDSCAPE

CURB FLUSH IN 1.0

LANDSCAPE BED-

SITE LAYOUT SHEET

FOR TOTAL LENGTH OF 12"

SPACE POSTS MAXIMUM 6.0' O.C.—

-HANDRAIL

EXTENSION

CORE DRILL POST HOLE 6" DEEP (MIN. 1/2" LARGER THAN PIPE POST DIAMETER).

SÉT WITH NON-SHRINK GROUT

1:12 MAX.

HANDICAP RAMP W/ HANDRAIL #1

NOT TO SCALE REVISED FOR THIS PROJECT

HANDICAP RAMP W/ HANDRAIL #2

NOT TO SCALE

REVISED FOR THIS PROJECT

RAMP WIDTH - AREA VARIES ---

1.6" TO 2.4"

CONCRETE WALK-

CONCRETE SIDEWALK

-RAMP FLUSH WITH

-MONOLITHIC RETAINING

-PAVERS

LANDSCAPE CURB

-STEEL HANDRAIL (TYP.)

- TRUNCATED DOMES PER

SITE LAYOUT SHEET

WALL WITH METAL RAILING

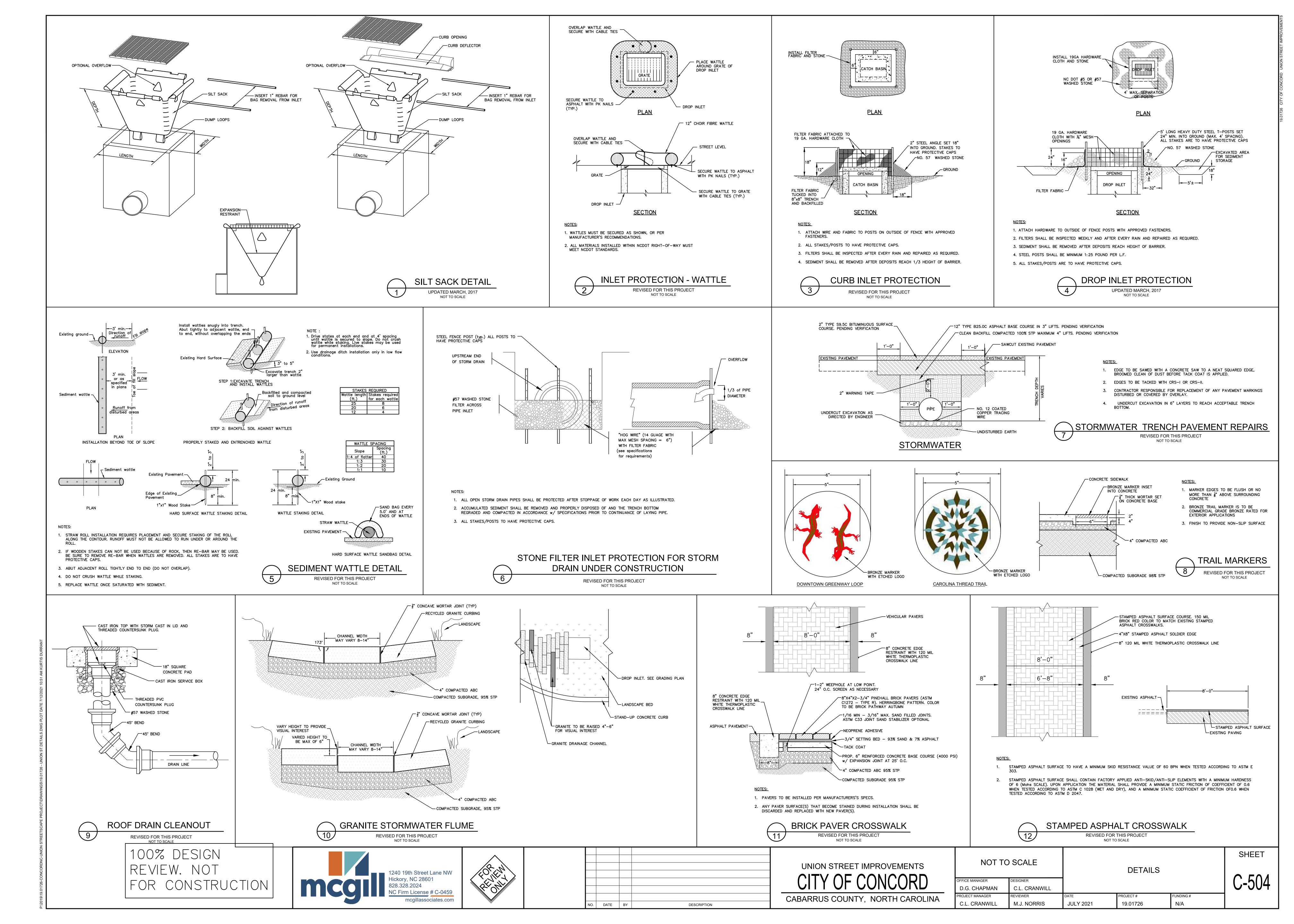
DECK AND LANDING

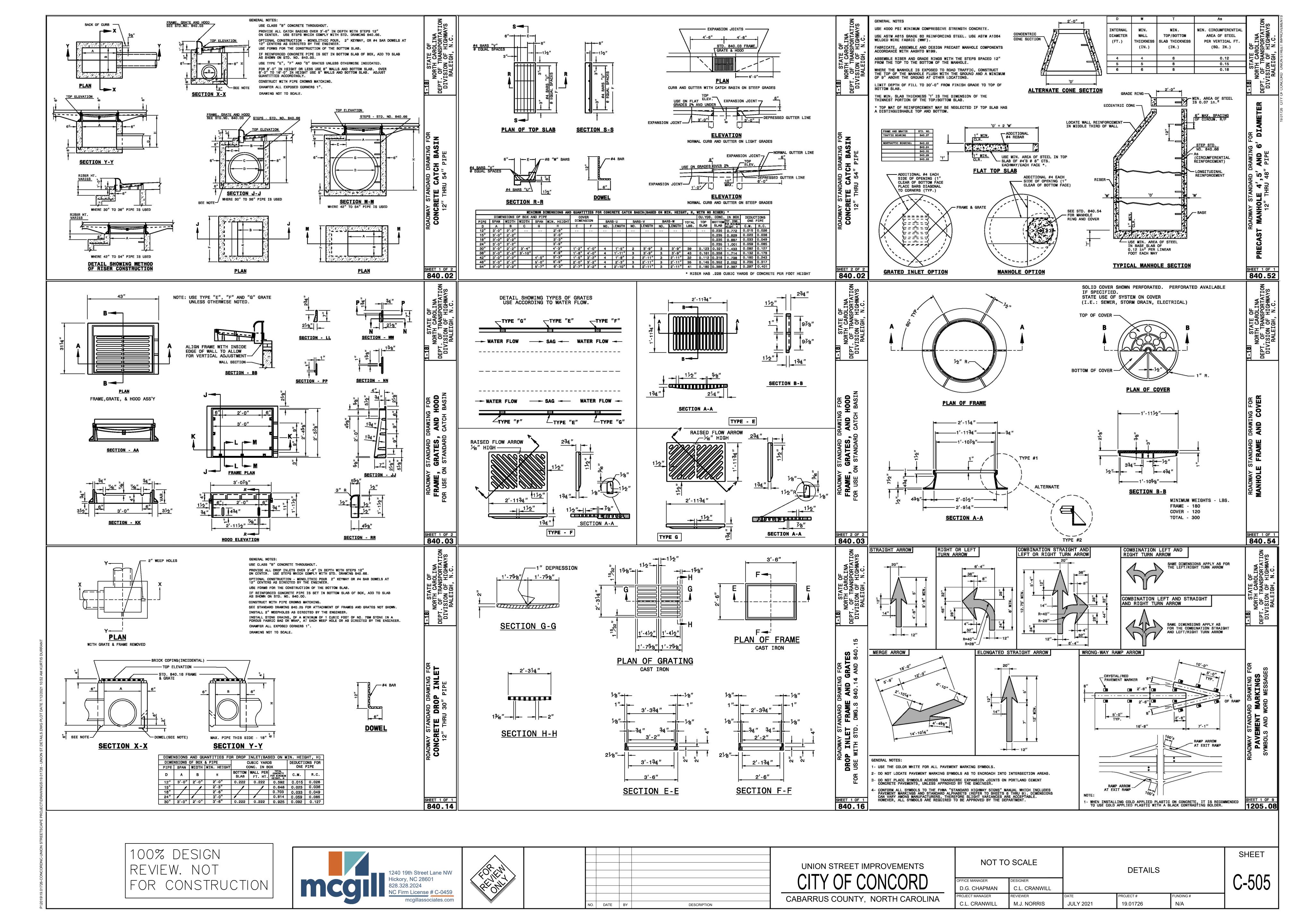
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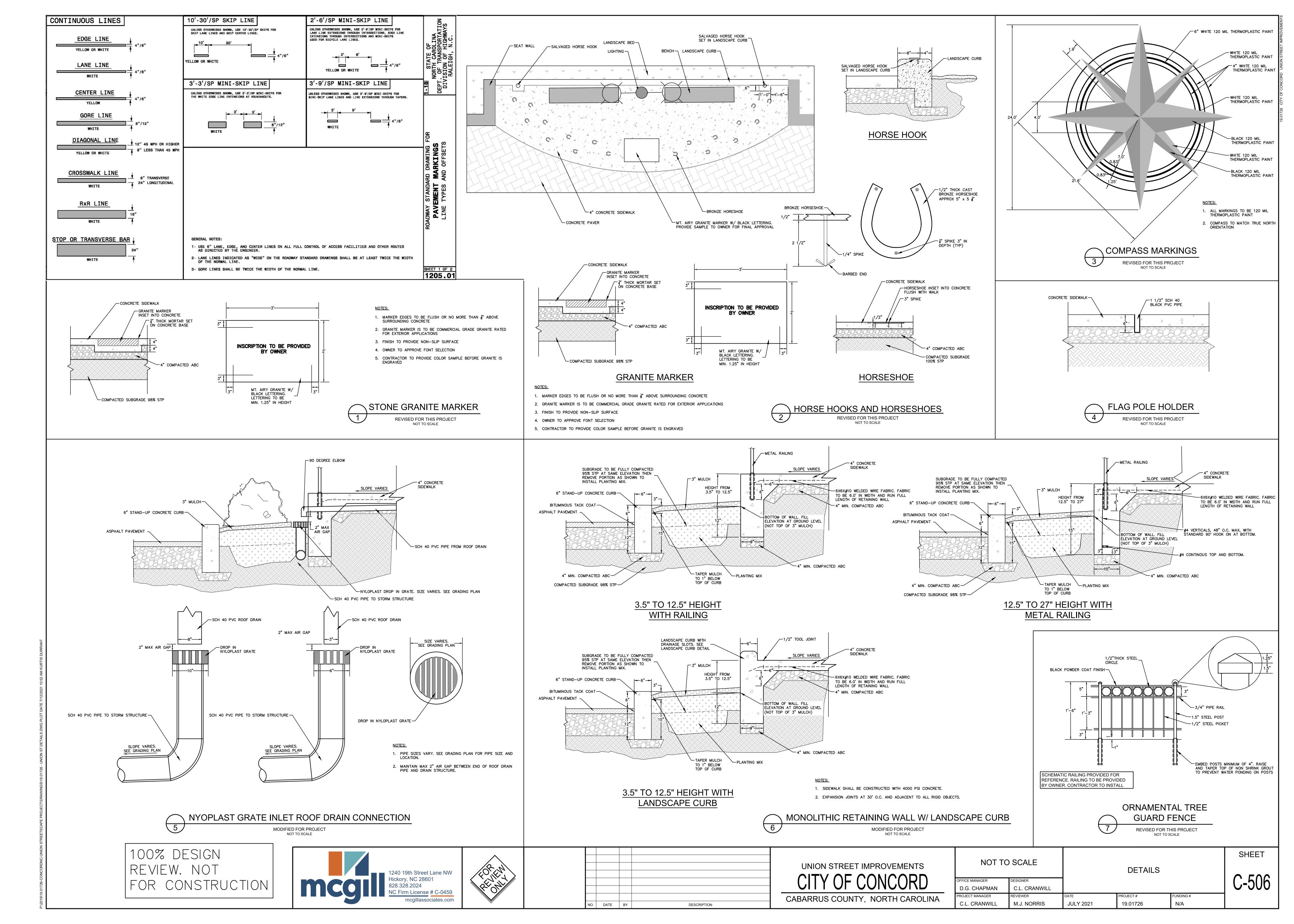
JULY 2021

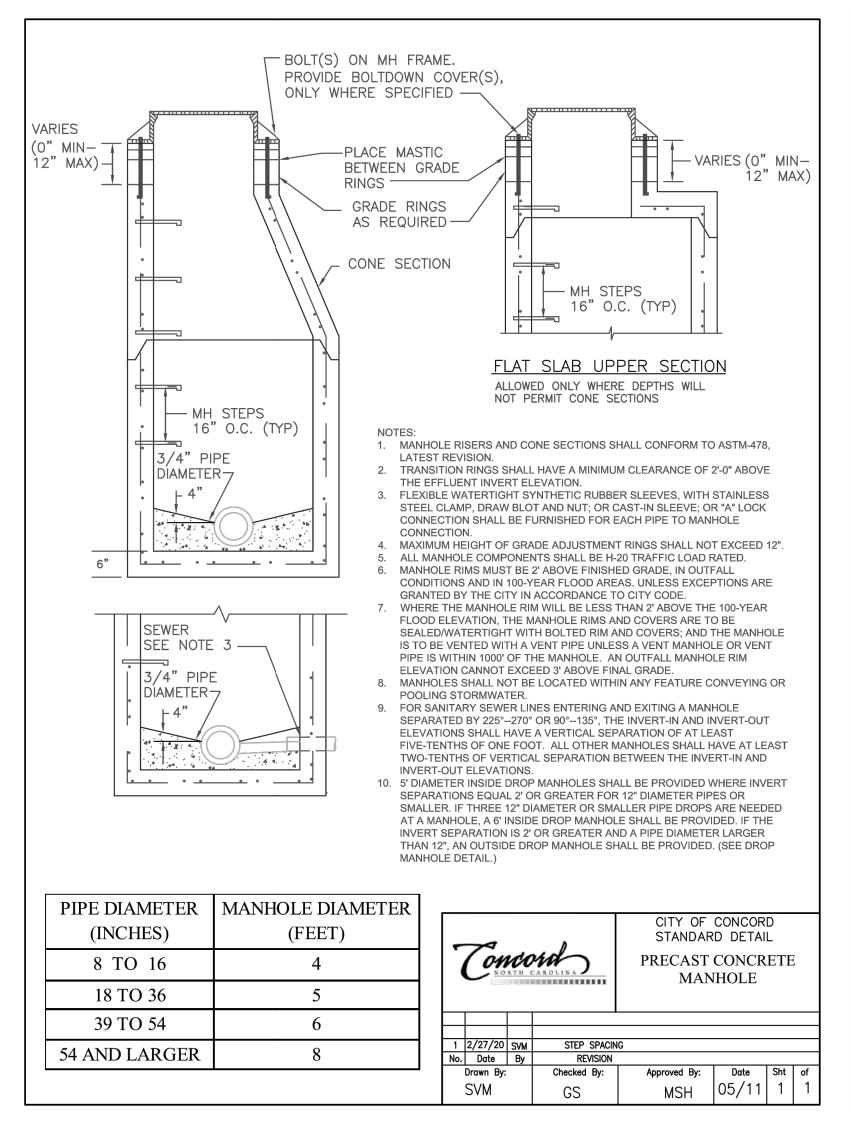
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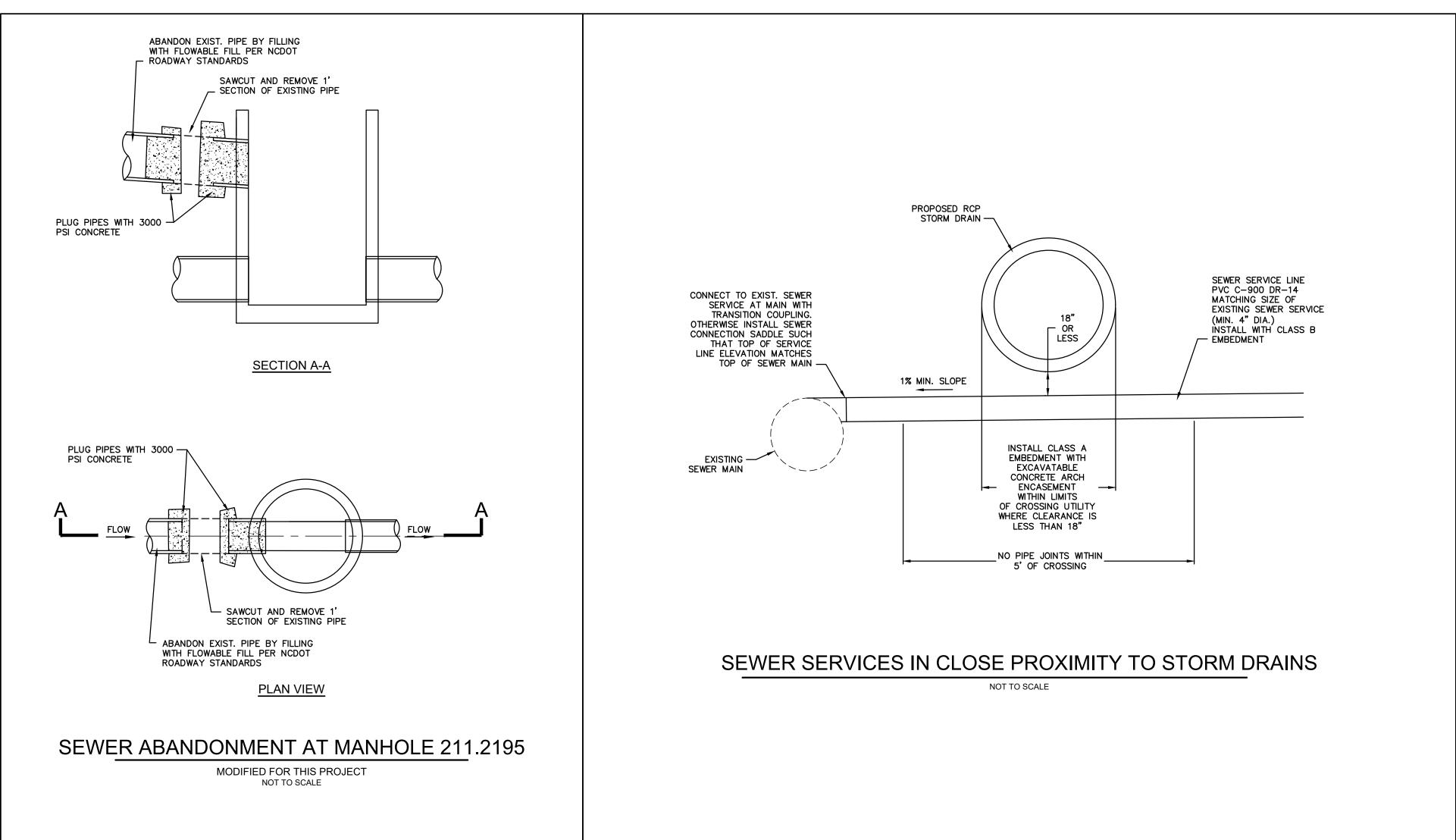
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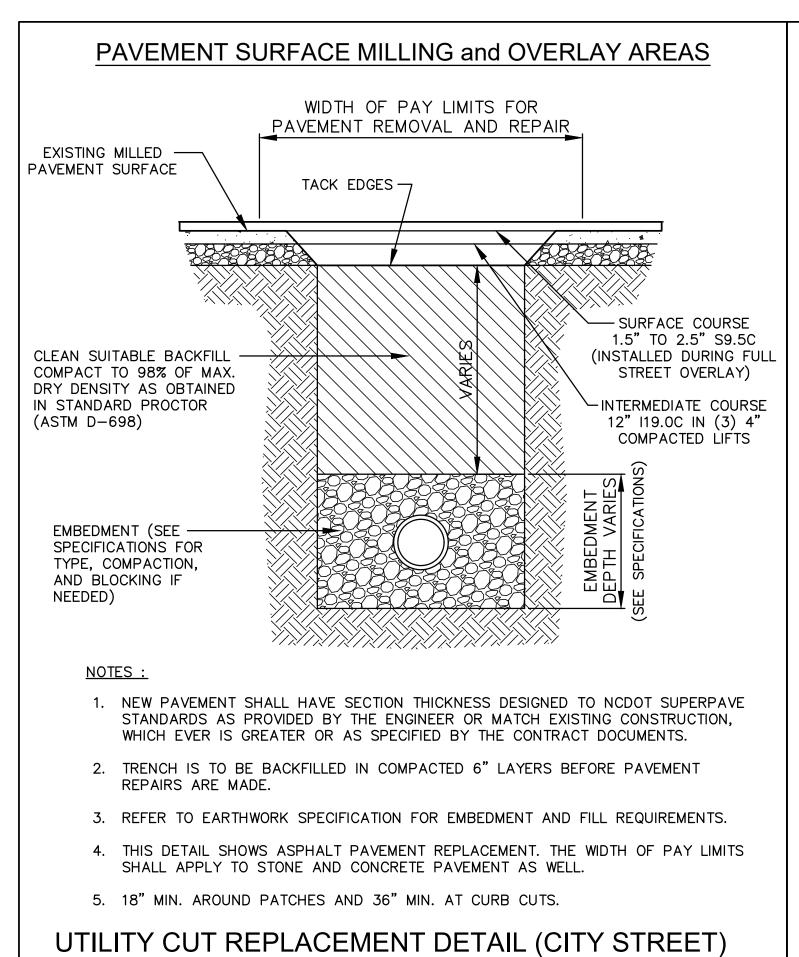






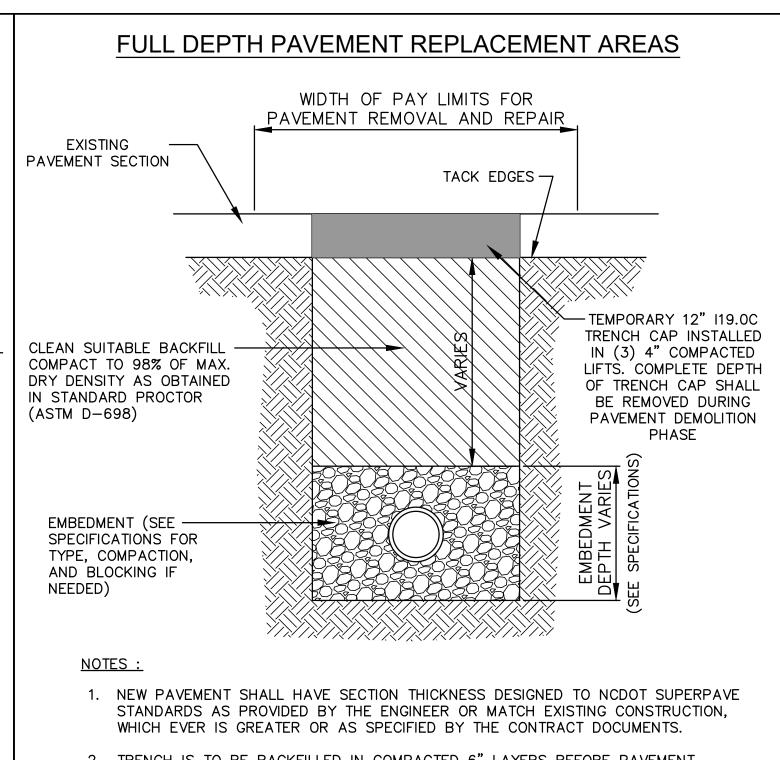






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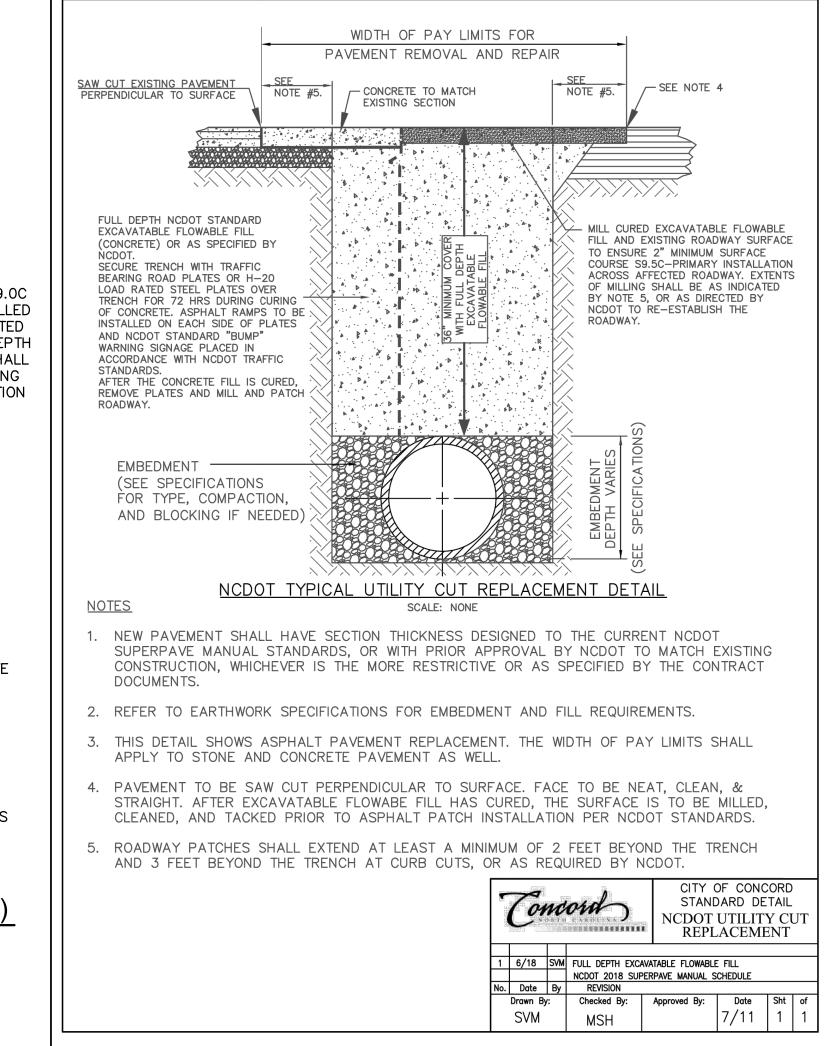


- 2. TRENCH IS TO BE BACKFILLED IN COMPACTED 6" LAYERS BEFORE PAVEMENT REPAIRS ARE MADE.
- 3. REFER TO EARTHWORK SPECIFICATION FOR EMBEDMENT AND FILL REQUIREMENTS.

 4. THIS DETAIL SHOWS ASPHALT PAVEMENT REPLACEMENT. THE WIDTH OF PAY LIMITS.
- 4. THIS DETAIL SHOWS ASPHALT PAVEMENT REPLACEMENT. THE WIDTH OF PAY LIMITS SHALL APPLY TO STONE AND CONCRETE PAVEMENT AS WELL.
- 5. 18" MIN. AROUND PATCHES AND 36" MIN. AT CURB CUTS.

UTILITY CUT REPLACEMENT DETAIL (CITY STREET)

MODIFIED FOR THIS PROJECT
NOT TO SCALE



100% SUBMITTAL
FOR REVIEW, NOT
FOR CONSTRUCTION







NO. DATE BY

DESCRIPTION



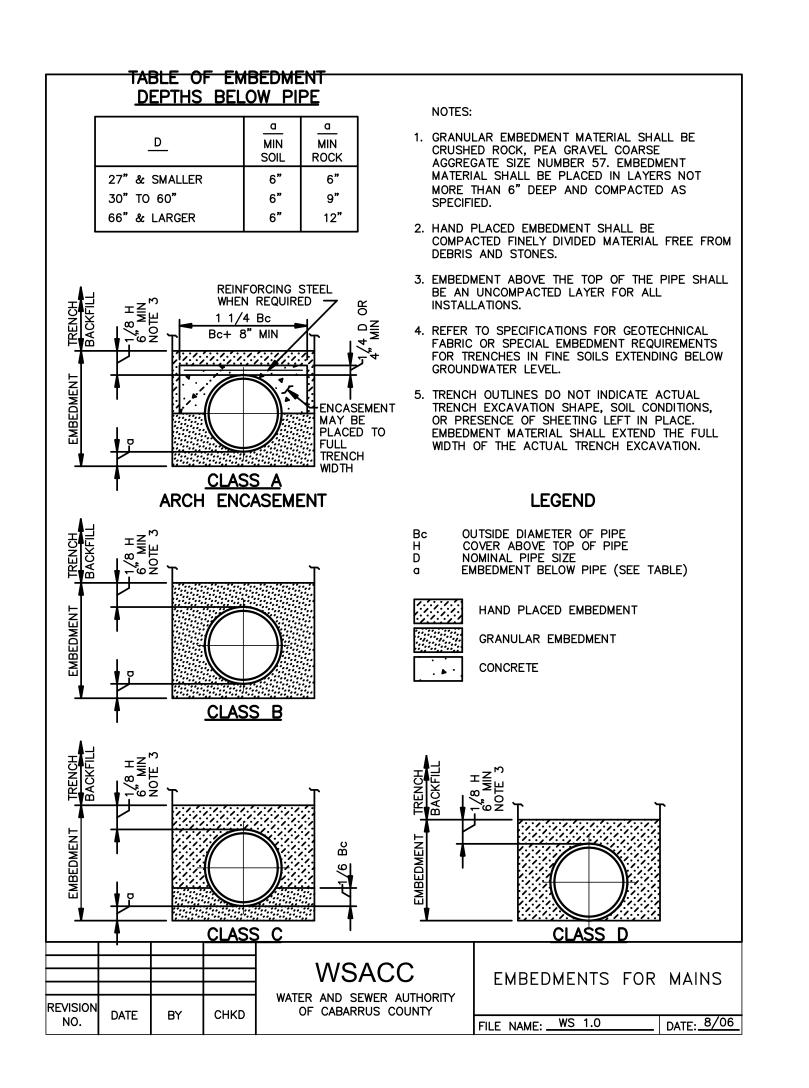
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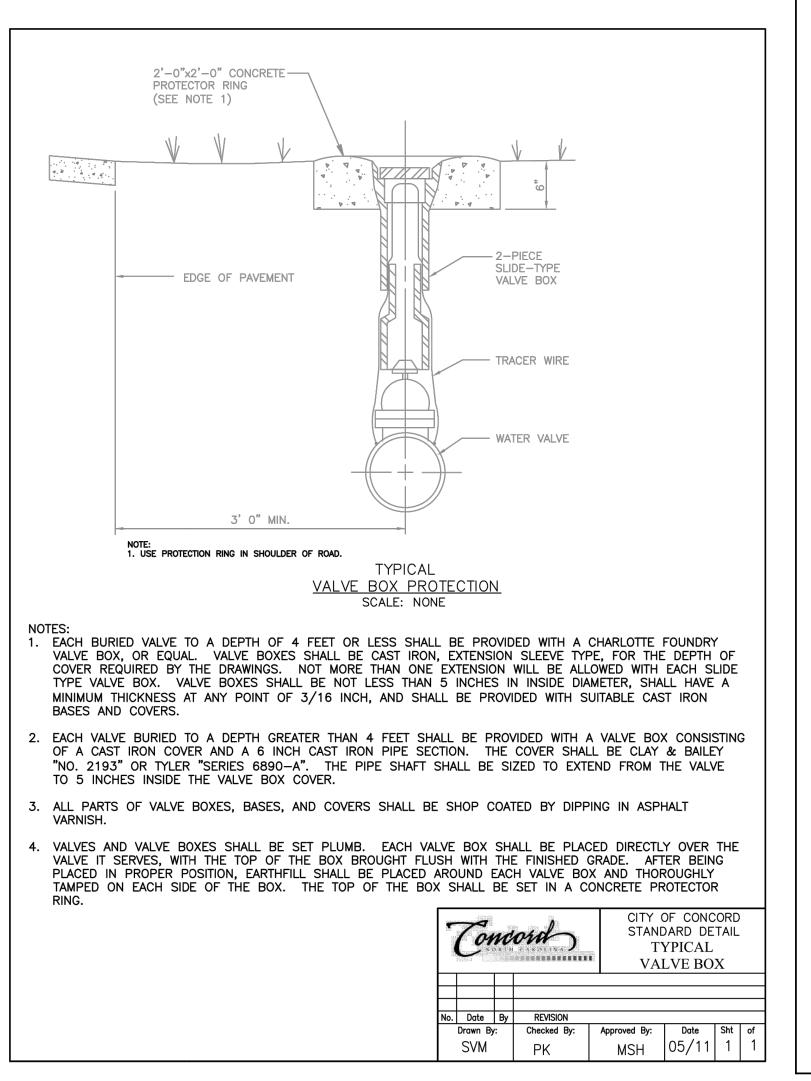
STANDARD UTILITY DETAILS

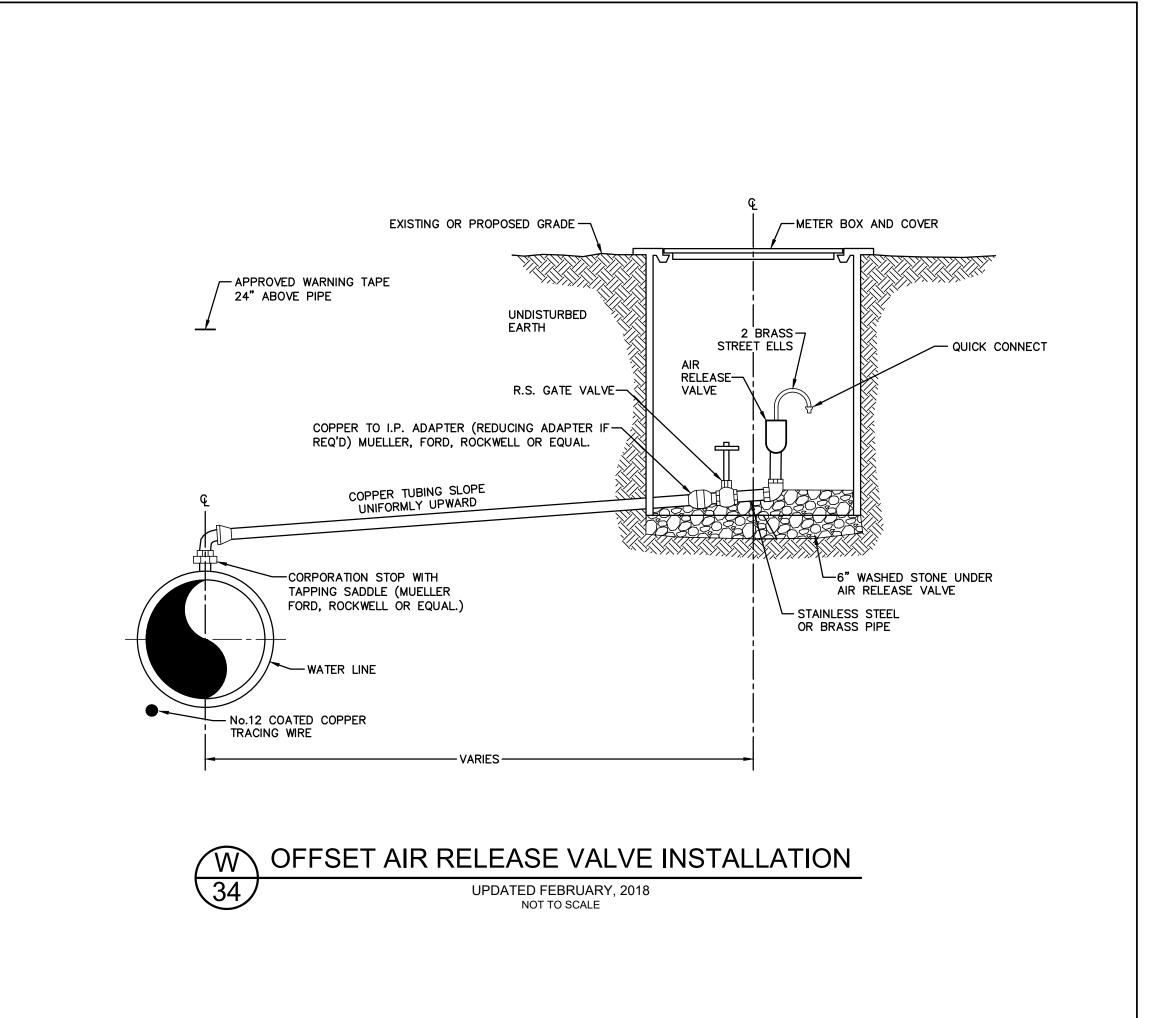
OFFICE MANAGER
D.G. CHAPMAN
M. OETTING

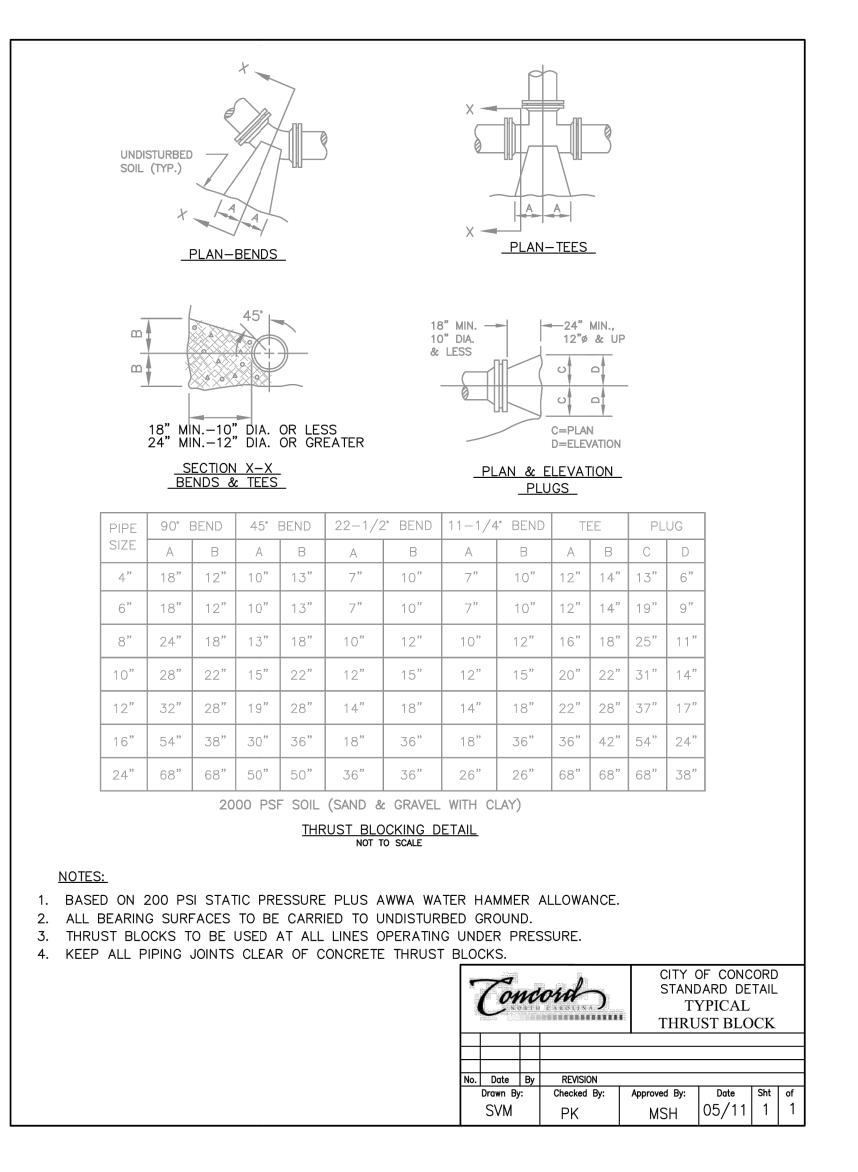
PROJECT MANAGER
REVIEWER
D.G. CHAPMAN
MAY, 2021
19.01726
N/A

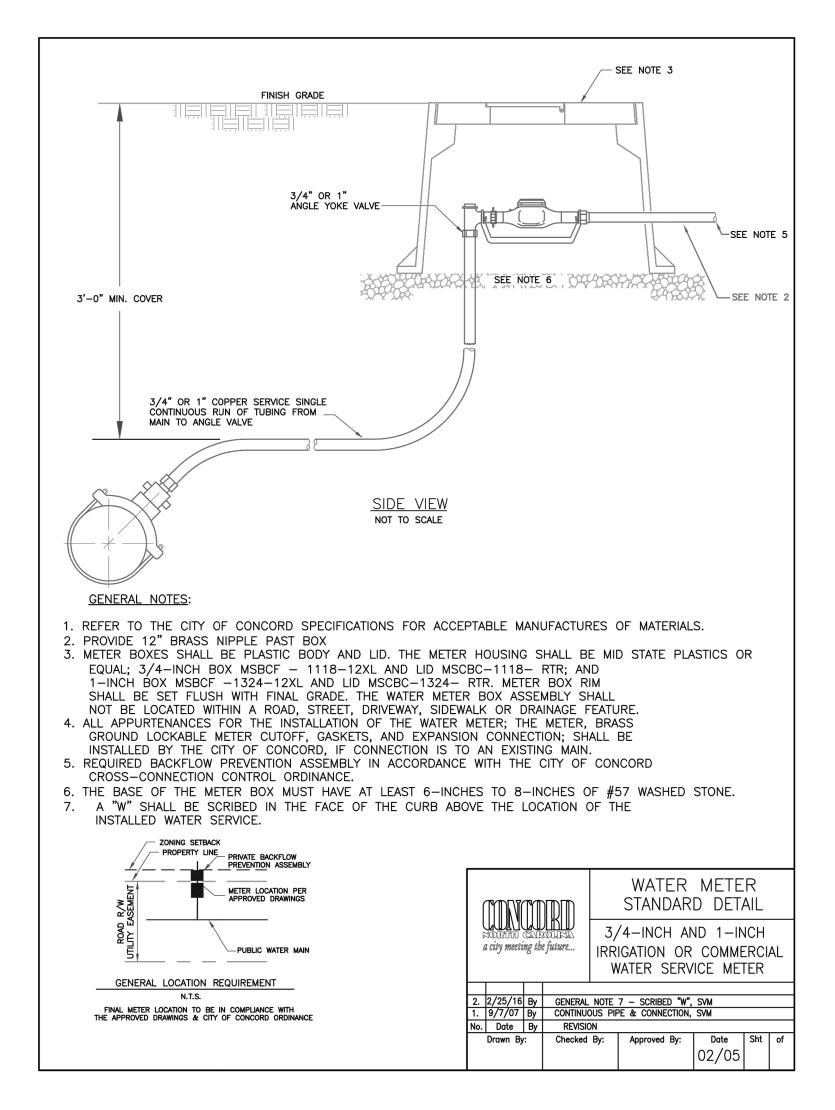
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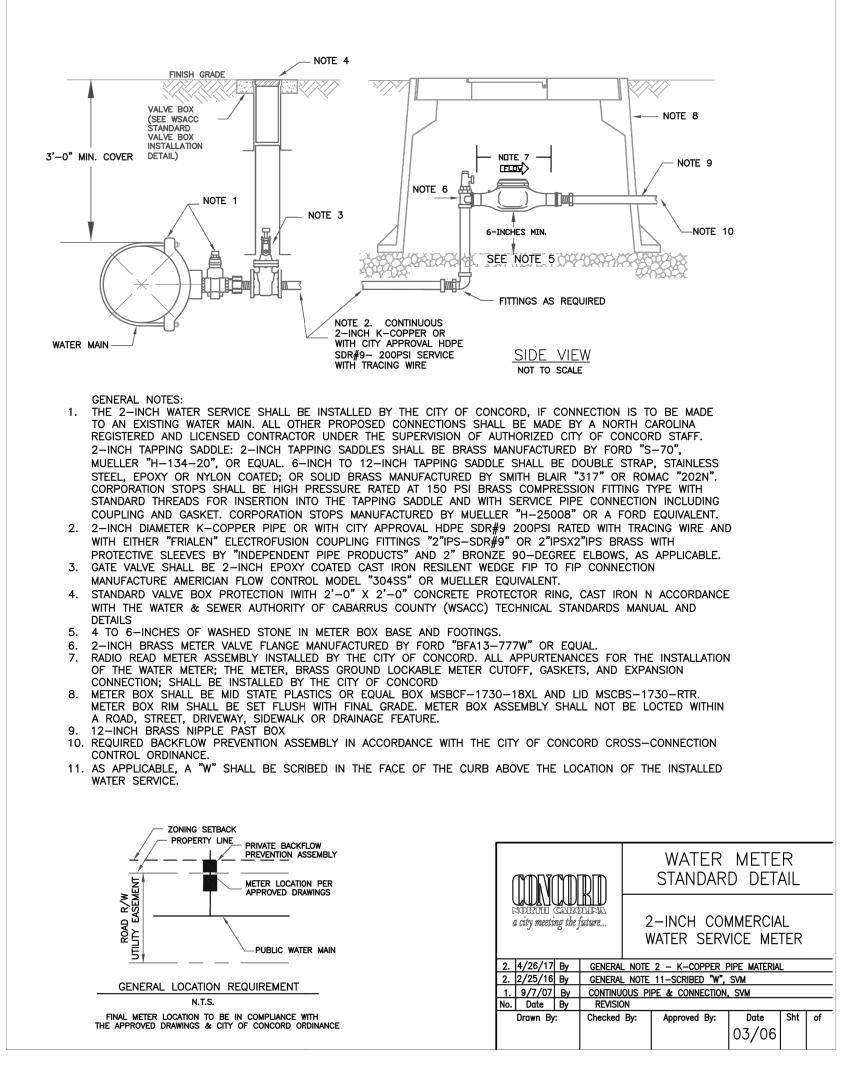


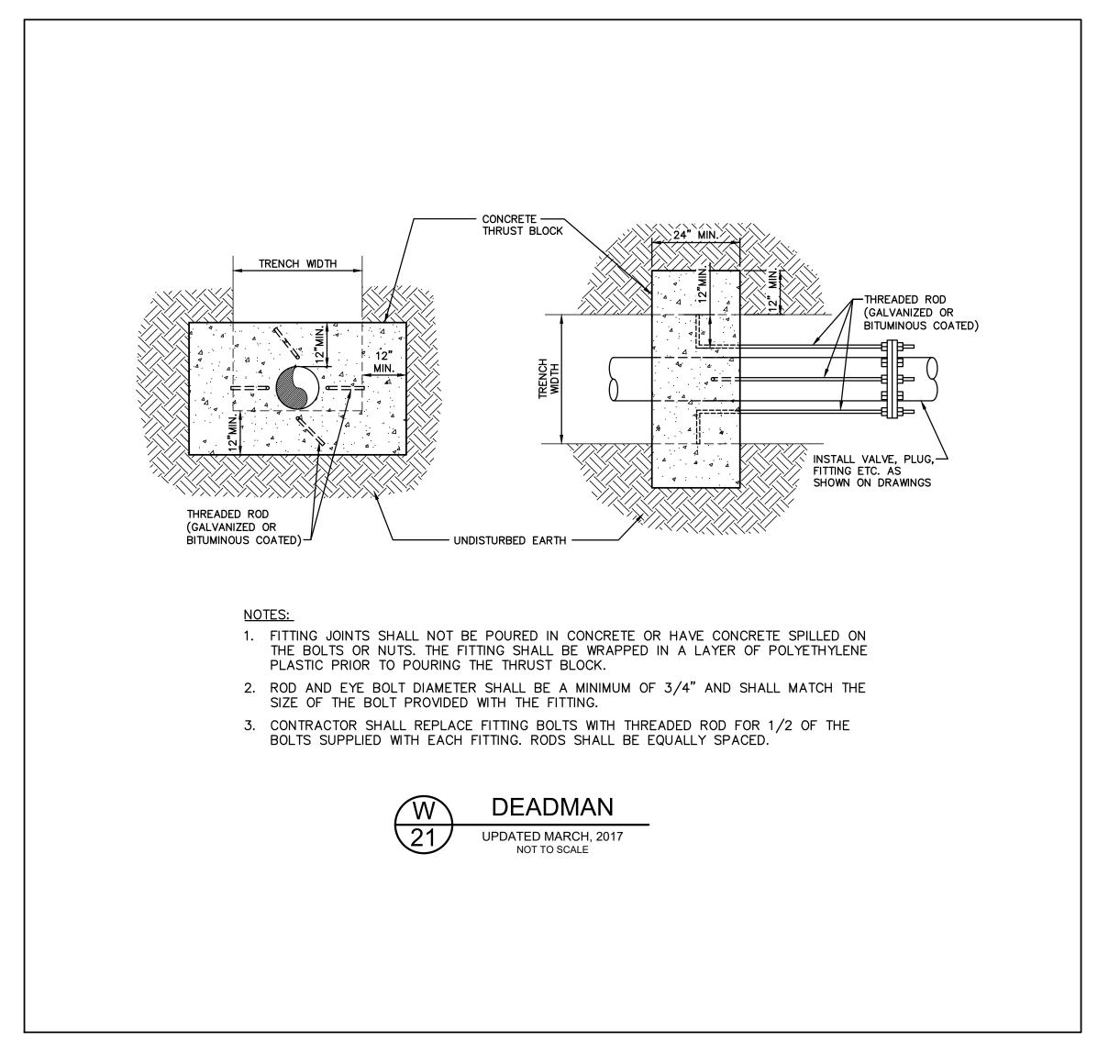












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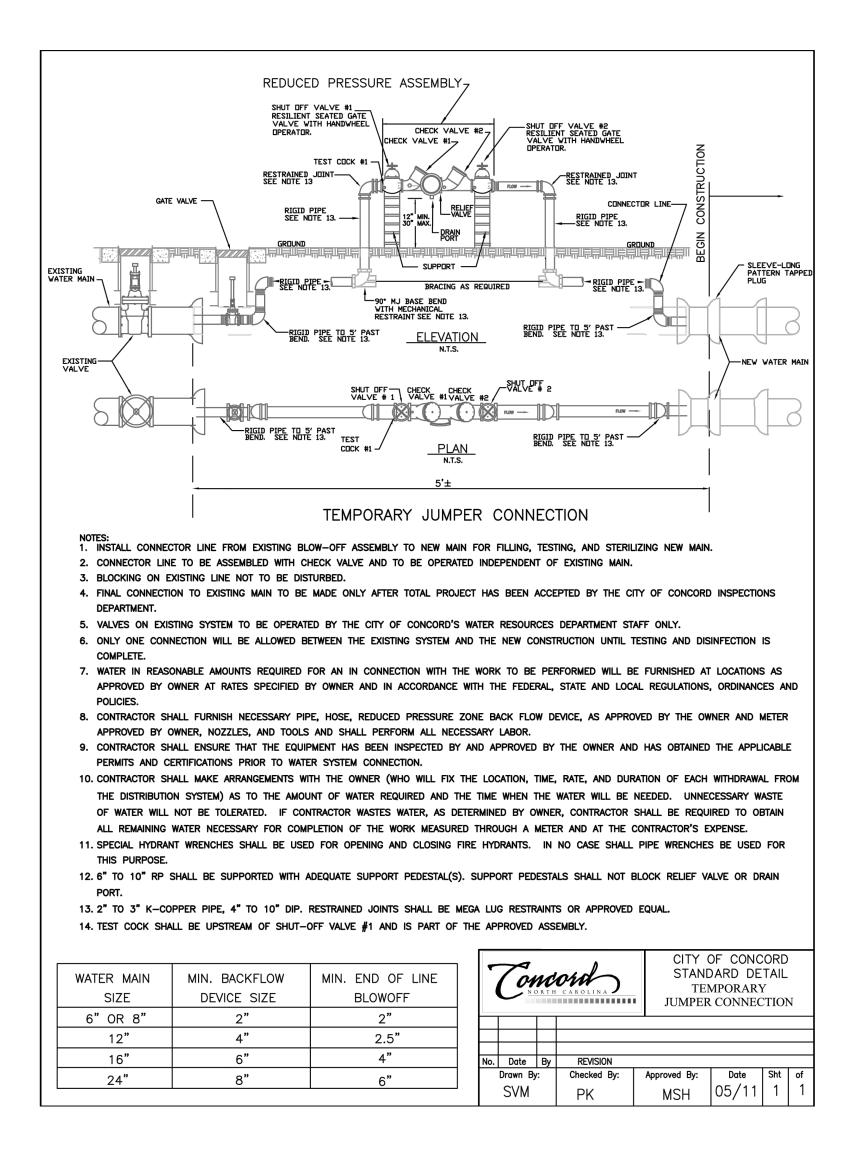


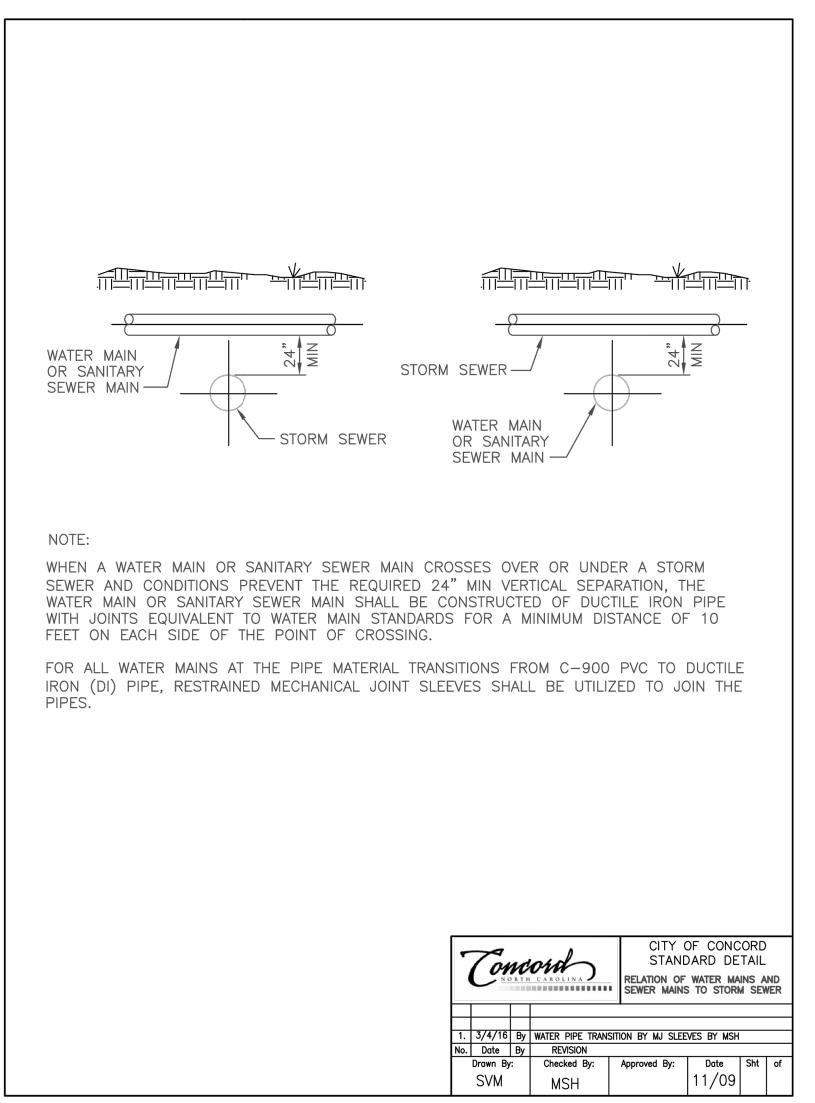
UNION STREET IMPROVEMENTS CITY OF CONCORD CABARRUS COUNTY, NORTH CAROLINA

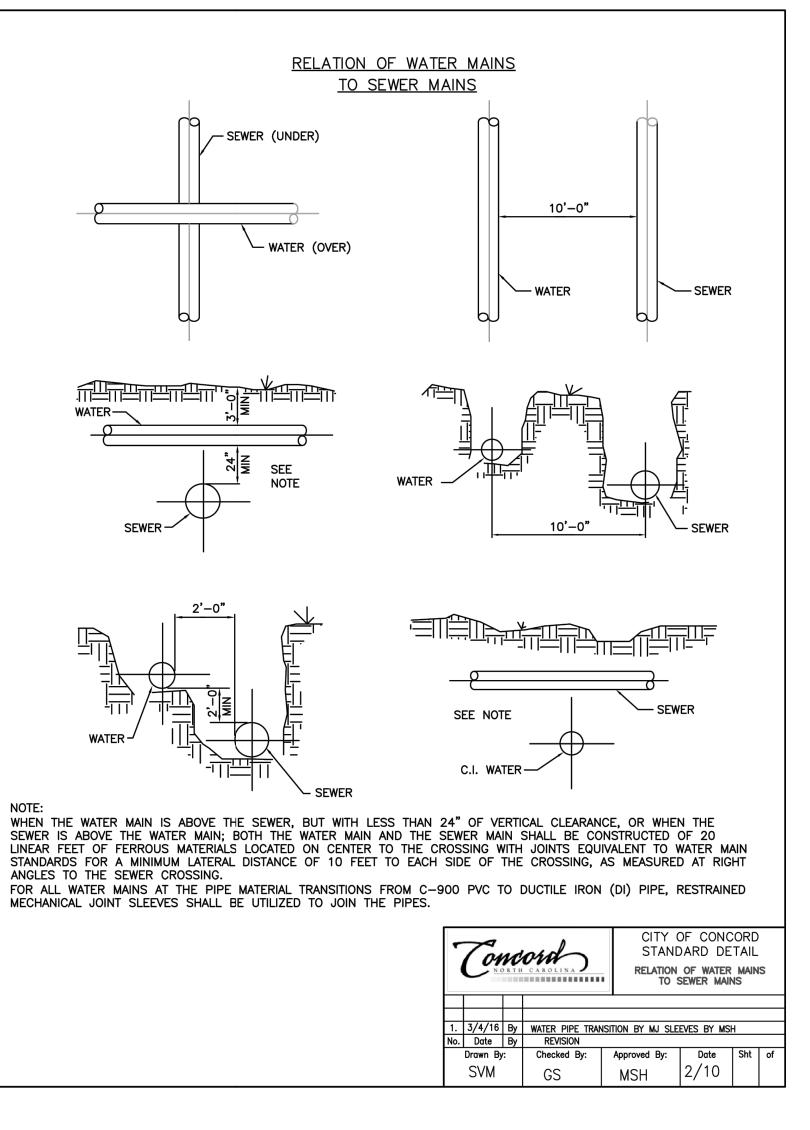
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OFFICE MANAGER	DESIGNER					
D.G. CHAPMAN	M. OETTING					
PROJECT MANAGER	REVIEWER	DATE	PROJECT#	FUNDING #		
M.J. NORRIS	D.G. CHAPMAN	MAY, 2021	19.01726	N/A		

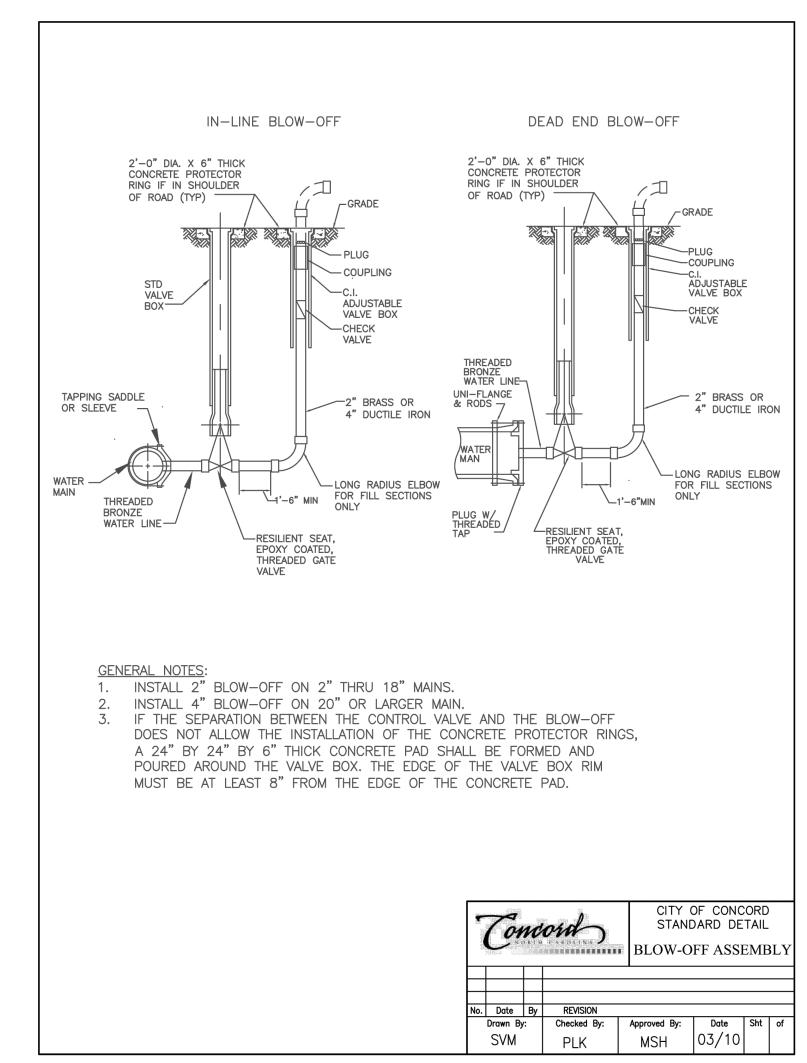
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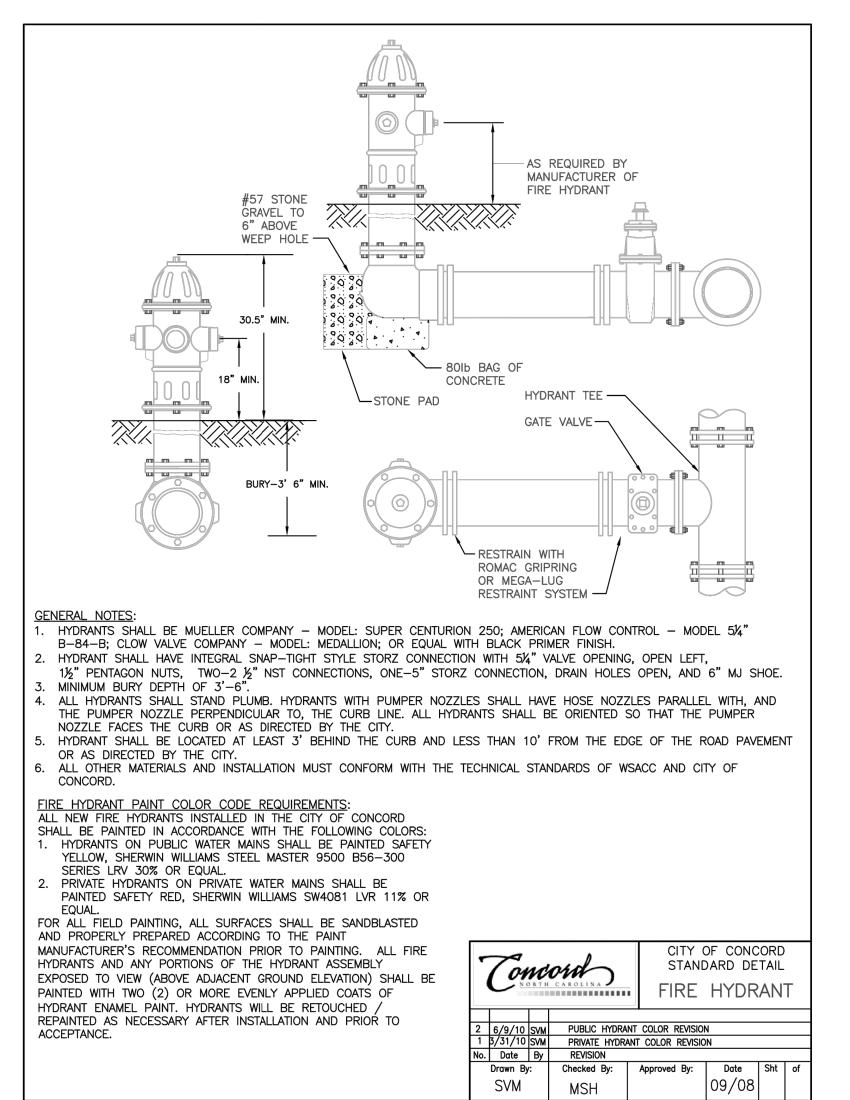
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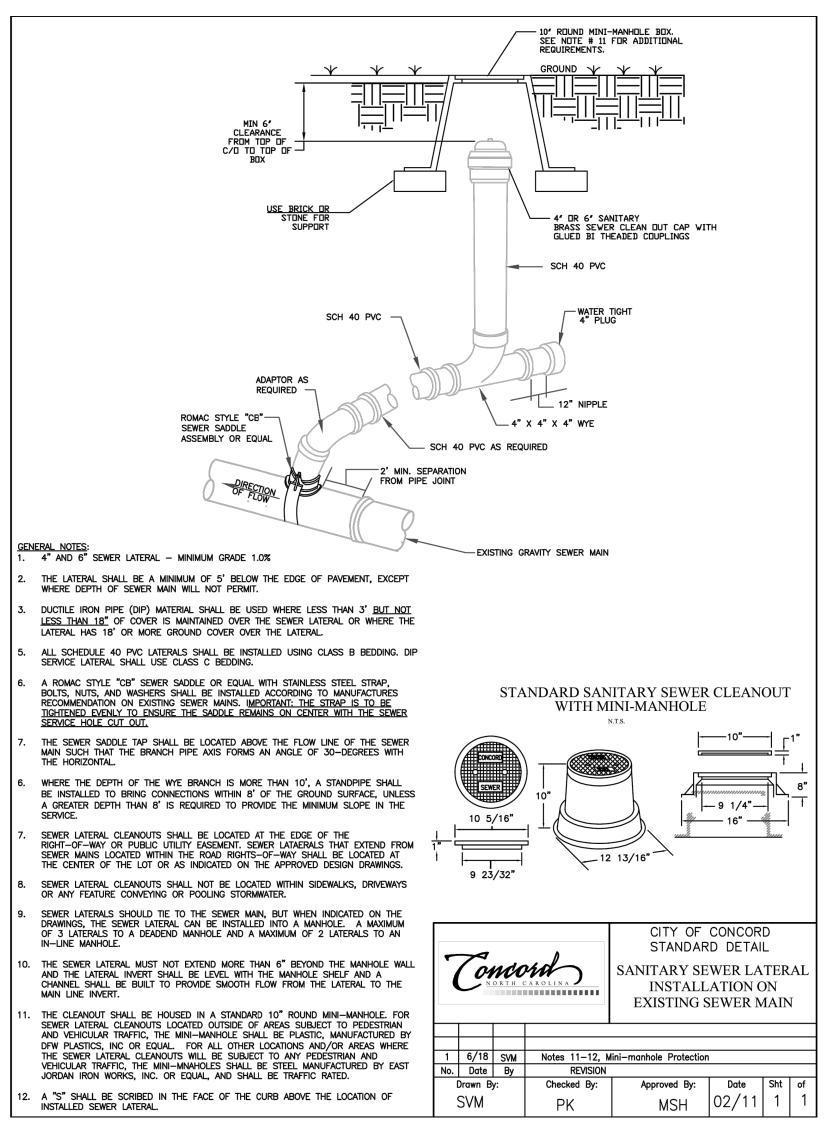


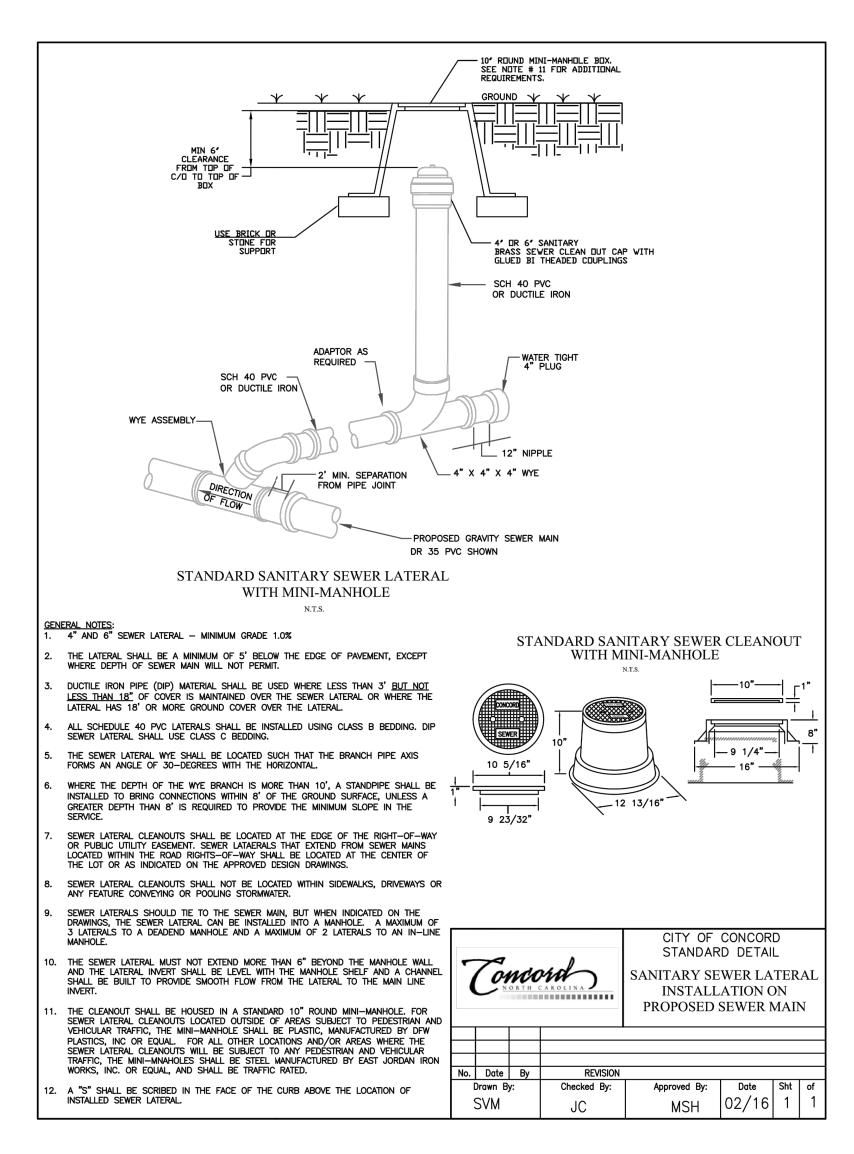


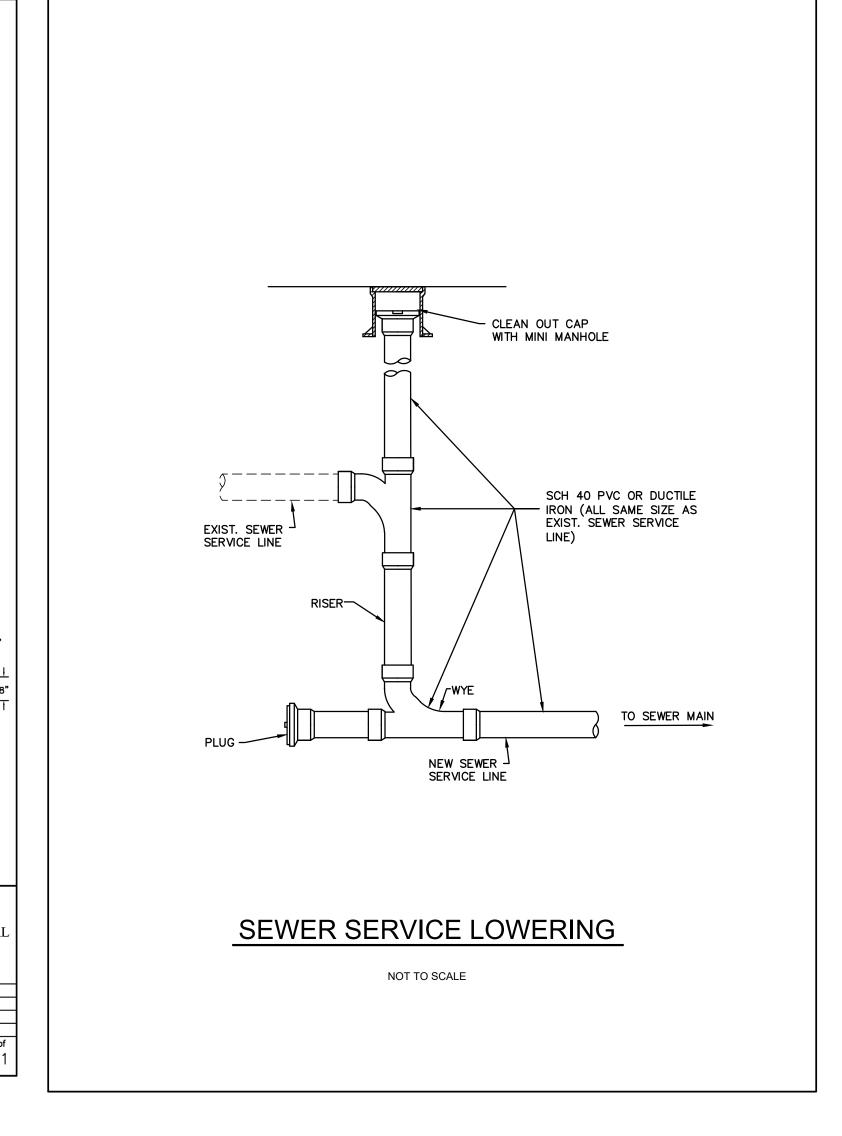












100% SUBMITTAL
FOR REVIEW, NOT
FOR CONSTRUCTION







NO. DATE

DESCRIPTION



NOT TO SCALE

STANDARD UTILITY DETAILS

DEFICE MANAGER

D.G. CHAPMAN

M. OETTING

PROJECT MANAGER

REVIEWER

D.G. CHAPMAN

MAY, 2021

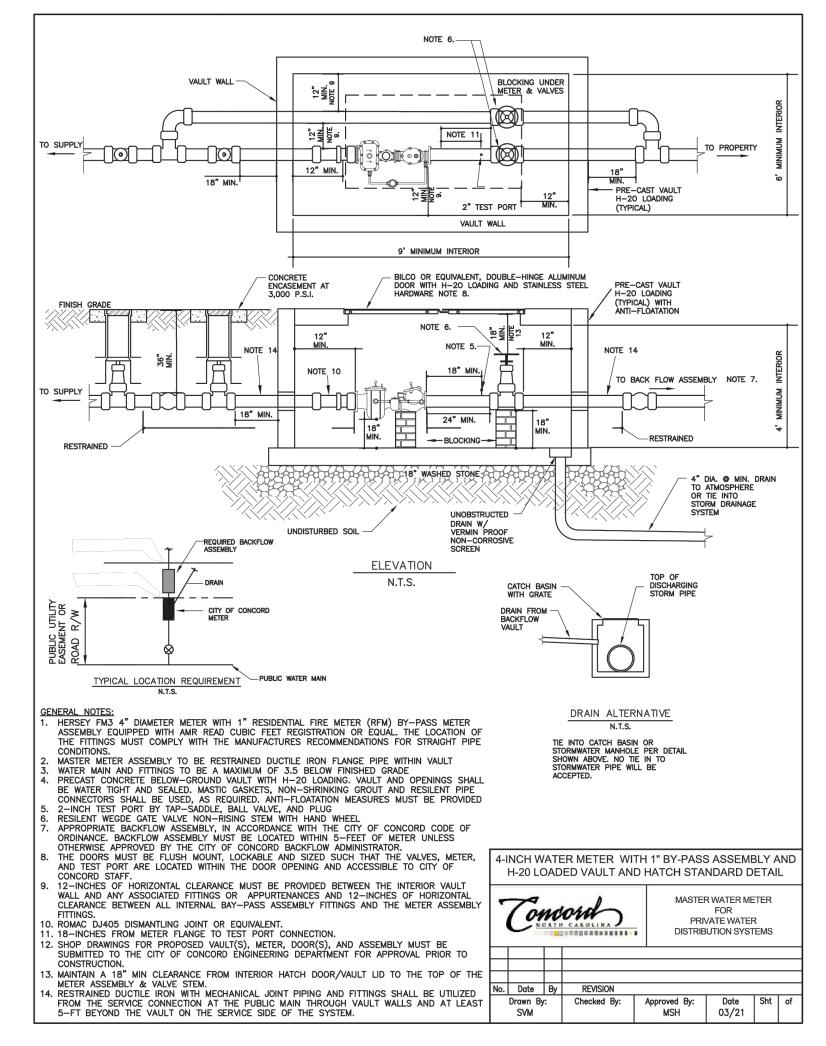
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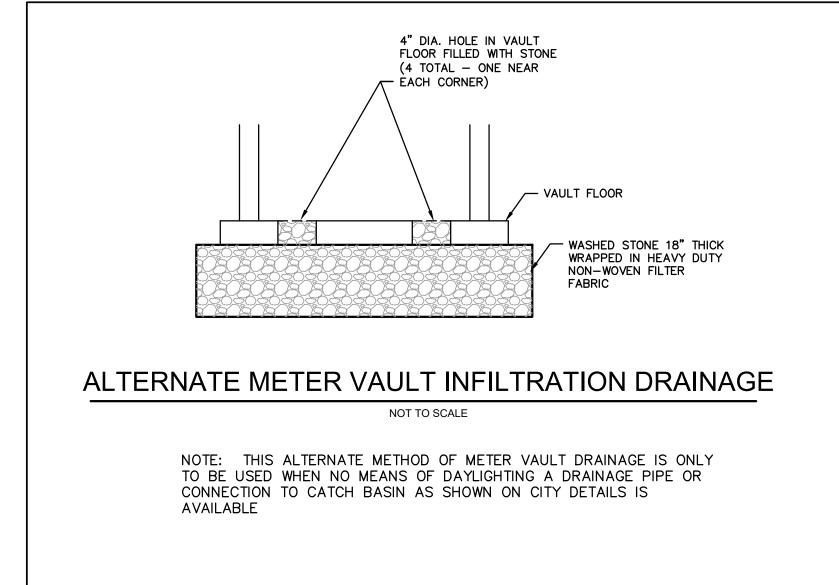
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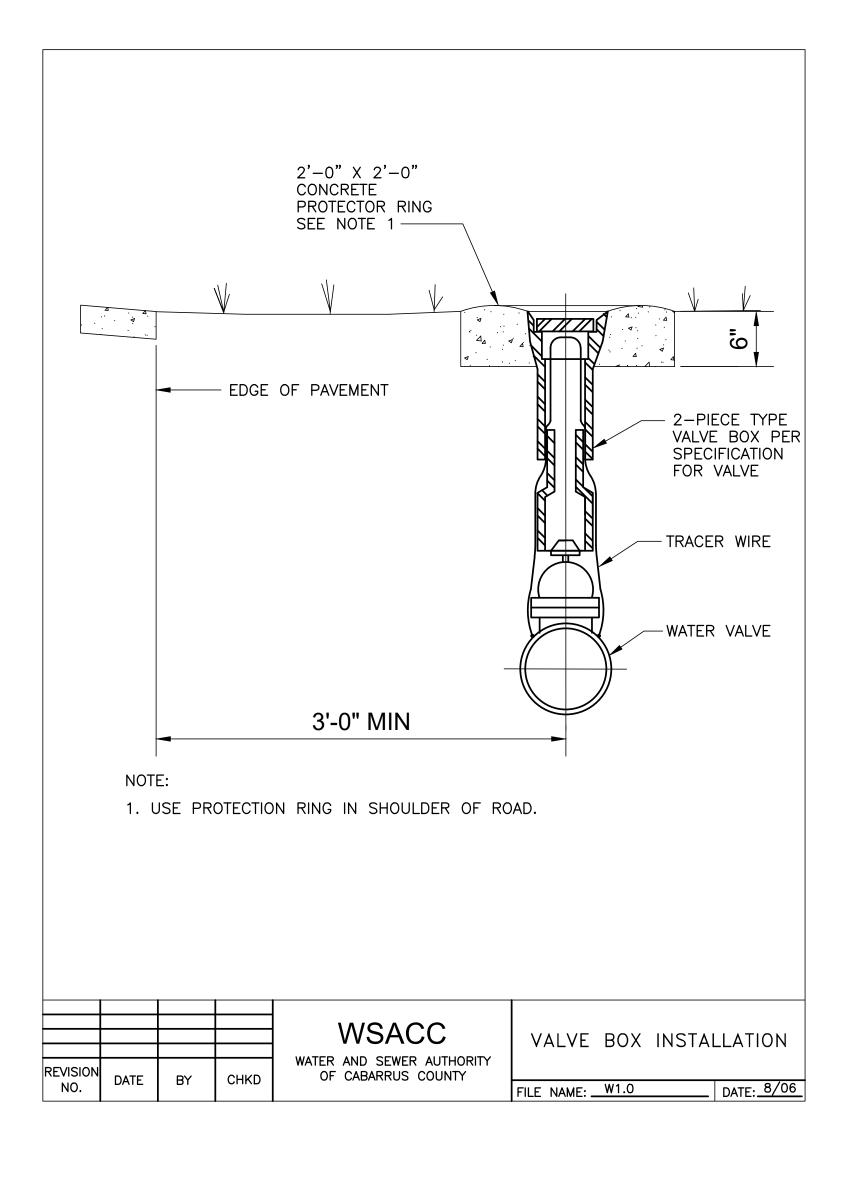
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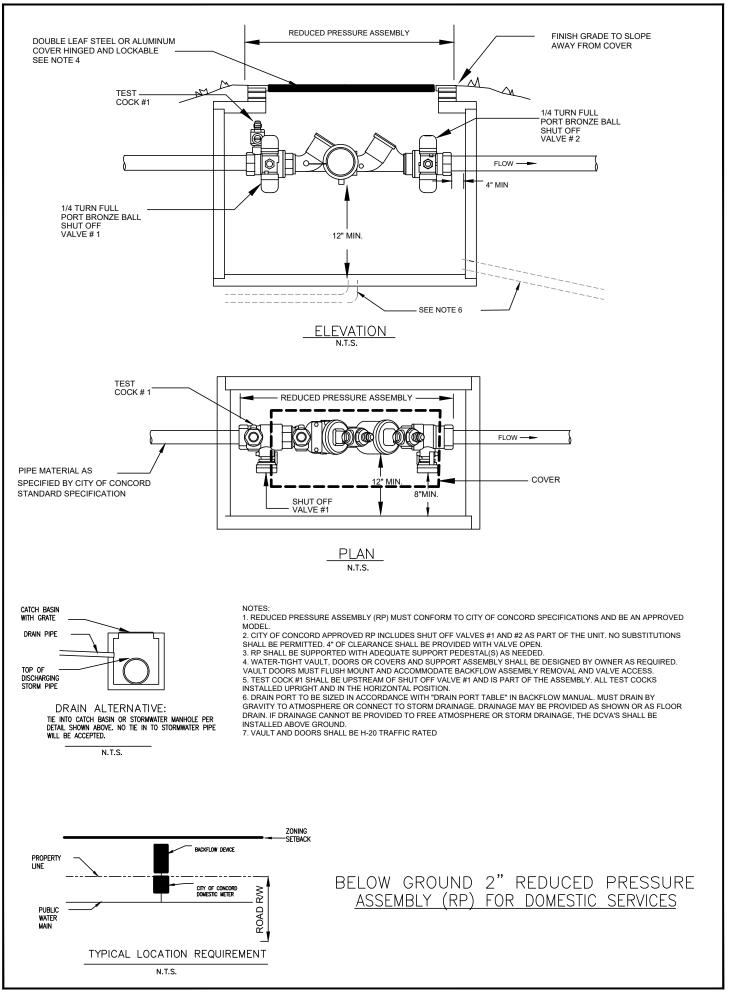
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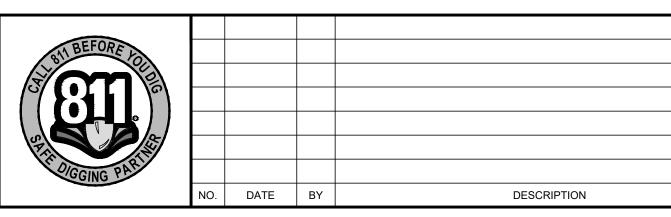




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FOR REVIEW, NOT
FOR CONSTRUCTION







CITY OF CONCORD

CABARRUS COUNTY, NORTH CAROLINA

NOT TO	SCALE	STANDARD UTILITY DETAILS				
FICE MANAGER	DESIGNER					
D.G. CHAPMAN	M. OETTING					
OJECT MANAGER REVIEWER		DATE	PROJECT#	FUNDING #		
M.J. NORRIS	D.G. CHAPMAN	MAY, 2021	19.01726	N/A		

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APPENDIX C

NCDEQ EROSION CONTROL PLAN LETTER OF APPROVAL

ROY COOPER Governor

JOHN NICHOLSON Interim Secretary

BRIAN WRENN Director



June 14, 2021

LETTER OF APPROVAL

City of Concord

Attention: Lloyd Payne, City Manager

35 Cabarrus Avenue West

Concord, North Carolina 28025

RE:

Project Name: Union Street Improvements

Acres Approved: 3.5

Project ID: CABAR-2021-074

County: Cabarrus City: Concord

Address: Union street

River Basin: Yadkin-PeeDee Stream Classification: Other Submitted By: City of Concord

Date Received by LQS: May 21, 2021

Plan Type: New

Dear Mr. Payne:

This office has reviewed the subject erosion and sedimentation control plan. We find the plan to be acceptable and hereby issue this Letter of Approval. The enclosed Certificate of Approval must be posted at the job site. This plan approval shall expire three (3) years following the date of approval, if no land-disturbing activity has been undertaken, as is required by Title 15A NCAC 4B .0129.

As of March 1, 2019, all new construction activities are required to complete and submit an electronic Notice of Intent (NOI) form requesting a Certificate of Coverage (COC) under the NCG010000 Construction Stormwater General Permit. This form MUST be submitted prior to the commencement of any land disturbing activity on the above named project. The NOI form may be accessed at deq.nc.gov/NCG01. Please direct questions about the NOI form to Annette Lucas at Annette.lucas@ncdenr.gov or Paul Clark at Paul.clark@ncdenr.gov. After you submit a complete and correct NOI Form, a COC will be emailed to you within three business days. Initially, DEMLR will not charge a fee for coverage under the NCG01 permit. However, on or after May 1, 2019, a \$100 fee will be charged annually. This fee is to be sent to the DEMLR Stormwater Central Office in Raleigh.

Title 15A NCAC 4B .0118(a) and the NCG01 permit require that the following documentation be kept on file at the job site:

- 1. The approved E&SC plan as well as any approved deviation.
- 2. The NCG01 permit and the COC, once it is received.



Letter of Approval City of Concord June 14, 2021 Page 2 of 2

3. Records of inspections made during the previous 30 days.

Also, this letter gives the notice required by G.S. 113A-61.1(a) of our right of periodic inspection to insure compliance with the approved plan.

North Carolina's Sedimentation Pollution Control Act is performance-oriented, requiring protection of existing natural resources and adjoining properties. If, following the commencement of this project, the erosion and sedimentation control plan is inadequate to meet the requirements of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statute 113A-51 through 66), this office may require revisions to the plan and implementation of the revisions to insure compliance with the Act.

Acceptance and approval of this plan is conditioned upon your compliance with Federal and State water quality laws, regulations, and rules. In addition, local city or county ordinances or rules may also apply to this land-disturbing activity. This approval does not supersede any other permit or approval.

Please note that this approval is based in part on the accuracy of the information provided in the Financial Responsibility Form, which you provided. You are requested to file an amended form if there is any change in the information included on the form. In addition, it would be helpful if you notify this office of the proposed starting date for this project.

Your cooperation is appreciated.

Sincerely,

Christopher Graybeal

Christopher Graybeal Assistant Regional Engineer Land Quality Section

Enclosures:

Certificate of Approval

NCG01 Fact Sheet

c:

McGill 1240 19th Street Lane NW Hickory, North Carolina 28601

Inspection Department

APPENDIX D

FINANCIAL RESPONSIBILITY/ OWNERSHIP FORM

FINANCIAL RESPONSIBILITY/OWNERSHIP FORM SEDIMENTATION POLLUTION CONTROL ACT

No person may initiate any land-disturbing activity on one or more acres as covered by the Act before this form and an acceptable erosion and sedimentation control plan have been completed and approved by the Land Quality Section, N.C. Department of Environmental Quality. Submit the completed form to the appropriate Regional Office. (Please type or print and, if the question is not applicable or the e-mail and/or fax information unavailable, place N/A in the blank.)

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1.	Project Name <u>L</u>	Inion Street Impro	ovements						
2.	Location of land-dis	turbing activity: (County: <u>Ca</u>	abarrus	City o	r Township	o: <u>Concor</u>	d	
	Highway/Street <u>l</u>	Jnion Street	La	titude_	35d24'38.5	<u>54" N</u> L	ongitude_	80d34	<u>52.41W</u>
3.	Approximate date la	and-disturbing ac	tivity will co	ommen	ce: <u>June</u>	2021			
4.	Purpose of develop	ment (residential	, commerc	ial, indu	ustrial, instit	utional, etc	:.):_ <u>Munici</u>	ipal	
5.	Total acreage distu	rbed or uncovere	d (includin	g off-sit	e borrow ar	nd waste ai	reas): <u>3</u>	3.5	
6.	Amount of fee encl up to the next acre	osed: \$ <u>260.0</u> 0) is assessed with	0 nout a ceili	ing amo	The appl ount (Exam	ication fee ple: a 9-ac	of \$65.00 re applica	per acre	(rounded is \$585).
7.	Has an erosion and	l sediment contro	l plan beer	n filed?	Yes	No	En	closed _	<u>X</u>
8.	Person to contact s	hould erosion and	d sedimen	t contro	l issues aris	e during la	ınd-disturb	oing acti	vity:
	Name		 	E-ma	il Address_				· · · · · · · · · · · · · · · · · · ·
	Telephone		Cell # _			_ F	ax #		
9.	Landowner(s) of Re	ecord (attach acco	ompanied	page to	list addition	nal owners	١٠		
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	Name			E-mail Address		
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APPENDIX E

ABATEMENT AC PIPE PROJECT GUIDELINES



ABATEMENT OF ASBESTOS CEMENT PIPING GUIDELINES AND PROCEDURES CITY OF CONCORD WATERLINES - VARIOUS QUANTITIES VARIOUS LOCATIONS CONCORD, NORTH CAROLINA

PROJECT SUMMARY

PROJECT NAME: Abatement of Asbestos Cement Water Piping

PROJECT LOCATION: Various Locations; Concord, North Carolina

OWNER: City of Concord

Post Office Box 308

Concord, North Carolina 28026-0308

CLIENT CONTACT: Enrique Blat, P.E. or Carolina Garcia-Zaragoza, P.E.

DATE: 3 December 2019

SCOPE OF WORK: Periodic abatement of varying lengths (9 to 13 linear feet) of asbestos cement pipe

and coupling collars.

Guidelines for the asbestos abatement procedures are attached.

PREPARED BY: DeWitt Whitten, REM, CES, REPA, CESCO

NC Asbestos Project Designer #40459



GENERAL PROJECT GUIDELINES

A. GENERAL

- 1. The asbestos abatement contractor (Contractor) will be a licensed general contractor in either the specialty interior, building, unclassified, or asbestos categories by the North Carolina Licensing Board of General Contractors and limited for the bid amount.
- 2. The Contractor shall be responsible for visiting the site, prior to bidding, to confirm the scope of the work. Any quantities provided by the Owner (City of Concord) are done so as approximations. No additional contract price adjustments will be allowed due to variances between actual quantities and the estimated quantities listed herein. Should additional ACM be discovered during abatement activities, which was not previously identified, the contractor shall immediately notify the Owner.
- 3. The Contractor shall furnish and is responsible for all costs including but not limited to: permit fees, containment preparation, labor, materials, services, insurance, bonding, and equipment necessary to perform and complete the asbestos abatement/removal and disposal of all asbestos containing materials in accordance with the plans and specifications, applicable EPA and OSHA regulations, and any applicable state and local government regulations.
- 4. The Contractor has and assumes the responsibility of proceeding in such a manner that he offers his employees and others a workplace free of recognized hazards causing or likely to cause death or serious injury. The Contractor shall be responsible for performing this abatement and disposal so that airborne asbestos fibers levels do not exceed established protective levels.
- 5. The Contractor will be responsible for all costs, including additional visits and analytical fees, should the Owner's air monitoring firm determines that the Contractor failed a visual clearance inspection.

B. PERSONNEL

Supervisor

- a. All supervisors shall be currently accredited by the NC HHCU for asbestos abatement.
- b. All supervisors on the project shall have a minimum of two years experience in the administration and supervision of asbestos abatement projects including



work practices, protective measures for building and personnel, disposal procedures, etc.

- c. One supervisor shall be provided for every ten (10) workers at the project site during work hours. A minimum of one supervisor shall be present at the project site during all work hours.
- d. The Contractor shall have at least one employee on the job, per shift, in either a foreman or supervisor's position, who is bilingual in the appropriate languages when employing workers who do not speak fluent English.
- e. A minimum of one accredited supervisor per company shall have attended a 24-hour respiratory protection course and provide appropriate documentation of such.

2. Worker

a. All workers shall be currently accredited as such by the NC HHCU.

3. Competent Person

a. A competent person, as defined in the OSHA Asbestos Standard, 29 CFR 1926.1101, employed by the Contractor must be outside the work area at all times to monitor activity, ensure containment security, provide information to visitors, and provide access for authorized persons to the work area.

4. Employees

- a. The Contractor is responsible for the behavior of workers within his employment. If at any time during the contracted work, or any of the Contractor's employees are judged to exhibit behavior unfitting for the area or judged to be a nuisance by the Building Owner or the Building Owner's representative, the Contractor shall immediately remove them from the project site.
- b. The contractor shall be responsible for compliance with the following behavior:
 - (i) Under no circumstances will alcohol, drugs, firearms, tobacco, tobacco products or any other type of controlled substances be permitted on the project site.



- (ii) All workers are restricted to the area of asbestos abatement work.
- (iii) All vehicles must be parked in the area designated by the Building Owner.
- (iv) All workers must conform to the following basic dress code when in the public area of the work site: long pants and shirts with sleeves, i.e., no tank tops, no shorts, etc.
- (v) The Contractor is responsible for disposal of all materials brought to the project site/work site by his employees including drink cans, bottles, wrappers, or other food containers.
- c. Failure to adhere to these rules could result in criminal or civil prosecution and/or removal from the project site.

C. SUBMITTALS

1. Upon Award of Contract

The successful contractor will submit one copy of the following documents prior to the start of work or within five days of the award of the contract for review and approval by the Owner. A copy of the submittals shall also be kept at the project site for review by the Owner or appropriate regulatory agency at the work site in a clean room or on-site office of the contractor. The submittals will contain, at a minimum, the following information:

- A. A summary of the company's training program and/or a list of EPA approved training certification courses that the company's employees have attended.
- B. A summary of the company's written respiratory protection program which is in compliance with OSHA regulations and other applicable state or local regulations.
- C. Statement indicating the company has an established medical surveillance program in compliance with 29 CFR 1926.1101. The statement should also include documentation that all personnel participate in the medical surveillance program.
- D. If the length of the pipe to be abated is one hundred and sixty linear feet or greater (≥ 160 lin. ft.), a copy of the Asbestos Permit Application and Notification for Demolition/Renovation (NC DENR Form 3768) must be submitted to the NC HHCU. The contractor will provide a copy of the notification to the City of Concord at the time the Form 3768 is submitted to the NC HHCU. Upon receipt of the approved



permit, the Contractor shall provide a copy of the approved permit to the City of Concord. The permit will be present at the work site during the removal activities.

- E. Provide documentation for all employees that will be involved in the abatement/removal activities at the work site. The documentation should include the name of each individual, their position, their accreditation, social security number, and copy of the most recent certificate.
- F. Documentation signed by each worker acknowledging their participation in the company's employee medical surveillance program.
- G. Documentation for each worker reflecting their most recent fit test records and completion date of most recent respiratory protection program.
- H. Copy of most recent Initial Exposure Assessment as required by the OSHA Construction Asbestos Standard, 29 CFR 1926.
- I. Name, location, and applicable permit of asbestos waste disposal site. A contact name and phone number for the facility shall also be provided.
- J. Proposed project schedule including anticipated start date, set-up time, anticipated dates of work, number of shifts per day, anticipated completion date, etc.
- L. Provide required Certificates of Insurance with the Owner listed as an additional party.

Post-Job

Upon completion of the scope of work, the Contractor shall submit a complete set of post-job submittals to the Owner. Request for final payment will not be approved until the post-job submittal package has been reviewed and approved by the Owner and the Owner's representative. The post-job submittal should include at a minimum:

- A. Affidavits: Provide Contractor's affidavit of payment of debts and claims, affidavit of release of liens, and consent of the surety company to final payment.
- B. Manifest: Provide North Carolina Asbestos Waste Shipment Record (NCDENR 3787) receipt from asbestos waste disposal site which acknowledges the Contractor's delivery(s) of waste material. Include date, name of waste transporter, quantity of material delivered, and signature of authorized representative of disposal site.
- C. Daily Logs: Submit copies of all daily logs showing the following: name of all persons entering the work site, date, entering and leaving time, company or agency represented, reason for entering, employee's daily air monitoring data as



required by the OSHA Standard, written comments by inspectors, APD, or other persons.

TEMPORARY FACILITIES

A. WATER SERVICE

- 1. The Contractor will need to supply a source of water at the work site, if needed. The Contractor bears all expense of getting water to the work site areas. The Contractor shall be responsible for ensuring that the waterline(s) that they are using are properly maintained and protected and do not leak or break. Any damage due to water shall be corrected at the Contractor's expense to the City of Concord's satisfaction.
- 2. After completion of use, waterlines, connections, and fittings shall be removed without damage or alteration to existing water piping and equipment.

C. ELECTRICAL SERVICE

- 1. The Contractor will need to supply a source of electricity at the work site, if needed. The Contractor bears all expense of providing electricity to the work site areas and decontamination locations.
- 2. The Contractor will comply with all applicable NEMA, NEC, and UL standards and governing state and local regulations for materials and layout of temporary electrical service.
- 3. If utilized, the Contractor will provide receptacle outlets equipped with ground fault circuit interrupters, reset button, and pilot light for plug-in connections of power tools and equipment.
- 4. If needed, the Contractor will provide a weatherproof, grounded temporary electric power service and distribution system of sufficient size, capacity, and power characteristics to accommodate performance of work during the abatement/removal period.
- 5. Install temporary lighting adequate to provide sufficient illumination for safe work and traffic conditions in every work area. If needed, the contractor will provide the services of an electrician, on a standby basis, to service electrical needs during the abatement process.



D. FIRST AID

1. A minimum of one first aid kit shall be located in the clean room of the decontamination unit. Additional first aid kits, as the Contractor feels is adequate or is required by law, shall be located throughout the work area.

E. FIRE EXTINGUISHERS

1. The Contractor shall comply with the applicable recommendations of NFPA Standard 10 – "Standard for Portable Fire Extinguishers". Locate fire extinguishers where they are most convenient and effective for their intended purpose but provide not less than one extinguisher in each work area or floor level.

F. TOILET FACILITIES

 The Contractor shall provide temporary toilet facilities to be used by the Contractor's employees.

G. PARKING

1. The Contractor's employees will park only in areas designated by the City of Concord.

H. SITE SECURITY

1. The Contactor is responsible for maintaining security in the work areas at all times during work hours at the work site. The Contractor is responsible for securing the work areas at the end of the work day.

I. STORAGE

1. The Contractor shall supply temporary storage for all equipment and materials for the duration of the project. Storage facilities and dumpster(s) will be maintained in areas designated by the City of Concord.

J. HEATING/COOLING

1. The Contractor shall provide adequate heating and cooling in the work areas if needed to perform his work as appropriate.



WORK AREA CLEARANCE

A. GENERAL

1. Notification and scheduling of the final clearance after the abatement is complete is the responsibility of the Contractor.

B. AIR MONITORING

1. Air monitoring will not be required during the abatement process.

C. FINAL CLEARANCE TESTING

1. After the abatement is completed, the City of Concord may request a visual clearance of the work area by the Asbestos Project Designer (APD). In the event, a visual clearance, the APD will be retained by the City of Concord and will submit a report to the City of Concord.

GENERAL ABATEMENT PROCEDURES

- Excavate overburden material to within four (4) to six (6) inches of the top of the pipe section to be removed and replaced
- Using hand tools, excavate overburden materials to a depth of approximately four (4) to six (6) inches below the top of the pipe along the length of the pipe to be removed including the pipe coupling collars
- Wrap length of pipe to be removed with 6 mil plastic to within twelve (12) to eighteen (18) inches of
 the collar couplings and place supports beneath the pipe to maintain stability of the pipe while
 removing the coupling collars
- Place glovebags at the coupling collars and remove the coupling collars; remove glovebags and place in
 6 mil bags and remove from excavation for proper disposal
- Wrap ends of pipe with 6 mil plastic and remove pipe section from excavation for proper disposal
- Transport ACM from site and dispose of abated ACM at approved facility

APPENDIX F

CITY OF CONCORD CONDITIONS

Job Address: 23 UNION ST S, CONCORD NC 28025 Conditions for record PRS2021-01915

improvements from the intersection of Union Street and Killarney Avenue to the Job Description: The Union Street Improvements project consists of streetscape

but is not limited to removal of existing asphalt, concrete, and curbing, water line and intersection of Union Street and Foard Ave and along Barbrick Ave. Work includes sewer line improvements, storm drainage, the installation of concrete sidewalk with brick bands and accents, concrete curbing, seat walls, site furnishings, landscaping, street lighting, signage, and asphalt paving.

Discipline Status	Status	Details	Attached To	Created By
		Specific Comments		
Fire	Open	1. Any reduction in street width as shown in design shall be discussed with Fire prior to implementation 2. Any utility modifications that could impact existing fire protection systems shall be discussed with fire prior to implementation. 3. Relocation of any FDC locations shall be discussed with fire prior to implementation.	NOT	Travis McGaha
Fire	Open	General Comments	NOT	Travis McGaha
		1. This jurisdiction abides by and enforces the requirements of NFPA 241 for construction projects. A document we refer to as an NFPA 241 letter is required verifying that all parties involved in this project know of and agree, to abide by the provision requiring water, hydrants, and access roads be in operation prior to vertical combustible construction. 2. When fire apparatus access roads or a water supply for fire protection is required to be installed, such protection shall be installed and made serviceable prior to and during the time of construction except when approved alternative methods of protection are provided. (NCFC 501.4) 3. Needed Fire Flow for the structure must be provided and maintained. 4. The site address shall be posted in a temporary form and upon completion in a permanent form in a visible location in 6-inch		

7/22/2021

Attached To

Created

sprinklers shall have two access roads placed a distance apart equal to not less han one half of the length of the maximum overall diagonal dimension of the result in future requirements for stripping and signage. Contact Concord Fire 18. Buildings exceeding 62,000 sqft. without sprinklers or 124,000 sqft. with provided for sprinkler systems and be remote from the building with signage. apparatus. (NCFC 503.2.5) 10. Fire lanes required for access to the structure and 26 feet for those over 30 feet. (NCFC 503.2.1) 7. Fire access roads shall means of fire apparatus access for each structure. (NCFC D105.1 & D105.2) are required to be stripped and marked by signs prohibiting parking in areas Buildings exceeding three stories or 30 feet in height shall have at least two Approved fire apparatus access roads shall be provided for every facility or marked in accordance with department specifications and approved prior to route around the exterior of the facility. (NCFC 503.1.1) 6. Access roads to other fire apparatus due hose connection (NCFC 912.2) see section 912 for building are required to be 20 feet in width for buildings up to 30 feet high ocation of the FDC. 15. Structures under construction are required to have temporary fire extinguishers on site during construction. 16. Fire apparatus approved route around the exterior of the building, on-site fire hydrant and official. (NCFC 503.2.4) 9. Dead end access roads in excess of 150 feet in 400 feet from a hydrant on a fire apparatus access road, as measured by an Private Hydrants shall be painted Red. All new hydrants shall be equipped required turning radius of fire access roads shall be determined by the fire hereafter constructed or moved into or within the jurisdiction is more than installation. (NCFC 503.3) 11. Where a portion of the facility or building within 150 feet of all portions of the facility as measured by an approved building within the jurisdiction. The fire apparatus access shall extend to have unobstructed clearance of 13 foot 6 inches. (NCFC 503.2.1) 8. The 507.5.1) 12. Fire Hydrants – Public hydrants shall be painted yellow and (NCFC 912.1). The location may not obstruct access to the buildings for where access may be blocked. Blockage to access after construction may mains shall be provided where required by the fire code official. (NCFC Prevention Division prior to lane stripping for details. All lanes shall be with a 5" Storz fitting. 13. Fire Department Connections (FDC) shall be characters in a reflective material & contrasting color. (NCFC 505.1) 5. length shall be provided with an approved area for turning around fire details on FDC's. 14. Fire Hydrants are required within 200 feet of the access roads shall not exceed 10 percent in grade. (NCFC D103.2) 17.

Discipline	Status	Details	Attached To	Created By
		property or area to be served, measured in a straight line between accesses. (NCFC D104.2 & D104.3) 19. Multiple-family residential developments having more than 100 dwelling units shall be equipped throughout with two separate and approved fire apparatus access roads. Projects equipped throughout with approved automatic sprinkler systems may have one entrance up to 200 units and above 200 must have a second remote entrance (NCFC D106.1 & D106.2) 20. One or Two-family residential developments. Developments where the number of dwelling units exceeds 30 shall be provided with separate and approved fire apparatus access roads and shall meet the requirements of D104.3 (NCFC D107.1) 21. Where two access roads are required, they shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the property or area to be served, measure in a straight line between accesses. (NCFC D104.3) 22. Please see Concord Fire Prevention Division's Web Page for details and specifications (http://www.concordnc.gov/Departments/Fire/Fire-Prevention-Division/Fire-Prevention-Division-Downloads). Please understand that approval of these documents in no way relieves the owner, architect, or engineer from responsibility related to violations of the governing codes and regulations not found they must be corrected. • The Occupancy of the building/upfit area shall not be conducted prior to a Certificate of Compliance & Occupancy being obtained from the Cabarrus County Building Inspection Department.		
Electric Utility	Open	Feed traffic light Will need to field coordinate how to feed traffic light at Union/Cabarrus with City electric department.	ED-102	Brandon Hargett
Electric Utility	Open	Street lighting Will need to field co-ordinate with City electric department on how to keep feed to existing City street lighting on Union towards Foard outside the limits of this project.	E-104	Brandon Hargett

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7/22/2021

Created By	Brandon Hargett
Attached To	G-002
Details	General comments All electrical installations must comply with City of Concord technical standards manual. Coordinate all electrical demolition and installation with City electric department.
Status	Open
Discipline Status	Electric Utility