

2026 Summary of Revisions

City of Bismarck Construction Specifications for Municipal Public Works Improvements

The City of Bismarck has revised the Construction Specifications for Municipal Public Works Improvements for 2026.

The following is a list of specification sections and standard plates that have significant revisions. Specification numbers listed below are the numbers in the 2026 revision, which may not correspond to the previous version. Other sections have been revised for clarity, formatting, or other minor revisions. Revisions are shown in redlined version in this document. The final version of the specifications can be found at: www.bismarcknd.gov/Engineering

GENERAL

- Measurement and Payment subsections were revised to refer Section 107 with additional specific requirements
- Bid item list revised for simplicity and clarity

DIVISION 100 - GENERAL PROVISIONS

Section 101 - Abbreviations and Definitions

- 3 - Added definitions

Section 102 - Bidding and Contract Documents

- 2 - Added specification for Online Bidding, previously a special provision
- 9 - Added specification for Supply of Materials

Section 104 - Control of Work

- 2 - Added specification for Online Project Management, previously a special provision
- 7 - Revised Contractor's Responsibilities to include open communication and added specification regarding damage caused by public traffic.

Section 105 - Legal Relationships and Responsibilities

- 4 - Added specification for Access requirements during construction

Section 107 - Measurement and Payments

- 1 - Added general specification regarding measurement and payment
- 2 - Clarification on retainage held on change orders and release of retainage

DIVISION 200 - EARTHWORK

Section 202 – Excavation and Embankment

- 3.11 – Clarified Tolerances to include portions removed from previous section(s)

Section 205 – Erosion and Sediment Control

- 2.9 – Added approved Inlet Filter

DIVISION 300 – BASE COURSES

Section 301 – Sand Subbase

- Section Removed – No Longer Used

Section 303 – Cement Stabilized Subgrade

- 3.5 – Added specification for Pulverization, previously Special Provision

DIVISION 400 – FLEXIBLE PAVEMENT

Section 402 – Bituminous Prime and Tack Coat

- 2.2 – Removed SS-1 as acceptable tack coat oil

Section 403 – Bituminous Seal

- 2.2 – Revised to refer gradation requirements to NDDOT specifications

Section 404 – Scrub Seal

- Added, previously Special Provision

Section 405 – Fog Seal

- Added, previously Special Provision

Section 406 – Milling Pavement Surface

- Previously Section 404
- 3 – Revised to state millings shall become property of Contractor

Section 407 – Crack Treatments

- Previously Section 405

Section 408 – Asphalt Removal

- Previously Section 406

DIVISION 500 – RIGID PAVEMENT

Section 501 – Portland Cement Concrete Pavement

- 3.23 – Revised Random Crack Seal requirements
- 3.27 – Added Concrete Removal requirements

- 3.28 – Added Uncontrolled Cracking Specification

DIVISION 600 – CONCRETE SIDEWALKS, DRIVEWAYS, AND CURB AND GUTTER

General

- Moved all concrete removal items to Section 501

Section 601 – Concrete Sidewalks

- 3.9 – Added requirement for “T” posts on ADA ramps
- 3.13 – Added Uncontrolled Cracking Specification

Section 602 – Concrete Driveways

- 3.12 – Added Uncontrolled Cracking Specification

Section 603 – Concrete Curb and Combined Curb and Gutter

- 4.12 – Added Uncontrolled Cracking Specification

DIVISION 800 - SEWERS

Section 801 - Sanitary Sewer

- 3.4 – Added requirement for sanitary service wyes
- 3.5 – Clarified backfill surface maintenance requirements
- 3.10 – Added complete backfill requirement for leakage tests
- 3.11 – Added complete backfill requirement for televising

Section 802 - Storm Sewer

- 3.5 – Revised In-Line cleanouts to be made with 2-way tee in lieu of wye
- 3.12 – Revised riprap grout requirements at end of FES
- 3.13 – Added requirement for flush and televise of storm sewer

DIVISION 900 - Water Distribution

Section 901 - Watermain

- 2.7 – Added requirement for 14” and larger gate valves have beveled gear actuators
- 3.6 - Added requirement that corp stops be left in closed and left in place when used for testing and/or flushing

DIVISION 1000 - ELECTRICAL

Section 1002 – Underground Circuits

- 3.2 – Added requirement for bored conduits to be installed 12” behind curb

Sections 1004 - Streetlight Units

- 2.2a, 2.3a, 2.4a, 2.5a – Added approved manufacturer and model: Traditional Concrete, Inc

- 2.6a, 2.7a – Revised model number for Millerbernd Manufacturing
- 2.8 – Revised requirement for splice connectors

DIVISION 1200 - MISCELLANEOUS CONSTRUCTION

Section 1202 - Seeding

- 2.1 – Corrected error in Class IV seed mix

Section 1205 - Manholes and Inlets

- 2.4 – Revised elevation datum from NGVD29 to NGVD88

Section 1206 - Casting and Adjustment

- 2.3 – Revised grate model number for Beehive castings
- 3.7 – Revised casting adjustment requirements

Section 1209 - Sanitary Sewer and Water Service Connections

- 2.9 & 2.10 – Clarified requirements for tapping sleeves and saddles

Section 1210 – Pavement Marking

- Section revised and updated

STANDARD DETAILS. The following Standard Details have been revised (drawings with revisions highlighted are available on the City of Bismarck website):

- 200 - 1
- 600 - 15,16,19
- 802 - 3
- 1003 - 1,2,5
- 1004 -1 ,2
- 1205 - 2,6,7,18
- 1206 - 1,2

CONTENTS

| SECTION | DESCRIPTION |
|--|--|
| DIVISION 100 – GENERAL PROVISIONS | |
| 101 | Abbreviations and Definitions |
| 102 | Bidding and Contract Documents |
| 103 | Scope of Work |
| 104 | Control of Work |
| 105 | Legal Relationships and Responsibilities |
| 106 | Prosecution and Progress |
| 107 | Measurement and Payment |
| DIVISION 200 – EARTHWORK | |
| 201 | Clearing and Grubbing/Miscellaneous Removals |
| 202 | Excavation and Embankment |
| 203 | Watering |
| 204 | Subgrade Preparation |
| 205 | Erosion and Sediment Control |
| DIVISION 300 – BASE COURSES | |
| 301 | Sand Subbase (Blank) |
| 302 | Aggregate Base and Aggregate Surface |
| 303 | Cement Stabilized Subgrade |
| DIVISION 400 – FLEXIBLE PAVEMENT | |
| 401 | Asphaltic Concrete Pavement |
| 402 | Bituminous Prime or Tack Coat |
| 403 | Bituminous Seal |
| 404 | Scrub Seal |
| 403 405 | Fog Seal |
| 404 406 | Milling Pavement Surface |
| 405 407 | Crack Treatments |
| 408 | Asphalt Removal |
| 406 | |
| DIVISION 500 – RIGID PAVEMENT | |
| 501 | Portland Cement Concrete Pavement |
| 502 | Slabjacking |
| 503 | Controlled Density Fill (CDF) |
| 504 | Concrete Pavement Repair |
| DIVISION 600 – CONCRETE SIDEWALKS, DRIVEWAYS, AND CURB AND GUTTER | |

DIVISION 100 – GENERAL PROVISIONS

6. Memorial Day, the last Monday in May;
7. Independence Day, July 4;
8. Labor Day, the first Monday in September;
9. Veterans Day, November 11;
10. Thanksgiving Day, the fourth Thursday in November;
11. Christmas Day, December 25; and
12. Every day appointed as a public holiday by the president of the United States or the Governor of the State

If January 1, July 4, November 11, or December 25 fall on a Sunday, the following Monday is a holiday.

If January 1, July 4, November 11, or December 25 fall on a Saturday, the previous Friday is a holiday.

Interim Completion. Substantial completion only for defined work areas or scope items as defined in the project documents.

Materials. Any substances, products, supplies, assemblies, or raw materials specified for use in the performance of the work.

Median. The portion of a divided street separating the traveled ways.

Milestone. Completion of a phase or critical objective.

Notice to Bidders. A notice issued by the CITY of projects available for proposals in an upcoming bid opening.

Notice to Proceed. The CITY's notice to the CONTRACTOR to begin the work.

Pavement Structure. The combination of subbase, base course, and surface course placed on a subgrade to support and distribute the traffic load to the roadbed.

Plan Quantity. The quantity of a contract item shown on the bid item list and the Plans.

Plans. The Project Plans and Standard Drawings that show the location, character, and dimensions of the prescribed work, including layouts, profiles, cross sections, and other details.

Project. The specific section of infrastructure on which construction is to be performed under the contract.

Project Number. A number generated by the CITY containing coded project data. Found on the cover sheet of the Plans.

Project Site. All areas used by the CONTRACTOR in the performance of the work.

DIVISION 100 – GENERAL PROVISIONS

Stabilization. The modification of soils or aggregates by incorporating materials that increase load-bearing capacity, firmness, or resistance to weathering or displacement.

Standard Drawings. An approved set of drawings showing Standard Details of construction and materials for the work on a project.

Standard Specifications. See Specifications.

Station. When used as a definition or term of measurement, a station is 100 linear feet.

Structures. Bridges, culverts, catch basins, drop inlets, retaining walls, cribbing, manholes, endwalls, buildings, sewers, service pipes, underdrains, foundation drains, and similar features that may be encountered in the work.

Subcontractor. See CONTRACTOR.

Subbase. The layers of specified or selected materials of designated thickness placed on a subgrade to support a base course.

Subgrade. The top surface of an embankment or cut section on a graded roadway. It is the foundation for the subbase, base course, and surface course.

Substantial Completion. A project is substantially complete when it is operational and ready for use by the CITY.

Superintendent. See CONTRACTOR.

Surety. See CONTRACTOR.

Surface Course. One or more layers of a pavement structure designed to accommodate the traffic load, the top layer of which resists skidding and traffic abrasion. The top layer is sometimes called "Wearing Course."

Traffic. Vehicles, pedestrians, and other modes of transportation.

Total Sum Bid. The total amount of a Proposal; the sum of the price extensions for all bid items.

Work. The providing of all labor, materials, equipment, and incidentals necessary to complete the project in accordance with the contract.

Work Order. A written directive from the ENGINEER to the CONTRACTOR to perform changed work, extra work, or other additional work.

Working Day. Every Calendar Day not defined as a Holiday.

SECTION 102 – BIDDING AND CONTRACT DOCUMENTS

102-1 PROPOSALS

No bids received after the time set for the receipt of the proposals will be considered. The right is reserved to hold all bids for a period of 30 days and to reject any or all bids. Bidders are invited to be present at the opening of Proposals.

102-2 ONLINE BIDDING

All bids shall be submitted and received via online bidding. Bids shall be submitted through QuestCDN's Virtual Bidding (vBid). See additional information available in the project advertisement or through www.QuestCDN.com.

102-2-3 FORM OF PROPOSAL AND SIGNATURE

The Proposal must be made on forms provided for that purpose, or forms provided by the Bidder which follow the same format, enclosed in a sealed envelope, and marked and addressed as required in the Advertisement. It must state the unit prices and the sum of money for which the Bidder proposes to supply the materials and perform the work called for in the Proposal and Schedule of Work. Bidders shall submit a bid on a unit price basis for each item of work so listed in the Proposal. The total of all estimated prices will be determined as the sum of the products of the estimated quantity of each item and the unit price bid for the item. If the bid is made by an individual, it must be signed with the full name of the Bidder whose address must be given. If made by a firm, it must be signed in the co-partnership name by a member of the firm, and the name and address of each member of the firm must be given. If made by a corporation, it must be signed by an officer of the corporation in the corporate name, and the corporate seal must be attached to such signature.

The Bidder may substitute a computer-printed spreadsheet of the Bid Schedule for the CITY-furnished Bid Schedule found in the Proposal. The substitute Schedule shall be attached to the last page of the CITY-furnished Bid Schedule in the Bidder's Proposal.

The following information shall appear on top of each page of the computer-printed Bid Schedule:

1. Improvement District Number or Project Number.
2. Date of Bid Opening.

in any way relieve the CONTRACTOR from its obligation or any risks from the fulfillment of all the work and terms of the contract.

102-9 SUPPLY OF MATERIALS

Bidders shall fully inform themselves as to the source of acceptable materials needed for the work and regarding the carrier rates and transportation facilities for those materials before submitting bids.

Changes in carrier rates, or the alteration of transportation facilities for those materials, during the life of the contract will not constitute cause for claiming extra compensation.

102-8-10 INDEMNITY AGREEMENT FOR CONTRACTORS

The CONTRACTOR agrees to indemnify and hold harmless the CITY OF BISMARCK, its appointed and elective officers and employees, from and against any and all loss or expense, including attorney's fees and costs by reason of liability imposed by law upon the CITY, its elected or appointed officials or employees, for damages because of bodily injury including death at any time resulting therefrom sustained by any person or persons and on account of damage to property including loss of use thereof, arising out of or in consequence of the performance of this work, whether such injuries to persons or damage to property is due to the negligence of the CONTRACTOR, its agents or employees, its subcontractors, their employees, CITY OF BISMARCK, its appointed or elected officers, employees, or their agents, except only such injury or damage as shall have been occasioned by the sole negligence of the CITY, its appointed or elected officials or employees.

102-9-11 REQUEST FOR ALTERNATE SPECIFICATIONS

The reference to manufacturer's name and catalog or model numbers shall be interpreted as establishing a standard of quality, not as limiting competition.

Pre-approved materials and equipment are listed in the Specification or Standard Drawings. CONTRACTORS intending to price material or equipment not referenced in Specifications or Standard Drawings shall request in writing, to the CITY ENGINEER, to have the material or equipment recognized as an approved equivalent. The CONTRACTOR must include complete descriptive technical data on the proposed item consisting of: model numbers, type, size, and performance characteristics. Procedure also applies to requests by suppliers.

The request for consideration of an approved equivalent must be provided to the CITY ENGINEER no later than 10 days prior to bid opening, unless otherwise specified. All equivalents approved for bid may be listed in addenda sent to all plan holders in advance of bid opening.

DIVISION 100 – GENERAL PROVISIONS

- b. The CONTRACTOR fails to carry out orders from the ENGINEER;
- c. During periods of unsuitable weather;
- d. For conditions considered unsuitable for performance of the work;
- e. For other conditions or reasons in the public interest; or
- f. For other reasons the ENGINEER and CONTRACTOR mutually agree on.

104-2 ONLINE PROJECT MANAGEMENT

The CITY utilizes Virtual Project Manager (VPM) online software (www.virtual-pm.com) for construction management of its projects. VPM is a no-cost, paperless system used for project documentation and administration. The CONTRACTOR shall use VPM's web-based platform for all project-related submittals, review and approval of pay estimates, and other required project management functions. All CONTRACTOR personnel responsible for these functions shall obtain and maintain a VPM account for the duration of the project.

104-2-3 CONTRACTOR

The foreman of the CONTRACTOR in charge of the work will be held to represent the CONTRACTOR during the absence of the latter or CONTRACTOR's legal representative. Instructions given to the CONTRACTOR's foreman on the work by the ENGINEER will be held as having been given to the CONTRACTOR.

104-3-4 CHARACTER OF WORKMEN

If any person employed on the project, whether a CONTRACTOR'S employee or not, is intemperate, prejudiced, abusive, or disorderly, the ENGINEER may direct the CONTRACTOR in writing to discharge the person from the work. Re-employ this person on the project only with the ENGINEER'S approval. If the CONTRACTOR fails to remove a person as directed by the ENGINEER or to provide sufficient personnel for the proper execution of the work, the ENGINEER may suspend the work by written notice until the CONTRACTOR complies.

104-4-5 METHODS AND APPLIANCES

The methods and appliances adopted by the CONTRACTOR shall be such as will enable the CONTRACTOR to secure a satisfactory quality of work and complete the work within the time specified. The choice of methods and appliances to complete the work in compliance with the Plans and Specifications is solely the CONTRACTOR's. It is the responsibility and obligation to produce a complete project that fully complies with the Plans and Specifications and is of satisfactory quality. The ENGINEER may at any time inform the CONTRACTOR of apparent deficiencies in the work, and the CONTRACTOR will make whatever adjustments are, in the CONTRACTOR's judgment, necessary to bring the work back into conformance. Failure of the ENGINEER to so advise the CONTRACTOR shall not in any way relieve the CONTRACTOR from its obligations which shall remain in full force and effect until the discharge of the contract. The Board of City Commissioners of the CITY OF BISMARCK reserves the right, in

case of improper construction, to suspend the work at any time and to reject the work or to order the reconstruction of any part or all of the work improperly done.

104-5-6 MONUMENTS, BENCH MARKS, WITNESS AND GRADE STAKES

All monuments, bench marks, and witness and grade stakes are the property of the CITY, and in the event of the destruction or removal by the CONTRACTOR, such stakes shall be replaced by the ENGINEER at the CONTRACTOR's expense. Any interruption of work and/or costs incurred by the CONTRACTOR due to any delays caused during the replacement of destroyed monuments, bench marks, and witness and grade stakes shall be borne by the CONTRACTOR. The CONTRACTOR shall be responsible for notifying the ENGINEER a minimum of 72 hours prior to the expected survey.

104-6-7 CONTRACTOR'S RESPONSIBILITIES

The CONTRACTOR shall maintain open communication with the ENGINEER throughout the duration of the project and respond to correspondence with the ENGINEER in a timely manner.

Unless otherwise specified, the CONTRACTOR shall furnish all labor, materials, and equipment necessary for the completion of the Schedule of Work in accordance with the Plans and Specifications. The CONTRACTOR shall ~~do all necessary hauling and perform all labor~~ provide all labor equipment and materials required to perform the work, incidental thereto, for which no express provisions have been made. The CONTRACTOR shall assume all risks or damages to persons or property prior to the final acceptance of the work. The CONTRACTOR shall so conduct its operation as not to interfere with the work of other contractors in the vicinity. The CONTRACTOR shall maintain at all times an efficiently sized crew headed by a competent construction foreman and the necessary skilled labor to efficiently complete the work.

The CONTRACTOR shall be responsible for maintenance and operation of all constructed facilities until final acceptance unless otherwise noted in Specifications, notes, or Special Provisions. This includes locating of CONTRACTOR-constructed underground facilities.

When damage occurs to work that is substantially complete, prior to final acceptance of a project, and is caused by public traffic, the CONTRACTOR shall identify the party that is responsible for the damage, pursue all reasonable means to recover the costs of the damage, and repair the damage to the work. When the CONTRACTOR cannot recover the costs by reasonable means, the CITY will pay the CONTRACTOR for the unrecovered costs. Repairs shall be authorized by the ENGINEER prior to any repair work by the CONTRACTOR.

DIVISION 100 – GENERAL PROVISIONS

established grassed lawn and boulevard areas in City rights-of-way and easements within work zones. Maintenance shall include regular mowing to keep grassed areas to a maximum of six inches tall during construction and four inches tall prior to project acceptance by the ENGINEER. This shall include areas that are not disturbed during construction but where access for regular maintenance by property owner is restricted by construction activities.

The CONTRACTOR shall restore, with no additional compensation, damaged property to a condition similar or equal to preconstruction conditions. Restoration shall be done in a manner acceptable to the ENGINEER and/or property owner.

105-4 ACCESS

The CONTRACTOR shall provide access to residences, businesses, other private property with existing access, and public institutions during construction. If at times during construction phases this is not possible, the CONTRACTOR shall notify the ENGINEER and PROPERTY OWNERS prior to disruption of access to coordinate and make alternate arrangements. All residents shall be notified in writing of access closures 24 hours in advance. All businesses and public institutions shall be notified in writing of access closures 48 hours in advance. Closures shall be approved by ENGINEER prior to coordination with PROPERTY OWNER.

105-4-5 PARKING AND STORAGE OF EQUIPMENT AND MATERIALS

The CONTRACTOR shall not use private property to park or store equipment, vehicles, or materials without written permission from the property owner. The CONTRACTOR shall provide the ENGINEER with a copy of the written permission and a release from the property owner upon restoration of the property to the owner's satisfaction.

105-5-6 PROTECTION OF TREES

A CONTRACTOR working on public rights-of-way or properties shall be responsible for the prevention of damage to trees, shrubs, bushes, hedges, or other woody plants located within or infringing on the public rights-of-way and properties, including parks, and shall notify the City Forestry Department prior to beginning any construction near said trees.

The CONTRACTOR shall exercise care in driving or working on the root zone area of trees to prevent excessive compaction of the soil. Gaseous, liquid, or solid substances which are harmful to plantings shall not come into contact with any plantings. Nails, bolts, or other fastening materials shall not be imbedded into the trunk or limbs of a tree. Ropes, wires, or other hanging materials shall not be attached to a plant in such a manner that the bark may be damaged or cause undue stress to the plant structure. Materials or debris shall not be stored above the root zone of any tree which may impede the free passage of air, water, or nutrients, except by written permission of the City Forester.

DIVISION 100 – GENERAL PROVISIONS

sanitary sewer; streets must be constructed and open to traffic; and street lights and traffic signals must be installed, tested, and energized.

The CITY will not assess liquidated damages during a period when the project is in an authorized state of suspension.

| <u>Contract Amount</u> | <u>Damages Per Calendar Day</u> |
|----------------------------|---------------------------------|
| \$0 to \$250,000 | \$200 |
| \$250,001 to \$500,000 | \$300 |
| \$500,001 to \$1,000,000 | \$500 |
| \$1,000,001 to \$2,500,000 | \$1,000 |
| \$2,500,001 to \$5,000,000 | \$1,500 |
| Over \$5,000,000 | \$2,500 |

SECTION 107 – MEASUREMENT AND PAYMENT

107-1 GENERAL

The quantities shown on the Plan sheets entitled "Approximate Quantities" are estimated quantities based on information available at the time of design. It is mutually understood that these quantities may change at the time of construction due to unforeseen conditions which may be encountered during construction. The Board of City Commissioners reserves the right to designate the amount of work to be completed.

The bid item list specifies the unit of measure for each contract item. Payment shall be made for the amount of work complete, in place, and accepted at unit prices specified in the contract as measured by the ENGINEER. Payment shall be full compensation for furnishing all materials, equipment, labor and incidentals required to complete the work as specified. Hauling and proper disposal of any materials or items shall be included in the unit price unless otherwise specified.

~~Payment shall be made for the final amount of work complete and accepted at unit prices specified in the contract.~~

Unless otherwise specified as payment by plan quantity, the ENGINEER shall measure the actual quantity of accepted work for each contract item.

107-2 ESTIMATES AND PAYMENTS

The ENGINEER shall make a monthly approximate measurement of the work done to date and an estimate of the value of the same at the prices agreed upon in the contract. When directed by the ENGINEER, the CONTRACTOR shall measure the work completed and submit to the ENGINEER in duplicate copy form an estimate of the work completed to date and value of same at the prices agreed upon in the contract.

DIVISION 100 – GENERAL PROVISIONS

The ENGINEER shall retain 10 percent of the amount of each payment until 50 percent of all work in the contract documents, including change orders, has been completed and accepted by the ENGINEER. No further amount of retainage shall be withheld from payments after 50 percent of the contract has been completed unless the ENGINEER has on file any valid claims against the CONTRACTOR by the CITY OF BISMARCK or others. The ENGINEER may reduce the amount retained upon completion of 90 percent of all work in the contract documents and accepted by the ENGINEER. On completion and acceptance of a part of the work on which the price is stated separately in the Contract Documents, payment in full may be made, including retained percentages less authorized deductions. Retainage may be held until completion and acceptance of all punch-list items and submittals, as required under the contract.

Payment for materials in storage may be added to any monthly estimate. The CONTRACTOR must submit the materials invoice, and the materials must be stored on CITY lands or rights-of-way, at the site, or as directed by the ENGINEER to be eligible for payment. All materials not in storage as directed by the CITY shall be deducted from the materials invoice. No retainage will be deducted for materials stored as directed by the CITY.

107-2.1 MATERIALS STORED. Payment for materials in storage may be added to any monthly estimate for the invoiced cost of materials to be incorporated in the work. Materials must meet the requirements of the contract, plans and specifications. The following conditions must be met for payment of materials stored:

- a. The CONTRACTOR must submit the materials invoice.
- b. The CONTRACTOR must furnish the CITY legal title or lien waiver (free of liens or encumbrances of any kind) to the materials stored. Lien waivers shall be submitted as follows to meet this requirement:
 - i. A lien waiver from the supplier to the CONTRACTOR,
 - ii. A lien waiver from the subcontractor to the prime CONTRACTOR (when applicable), and
 - iii. A lien waiver from the prime contractor to the CITY.
- c. The materials must be stored on CITY lands or rights-of-way, at the site, or as directed by the ENGINEER. All materials not in storage as directed by the ENGINEER shall be deducted from the materials invoice.
- d. The CONTRACTOR must provide satisfactory evidence that the materials and transportation costs have been paid.
- e. The CONTRACTOR must provide satisfactory evidence that the materials are insured against loss by damage to or disappearance of such materials at any time prior to use in the work.

The transfer of title and the CITY's payment for stored materials shall in no way relieve the CONTRACTOR of their responsibility for furnishing and placing such materials in accordance with the contract, plans, and specifications.

In no case will the dollar amount or quantity paid for materials stored exceed the contract price or quantity for such materials or for the contract item in which the materials are intended to be used.

SECTION 202 - EXCAVATION AND EMBANKMENT

202-3.10 HAUL. No payment will be made separately or directly for haul on any part of the work. All hauling will be considered a necessary and incidental part of the work, and its cost shall be considered by the CONTRACTOR and included in the unit price bid for the pay items of work involved.

202-3.11 TOLERANCES. The ENGINEER shall verify that finished grading of roadway is within 0.05 feet below to 0.15 feet above the final subgrade elevation specified, and the average grading of any 500 lineal foot section of roadway shall be within 0.1 foot above the final subgrade elevation specified.

The top of the subgrade shall be of such smoothness that, when tested with a 10-foot straightedge applied parallel and at right angles to the centerline, it shall not show any deviation in excess of .10 feet.

In areas to be turfed under the project or in the future, outside the sidewalk, curb and gutter, and pavement limits, the surface shall be of such smoothness that it will not vary more than 0.10 feet from true grade as established in plans or by grade hubs.

The ENGINEER shall verify that finished grading of stormwater ponds shall be within plus/minus 0.25 foot of design grade.

If grading does not meet tolerance, the CONTRACTOR shall be responsible for regrading to meet tolerance.

202-4 MEASUREMENT AND PAYMENT

Measurement and payment shall be as specified in Section 107 and as follows:

202-4.1 UNCLASSIFIED EXCAVATION. Unclassified Excavation shall be measured ~~by the cubic yard (CY)~~ in its original position by the method of average end areas of materials acceptably excavated and stripped as specified. Measurements shall not include the yardage of material excavated without authorization beyond normal slope lines, or the yardage of material used for purposes other than those directed. The plans shall state an assumed shrinkage factor to be used to compute embankment volume placed using "Unclassified Excavation."

~~Payment shall be made at the unit price bid per cubic yard (CY) for "Unclassified Excavation."~~

202-4.2 ROCK EXCAVATION. All rock found in the excavation and not allowed to be placed in the backfill or embankment shall be classified as Rock Excavation, ~~measured by the cubic yard (CY)~~ and disposed of by the CONTRACTOR, or as directed by the ENGINEER.

The CONTRACTOR shall place all rocks not allowed to be placed in the backfill or embankment and less than 1 cubic yard in a pile to be measured by the ENGINEER.

SECTION 205 – EROSION AND SEDIMENT CONTROL

multiple movements and reinstallations. Wattles shall have a 9-inch diameter (1-inch tolerance) and a minimum unit weight of 1.6 pounds per square foot. Wood posts of sufficient strength to withstand installation and weather shall be used for anchoring. Stakes shall be wooden, 1½ inches thick by 30 inches long.

205-2.8 STRAW WATTLES, 12-INCH DIAMETER. Wattles shall consist of rice or wheat straw fibers as filler within a containment netting. Filler shall be certified as weed-free. Fibers must have an average length greater than 3 inches and shall contain ultraviolet inhibitors. The strand thickness shall be no less than 0.035 inches, the knot thickness no less than 0.0555 inches, and the netting weight no less than 0.35 ounces per foot. The entire wattle unit shall be sufficiently durable to withstand weather, construction, and installation conditions for at least three months, including multiple movements and reinstallations. Wattles shall have a 12-inch diameter (1-inch tolerance) and a minimum unit weight of 3.75 pounds per linear foot. Wood posts of sufficient strength to withstand installation and weather shall be used for anchoring. Stakes shall be wooden, 1½ inches thick by 30 inches long.

205-2.9 DRAINAGE STRUCTURE INLET FILTER. The drainage structure inlet filter shall be Top Guard by ERTEC, EZ-Catch or EZ-Flo by Flo-Water, or approved equivalent. The inlet filter shall include an overflow feature designed to allow full flow of water into the structure if the filter is filled with sediment. The inlet filter shall have a minimum flow rate of 130 gallons per minute per square foot.

205-2.10 CONCRETE EROSION CONTROL BLANKET. Prefabricated concrete erosion control blanket shall be Creflex 40F. The concrete erosion control blanket shall be a minimum 40 pounds per square foot with 7-ounce geotextile fabric backing. Concrete used to fabricate the erosion control blanket shall have a compressive strength of 4,000 pounds per square inch.

205-2.11 EROSION CONTROL BERM. Inlet pipes shall be 6-inch PVC and coiled pipes shall be six inch perforated pipe. Wire and/or twine shall be used to tie the pipe coils together. Wooden stakes shall be used with a minimum length of 24 inches. Riprap shall consist of rocks with diameters of 9 to 12 inches placed on a woven fabric.

205-3 CONSTRUCTION REQUIREMENTS

205-3.1 GENERAL. The CONTRACTOR shall furnish all labor, materials, and services necessary for and incidental to the completion of all work as shown on the drawings and specified herein. All machinery and equipment owned or controlled by the CONTRACTOR shall be of sufficient size to meet the requirements of the work and shall produce satisfactory work. All work shall be subject to the inspection and approval of the ENGINEER. The CONTRACTOR shall employ at all times a sufficient force of workmen of such experience and ability that the work can be completed in a satisfactory and workmanlike manner.

SECTION 303 – CEMENT STABILIZED SUBGRADE

$$\% \text{ Pulverization} = 100 \times (A)/(B-C)$$

(A) Weight of minus #4
(B) Weight of original sample
(C) Weight of plus #4 Gravel

Disc harrows, bucket teeth and other equipment that does not meet the above requirements shall only be used as needed, when mixers/reclaimers can't be utilized, with approval by the ENGINEER.

The mixer/reclaimer shall be fitted with an integrated water injection system capable of introducing the water into the cutting drum during the mixing process. The metering device shall be capable of automatically adjusting the flow of water to compensate for any variation in the amount of reclaimed material introduced into the mixing chamber. Automatic digital readings shall be displayed for both the flow rate and total amount of reclaimed material and water in appropriate units of weight and time.

Mixers/reclaimers shall meet the description as stated or an approved method by the ENGINEER.

The mixing shall be completed within 30 minutes of adding the cement to the subgrade soil.

Prior to compaction, at the location of the mix design, an unconfined compressive strength test in accordance with ASTM D 1633 and a No. 4 Sieve Gradation Test, as specified in this provision, shall be taken.

The CONTRACTOR shall target a 7-day unconfined compressive strength of 225 psi with a minimum of 175 psi and no more than 350 psi. The CONTRACTOR or ENGINEER shall adjust the cement application rate as needed to achieve the target compressive strength of 225 psi.

303-3.4 COMPACTION. Compaction shall begin immediately after the cement has been mixed thoroughly with the subgrade soil. Compaction testing shall conform to Section 204. The compaction operation shall be completed within 2 hours of incorporating the cement into the subgrade. If mixing, spreading, and compacting requirements are not satisfied, the CONTRACTOR shall reprocess, recompact and refinish the deficient areas.

The finish subgrade shall be compacted to 92 percent of standard proctor maximum dry density as determined by ASTM D 558. The CONTRACTOR shall be responsible for all retesting of failing tests. If failing tests are still present after 72 hours the CONTRACTOR shall perform an extensive proof roll in the area of concern according to the specifications below.

303-3.5 ASPHALT PULVERITZATION. All areas of reconstruction with cement stabilized subgrade shall utilize pulverization. This work shall consist of pulverizing and blending the existing asphalt and subgrade materials for cement stabilized subgrade.

SECTION 303 – CEMENT STABILIZED SUBGRADE

Pulverization shall be done with a self-propelled, high-powered, rotary mixer/reclaimer capable of mixing, in-place, to a depth as specified in plans. The cutting drum shall be fit with cutting teeth capable of trimming earth and aggregate and shall be designed to be accurately adjusted and held in place vertically.

The existing asphalt and subgrade material shall be pulverized to a depth as per plans and special provisions. The mixing shall continue until a homogenous layer of the required thickness has been obtained.

After pulverization and prior to pulverization excavation the CONTRACTOR shall take one field moisture test for every 750 LF of the centerline of reconstructed roadway. The moisture content prior to cement stabilization shall not be more than six percentage points above optimum moisture. The ENGINEER shall determine prior to pulverization excavation if additional material shall be excavated and replaced with blended base.

303-3.5-6 FINISHING. After compaction of the stabilized subgrade, the surface shall be trimmed to the specified lines and grades. Lightly scarify and blade the surface to eliminate equipment imprints while performing final rolling.

303-3.6-7 CURING. The CONTRACTOR shall allow a minimum of 72 hours before covering the subgrade with gravel or bituminous asphalt and before it is subjected to freezing. If the finished stabilized subgrade is not covered with a lift of bituminous asphalt or aggregate base and is subjected to freezing, the ENGINEER will determine if any of the subgrade needs to be reworked at the CONTRACTOR's expense.

The CONTRACTOR shall protect the finished subgrade against drying for 5 days after completion, or until the subgrade is covered with a base. The finished subgrade shall be protected from drying by spraying with water to maintain a continuous moist condition. The CONTRACTOR may apply an asphalt prime coat instead of keeping the finished surface moist with water. If this option is chosen, apply SS-1, CSS-1, or MC-250 at the rate of 0.22 gallons per square yard to achieve minimum of 0.13 gallons per square yard residue. Multiple light applications may be necessary to obtain the specified rate of application without run-off.

303-3.7-8 PROOF ROLL. Prior to covering the subgrade with gravel or bituminous asphalt and before it is subjected to freezing, the CONTRACTOR shall proof roll the subgrade, under the supervision of the ENGINEER. The proof roll shall be performed with a minimum gross weight of 44,000 lbs. on a tandem axle truck with four tires per rear axle. Any failing areas in the subgrade shall be the responsibility of the CONTRACTOR to remove and replace with gravel, at the discretion of the ENGINEER.

303-4 MEASUREMENT AND PAYMENT

Measurement and payment shall be as specified in Section 107 and as follows:

SECTION 402 – BITUMINOUS PRIME ~~OR-AND~~ TACK COAT

402-1 DESCRIPTION

This item shall consist of supplying and applying bituminous material to a previously prepared, bonded, and/or bituminized binder, leveling, or aggregate base course, AC ~~base courses~~ superpave lift or existing pavement in accordance with these specifications and to the width shown on the typical cross section on the plans.

402-2 MATERIALS

402-2.1 QUANTITY OF MATERIAL. The approximate amount of bituminous material per square yard for prime or tack coat shall be as provided in the following table. The exact amount shall be as ordered by the ENGINEER.

| Material | Amount |
|-----------------------|---------------------|
| Bituminous Prime Coat | 0.25 to 0.05 Gal/SY |
| Bituminous Tack Coat | 0.05 to 0.20 Gal/SY |

402-2.2 BITUMINOUS MATERIAL. The types, grades, controlling specifications, and application temperatures for the bituminous materials are shown in the following table. The specific material to be used shall be designated by special provision or by the ENGINEER. The supplier of the bituminous material shall supply asphalt viscosity charts for the material delivered.

| PRIME COATS | | |
|----------------|-----------------|-------------------------|
| Type and Grade | Specification | Application Temperature |
| MC-30 | ASTM D2027 (MC) | 85°F - 140°F |
| MC 70 | ASTM D2027 (MC) | 120°F - 175°F |

| TACK COATS | | |
|-------------------------|---------------|-------------------------|
| Type and Grade | Specification | Application Temperature |
| SS-1 , SS-1h | ASTM D977 | 75°F - 130°F |
| CSS-1h | ASTM D2397 | 50°F - 130°F |

402-3 CONSTRUCTION REQUIREMENTS

402-3.1 WEATHER LIMITATIONS FOR PRIME COAT. The prime coat shall be applied only when the existing surface is dry or contains sufficient moisture to get uniform distribution of the bituminous material when the pavement temperature is above

SECTION 403 – BITUMINOUS SEAL

403-1 DESCRIPTION

This ~~item-work~~ shall consist of a bituminous surface treatment as a wearing course composed of single or multiple applications of bituminous material and aggregate cover placed on the prepared and primed base or properly cured wearing surface in accordance with these Specifications and shall conform to the dimensions and typical cross section shown on the Plans and with lines and grades established by the ENGINEER.

403-2 MATERIALS

403-2.1 QUANTITY OF MATERIAL. The amounts of bituminous material, aggregates, and blotter sand per square yard for the bituminous seal shall be determined by the CONTRACTOR as necessary to obtain a finished product in conformity with the plans and specifications.

403-2.2 COVER AGGREGATE. This material shall consist of sound, durable particles of gravel and sand, either crushed or uncrushed or a combination of both, and shall be in accordance with the requirements for gradation ~~shown in the following table:~~ as per NDDOT Table 816-02 for Class 43.

| SEAL AGGREGATE | | BLOTTER SAND | |
|--------------------------------|---------------------------|--------------------------------|---------------------------|
| Square Mesh Sieve Size | Percent by Weight Passing | Square Mesh Sieve Size | Percent by Weight Passing |
| 1/2" | 100 | 1/2" | |
| 3/8" | 95-100 | 3/8" | 100 |
| No. 4 | 20-85 | No. 4 | 85-100 |
| No. 10 | 0-12 | No. 10 | |
| No. 16 | | No. 16 | 40-80 |
| No. 50 | | No. 50 | 5-30 |
| No. 100 | | No. 100 | 0-10 |
| No. 200 | 0-4 | No. 200 | |
| % Shale & Rock in Total Sample | 8 (max.) | % Shale & Rock in Total Sample | 8 (max.) |
| % L.A. Abrasion | | | |
| Loss | 40 (max) | | |

The aggregate shall be flushed with clear water but not so wet that free water will be draining from aggregate or truck bed before applying.

The sieve analysis will be determined by a wash screening in accordance with ASTM C136.

If bituminous material is changed during construction, the CONTRACTOR shall perform another coating and stripping test prior to utilizing a different cover aggregate blend.

SECTION 4064 – MILLING PAVEMENT SURFACE

404-1406-1 DESCRIPTION

This work consists of improving the profile, cross slope, and surface texture of an existing pavement surface.

404-2406-2 EQUIPMENT

The equipment for milling and texturing the pavement shall be a power-operated, self-propelled planer or grinder capable of removing pavement surface to the required depth, profile, cross slope, and surface texture. The machine shall be capable of accurately establishing profile grades by reference to the existing pavement or from an independent grade control, and shall positively control the cross slope. The machine shall be of size, shape, and dimensions which do not interfere with safe traffic passage adjacent to the work. The milling head shall have a minimum width of 8 feet. The machine shall have a control system to automatically control the elevation and transverse slope of the milling head. A 15-foot minimum length skid, rolling straightedge, or other approved device shall be used to establish the grade reference for control of the milling head. The system shall permit the grade reference device to operate on either side of the milling machine and shall maintain the desired transverse slope regardless of changes in the elevation of the milling head.

Conveyors capable of side, rear, or rear on front loading shall be provided with the necessary equipment to transfer the milled material from the roadway to a truck.

404-3406-3 CONSTRUCTION REQUIREMENTS

The milling shall be started at the centerline of the pavement and proceed on a longitudinal line parallel to the centerline. Succeeding passes shall progress toward the outer edge of the pavement unless a different sequence of operation is permitted by the ENGINEER. The CONTRACTOR shall make every effort to complete the milling operations on the full width of each street so that it is open to traffic at the end of each day, unless otherwise approved by the ENGINEER. The milled depth shall be gradually tapered to the original pavement surface prior to opening to traffic. Before overlaying, the gradual taper to the original pavement surface shall be milled out transversely to produce a vertical cut.

The completed milled surface shall be free from transverse and longitudinal irregularities exceeding 1/4 inch when measured with a 10-foot straightedge.

The CONTRACTOR shall clean the milled surface by brooming and remove all equipment and materials prior to opening to traffic.

~~The CONTRACTOR shall salvage the milled material for the CITY and stockpile as indicated on the plans. Millings shall become property of the CONTRACTOR and removed from the site.~~ All equipment necessary for ~~stockpiling removal of~~ milled material will be furnished by the CONTRACTOR.

Machine exhaust shall not damage or scorch any parts of trees.

The CONTRACTOR shall mill around appurtenances such as manhole and valve box castings without removing those appurtenances. If any asphalt remains on the face of the exposed curb and gutter section or radii around appurtenances, it must be removed to a depth of the milled surface. Appurtenances in the driving lanes shall be wedged with asphalt millings which shall be removed prior to the overlay. Appurtenances not wedged shall be marked with a Type II barricade. The measurement and payment will be in conjunction with the milling pavement surfacing.

404-4406-4 MEASUREMENT AND PAYMENT

Measurement and payment shall be as specified in Section 107 and as follows:

~~406404-4.1~~ **MILLING PAVEMENT SURFACE.** Milling Pavement Surface shall be measured to the nearest 0.1 ton of material weighed and placed in an approved stockpile complete, in place, and accepted by the ENGINEER. Loading, hauling, and stockpiling will not be measured and will be considered incidental to ~~"Milling Pavement Surface."~~ The labor, equipment, brooming, and cleaning before and after milling, water used in milling, and deposit of the milled material in a hauling unit will not be measured for payment, ~~but and will be considered incidental to "Milling Pavement Surface."~~ shall be included in the price bid.

SECTION 501 – PORTLAND CEMENT CONCRETE PAVEMENT

501-3.22 DRILLED IN DOWEL AND TIE BARS. Dowels shall be drilled into widened, existing, or repaired concrete pavements. Transverse dowels shall be 1¼ inches by 18 inches long smooth epoxy coated or #9 by 18 inches deformed (reinforcing bar) epoxy coated.

Holes drilled for dowels shall be located at mid-depth of the slab and spaced at 12 inches on center ~~in accordance with the standard details~~ or as directed by the ENGINEER. Holes drilled for dowels shall use a rigid frame mounted drill rig. The holes shall be a maximum diameter of 1 3/8 inches. Transverse doweled holes shall be air blown clean to the back of the hole. For smooth dowels, inject high-viscosity epoxy (meeting AASHTO M 235 Type 4, Grade III) into the back of the hole with a pressurized caulking apparatus. Insert 1¼ inches by 18 inches smooth dowel to allow air to escape and ensure completely filled holes with bars permanently fastened to the existing concrete. Apply a small form to face of hole to keep epoxy from flowing out and remove it prior to placing concrete. Align smooth dowel bars with the pavement direction parallel to the plane of the surface. Lightly coat the end of the smooth dowels extending into the concrete with grease.

Longitudinal tie bars shall be #6 by 18 inches deformed bars (grade 40) and shall be installed at 3 feet on center. Drills shall be mounted on a rigid frame to provide proper position and alignment. The holes shall be a maximum diameter of 7/8 inch. Tie bars shall be located at mid-depth of the slab and spaced as indicated on the details, or as directed by the ENGINEER. The cost for drilled in tie bars shall be considered incidental.

501-3.23 RANDOM CRACK SEALING. Random cracks ~~narrower than 1/2 inch~~ in ~~existing~~ portland cement pavement and curb and gutter that are not settled or displaced shall be sealed as directed by the ENGINEER. Before sealing, each crack shall be thoroughly cleaned mechanically of all dust, dirt, concrete scale, ~~existing sealant~~ or other foreign matter and ~~blown out followed~~ with a ~~high-velocity~~ jet of compressed air ~~with a minimum airflow of 185 cfm and 120 psi at the air nozzle. The nozzle shall be no less than 1/2 inch, inside diameter, utilizing a commercial grade air compressor. A leaf blower shall NOT be an acceptable substitute for compressed air.~~ The crack shall be clean and dry when sealed. Random cracks shall not be sealed when the air temperature ~~is below 40°F~~ ~~does not meet manufacturer's recommendations, unless approved by the ENGINEER.~~

Random cracks ~~wider narrower~~ than ~~1/2~~ 1/4 inch shall be widened ~~to 3/8 inch~~ and sealed with silicon sealant according to Section 501-2. All other random cracks shall be sealed with hot pour in accordance with Section 501-2.

Random cracks shall be sealed within 1/4 inch of the surface.

501-3.24 SAW AND SEAL. Repaired working joints and random cracks on ~~existing~~ portland cement pavements and curb and gutters shall be sawed and sealed as follows:

SECTION 501 – PORTLAND CEMENT CONCRETE PAVEMENT

Saw and seal any single, transverse, uncontrolled crack that penetrates the full slab length.

All uncontrolled cracking and repaired working joints shall be sawed and sealed to the following dimensions:

| Sawed Joint Width, Inches | Sealant Bead Thickness, Inches | Backer Rod Diameter, inches | Minimum Sawed Joint Depth, Inches | Backer rod Placement Depth, Inches |
|---------------------------|--------------------------------|-----------------------------|-----------------------------------|------------------------------------|
| 1/2 | 1/4 | 5/8 | 1 1/4 | 1/2 |
| 5/8 | 5/16 | 3/4 | 1 1/2 | 9/16 |
| 3/4 | 3/8 | 1 | 1 3/4 | 7/8 |
| 7/8 | 7/16 | 1 | 1 3/4 | 1 1/16 |
| 1 | 1/2 | 1 1/4 | 2 | 3/4 |

Joints shall be sawed to the nearest 1/8 inch in width and to the nearest 1/4 inch in depth.

The joint shall be cleaned of any materials such as rocks, dirt, oil, asphalt, paint, and rust, and blown out with compressed air immediately prior to installing sealant. Backer rod, if utilized, shall be 25 percent larger than joint width and installed full width of joint repair. Sealant shall be installed from inside the joint with an approved mechanical device. Sealant shall be filled to 1/4 inch below pavement surface. Sealant shall conform to Section 501-2. Joints to be sealed by this method will be marked by the ENGINEER.

Compression joint material within 1/2 inch from surface of pavement shall be removed and sealed, which will be paid at the unit price bid for joint and crack sealing.

501-3.25 CASTING ADJUSTMENTS. Construction materials, methods, and measurements and payments shall conform to Section 1206.

501-3.26 WRAPPED UTILITY BOXES. Construction materials, methods, and measurements and payments shall conform to Section 1206.

501-3.27 CONCRETE REMOVAL. All concrete removed shall be to the nearest joint, unless otherwise directed by the ENGINEER. Removed concrete materials shall become property of the CONTRACTOR, removed from site, and disposed of at CONTRACTOR's expense, unless otherwise specified.

501-3.28 UNCONTROLLED CRACKING. When uncontrolled cracking occurs within 2 years of acceptance of new roadway concrete:

- If single crack in panel, CONTRACTOR may route and seal if:

SECTION 501 – PORTLAND CEMENT CONCRETE PAVEMENT

- Crack is not parallel to and within 6 inches of a joint.
- Total cracked panels do not exceed 2% of total panels on a project.
- When CONTRACTOR route and seals cracks, end of cracks shall be drilled out with a 2" diameter hole completely through the concrete and sealed.
- If panel(s) has more than one crack or the total number of panels cracked exceeds 2% of the total panels on a project, all cracked panel(s) shall be removed and replaced.
- If cracking occurs prior to final acceptance of the project, a deduct of 10% of the bid cost for cracked panels will be applied to all panels that are route and sealed.

All crack repairs and/or panel replacement shall be at CONTRACTOR's expense. CONTRACTOR may elect to remove and replace panels, at own expense, in lieu of route and seal.

This specification does not apply to sidewalks, driveways or curb and gutter.

501-4 MEASUREMENT AND PAYMENT

Measurement and payment shall be as specified in Section 107 and as follows:

~~**501-4.1 PORTLAND CEMENT CONCRETE PAVEMENT.** Portland Cement Concrete Pavement shall be measured by the square yard (SY) as indicated and paid for at the unit price bid for "P.C.C. Pavement" complete, in place, and accepted by the ENGINEER. Pavement thickness shall be as designated in the bid item.~~

~~**501-4.3 SAW AND SEAL JOINTS.** Saw and Seal Joints shall be measured by the linear foot (LF) and paid for at unit the price bid for "Conc. Saw & Seal Joints" complete, in place, and accepted by the ENGINEER.~~

~~**501-4.5 SAWING CONCRETE.** Sawing Concrete shall be measured by the linear foot (LF) and paid for at the unit price bid for "Sawing Concrete" completed to the required depth and approved by the ENGINEER.~~

~~**501-4.10 SELECT BACKFILL.** Select Backfill when listed on the Proposal form shall be measured by the ton (TON) and paid for at the unit price bid for "Select Backfill" complete, in place, and accepted by the ENGINEER.~~

501-4.14 ADDITIONAL PORTLAND CEMENT. During the course of construction, the ENGINEER may require the use of additional portland cement in the concrete mix. When requested and used, all cement greater than six sacks (564 lbs.) per cubic yard of concrete except for full-depth repairs shall be measured by the sack (94 lbs.) and paid for at the unit price bid for "Additional Portland Cement" ~~complete, in place, and accepted by the ENGINEER.~~

SECTION 601 – CONCRETE SIDEWALKS

601-3.8 CONCRETE QUALITY CONTROL AND SUBGRADE TESTING. Testing frequencies shall conform to Section 501-3. Payment shall be considered incidental to other bid items.

601-3.9 ADA CURB RAMPS. ADA curb ramps must be installed when installation of new sidewalks, new asphaltic or concrete pavements, and repair of existing sidewalks, curbs, valley gutters, and utility cuts are made at an intersection. For any repair done to an existing ADA curb ramp that does not have the detectable warning panels for each direction of the ramp, the CONTRACTOR shall remove the additional concrete to install a detectable warning panel.

The ADA curb ramps shall be tied to adjacent concrete pavements and curb with one foot #4 reinforcing steel spaced at one foot centers.

The curb ramp landing lengths, directions, and placements of the detectable warning panels shall be determined by the ENGINEER in the field.

Curb ramps installed prior to installation of adjacent sidewalk shall be placed such that the top of the ramp matches the low side of the future sidewalk. The top of ramp elevation shall comply with ADA standards and the City of Bismarck Standards for placement and elevations of sidewalks as per Standard Drawing 600-18.

The ADA curb ramps for new asphaltic pavements or concrete pavements shall be protected by steel fence posts until construction of adjacent sidewalks is completed. The number of fence posts and the location shall be in accordance with Standard Details or shall be determined by the ENGINEER. Cost of furnishing and installing steel fence posts shall be considered incidental to the price bid for "Detectable Warning Panel and Detectable Warning Panel CI."

Detectable warning surface shall extend 24 inches in the direction of pedestrian traffic and the full width of the curb ramp landing.

The detectable warning surface shall be located so that the nearest edge is 6 inches minimum and 8 inches maximum from the face of the curb, or determined by the ENGINEER in the field.

The detectable warning panels shall be installed according to the manufacturer's recommendation and in accordance with Standard Details 600-3 and 600-4.

When installing ADA ramps with two directional ramps, the distance between the ramps must be no less than three feet. If three feet cannot be maintained between the ramps, a full drop radius ramp shall be installed.

ADA ramps installed as part of new roadway paving project shall have "T" post installed on property line at the center of each new panel. Costs shall be incidental to concrete.

SECTION 601 – CONCRETE SIDEWALKS

601-3.10 SIDEWALK TRENCH DRAIN. Sidewalk trench drains shall be installed to the dimensions shown on the plans and in accordance with Standard Detail 600-5. All costs of labor, materials, and equipment to install sidewalk trench drains shall be included in the price for “Sidewalk Trench Drain.”

601-3.11 RELOCATION OF LAWN IRRIGATION SYSTEM. Any concrete work requiring the relocation of any part of a lawn irrigation system shall be paid for as extra work as outlined in Section 104.

601-3.12 MACRO-FIBER REINFORCED CONCRETE. All sidewalk concrete shall contain macro-fiber reinforcement unless otherwise directed by the ENGINEER. All macro-fiber shall be in conformance with 601-2.7. Dosage of macro-fiber shall be per the manufacturer recommended dosage rates. The cost for macro-fiber reinforcement shall be considered incidental.

601-3.13 UNCONTROLLED CRACKING. Section 501-3.8 does not apply to sidewalks, driveways or curb and gutter. Panels shall be replaced if multiple cracks occur within 2 years of acceptance. Panels with a single crack may be accepted if crack does not exceed 1/4” displacement vertically or horizontally, if crack exceeds this displacement within 2 years of acceptance, panel shall be replaced.

All crack repairs and/or panel replacement shall be at CONTRACTOR's expense.

601-4 MEASUREMENT AND PAYMENT

Measurement and payment shall be as specified in Section 107 and as follows:

MISCELLANEOUS PAY ITEMS:

601-4.1 Aggregate base for sidewalks shall be paid under ~~bid contract~~ item ~~302-4.3~~ “Blended Base” by the cubic yard (CY) at plan quantity as calculated from the required width and depth given in Section 601-3.4

~~**601-4.1 4” CONCRETE.** Concrete shall be measured by the square foot (SF) and paid for at the unit price bid for “4” Concrete” complete, in place, and accepted by the ENGINEER.~~

~~**601-4.3 4” CONCRETE REMOVAL.** Four-inch concrete removed and disposed of shall be measured by the square foot (SF) and paid for at the unit price bid for “4” Concrete Removal.” All concrete removed which is less than 6 inches in thickness shall be paid for under this item. Field Measurement Contract Item~~

| | |
|---------------------------|---------------------------------|
| 5” and Less | Concrete Removal: 4” |
| 5” to 7” | Concrete Removal: 6” |
| 7” and Greater | Concrete Removal: 8” |

SECTION 602 – CONCRETE DRIVEWAYS

602-3.11 MACRO-FIBER REINFORCED CONCRETE. All driveway concrete shall contain macro-fiber reinforcement unless otherwise directed by the ENGINEER. All macro-fiber shall be in conformance with 601-2.7. Dosage of macro-fiber shall be per the manufacturer recommended dosage rates. The cost for macro-fiber reinforcement shall be considered incidental.

602-3.12 UNCONTROLLED CRACKING. Uncontrolled cracking shall be repaired as per Section 601-3.13.

602-4 MEASUREMENT AND PAYMENT

Measurement and payment shall be as specified in Section 107 and as follows:

602-4.1 MISCELLANEOUS PAY ITEMS. Aggregate base for driveways shall be paid under bid item ~~302-4.3~~ "Blended Base" by the cubic yard (CY) at plan quantity as calculated from the required width and depth given in Section 602-3.2.

~~**602-4.1 6" CONCRETE.** Six inch Concrete shall be measured by the square foot (SF) and paid for at the unit price bid for "6" Concrete" complete, in place, and accepted by the ENGINEER.~~

~~**602-4.2 8" CONCRETE.** Eight inch Concrete shall be measured by the square foot (SF) and paid for at the unit price bid for "8" Concrete " complete, in place, and accepted by the ENGINEER.~~

~~**602-4.2A 8" CONCRETE REMOVAL.** Eight inch or thicker concrete removed and disposed of shall be measured by the square foot (SF) and paid for at the unit price bid for "8" Inch Concrete Removal."~~

~~**602-4.3 6" CONCRETE REMOVAL.** Six inch concrete removed and disposed of shall be measured by the square foot (SF) and paid for at the unit price bid for "6" Inch Concrete Removal."~~

SECTION 603 – CONCRETE CURB AND COMBINED CURB AND GUTTER

height equal to the top finished grade of the curbing. The backfill shall be compacted in accordance with Section 202 "Excavation and Embankment."

603-4.7 CONTRACTOR'S STAMP OR NAME PLATE. CONTRACTOR shall mark every 100 linear feet for continuous pours of new curb and gutter laid, and every curb and gutter patch done per city lot, by stamping or by inlaying an approved metal plate conforming to Section 501.

603-4.8 CURB OR CURB AND GUTTER REMOVAL. All curb or curb and gutter removed shall be removed and disposed of in accordance with Section 501.

603-4.9 CURB AND GUTTER EXTRUSION MACHINE. This type of machine shall be capable of producing concrete curb, curb and gutter, or mountable curb and gutter to conform to the requirements of this section and line, grade, shape, and dimensions given in the plans and specifications or approved by the ENGINEER using materials conforming to the specifications.

The CONTRACTOR shall provide the ENGINEER with the following information prior to being given permission to produce a test section with the machine:

- a. Complete machine specifications regarding the machine and its performance.
- b. Details of the proposed section of curb or curb and gutter to be produced by the machine.
- c. Provide evidence of having previous experience of operating and maintaining the proposed machine.

If the above items are found to be satisfactory to the ENGINEER, written permission will be given to the CONTRACTOR to provide a 100-foot test section in place with the proposed machine.

If the manufacture of the test section and the performance of the extrusion machine prove to be satisfactory, the ENGINEER shall then issue final written approval to the CONTRACTOR. If, during the course of construction on the project, manufacture and performance becomes unsatisfactory, the ENGINEER shall disallow the continued use of said machine.

603-4.10 SEALING JOINTS. All expansion joints shall be sealed in accordance with Section 501.

603-4.11 CONCRETE QUALITY CONTROL AND SUBGRADE TESTING. Testing shall meet the requirements of Section 501. Payment shall be considered incidental.

603-4.12 UNCONTROLLED CRACKING. Uncontrolled cracking shall be repaired as per Section 601-3.13.

SECTION 801 – SANITARY SEWER

801 "Excavation and Preparation of Trench." If solid rock extends below the necessary depth of excavation, it shall be measured for payment to a horizontal plane 6 inches below the bottom of the pipe. All rocks smaller in volume than 1 cubic foot shall not be classified as solid rock, but may be used in backfilling as directed by the ENGINEER.

Whenever ledge rock is encountered, the CONTRACTOR shall strip all overlying earth and he shall then notify the ENGINEER that the rock is ready for measurement. The ENGINEER may then take levels upon the rock or he may at his discretion defer measurement until after the excavation is completed. CONTRACTOR shall not refill any trench where rock is encountered until notified by the ENGINEER that measurement has been made. Payment will not be allowed for any rock unless measurement has been made as herein provided. The rock shall be excavated to a depth of six inches below the bottom of the pipe, and the trench shall be refilled to the proper grade with bedding material.

All rock found in the trench having greater volume of 1 cubic foot shall not be used as backfill but shall be disposed of as directed by the ENGINEER.

801-3.4 PIPE LAYING. All watermain and sanitary sewer crossings shall conform to the following policy:

- a. Where both water and sewer are of new construction:
 1. No additional protections needed if water main crosses at least 5 feet above the sewer.
 2. If the water main crosses within 3 to 5 feet above the sewer, a full length of water main shall be centered over the sewer.
 3. If the water main crosses within 3 feet above the sewer, a full length of water main shall be centered over the sewer, and the sewer joints located within 10 feet of the crossing shall be able to withstand 25 psi internal pressure.
- b. Where water main crosses over an existing sewer:
 1. No additional protection needed if water main is at least 3 feet above the sewer. The intervening dirt must be left undisturbed.
 2. If crossing is within 3 feet above sewer, a full length of water main must be centered over the sewer main.
- c. Where water main crosses under the sewer:
 1. In all cases, additional protection shall be provided by centering a full length of water main under the sewer main. All sewer joints located within 10 feet of the crossing shall be able to withstand 25 psi internal pressure.

Proper implements, tools, and equipment satisfactory to the ENGINEER shall be provided and used by the CONTRACTOR for the safe and convenient prosecution of the work. All pipe and fittings shall be carefully lowered into the trench piece by piece by means of a derrick, ropes, or other suitable tools or equipment in such a manner as to prevent damage to the pipe. Under no circumstance shall pipe be dropped or dumped into the trench.

SECTION 801 – SANITARY SEWER

After the trench has been excavated to the proper grade, the first pipe at the outlet end of the sewer shall be bedded to the proper line and grade with the bell end upstream. All pipe shall be laid to line and grade. The pipe shall be held in place by backfilling along the bottom and sides of the pipe section with bedding material thoroughly tamped up to the centerline of the pipe and protected from movement.

During the pipe laying operation, the CONTRACTOR shall have a watertight plug available to install in the last pipe laid at the end of each work day, or to install during the work day, to prevent water, sediment, or other foreign material from entering the newly installed pipe.

Wyes for sanitary sewer connections shall be installed at an angle between 10 and 80 degrees from vertical.

The CONTRACTOR shall exercise due care so as to prevent water and other foreign matter from entering the newly constructed sewer mains at new manhole locations.

All joints shall be installed in accordance with the pipe manufacturer's instructions.

Where polyvinyl chloride sewer pipe is installed in a vitrified clay sewer line, V.C. to PVC adaptors shall be used at each junction. Adapters shall be Shear Guard repair couplers as manufactured by Indiana Seal, or approved equivalent.

The cost of adapters shall be considered incidental to the unit price bid for cast iron sewer pipe or polyvinyl chloride sewer pipe.

The interior of the pipe shall be cleaned as the work progresses. The manholes and sewer pipe shall be flushed with clean water after completion and prior to acceptance by the ENGINEER.

All connections to existing utilities shall be considered incidental to other bid items.

801-3.5 BACKFILLING OF PIPE TRENCH. After the pipe has been laid to line and grade, the trench shall be backfilled under and along the sides of the pipe up to the centerline of the pipe by thoroughly compacting bedding material into place so as to form a uniform bed for the pipe. The compaction may be obtained by any approved method or equipment which will produce a uniform density meeting the requirement to obtain not less than 85 percent maximum dry density at optimum moisture made in accordance with ASTM D1557 (modified proctor). Care shall be exercised not to displace the pipe or damage the pipe during the compaction operations. If the material in the trench is sand or gravel and acceptable to the ENGINEER, it will not be necessary to furnish any other material than that found within the trench to backfill up to the centerline of the pipe. If sand or gravel is not found within the trench, the CONTRACTOR will be required to furnish bedding material as per Pipe Bedding Standard Plate. CONTRACTOR shall keep the bedding completed within 3 lengths of

SECTION 801 – SANITARY SEWER

the last pipe being laid and bedding for all pipe installed shall be completed at the end of each day's work.

After the pipe has been inspected and bedding material is in place, two feet of backfill shall be placed over the pipe to prevent damage to the installed pipe. The remaining trench shall be backfilled as per Section 801-3.6. On all areas outside of the pavement, curb and gutter, and sidewalk areas, no compaction will be required on the top 4 inches.

The use of drop pile hammers, loaded or unloaded clam shells or backhoe buckets, or other similar equipment will not be permitted to obtain the required density. The CONTRACTOR shall use specialized equipment or hand tamping around appurtenances such as manholes to ensure proper density. The remaining trench shall be backfilled in accordance with the specifications for the class of backfill as set forth in Section 801-3.6. The areas for each class of backfill specified shall be designated on the plans.

The CONTRACTOR shall engage an independent soils testing laboratory, approved by the ENGINEER, to determine the soil moisture density relationships and perform the required compaction testing.

The compaction control tests for this section are based on one individual compaction test per 200 feet of trench per 36 inches of backfill or where directed by ENGINEER. Compaction tests shall be taken for service lines a minimum of one test per line, at a depth as directed by ENGINEER. The CONTRACTOR shall be responsible for all retesting of failing tests and a proctor determination to represent each soil condition to be encountered on the project. The time, locations, depths, and frequency of compaction testing shall be at the discretion of the ENGINEER during construction. Should it become necessary to require an additional number of initial compaction tests, over and above the number specified for bidding purposes, the ENGINEER will assume the responsibility to perform said additional testing. The CONTRACTOR, however, will be required to assume the cost of all retesting of failing tests regardless of the total number required during construction.

Compaction testing to determine densities may be accomplished with a nuclear density testing apparatus and/or the sand cone method. Should disputes arise concerning test results, they will be resolved by using the sand cone method.

Written reports of all test results shall be supplied to the ENGINEER and the CONTRACTOR by the testing laboratory as soon as possible. The availability of the independent testing laboratory when needed and speed of testing and reporting are to be considered the responsibility of the CONTRACTOR.

Compaction control tests as stated above shall be incidental to other bid items.

All excess excavated material and material unsuitable for backfill shall become the CONTRACTORs property. The CONTRACTOR shall be responsible for disposal of and transporting material from the site.

SECTION 801 – SANITARY SEWER

The CONTRACTOR shall restore all shrubbery, fences, sod, or other surfaces disturbed to a condition equal to that before the work began, furnishing all labor and material incidental thereto. If the area cannot be restored to the original line and cross section without the aid of grade stakes, they will be furnished by the ENGINEER at the CONTRACTOR expense.

Following ~~the certification of completion acceptance~~ by the ENGINEER, the CONTRACTOR shall maintain the surface, including settlement, of pavement, unpaved trenches, adjacent curbs and gutters, sidewalks, driveways, shrubbery, fences, grass, sod, or other surfaces disturbed ~~for a period of 3 months thereafter throughout the warranty period~~. All material and labor required for maintenance of the trenches and adjacent structures shall be supplied by the CONTRACTOR and the work done in a manner satisfactory to the ENGINEER. The cost of backfilling and cleanup shall be included in the price per linear foot of ~~sewer~~ pipe in place.

801-3.6 BACKFILL CLASSIFICATIONS. Backfill shall meet the requirements of the backfill classification as per plans, if no backfill class is specified, backfill shall be Class A.

Any costs associated with obtaining backfill requirements shall be incidental.

After the pipe has been inspected and bedding material plus the initial two feet of backfill is in place, as per Section 801-3.5, the remaining trench shall be backfilled in layers of not more than twelve inches and compacted by any approved method or equipment which will produce a uniform density meeting the requirements to obtain the following at optimum moisture in accordance with ASTM D1557 (modified proctor):

- (a) **Class AA Backfill.** Not less than 95 percent maximum dry density.
- (b) **Class A Backfill.** Not less than 90 percent maximum dry density.
- (c) **Class B Backfill.** Not less than 85 percent of maximum dry density.
- (d) **Class C Backfill.** Equal to the adjacent undisturbed soil but not to exceed 85 percent of maximum dry density.
- (e) **Class D Backfill.** No minimum.

When Class D backfill is specified, material shall be backfilled in 24 to 36 inch layers compacted by any approved method or equipment which will obtain a uniform density.

801-3.7 CONNECT TO MANHOLE. Connections to existing structures and new manholes, which are not pre-formed, for sanitary sewer shall be core drilled unless otherwise approved by the ENGINEER. Connections shall be made with flexible pipe to manhole connector (rubber boot) or with PVC manhole adaptor per Section 1205. If connector is used, two bands shall be required to secure boot to pipe.

SECTION 801 – SANITARY SEWER

The maximum average inside diameter shall be equal to the average outside diameter per applicable ASTM Standards minus 2 minimum wall thicknesses per applicable ASTM Standards. Manufacturing and other tolerances shall not be considered for determining maximum allowable deflections.

Deflection tests shall be performed a minimum of 30 days after the pipe has been fully backfilled and received passing compaction tests per Section 801-3.5 “Backfilling of Pipe Trench.”

The mandrel shall be pulled through the pipe by hand to ensure that maximum allowable deflections have not been exceeded. Prior to use, the mandrel shall be certified by the ENGINEER. If the mandrel fails to pass through the pipe, it will be deemed to be over-deflected.

The rigid ball or mandrel used for the deflection test shall have a diameter not less than 95 percent of the base inside diameter or average inside diameter of the pipe depending on which is specified in the ASTM Specification, including the appendix, to which the pipe is manufactured. The test shall be performed without mechanical pulling devices. The mandrel shall be fabricated of steel or aluminum and shall have pull rings at either end. The mandrel shall be stamped or engraved indicating the pipe material specification, nominal size, and mandrel outside diameter. The maximum average inside diameter of the pipe shall be measured and calculated by the ENGINEER in the field prior to installation.

Unless otherwise permitted by the ENGINEER, any over-deflected pipe shall be uncovered and, if not damaged, removed and reinstalled. Damaged pipe shall be removed from the work site and replaced with new pipe. Any pipe requiring replacement shall be retested at the expense of the CONTRACTOR.

All costs incurred by the CONTRACTOR attributable to mandrel and deflection testing, including any delays and reinstallation of deflected pipe, shall be considered incidental to the installation of the pipe.

801-3.10 LEAKAGE TESTS. The CONTRACTOR shall provide one of either a Hydrostatic Test or an Air Test as specified below:

Trench shall be completely backfilled to final grade prior to testing, unless otherwise approved by the ENGINEER.

(a) Hydrostatic Test. The CONTRACTOR shall perform an exfiltration or infiltration test with a minimum positive head of 2 feet.

Allowable exfiltration or infiltration shall not exceed 100 gallons per inch of internal pipe diameter, per mile, per day.

SECTION 801 – SANITARY SEWER

(b) Air Test. The CONTRACTOR shall conduct an air test, as a minimum, conforming to the test procedure as described in ASTM F1417 for plastic pipe. For other materials, test procedures shall be approved by the ENGINEER.

801-3.11 TELEWISE SEWER MAIN. All newly constructed ~~sanitary~~ sewer mains shall be televised. If not specified as a bid item, the televising shall be considered incidental to the price bid for the ~~sanitary~~ sewer installation. After flushing the sewer main, ~~under~~ as per Section 801-3.4, the CONTRACTOR shall have the sewer main televised and recorded by a firm normally engaged in such type of work. The CONTRACTOR shall provide a high-quality digital video or downloadable shared file with a report for each section of sewer main televised. The recording shall be clearly marked as to the project number and recording number. The recording shall describe locations and conditions of the sewer and shall have a visual footage counter showing the distance of the camera from the manhole. After the CONTRACTOR has submitted the recordings and report, they will be viewed by the ENGINEER for acceptance. Any sewer failing inspection shall be replaced and re-televised at the expense of the CONTRACTOR.

Trench shall be completely backfilled to final grade prior to televising, unless otherwise approved by the ENGINEER.

801-3.12 CLEANOUT. Cleanouts shall be constructed in accordance with the standard detail 801-1.

801-3.13 SANITARY SEWER FORCE MAIN. The construction requirements for sanitary sewer force mains shall comply with Section 901 “Water Mains,” with the exception of the hydrostatic pressure tests, disinfection, and bacteriological testing. The hydrostatic pressure test shall be the same as Section 901 “Water Mains,” except the hydrostatic pressure test shall be 125 pounds per square inch and shall be held for 2 hours. No pipe disinfection or bacteriological testing shall be required.

801-3.14 CONNECTION TO EXISTING SEWER MAIN. Whenever a wye branch is not available for a sewer service connection, the connection to the sewer main shall consist of one of the following:

- a. A “factory assembled” wye branch may be cut into an existing PVC sewer main using gasketed repair couplings to the existing PVC sewer main.
- b. A “factory assembled” wye branch may be cut into an existing VC sewer main using Shear Guard couplings, or approved equivalent, to the existing VC sewer main.
- c. PVC, VC, or RCP sewer main may be connected to the existing VC sewer main service using an Inserta Tee as manufactured by Inserta Fittings Co., or approved equivalent. The City of Bismarck Public Works Department will make the tap into the existing PVC, VC, or RCP sewer main. Call to schedule and for the current price of tap.

802-3 CONSTRUCTION REQUIREMENTS

802-3.1 EQUIPMENT. All equipment necessary and required for the proper construction of storm sewers shall be on the project in proper working condition and approved by the ENGINEER before construction is permitted to start.

The CONTRACTOR shall provide appropriate hoisting equipment to handle the pipe while unloading and placing it in its final position without damage to the pipe.

The CONTRACTOR shall provide method and means to obtain the required compaction of the pipe bed and the backfill as specified.

The CONTRACTOR shall provide a sufficient number of watertight sewer plugs to prevent infiltration of water and any other foreign material from entering the existing sewer system and the newly constructed sewer lines.

802-3.2 EXCAVATION AND PREPARATION OF TRENCH. Excavation and preparation of the trench for storm sewer construction shall conform to Section 801 with the following additions:

HDPE sewer pipe shall have bedding material installed to 6 inches over the top of the pipe. Bedding material from the center of the pipe to 6 inches over the pipe shall be considered incidental to the pipe items.

If perforated storm drain is installed, the fine aggregate shall conform to Section 802-3.7.

802-3.3 ROCK EXCAVATION. The rock excavation shall conform to Section 801.

802-3.4 PIPE LAYING. Pipe laying shall conform to Section 801 with the following additions:

Connections between HDPE and RCP shall be made using an internal coupler spigot adaptor equivalent to the Mar-Mac Coupler manufactured by Advanced Drainage Systems per Detail No. 802-2. This work shall be incidental to the storm sewer pipe.

802-3.5 SIX-INCH CLEANOUT - IN-LINE. Where shown on the plans, storm sewer in-line cleanouts shall be constructed according to the corresponding Detail (802-3) in the City of Bismarck Construction Specifications and conform to the following criteria. The pipe shall be polyvinyl chloride sanitary sewer (PVC) pipe. Pipe that is 15 inches or smaller shall conform to the requirements of ASTM D3034 for TYPE PSM, PVC sewer pipe and fittings and shall have an SDR of 35, all of which shall be stamped on the pipe. Polyvinyl chloride sewer pipe 18 inches or larger shall conform to the requirements of ASTM F679-PS46. PVC sewer main line pipe and PVC sewer service pipe shall have the elastomeric gasket-type joint providing a watertight seal. A solvent cement-type joint will not be allowed. Connection to pipe shall be made with PVC 2-Way cleanout tee as manufactured by Charlotee Pipe or approved equal. ~~PVC wye branches shall be~~

SECTION 802 – STORM SEWER

manner directed by the ENGINEER and for which extra compensation will be allowed the CONTRACTOR.

(b) Deviation Without Engineer's Consent. No deviation shall be made from the required line and grade established by the ENGINEER without the consent of the ENGINEER.

(c) Subsurface Explorations. Whenever necessary to determine the location of existing pipes, valves, or other underground structures, the CONTRACTOR, after examination of available records and upon written order from the ENGINEER, shall make all explorations and excavations for such purpose for which the ENGINEER may allow extra compensation.

802-3.11 CIRCULAR DEFLECTION TEST. All fittings and flexible pipe of 8 inches in diameter or larger shall be tested by the CONTRACTOR to ensure that circular deflections do not exceed the maximum allowable deflection. The CONTRACTOR shall test in accordance with Section 801 "Circular Deflection Test." Any pipe requiring replacement shall be retested at the expense of the CONTRACTOR.

Deflection tests shall be performed a minimum of 30 days after the pipe has been fully backfilled or after gravel section is in place and compacted when pipe is under roadway, and received passing compaction tests per Section 801 Backfilling of Pipe Trench.

802-3.12 RIPRAP. Hand placement of riprap may be required to ensure an acceptable gradation, uniform surface, and to fill gaps between larger rocks to cover any exposed riprap fabric.

Type VL riprap and Type L riprap shall be buried with topsoil and revegetated. All items shall be considered incidental to the bid price for riprap, unless otherwise specified.

Riprap fabric shall be used under the riprap as bedding. All costs for providing and installing the riprap fabric shall be incidental to the riprap.

Riprap grout shall be installed for the first 3 feet from the end of the flared end section (FES) the width of the flared end section plus 1 foot on each side of the FES.

Grout shall be installed on a 4-inch thick layer of granular material. -The granular material shall be in accordance with Section 801 "Bedding Material." -The riprap prior to the grout placement must be as clean as practical. The grout shall be delivered to the place of final deposit by means that will ensure uniformity and prevent segregation of the grout. Placing of grout shall be obtained by pumping under pressure through a 2-inch maximum diameter hose to ensure complete penetration of the grout into the rock layer. - A vibrator is to be employed near the nozzle during placement to aid the flow of the grout. The excess grout must be removed immediately by washing to leave a clean rock face exposed.

SECTION 802 – STORM SEWER

Grout shall fill the voids to within approximately 4 inches of the riprap surface.- The recommended minimum grout specifications include entrained air, a 28-day strength of at least 2,400 pounds per square inch, and a high slump (5-7 inches) in order to penetrate either the full depth of the riprap layer or at least 2 feet where the riprap layer is thicker than 2 feet.- Concrete having maximum aggregate size of 3/4 inch may be substituted for grout when using Type M riprap or larger.

802-3.13 FLUSH AND TELEVISION SEWER MAIN. All storm sewer, including laterals and culverts, regardless of pipe material, shall be flushed and televised as per section 801.

802-4 MEASUREMENT AND PAYMENT.

Measurement and payment shall be as specified in Section 107 and as follows:

~~802-4.1 thru 4.24 (X)~~ STORM SEWER PIPE. ~~(X)~~ Storm Sewer Pipe shall be measured ~~by the linear foot (LF)~~ from centerline of manhole or inlet to centerline of manhole or inlet. If no inlet or manhole is installed, pipe shall be measured to end of pipe section. Flared end sections shall be paid under separate bid item. ~~Items shall be paid for at the unit price for “(X) Storm Sewer Pipe” complete, in place, and accepted by the ENGINEER.~~

~~802-4.25 thru 4.35 (X)~~ ARCHED STORM SEWER PIPE. ~~(X)~~ Arch Storm ~~STS~~ Sewer Pipe shall be measured ~~by the linear foot (LF)~~ from centerline of manhole or inlet to centerline of manhole or inlet, ~~and paid for at the unit price bid for “(X) Arched (S or St) Sewer Pipe” complete, in place, and accepted by the ENGINEER.~~

~~802-4.36 thru 4.50 (X)~~ CORRUGATED STEEL STORM SEWER PIPE. ~~(X)~~ Corrugated Steel ~~Storm Sewer~~~~STS~~ Pipe shall be measured ~~by the linear foot (LF)~~ from centerline of manhole or inlet to centerline of manhole or inlet, ~~and paid for at the unit price bid for “(X) Corr Steel St Sewer Pipe” complete, in place, and accepted by the ENGINEER.~~

~~802-4.51 thru 4.79 (X)~~ FLARED END SECTION. ~~(X)~~ “Flared End Sections shall be measured on an individual unit basis (EA) and paid for at the unit price bid for “(X) Flared End Section” complete, in place, and accepted by the ENGINEER.

~~802-4.80 thru 4.89 (X)~~ 4 PERFORATED PIPE. ~~“(X) Perforated Pipe” shall be measured and paid by the linear foot (LF) in place and accepted by the ENGINEER.~~ Bends, tees, caps and coupling bands shall be considered incidental ~~to the unit price bid.~~

~~802-4.90-5~~ BEDDING MATERIAL. Bedding Material shall be measured and paid for ~~under as per~~ Section 801-~~4.60~~, with the following revision:

SECTION 901 – WATERMAIN

901-2.5 DUCTILE IRON FITTINGS. Ductile Iron fittings shall be manufactured in accordance with AWWA/ANSI C110/A21.10 and shall be furnished with either Standardized Mechanical Joints or Push-On Joints ~~in accordance with AWWA/ANSI C111/A21.11.~~ Ductile Iron fittings shall be manufactured in accordance with AWWA/ANSI C153/A21.53 or AWWA/ANSI C110/A21.10. Ductile iron fittings shall have a working pressure of 350 pounds per square inch ~~conforming to AWWA/ANSI C153/A21.53 or AWWA/ANSI C110/A21.10.~~ All ductile iron fittings shall contain an interior and exterior bituminous seal conforming to AWWA/ANSI C104/A21.4. All ductile iron fittings shall be considered incidental to the price bid for watermain.

901-2.6 COUPLINGS. All pipe couplings 12-inch diameter and smaller shall be epoxy coated ductile iron meeting the requirements of ASTM A 536, grade 65-45-12 and AWWA C219. Couplings shall have a minimum working pressure of 250 psi and have end rings that are segmented and joined with a pinless hinge. Gaskets shall be for water and sewer as per ASTM D2000. Fasteners shall be stainless steel.

Couplings larger than 12-inch diameter shall be Romac Macro HP, Hymax High Pressure or approved equivalent. Couplings larger than 12-inch diameter shall be mechanical joint long body sleeves (min. 15" length) meeting AWWA C153.

901-2.7 GATE VALVE. The gate valve furnished shall be manufactured by American Flow Control or American AVK Company or approved equivalent, under the minimum requirements in design, material, and workmanship conforming to the latest AWWA Standard C515. The metals used shall be in accordance with AWWA and ASTM Standards. Unless otherwise designated, all gate valves shall have a non-rising stem, O-ring stem seals, 2-inch operating nuts, and open counterclockwise. If a stem extension is specified, it shall be fastened to the operating nut with a set screw. The operating nut shall be drilled or otherwise indented to accept the set screw and provide a secure connection that will prevent an extension from coming loose during operation. The gate valve shall have a resilient synthetic rubber coating seat attached to the wedge, manufactured and designed in accordance with the latest AWWA Standard C515. Resilient-seated gate valve body and bonnet shall be coated, inside and out, with a fusion bonded epoxy in accordance with AWWA C550. The waterway shall have a full unobstructed flow without recesses in the bottom. All bonnet bolts shall be stainless steel.

All gate valves 14 inch and larger shall have a beveled gear actuator, actuator shall be included in the price bid.

All valves shall be placed on a minimum 6 inch thick concrete pad of sufficient dimensions for valve size.

901-2.8 VALVE BOXES. The valve boxes furnished shall be manufactured by Tyler Pipe Model 6860, Sigma Type "G" or Star Pipe Products Cast Iron Heavy Duty Model "G" or approved equivalent, with bases and dimensions of each section to be as follows:

SECTION 901 – WATERMAIN

of the ENGINEER in accordance with AWWA C651-14 Disinfecting Water Mains, with the exception that 5.1.1.1 Option B will not be allowed. Water shall be fed into the new line with chlorine applied in amounts to maintain a chlorine residual of 50 milligrams per liter for 24 hours or chlorine residual of 200 milligrams per liter for three hours. All valves and hydrants in the section treated shall be operated during this time in order to disinfect the appurtenance. Heavily chlorinated water should not remain in prolonged contact (maximum of 48 hours) with the watermain pipe. The chlorine shall be flushed from the main through hydrants and taps until all excess chlorine has been removed. The CONTRACTOR shall be responsible for repairing all grass, new or existing, damaged by the chlorination and flushing process. No chlorination water will be permitted in the watermain trench. The CONTRACTOR shall furnish all tools, equipment, materials, and chlorine to complete the chlorination process, incidental to other bid items. Prior to discharging chlorinated water into any drainage way, the CONTRACTOR shall obtain the permission of the ENGINEER. Taps are to be provided so at least one set of samples may be collected from every 1,200 feet of the new watermain, with one set from the end of the line and at least one set from each branch exceeding 20 feet in length. If the new watermain is less than 1,200 feet but more than 400 feet the CONTRACTOR shall collect two sets of samples, with one set from the end of the line and one set from location as determined by the ENGINEER. If the new watermain is less than 400 feet, one set of samples will be acceptable.

After final flushing two consecutive sets of acceptable samples, taken at least 16 hours apart, shall be collected from the new main. Any other option will only be allowed with the approval of the ENGINEER. The CONTRACTOR or testing laboratory, in the presence of the ENGINEER, shall perform the sampling. The CONTRACTOR shall record the locations, by street, station and date, the samples were taken. Sampling shall be performed with due care to prevent contamination using sterile bottles provided by the testing laboratory. It is not recommended that samples be collected from hoses or fire hydrants. The testing of the samples shall be performed by a State of North Dakota certified testing laboratory selected by the CONTRACTOR. All samples shall be tested for bacteriological quality, chlorine residual, and shall show the absence of coliform organisms. All super chlorinated water from the disinfection of a potable distribution system shall not reach waters of the state until the total residual chlorine level has become non-detectable. Any sample result less than 0.05 mg/l will be considered "non-detectable."

Written records of all test results shall be supplied to the ENGINEER and the CONTRACTOR by the testing laboratory as soon as possible. If trench water has entered the new main during construction or if, in the opinion of the ENGINEER, excessive quantities of dirt or debris have entered the new main, bacteriological samples shall be taken at intervals of approximately 200 feet and shall be identified by location. Samples shall be taken of water that has stood in the new main for at least 16 hours after final flushing has been completed.

The testing laboratory shall test for coliforms and e-coli using the "Colilert" or other ENGINEER approved equivalent test. The "Colilert" test is a pass/fail test that does not

SECTION 901 – WATERMAIN

quantify the amount of bacteria. Any presence of coliforms or e-coli shall qualify as a failed test.

If the initial disinfection fails to produce satisfactory bacteriological results, the new main may be reflashed and shall be resampled. If check samples also fail to produce acceptable results, the main shall be rechlorinated by the continuous-feed or slug methods of chlorination until satisfactory results are obtained.

Disinfection of any repair or short connection shall be in accordance with AWWA C651-14 Disinfecting Water Mains.

When corporation stops are used for testing and/or flushing, corporation stop shall be closed and left in place, no plugs are allowed.

All disinfection and bacteriological testing shall be incidental to other items.

901-3.7 HANDLING PIPE AND ACCESSORIES. Pipe, fittings, valves, hydrants, and other accessories shall, unless otherwise directed, be unloaded at the point of delivery, and hauled to and distributed at the site of the project by the CONTRACTOR. They shall at all times be handled with care to avoid damage. In loading and unloading, they shall be lifted by hoists or slid or rolled on skidways in such a manner as to avoid shock. Under no circumstances shall they be dropped. Pipe handled on skidways must not be skidded or rolled against pipe already on the ground. In distributing the material at the site of the work, each piece shall be unloaded opposite or near the place where it is to be laid in the trench. Pipe shall be handled in such a manner that a minimum of damage to the coating will result. Damaged coating shall be repaired in a manner satisfactory to the ENGINEER. Pipe shall be placed on the site of work parallel with the trench alignment and with bell ends facing the direction in which the work will proceed unless otherwise directed. The interior of all pipe fittings and other accessories shall be kept free from dirt and foreign matter at all times. Valves and hydrants, before installation, shall be drained and stored in a manner that will protect them from damage by freezing.

901-3.8 BACKFILLING OF PIPE TRENCH. Excavation and preparation of the trench for watermain construction shall conform to Section 801 with the following revision:

After the pipe has been laid to line and grade, the trench shall be backfilled under and along the sides of the pipe up to 2 inches over the top of the pipe by thoroughly compacting bedding material into place so as to form a uniform bed for the pipe. ~~See Standard Detail 900-3.~~

901-3.9 BACKFILL CLASSIFICATIONS. The backfill classifications shall be as defined in Section 801.

901-3.10 PROTECTING UNDERGROUND AND SURFACE STRUCTURES.

Protection shall conform to Subsection 801.

SECTION 1002 – UNDERGROUND CIRCUITS

1002-3.2 CONDUIT INSTALLATION - BORED. The conduit shall be bored whenever possible to avoid pavement and sod removal and replacement. The conduit for all street lighting conductors shall be installed between 24-inches and 30-inches below final grade and 12-inches behind the back of curb. The conduit for utility service conductors shall be installed a between of 36-inches and 40-inches below final grade. The alignment and depth of the conduit must be maintained as detailed such that the bored conduit does not deviate more than 6 inches from its intended location. The CONTRACTOR shall mark with paint or flag the location of the bored conduit.

At the request of the ENGINEER, the CONTRACTOR shall demonstrate the installed conduit meets the alignment and required depth throughout the length of any conduit run. Any deviation in alignment and/or depth shall be corrected by the CONTRACTOR as directed by the ENGINEER, at no cost to the CITY.

For concrete light standards, the conduit shall end between 12-inches and 18-inches from the pole wire entrance to allow space for a frost loop. At feedpoints and streetlights with concrete bases, connect the conduit to the conduit at the feedpoint and concrete base such that the conduit is continuous into the feedpoint or concrete base. At junction boxes, the conduit should extend one inch past the edge of the junction box wall. Conduit shall end between 24-inches and 36-inches from any underground splices. Conduit ends shall be terminated with bell-type fittings. Where practical, conduit shall be sloped to provide drainage.

If an obstruction is encountered when boring conduit under a concrete or asphalt street, driveway, or alley, or for any reason it becomes impractical to install the conduit in this manner, the ENGINEER may grant the CONTRACTOR permission to cut or saw the street, driveway, or sidewalk so conduit can be trenched into place. The width of the concrete or asphalt to be removed and the depth of the saw cutting shall be performed as directed by the ENGINEER. No extra payment will be made for cutting, removing, and replacing the concrete or asphalt. Cost of installing conduit by this method shall be included in the price bid for 2-inch conduit. Street cuts shall not be started until permission is granted by the ENGINEER.

Any excavations or exploratory cuts to any asphalt or concrete surface for the purpose of locating any existing underground utilities or obstructions to aid in the boring conduit shall be included in the price bid for conduit bored including any traffic control requirements. No extra payment will be made for sawing, removing, and replacing the concrete or asphalt. The width of the concrete or asphalt to be removed and the depth of the saw cutting shall be performed as directed by the ENGINEER.

1002-3.3 CONDUIT INSTALLATION - TRENCHED. The conduit installed by trenching shall be installed as per Section 1002-3.2 except for the method of installation. Excavate trench to 3-inches below the required minimum depth per Section 1002-3.2. Conduit shall be laid in the trench as per the standard detail.

Trench shall be backfilled and compacted in inch lifts or layers to the top of the trench.

SECTION 1004– STREETLIGHT UNITS

All submittals must contain the following information:

- a. Digital IES files
- b. Full product specification detailing how the product meets the specifications per the standard specifications and details.
- c. Applicable structural test data for light standards.
- d. A minimum of three references on comparable installations.

Incomplete submittals will not be considered. Approved equivalents will be at the discretion of the ENGINEER and will be included in the project special provisions in advance of opening of bids.

The CONTRACTOR shall submit shop drawings or product data, in accordance with Section 104 for all items included in this section. Drawings or product data shall be marked with bid item designation and submitted within 30 days after contract award. No equipment shall be ordered until shop drawings and product data have been approved by the ENGINEER.

The CITY reserves the right to order additional light standards and/or luminaires along with the CONTRACTOR's shipment for the specific project for the following types of light units: BL, L, L1, C, C1 and DL1, as detailed in these specifications. Materials are to be billed to the CITY at the CONTRACTOR's invoice cost plus 15 percent; the CITY is exempt from paying sales tax. The CITY will be responsible for unloading and storing additional materials ordered by the CITY. The CONTRACTOR shall contact the CITY, by letter or email, prior to placing the order for light standards and luminaires. The CITY shall state quantities of additional materials, per item desired, in a letter or email addressed to the CONTRACTOR.

The CONTRACTOR shall keep one set of plans at the construction site as work is occurring to record any deviations from the plans and specifications including, but not limited to, relocated light units, feed points, junction boxes and changes in the cable location. This red-lined plan set shall be turned over to the CITY prior to the close of the project.

When the installation is complete and at such time as may be specified by the ENGINEER, the CONTRACTOR shall conduct an operating test for approval. The equipment shall be demonstrated to operate in accordance with the requirement of the specifications, the plans, and to the satisfaction of the ENGINEER. The CONTRACTOR shall furnish all instruments and personnel required for all tests. All test results shall be recorded. The CONTRACTOR shall be present during all tests and inspections unless so informed by the ENGINEER.

1004-2.2 TYPE BL STREETLIGHT UNIT

- a. Type BL light standard, concrete having the following features:
 1. Precast, pre-stressed spun concrete, direct embedded, octagonal, tapered, 13' nominal mounting height.

SECTION 1004– STREETLIGHT UNITS

2. 2 7/8-inch cast aluminum tenon
 3. Mix color and finish: Equivalent to Ameron color No.112-sky gray, or Stresscrete color salt & pepper with gloss acrylic graffiti-resistant coating.
 4. Handhole opening, placed at 180° to curb side, minimum 1 5/8"X9" opening (consistent through the depth of the pole wall) with cast aluminum frame and cover with stainless steel screws.
 5. Cable entrances, placed at 90° and 270° to curb side, minimum 1 5/8" X 8" (consistent through the depth of the pole wall).
 6. Grounding lead to bond the pole to the grounding system.
 7. Manufacturers and model number:
 - Ameron SEO04SPL
 - Stresscrete E16'4"-APO-G-S30-AG C/W 140(30/30)
 - [Traditional Concrete, Inc. D413-SP-PA-3T](#)
 - Other manufactures and models as approved by special provision.
- b. Type BL Luminaire, post top fixture having the following features:
1. Type and style of fixture to equal to Holophane, model PTUE3 series.
 2. Heavy grade cast aluminum, non-photocell type housing with tool-less access to electrical components, integral slip-fitter for 3-inch OD tenon for mounting to the pole having a total of 6 tenon set screws, black polyester powder coat finish to meet a 5000 hour salt spray test.
 3. High CRI LEDs with IES Type III photometrics with a semi cutoff distribution glass refractor, BUG rating not to exceed B3-U3-G3.
 4. Luminaire to operate LED's at 4000K with minimum lumen output of 7000 lumens, a maximum rated power of 60W, and a maximum driver current of 1075 mA.
 5. The fixture shall be L70 rated, have a full 10-year manufacturer's warranty with supporting documentation, and UL Listed or CSA Certified to UL Standards.
 6. Surge protection per ANSI C136.2 with a surge rating of 20kV/10kA.
 7. Manufacturer:
 - Holophane, model number per special provisions.
 - Other manufactures and models as approved by special provision.

1004-2.3 TYPE L STREETLIGHT UNIT

- a. Type L light standard, concrete having the following features:
1. Precast, pre-stressed spun concrete, direct embedded, octagonal, tapered, 28-foot nominal mounting height.
 2. 6-foot galvanized steel mast arm with 4-bolt arm clamp with scroll assembly, Ameron Part No. C6ARMA.
 3. Mix color and finish: equivalent to Ameron color No.112-sky gray, or Stresscrete color salt & pepper with gloss acrylic graffiti-resistant coating.
 4. Bolt on cast aluminum top cap with two 3/8" X 1" cap screws.
 5. Handhole opening, placed at 180° to curb side, minimum 2-4/4" X 7" opening (consistent through the depth of the pole wall) with cast aluminum frame and cover with stainless steel screws.

SECTION 1004– STREETLIGHT UNITS

6. Cable entrances, placed at 90° and 270° to curb side, minimum 2 1/4" X 9" (consistent through the depth of the pole wall).
 7. Grounding lead to bond the pole to the grounding system.
 8. Manufacturers and model number:
 - Ameron MEO-8.5-C6-Brace
 - Stresscrete E330-BPO-G-S30-AG C/W
 - [Traditional Concrete, Inc. D128-SP-PA-FI](#)
 - Other manufactures and models as approved by special provision.
- b. Type L Luminaire, mast arm mounted fixture having the following features:
1. Heavy grade diecast aluminum, non-photocell type housing with tool-less access to electrical components, bubble level, 2" slip-fitter for horizontal mounting and 3G vibration design, gray polyester powder coat finish to meet a 5000 hour salt spray test.
 2. High CRI LEDs with IES Type III photometrics, BUG rating not to exceed B2-U0-G2.
 3. Luminaire shall deliver a minimum of 11,000 lumens at 4000K with a maximum rated power of 90W, a maximum driver current of 1,000 mA, and a rated life of 100,000 hours. The light engine and assembly shall have a minimum IP65 rating.
 4. The fixture shall be L70 rated, have a full 10-year manufacturer's warranty with supporting documentation and UL Listed or CSA Certified to UL Standards.
 5. Surge protection per ANSI C136.2 with a surge rating of 20kV/10kA.
 6. Manufacturer:
 - American Electric Lighting or GE Current, model numbers per special provision.
 - Other manufacturers and models as approved by special provision.

1004-2.4 TYPE L1 STREETLIGHT UNIT

- a. Type L1 light standard, concrete having the following features:
1. Precast, pre-stressed spun concrete, direct embedded, octagonal, tapered, 28-foot nominal mounting height.
 2. 6-foot galvanized steel mast arm with 4-bolt arm clamp with scroll assembly brace, Ameron Part No. C6ARMA.
 3. Mix color and finish: equivalent to Ameron color No.112-sky gray, or Stresscrete color salt & pepper with gloss acrylic graffiti-resistant coating.
 4. Bolt on cast aluminum top cap with two 3/8" X 1" cap screws.
 5. Handhole opening, placed at 180° to curb side, minimum 2 ~~1/4~~" X 7" opening (consistent through the depth of the pole wall) with cast aluminum frame and cover with stainless steel screws.
 6. Cable entrances, placed at 90° and 270° to curb side, minimum 2 1/4" X 9" (consistent through the depth of the pole wall).
 7. Grounding lead to bond the pole to the grounding system.
 8. Manufacturers and model number:
 - Ameron MEO-8.5-C6-Brace

SECTION 1004– STREETLIGHT UNITS

Stresscrete E330-BPO-G-S30-AG C/W

[Traditional Concrete, Inc. D128-SP-PA-FI](#)

Other manufactures and models as approved by special provision-

- b. Type L1 Luminaire, mast arm mounted fixture having the following features:
1. Heavy grade diecast aluminum, non-photocell type housing with tool-less access to electrical components, bubble level, 2" slip-fitter for horizontal mounting and 3G vibration design, gray polyester powder coat finish to meet a 5000 hour salt spray test.
 2. High CRI LEDs with IES Type III photometrics, BUG rating not to exceed B3-U0-G3.
 3. Luminaire shall deliver a minimum of 18,000 lumens at 4000K with a maximum rated power of 130W, a maximum driver current of 1,000 mA, and a rated life of 100,000 hours. The light engine and assembly shall have a minimum IP65 rating.
 4. The fixture shall be L70 rated, have a full 10-year manufacturer's warranty with supporting documentation and UL Listed or CSA Certified to UL Standards.
 5. Surge protection per ANSI C136.2 with a surge rating of 20kV/10kA.
 6. Manufacturer:
American Electric Lighting or GE Current, model numbers per special provision.
Other manufactures and models as approved by special provision.

1004-2.5 TYPE DL1 STREETLIGHT UNIT

- a. Type DL1 light standards, concrete having the following features:
1. Precast, pre-stressed spun concrete, direct embedded, octagonal, tapered, 19.5' nominal mounting height.
 2. 2 7/8-inch cast aluminum tenon
 3. Mix color and finish: Equivalent to Ameron color No. 6P3A, or Traditional Concrete Eclipse Black with gloss acrylic graffiti-resistant coating.
 4. Handhole opening, placed at 180° to curb side, minimum 2" X 7 7/8" opening (consistent through the depth of the pole wall) with cast aluminum frame and cover with stainless steel screws.
 5. Cable entrances, placed at 90° and 270° to curb side, minimum 2" X 9" (consistent through the depth of the pole wall).
 6. Grounding lead to bond the pole to the grounding system.
 7. Manufacturers and model number:
Ameron MEO06
Stresscrete E23'10"-BPO-G-E11-AG C/W 140(30/30)
[Traditional Concrete, Inc. D120-EB-EA-3T](#)
Other manufactures and models as approved by special provision.

- b. Type DL1 luminaires, post top mounted having the following features:

SECTION 1004– STREETLIGHT UNITS

1. Type and style of fixture to equal to Holophane, model WAE3 STS series complete with ornate trim including spike finial, bands, ribs and medallions,
2. Heavy grade cast aluminum, non-photocell type housing with tool-less access to electrical components, integral slip-fitter for 3-inch OD tenon for mounting to the pole, black polyester powder coat finish to meet a 5000 hour salt spray test.
3. High CRI LEDs with IES Type III photometrics with a semi cutoff distribution glass refractor, BUG rating not to exceed B3-U5-G5.
4. Luminaire to operate LED's at 4000K with a minimum lumen output of 13,300 lumens, a maximum rated power of 95W, and a maximum driver current of 525 mA.
5. The fixture shall be L70 rated, have a full 10-year manufacturer's warranty with supporting documentation and UL Listed or CSA Certified to UL Standards.
6. Surge protection per ANSI C136.2 with a surge rating of 20kV/10kA.
7. Manufacturer:
 - Holophane-Washington Postlite Series, model number per special provision.
 - Other manufactures and models as approved by special provision.

1004-2.6 TYPE CL STREETLIGHT UNIT

- a. Type CL light standards, galvanized steel having the following features:
 1. 40' nominal mounting height, davit type pole with a 6' mast arm and aluminum transformer base.
 2. The pole shaft, a one-piece assembly, conforming to ASTM A572 Grade 55 and davit arm conforming to ASTM A595 Grade A.
 3. Anchor bolts conforming to ASTM F1554 Grade 55. Bolts have an L bend on one end and are galvanized a minimum of 12" on the threaded end.
 4. Aluminum transformer base, nominal height 17", complete with connecting bolts, flat washers, bearing washers and hex nuts. Access door minimum 8.5" X 11". As manufactured by Akron Foundry or Valmont, type TB1-17 or approved equivalent.
 5. Reinforced handhole opening and cover, placed at 180° to curb side, minimum 4" X 6.5" and 18" above grade. A grounding lug to be provided inside handhole.
 6. Manufacturers and model number:
 - Millerbernd Manufacturing, [RLDA6RLDB6-400ND](#)
 - Valmont Industries, Inc. DS90 RTS
 - Other manufactures and models as approved by special provision.
- b. Type CL Luminaire, mast arm mounted fixture having the following features:
 1. Heavy grade diecast aluminum, non-photocell type housing with tool-less access to electrical components, bubble level, 2" slip-fitter for horizontal mounting and 3G vibration design, gray polyester powder coat finish to meet a 5000 hour salt spray test.

SECTION 1004– STREETLIGHT UNITS

2. High CRI LEDs with IES Type III photometrics, BUG rating not to exceed B3-U0-G3.
3. Luminaire shall deliver a minimum of 18,000 lumens at 4000K with maximum rated power of 130W, a maximum driver current of 1,000 mA, and a rated life of 100,000 hours. The light engine and assembly shall have a minimum IP65 rating.
4. The fixture shall be L70 rated, have a full 10-year manufacturer's warranty with supporting documentation and UL Listed or CSA Certified to UL Standards.
5. Surge protection per ANSI C136.2 with a surge rating of 20kV/10kA.
6. Manufacturer:
 - American Electric Lighting or GE Current, model numbers per special provision.
 - Other manufactures and models as approved by special provision.

1004-2.7 TYPE CL1 STREETLIGHT UNIT

- a. Type CL1 light standards, galvanized steel having the following features:
 1. 40' nominal mounting height, davit type pole with a 6' mast arm and aluminum transformer base.
 2. The pole shaft, a one-piece assembly, conforming to ASTM A572 Grade 55 and davit arm conforming to ASTM A595 Grade A.
 3. Anchor bolts conforming to ASTM F1554 Grade 55. Bolts have an L bend on one end and are galvanized a minimum of 12" on the threaded end.
 4. Aluminum transformer base, nominal height 17", complete with connecting bolts, flat washers, bearing washers and hex nuts. Access door minimum 8.5" X 11". As manufactured by Akron Foundry or Valmont, type TB1-17 or approved equivalent.
 5. Reinforced handhole opening and cover, placed at 180° to curb side, minimum 4" X 6.5" and 18" above grade. A grounding lug to be provided inside handhole.
 6. Manufacturers and model number:
 - Millerbernd Manufacturing, [RLDA6RLDB6](#)-400ND
 - Valmont Industries, Inc. DS90 RTS
 - Other manufactures and models as approved by special provision.
- b. Type CL1 Luminaire, mast arm mounted fixture having the following features:
 1. Heavy grade diecast aluminum, non-photocell type housing with tool-less access to electrical components, bubble level, 4-bolt. 2" slip-fitter for horizontal mounting and 3G vibration design, gray polyester powder coat finish to meet a 5000 hour salt spray test.
 2. High CRI LEDs with IES Type III photometrics, BUG rating not to exceed B3-U0-G4.
 3. Luminaire shall deliver a minimum of 27,000 lumens at 4000K with maximum rated power of 200W, a maximum driver current of 1,100 mA, and a rated life of 100,000 hours. The light engine and assembly shall have a minimum IP65 rating.

SECTION 1004– STREETLIGHT UNITS

4. The fixture shall be L70 rated, have a full 10-year manufacturer's warranty with supporting documentation and UL Listed or CSA Certified to UL Standards.
5. Surge protection per ANSI C136.2 with a surge rating of 20kV/10kA.
6. Manufacturer:
 - American Electric Lighting or GE Current, model numbers per special provision.
 - Other manufactures and models as approved by special provision.

1004-2.8 WIRING SPLICE CONNECTORS AT LIGHT UNIT. Splice connectors at pole handhole shall be [ILSCO PBTS with 3/16 min. hex size](#)~~Penn-Union PBNA2/0X~~, or approved equivalent.

1004-2.9 IN-LINE FUSE AND FUSE HOLDER. The fuse holder shall be type FEB, Ferraz Shawmut, rated for 600Vac and 30 amps or approved equivalent. The fuse shall be a fast-acting midget fuse with an interrupt rating of 10kA at 600Vac, 5 amp as manufactured by Bussmann, Littelfuse or equivalent.

1004-3 CONSTRUCTION REQUIREMENTS

1004-3.1 STREETLIGHT STANDARD – GENERAL REQUIREMENTS. Streetlight standards shall be set as shown on the plans. Install 1/2-inch by 10-foot ground rod at each streetlight. All streetlight standards shall be grounded. Bond ground conductor, streetlight standard, and ground rod.

Pole wiring shall be No. 10 AWG stranded copper, Type THHN/THWN 600-volt cable, three conductors minimum (power, neutral, and ground), and shall be continuous from the luminaire to the fuse holder in the light standard base. Wire nuts shall not be permitted.

Fuse each luminaire in the base of the lighting standard at the handhole. Tape fuse kits with a 1/2-inch lapped layer for a distance of 1½ inches on each side of joint with conductor. Fuse holders to be complete with proper fuse to protect luminaire. The neutral conductor shall be solidly connected and unfused throughout system.

The fuse holder shall be supported by the conductors at the level of the hand hole. Sufficient excess conductor length shall be provided to permit withdrawal of the fuse holder through the hand hole a minimum of 6 inches outside of the hand hole for purposes of installation and inspection.

All luminaires shall be leveled after the pole is standing or in place, ready for operation. For fixtures with mast arms, mast arms to be oriented perpendicular to the face of the curb unless otherwise noted. For post top mounted streetlight units, the fixture shall be orientated so the optics are perpendicular to the face of the curb unless otherwise noted.

SECTION 1004– STREETLIGHT UNITS

1004-3.2 STREETLIGHT UNITS - DIRECT EMBEDDED (TYPES, BL, L, L1 and DL1).

A concrete-bearing base pad, 6 inches thick and a minimum 16 inches diameter, shall be provided under the bottom of the pole as shown in the standard detail. Provide roofing tar paper around poles between pole and concrete pad. In sidewalks, provide 3/4-inch expansion joint around concrete pad between concrete pad and sidewalk.

A concrete housekeeping pad of dimensions shown in the standard detail shall be constructed around the base of the direct buried concrete standard.

The concrete to be used in the construction of the concrete housekeeping pads and bearing base pads shall be a minimum of 4,000 psi strength at 28 days with a minimum of six bags of cement per cubic yard of concrete and shall conform in all respects to the City of Bismarck Specifications, Section 600 for Sidewalks, Driveways, Curb, and Combined Curb and Gutter.

1004-3.3 STREETLIGHT UNITS WITH CONCRETE FOUNDATIONS (TYPES CL and CL1). Concrete foundations shall be installed as per standard detail. Foundations shall be completed with anchor bolts, rebar, and conduit stub-in. Anchor bolt spacing to accommodate poles shall be verified in the field prior to construction.

The concrete to be used in the construction of the concrete foundations shall be a minimum of 4,000 psi strength at 28 days with a minimum of six bags of cement per cubic yard of concrete and shall conform in all respects to the City of Bismarck Specifications, Section 600 for Sidewalks, Driveways, Curb, and Combined Curb and Gutter.

The CONTRACTOR shall notify the ENGINEER at least 24 hours prior to pouring a concrete foundation such that the form with the anchor bolt placement, rebar, conduit stub-ins, and ground rod can be inspected. The CONTRACTOR shall provide concrete tests in conformance with City of Bismarck Specifications, a minimum of one test per day or a minimum of one test per ~~five light standard foundation~~ struckload of concrete or as directed by the ENGINEER.

1004-3.4 REMOVE STREETLIGHT STANDARD. The standard shall be removed from the site shown on the plans, salvaged, transported, and stored (by blocking and supporting at three points) in the CITY storage yard located at the Municipal Solid Waste Facility on North 52nd Street. Where plans indicate that the light unit shall not be salvage, the CONTRACTOR will be responsible to dispose of the light unit.

The luminaire wiring within the pole shall be disconnected at the fuse. The luminaire shall be removed from the mast arm, salvaged, and delivered to CITY storage at 601 South 26th Street.

Where the plans call for salvaging the conductors and re-splicing the underground conductors, the standards shall be removed carefully to prevent damage to the conductors. Splices shall be made as detailed in these specifications.

SECTION 1202 – SEEDING

CLASS II

Use: Boulevards and other areas requiring salt resistance or high drought tolerance

Application Rate: 6 PLS/1000 sf

| Seed | % by Weight |
|--------------------|-------------|
| Fairway Crested | 50 |
| Sheep Fescue | 30 |
| Perennial Ryegrass | 20 |

CLASS IIB

Use: Restoration of established lawns with irrigation requiring less salt resistance

Application Rate: 6 PLS/1000 sf

| Seed | % by Weight |
|------------------------------|-------------|
| Fairway Crested | 60 |
| Creeping Red Fescue | 10 |
| Fineleaf Perennial Ryegrass* | 30 |

*For quick establishment, replace a portion of perennial with annual, consult supplier and submit to Engineer for approval prior to installation.

CLASS III

Use: Ditches and side slopes

Application Rate: 2.5 PLS/1000sf

| Seed | % by Weight |
|--------------------|-------------|
| Fairway Crested | 30 |
| Sheep Fescue | 30 |
| Perennial Ryegrass | 40 |

CLASS IV

Use: Natural and/or Native Grass Areas

Application Rate: 15 PLS/1 acre if broadcast seeding

10 PLS/acre if drilled

| Seed | % by Weight |
|--|-------------|
| Canada Wildrye | 30 |
| Western Wheatgrass | 20 |
| Northern Wheatgrass | 20 |
| Green Needle | 6.5 |
| Sideoats | 6.5 |
| Little Bluestem | 5 |
| Slender Wheatgrass | 5 |
| Little Bluestem Switchgrass | 5 |
| Blue Grama | 2 |

SECTION 1206 – CASTING AND ADJUSTMENT

1205-2.3 INLET CASTINGS. Inlet castings shall be of the type manufactured by Neenah Foundry Company with Type V Grates and NDDOT Style Backs, East Jordan Iron Works with M6 Type Grate and Type T2 Back for Type 24-inch and with type M4 Grate and Type T5 Back for Type 36-inch or larger, or approved equivalent. All bolts to be temper finish, double heat-treated 1038 S.A.E., Grade 5, Cad-Dichromate plated.

(a) Type 24" Castings. Type 24-Inch Castings shall be Neenah Foundry Number R-3030, East Jordan Iron Works Number 7010 with round base, or approved equivalent.

(b) Type 36" Castings. Type 36-Inch Inlet Castings shall be a Neenah Foundry Number R-3295, East Jordan Iron Works Number 7030, or approved equivalent.

(c) Type 72" Castings. Type 72-Inch Castings shall be Neenah Foundry Number R-3295-2, East Jordan Iron Works Number 7031, or approved equivalent.

(d) Type 108" or Larger Castings. Type 108-Inch or Larger Castings shall be Neenah Foundry Number R-3295-3, or East Jordan Iron Works Number 7032 with additional inner sections, or approved equivalent.

(e) Catch Basin Castings. Catch Basin Castings shall be Neenah Foundry Number R-2573 with concave grate, Neenah Foundry Number R-~~2573~~-2561 with "beehive" grate, or approved equivalent.

1206-2.4 Flexible foam expansion joint materials shall meet the requirements of ASTM D5249, TYPE 2 and ASTM D1752, Sections 5.1 through 5.4 with the compression required modified to 10 psi and 25 psi maximum. This material shall be non-gassing and shall be compatible with hot pour joint sealants.

1206-3 CONSTRUCTION REQUIREMENTS

1206-3.1 GENERAL. The methods of construction shall conform insofar as applicable to the requirements of Section 1205.

Existing manholes, inlets, and valve boxes shall be adjusted to the elevation, grade, or dimensions as indicated on the plans and standard details, or as ordered by the ENGINEER. The structures are assumed to be clean prior to the beginning of the adjustment construction unless otherwise agreed to by the CONTRACTOR and the ENGINEER. Castings shall be carefully removed and reinstalled by the CONTRACTOR as indicated. If the height of a rectangular casting is to be increased, the addition may be of solid concrete block or concrete as specified in Section 501. Solid concrete block shall not be used to increase the height of circular castings. In the event the top part of the existing structure is weak and faulty, it shall be replaced as directed by the ENGINEER and the extension completed. Where the casting, grating, I & I barrier, or cover is to be lowered, the masonry or concrete shall be removed to sufficient depth so that a seat of proper dimensions may be reconstructed to receive the casting, grating, I & I barrier, or cover at the new grade. Castings shall be set in full mortar beds or

SECTION 1206 – CASTING AND ADJUSTMENT

installed in future paved areas shall have I/I barriers installed unless the roadway is scheduled to be paved within the same construction season. I/I barriers will not be required when casting, all rings and top of cone are encased in concrete and located in a paved roadway, including roadways scheduled to be paved in the same construction season.

All newly installed manholes requiring adjustment under this bid item shall use the precast concrete adjusting rings with the AP/M PERMAFORM I/I BARRIER as manufactured by Strike Products, or approved equivalent, installed and field tested according to the manufacturers' specifications. This item shall be paid for under Section 1206 "Castings and Adjustment." All inlet castings shall be placed on the inlet facing the roadway with bolts, washers, and nuts installed in accordance with Standard Detail 1206-1.

The I/I Barrier shall have a watertight seal to the top of manhole barrel using butyl sealant, or approved equivalent, as specified by the manufacturer of the I/I Barrier. The top of manhole barrel shall be free of dust and debris before applying the sealant and the I/I Barrier. A sufficient quantity of sealant must be used to accommodate any flaws in the top of manhole barrel.

If deemed necessary by the ENGINEER, to check the seal of the I/I Barrier, the excavated area around the I/I Barrier shall be filled with water to a level above the joint between the I/I Barrier and the top of manhole barrel. If any leakage or moisture is present in the area inside the manhole around the seal, the CONTRACTOR shall remove the I/I Barrier and reseal at no additional cost.

The bottom ring placed on the I/I Barrier shall not be sealed to the I/I Barrier to allow infiltrated water to escape. All successive rings above the bottom ring shall be sealed together per manufacturer's recommendations. The I/I Barrier shall extend a minimum of 2 inches above the top ring. If a floating manhole casting is used, the I/I Barrier extending above the top ring shall be trimmed so that the I/I Barrier does not interfere with the manhole casting's ability to function. All pressure-reducing valve and air release valve manholes shall include a Cap 'N Seal as manufactured by Strike Products.

All existing manholes outside the roadway surface that require adjustment shall be paid for under Section 1206-4.17 "Adjust Manhole Casting in Unpaved Area." All existing manholes outside the roadway surface that require a new manhole casting shall have standard castings and shall be paid for under Section 1206-4.18 "Furnish and Adjust Manhole Casting in Unpaved Area."

1206-3.7 CASTING ADJUSTMENTS. All manhole and inlet castings shall be adjusted to final grade with concrete or poly adjustment rings. Rings shall be installed per manufacturer's recommendations and City of Bismarck Standard Details. Use of other methods to adjust castings to final grade may be allowed with approval by Engineer in Field. All adjustments requiring more than two adjustment rings shall have all rings sealed together.

SECTION 1206 – CASTING AND ADJUSTMENT

When concrete adjustment rings are used, installation shall include using a concrete glue between all rings.

Casting adjustments for 72" and larger inlets shall use concrete adjustment rings only.

1206-4 MEASUREMENT AND PAYMENT

Measurement and payment shall be as specified in Section 107 and as follows:

~~**1206-4.1 ADJUST MANHOLE CASTING IN ASPHALT PAVEMENT.** This item shall be measured on an individual unit basis (EA) and paid for at the unit price bid for "Adj Manhole Casting-Asph Pvmnt" complete as detailed and accepted by the ENGINEER.~~

~~**1206-4.2 FURNISH AND ADJUST MANHOLE CASTING IN ASPHALT PAVEMENT.** This item shall be measured on an individual unit basis (EA) and paid for at the unit price bid for "Furn & Adj. M.H. Cast Asph Pvmnt" complete as detailed and accepted by the ENGINEER.~~

~~**1206-4.3 ADJUST TYPE 24" INLET CASTING.** This item shall be measured on an individual unit basis (EA) and paid for at the unit price bid for "Adjust Type 24" Inlet Casting" complete as detailed and accepted by the ENGINEER.~~

~~**1206-4.4 FURNISH AND ADJUST TYPE 24" INLET CASTING.** This item shall be measured on an individual unit basis (EA) and paid for at the unit price bid for "Furn & Adj Type 24" Inlet Cast" complete as detailed and accepted by the ENGINEER.~~

~~**1206-4.5 ADJUST TYPE 36" INLET CASTING.** This item shall be measured on an individual unit basis (EA) and paid for at the unit price bid for "Adjust Type 36" Inlet Casting" complete as detailed and accepted by the ENGINEER.~~

~~**1206-4.6 FURNISH AND ADJUST TYPE 36" INLET CASTING.** This item shall be measured on an individual unit basis (EA) and paid for at the unit price bid for "Furn & Adj Type 36" Inlet Cast" complete as detailed and accepted by the ENGINEER.~~

~~**1206-4.7 ADJUST TYPE 72" INLET CASTING.** This item shall be measured on an individual unit basis (EA) and paid for at the unit price bid for "Adjust Type 72" Inlet Casting" complete as detailed and accepted by the ENGINEER.~~

~~**1206-4.8 FURNISH AND ADJUST TYPE 72" INLET CASTING.** This item shall be measured on an individual unit basis (EA) and paid for at the unit price bid for "Furn & Adj Type 72" Inlet Cast" complete as detailed and accepted by the ENGINEER.~~

~~**1206-4.9 ADJUST TYPE 108" OR LARGER INLET CASTING.** This item shall be measured on an individual unit basis (EA) and paid for at the unit price bid for "Adj Type 108" or LGR Inlet Casting" complete as detailed and accepted by the ENGINEER.~~

SECTION 1209 – SANITARY SEWER AND WATER SERVICE CONNECTIONS

1209-2.5 CORPORATION STOP. Corporation stops shall be Mueller, McDonald, Ford, or approved equivalent and shall be a ball valve with AWWA tapered threads. No plug or key style corporation stops will be allowed.

1209-2.6 CURB STOP. Curb stops shall be Mueller, McDonald, Ford, or approved equivalent and shall be a straight ball valve, without drain, having a Minneapolis Pattern. Curb stops shall be installed on a 6(six)-inch square by 4(four)-inch thick concrete pad.

1209-2.7 CURB BOX. Curb boxes shall be McDonald No. 5622 or Mueller No. H- 10302 (1½-inch diameter upper section) for all size curb stops, or approved equivalent. Stationary rods shall not be installed with curb stop boxes. The length of the curb box extended shall be 8 feet. The curb stop box cap shall have a pentagon cast iron threaded plug.

All curb boxes shall be encased with 8-mil linear low-density (LLD) polyethylene film in accordance with ANSI/AWWA C105/A21.5. All encasements shall be considered incidental.

1209-2.8 CONCRETE. Concrete for pipe cradles and saddles shall conform to the requirements of Section 501.

1209-2.9 TAPPING SLEEVE WITH TAPPING GATE VALVE. For connecting to pipe sizes 6 inches to 24 inches, the tapping sleeve shall be stainless steel with a stainless steel flange and bolts and shall conform to the “Smith Blair” Type 663 or “Romac” Type SST, or approved equivalent. For connections to pipe sizes 24 inches or larger, the tapping sleeve shall be epoxy lined and coated with stainless steel bolts and shall conform to the “Smith Blair” Type 622 Split Sleeve with O-Ring Seal. The tapping valve shall conform to Section 901 for Gate Valves.

The City of Bismarck Public Works Department will tap the water main at a charge to the CONTRACTOR. The CONTRACTOR shall be responsible for all other work connected with installation of the tapping sleeve and valve, including the necessary space around the water main required for the tapping machine and assisting the Public Works Department in positioning the tapping machine.

1209-2.10 TAPPING SADDLE WITH CORPORATION VALVE. ~~All Corporation taps made into all material, sizes and classes of asbestos cement, PVC, sandcast iron, cast iron, ductile iron, and prestressed concrete~~ water mains shall be reinforced with a tapping saddle.

Tapping saddles used on PVC water main shall provide full support around the circumference of the pipe and provide a bearing area of sufficient width along the axis of the pipe 2 inches minimum, ensuring that the pipe will not be distorted when a saddle is tightened.

Tapping saddles for connecting to PVC, ductile iron, cast iron, and sand cast iron water main up to 12 inches in diameter shall be one of the following: (a) Romac Style 306, (b) PowerSeal Model 3412, (c) Smith Blair Series 370, (d) Ford FS313 or (e) approved

SECTION 1209 – SANITARY SEWER AND WATER SERVICE CONNECTIONS

equivalent.

Tapping saddles for connections to PVC, ductile iron, cast iron, asbestos cement, and sand cast iron water main over 12 inches in diameter shall be Romac Style 305 or approved equivalent.

Tapping saddles for connections to HDPE water main shall be mechanical saddles type Ford FS313. No Belleville washer style mechanical saddles or electorfused saddles will be allowed.

~~Tapping saddles for asbestos cement water main shall be a double strap bronze with an O-ring gasket cemented in body groove as manufactured by the Mueller Company or approved equivalent.~~

Tapping saddles for prestressed concrete water mains shall be approved by the ENGINEER.

Tapping saddles shall be installed according to manufacturer's installation instructions. The tapping saddle bolts shall be torqued using a calibrated torque wrench with a handle at least 12 inches in length. The CONTRACTOR should be prepared to show certification of torque wrench calibration at the request of the ENGINEER.

1209-3 CONSTRUCTION REQUIREMENTS

1209-3.1 GENERAL. Construction requirements shall conform to Section 801 for sewer service connections and Section 901 for water service connections. All pipe and fittings shall be installed in accordance with the manufacturer's recommendations unless otherwise specified herein. All copper water service lines shall be constructed "snaked" within the trench.

On new construction, for each sewer stubout, a 2x2 inch wood marker shall be placed a minimum of one foot from the end of the sewer stubout, shall extend vertically and plumb to not less than two feet above the existing surrounding ground, and painted green.

On new construction, for each water curb stop, a metal T-Post marker shall be placed a maximum of one foot from the curb stop box, extended vertically to a minimum of three feet above the existing surrounding ground, and painted blue.

The CONTRACTOR shall be responsible for maintaining the markers until the project has been accepted by the ENGINEER. The cost of the stubout markers shall be considered incidental to other bid items.

When connecting to a sewer main and a wye is not available, the connection shall be made using an Inserta Tee manufactured by Inserta Fittings Co., or approved equivalent. A factory-assembled wye may be cut in using gasketed repair couplers. When connecting to VC sewer main, ~~Shear Guard Indiana Seal (GPK)~~ repair couplers manufactured by Fernco, Inc. with Shear Guard by GPK, or approved equivalent, may

SECTION 1209 – SANITARY SEWER AND WATER SERVICE CONNECTIONS

be used.

~~The angle of the bend shall be compatible with the type of sewer service pipe and wye branch selected to provide a 90 degree angle between the sewer mainline and sewer service line.~~

Bedding material in accordance with Section 801 shall be placed in the trench, prior to laying any type of sewer pipe, 2 inches below bottom of pipe up to 6 inches or smaller, 4 inches when pipe used is 8 inches or larger. Bedding material shall be installed to the centerline of the pipe and the full width of the excavating trench.

1209-3.2 SANITARY SEWER RISERS. When the depth of the sewer exceeds 12 feet, risers shall be installed. Risers shall be sufficiently long to reach within 10 feet of the top of curb elevation. When risers are five feet or greater, 1¼-inch crushed rock shall be used to encase the wye and support the vertical bend. Risers shall be laid on a slope not to exceed 2:1 vertical to horizontal.

~~1209-3.3 SANITARY SEWER SERVICE BENDS. The angle of the bendSanitary sewer service bends shall be compatible with the type of sewer service pipe and wye branch selected to provide a 90 degree angle between the sewer mainline and sewer service line.~~

~~1209-4.553.4 DISCONNECT WATER SERVICE LINE. Disconnecting a water service line shall consist of turning off the corporation stop at the main and disconnecting the pipe after the corporation stop.~~

1209-4 MEASUREMENT AND PAYMENT

Measurement and payment shall be as specified in Section 107 and as follows:

~~1209-4.1 thru 4.5 (X)" SEWER SERVICE PIPE.~~ On new construction, the sewer service pipe shall be measured ~~by the linear foot (LF)~~ from centerline of sewer main to plugged end of service connection. On reconstruction projects, the sewer service pipe shall be measured ~~by the linear foot (LF)~~ from end of the wye to the end of the existing sewer service pipe. ~~Sewer service pipe shall be paid for at the unit price bid for "(X)" Sewer Service Pipe" complete, in place, and accepted by the ENGINEER.~~

~~1209-4.6 thru 1209-4.10 (X)" SEWER PIPE BEND. The angle of the bend shall be compatible with the type of sewer service pipe and wye branch selected to provide a 90-degree angle between the sewer mainline and sewer service line. The sewer pipe bend shall be measured on an individual unit basis (EA) and paid for at the unit price bid for "(X)" 45-Degree Bend" complete, in place, and accepted by the ENGINEER.~~

~~1209-4.211 thru 1209-4.23 (X)" (MATERIAL) WATER SERVICE PIPE.~~ On new construction, the water service pipe shall be measured on an in-line basis ~~by the linear foot (LF)~~ from the centerline of the water main at the water service connection to the end of the water service pipe. On reconstruction projects, the water service pipe shall be measured on an in-line basis ~~by the linear foot (LF)~~ from the water service connection

SECTION 1210 – PAVEMENT MARKING

1210-1 DESCRIPTION

This work consists of furnishing and installing specified pavement markings and related items in accordance with these Specifications at the designated locations as shown in the plans or as directed by the ENGINEER.

All pavement marking installation, materials, and construction requirements not covered in these specifications shall be in accordance with Section 762 of the latest edition of the *Standard Specifications for Road and Bridge Construction*, North Dakota Department of Transportation.

1210-2 MATERIALS

1210-2.1 GENERAL. All paint and glass beads shall be preapproved by the North Dakota Department of Transportation Materials and Research Division.

1210-2.2 GLASS BEAD CERTIFICATION. The manufacturer shall furnish one copy of a certificate for each lot of the material furnished, giving the properties of the beads, and certifying that they meet the required specifications. The affidavit shall show designation of the sample, lot number, and date of manufacture.

1210-2.3 PREFORMED PATTERNED TAPE PAVEMENT MARKING. Preformed Patterned Tape Pavement Markings shall be 380IES as manufactured by 3M, or an approved equivalent, and shall be approved by the ENGINEER prior to ordering. The Preformed Patterned Tape Pavement Markings shall be installed using primer and as recommended by manufacturer.

1210-2.4 PREFORMED PATTERNED THERMOPLASTIC PAVEMENT MARKING. Preformed Patterned Thermoplastic Pavement Markings shall be Preformed Thermoplastic PreMark with Vizigrip as manufactured by Ennis-Flint, or 125mil Optamark as manufactured by Geveko Markings, or 3M Durable Retroreflective Liquid Pavement Markings Series 500, or approved equivalent, and shall be approved by the ENGINEER prior to ordering.

Preformed Patterned Thermoplastic Pavement Markings installed on asphalt pavements shall be 125 +/-5 mils thick. The thermoplastic pavement markings installed on concrete pavements shall be 125 +/- 5 mils thick. The thermoplastic pavement markings shall be installed as recommended by the manufacturer.

1210-2.5 EPOXY WET REFLECTIVE PAVEMENT MARKING LINE. Epoxy pavement markings material shall conform to the NDDOT Standard Specifications Section 880.02 Epoxy Pavement Marking Paint. Epoxy painted pavement markings shall have 3M Connected Roads All Weather Elements Series 70 for Epoxy Pavement Markings,

SECTION REVISED

Visimax Plus Type IV EC/AC White and Yellow Glass beads, or an approved equivalent or alternative.

1210-2.6 PREFORMED PATTERNED TAPE CONTRAST PAVEMENT MARKING.

Preformed Patterned Contrast Tape Pavement Marking shall be as manufactured by 3M series 380IES-5 Stamark High Performance Contract Marking Tape or approved equivalent, and shall be approved by the ENGINEER prior to ordering.

1210-3 CONSTRUCTION REQUIREMENTS

1210-3.1 PAVEMENT MARKING CERTIFICATION. All CONTRACTORS installing pavement marking material for the City shall provide a crew of which 50 percent are trained and “certified” by the manufacturer. “Certified” CONTRACTORS must be able to provide proof of the certification through a manufacturer-provided ID card or certification paper.

1210-3.2 PAINTED PAVEMENT MARKING. Painted pavement marking shall be installed as soon as the new pavement has been placed and traffic control devices have been removed. All longitudinal painted pavement marking lines shall be installed with a striping truck as described in Section 1210-3.4, unless approved by the ENGINEER. The painted pavement marking shall have a thickness of between 18 mils and 21 mils.

1210-3.3 PAINTED PAVEMENT MARKING MONITORING SYSTEM

DESCRIPTION. All striping trucks shall require a computerized data logging system (DLS) for monitoring the application of pavement marking to the roadway. DLS is an addition to pavement marking equipment to record data relating to pavement marking installation.

All painted pavement marking operations shall be in accordance with NDDOT Standard Specifications for Road and Bridge Construction Section 762. The system shall document for a minimum length of 300 linear feet. The following data shall be included in the documentation from the DLS:

- a. Application vehicle speed to nearest 0.1 mph.
- b. Weight (lbs) and/or volume (gal as measured through a piston displacement pump mechanism) of paint material used by color.
- c. Weight (lbs) of reflective material used.
- d. Pavement surface temperature (°F).
- e. Air temperature (°F).
- f. Dew point (°F).
- g. Humidity (%).
- h. The system shall record the average material application rates and material thickness calculated over the section painted.

An electronic or printed record of the data shall be provided to the ENGINEER upon request. The ENGINEER may determine that more frequent submission is necessary, particularly if equipment malfunctions occur. Either the printed or

SECTION REVISED

electronic records shall be produced in their final form prior to the records being removed from the pavement marking equipment (i.e., the CONTRACTOR presents this to the ENGINEER in the field). If only one record is produced at the pavement marking equipment, the other may be produced in an office. However, the first record shall be presented to the ENGINEER prior to any of the data entering an office environment.

The electronic record shall be a comma or spaces delimited text file, adequate for insertion into a computerized spreadsheet software package or a spreadsheet format acceptable to the ENGINEER.

The CONTRACTOR shall provide the ENGINEER the above records for all longitudinal non-handwork lines painted.

The CONTRACTOR shall have equipment with functional DLS equipment. It shall be operational, calibrated, and in use during pavement marking operations.

The CONTRACTOR shall provide the ENGINEER the DLS manufacturer's recommendations for equipment calibration frequency and provide certification that the equipment meets manufacturer's recommended calibrations.

A 100-foot distance shall be traveled prior to the start of pavement marking operations to verify the physical and electronic measurement of distance traveled is consistent.

DLS shall not be measured or paid and shall be incidental to other bid items.

1210-3.4 SURFACE PREPARATION. Prior to the placement of any preformed plastic pavement marking that cannot be rolled into hot asphalt, the placement area shall be cleared of debris using a high-velocity compressed air blower with minimum 185 cfm airflow and 120 psi at the air nozzle. The air nozzle shall be no less than 1/2 inch inside diameter commercial grade air compressor. The compressor shall be equipped with a moisture evaporator. A leaf blower shall NOT be an acceptable substitute for compressed air.

1210-3.5 GROOVING FOR PAVEMENT MARKINGS. The CONTRACTOR shall groove to make a recess in the pavement surface for the pavement markings.

Epoxy Wet Reflective Pavement Markings shall meet the following tolerances:

| | |
|------------|---|
| Depth | 50 mils ± 5 mils |
| Smoothness | Ridges, within the groove, no more than 6 mils higher than either adjacent valley |
| Width | Line width plus 1/2 inch |

SECTION REVISED

| | |
|-----------------|---|
| Length | Line length plus 3 inches per end of line |
| Line End Tapers | 3 inches |

All other pavement markings shall meet the following grooving tolerances:

| | |
|-----------------|---|
| Depth | 125 mils \pm 5 mils |
| Smoothness | Ridges, within the groove, no more than 6 mils higher than either adjacent valley |
| Width | Line width plus 1/2 inch |
| Length | Line length plus 3 inches per end of line |
| Line End Tapers | 3 inches |

For messages, the area grooved shall be the same area as the messages. Grooving a rectangular area to contain the message shall not be allowed unless approved by the ENGINEER. Grooving shall meet the depth requirements specified above. The equipment and method used shall be approved by the pavement marking manufacturer.

The groove shall be made in a single pass dry cut using stacked diamond cutting heads mounted on a floating head with controls capable of providing uniform depth and alignment. The bottom of the groove shall have a fine corduroy finish. Grooves shall be clean and dry prior to pavement marking application. The equipment shall be self-vacuuming, and be capable of vacuuming and containing all dust contaminants from entering the air, and leave the cut groove ready for pavement marking installation. If the ENGINEER in the field deems that the dust collection is not adequate, the ENGINEER may shut down the CONTRACTOR's operation until the problem has been fixed according to the satisfaction of the ENGINEER. The pavement marking shall be placed in the grooves the same day as the pavement is grooved.

1210-3.6 OBLITERATION OF PAVEMENT MARKINGS. Removal of pavement markings shall not permanently damage the surface or texture of the pavement. Where blast cleaning is used for removal of markings or other objectionable material, the sand or other blast material left on the pavement shall be removed immediately. No carbide or diamond tip blades or wheels are allowed on removal equipment. All removal methods shall be demonstrated by the CONTRACTOR and approved by the ENGINEER in the field before removal is allowed.

1210-4 MEASUREMENT AND PAYMENT

Measurement and payment shall be as specified in Section 107 and as follows:

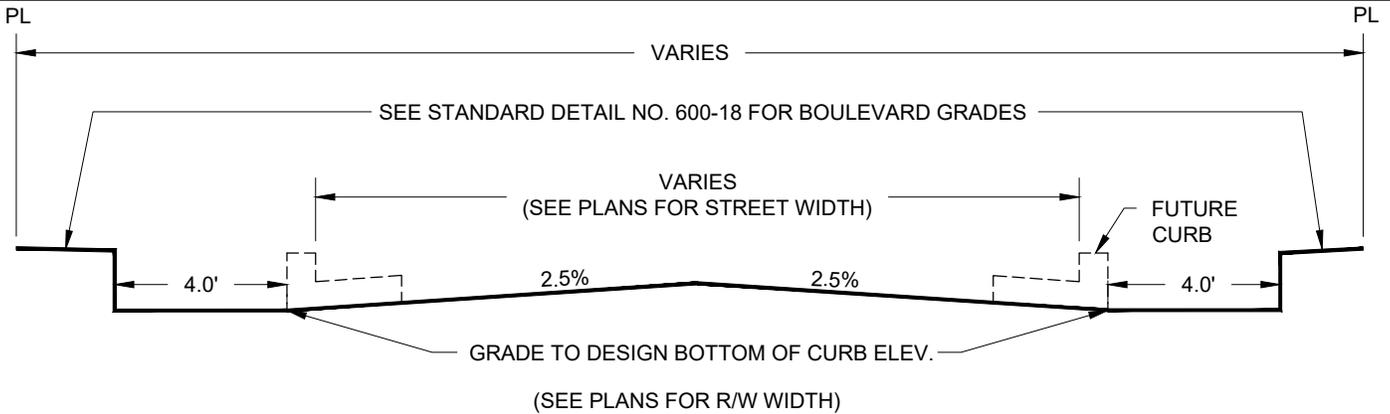
SECTION REVISED

All traffic control necessary for installing the pavement marking items shall be included in the unit price bid.

1210-4.1 DLS MONITORING SYSTEM All manufacturer representation, labor, equipment, reports, and documentation for the DLS monitoring system shall not be measured separately but included in the unit price bid.

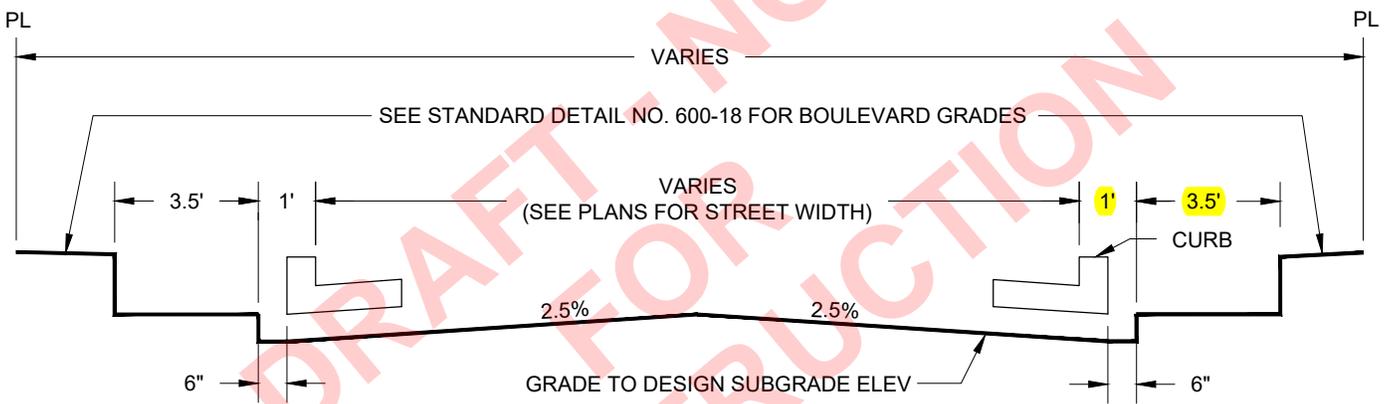
1210-4.2 GROOVED PAVEMENT MARKINGS. For grooved pavement markings, the markings and grooving shall not be measured separately but included in the unit price bid.

DRAFT - NOT
FOR
CONSTRUCTION

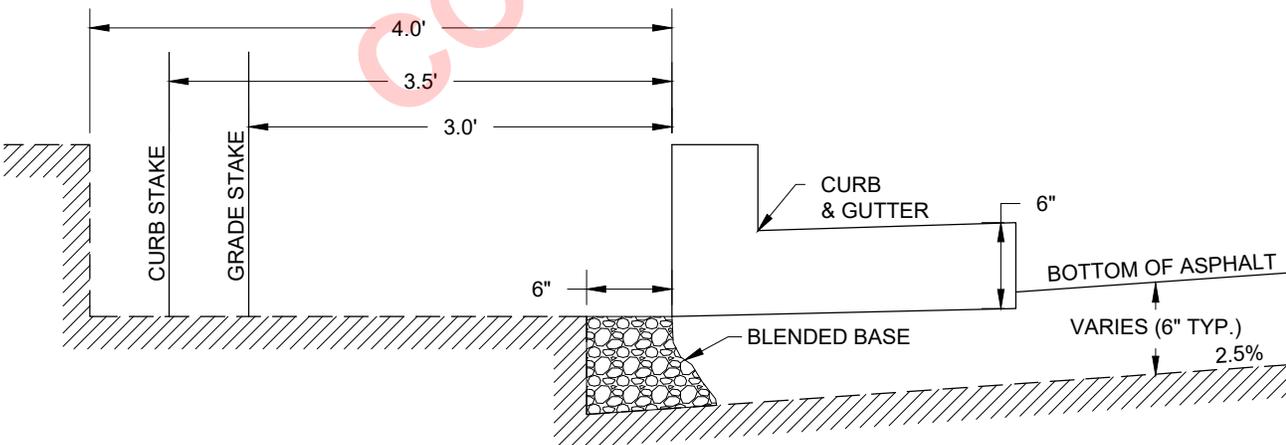


TYPICAL ROUGH GRADING WIDTHS
 80' R/W & 48' FACE TO FACE CURB = 57' WIDE ROUGH GRADING
 80' R/W & 44' FACE TO FACE CURB = 53' WIDE ROUGH GRADING
 66' R/W & 40' FACE TO FACE CURB = 49' WIDE ROUGH GRADING

TYPICAL ROUGH GRADING SECTION
 (PRIOR TO UNDERGROUND INSTALLATIONS)

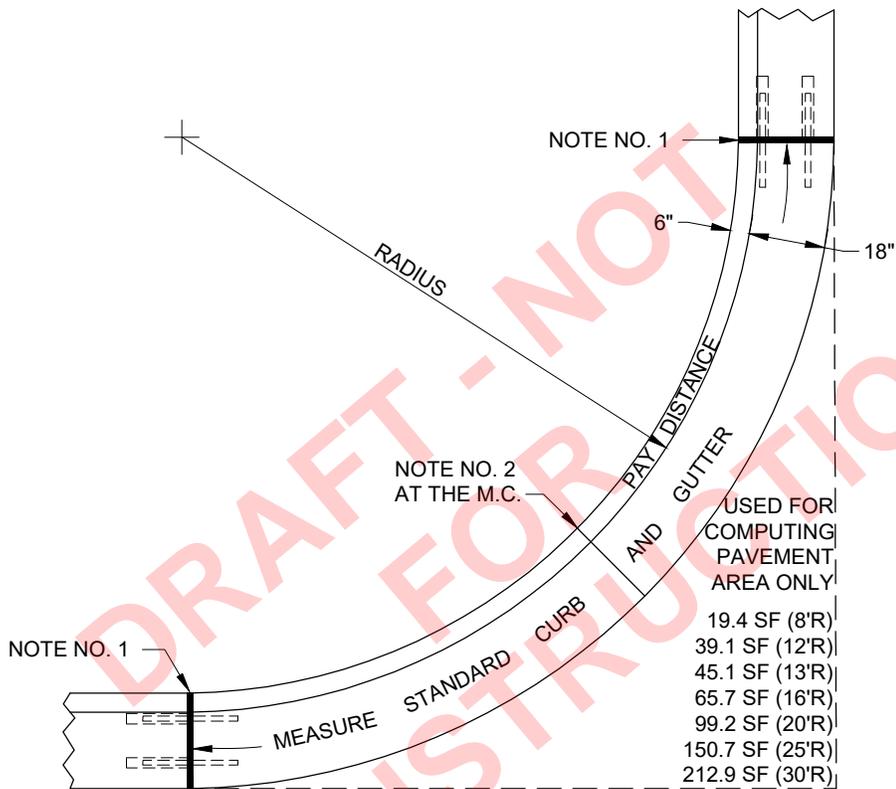


TYPICAL FINAL GRADING SECTION
 AFTER UNDERGROUND INSTALLATIONS, GRADING SHALL BE AT DESIGN SUBGRADE ELEVATION



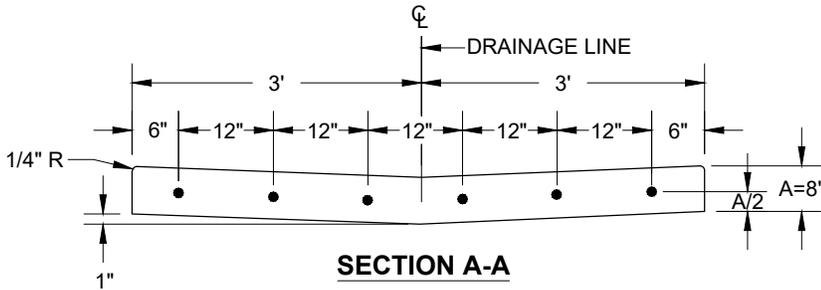
TYPICAL CURB GRADING DETAIL
 (AFTER UNDERGROUND INSTALLATIONS)

- NOTE NO. 1 3/4" EXPANSION JOINT WITH DRILLED IN 1/2"X12" SMOOTH REINFORCING STEEL OR #4 REINFORCING STEEL. WHEN USING 5/8" DRILL BIT, BOND BREAKER MATERIAL MAY BE ELIMINATED. ALL JOINTS SHALL BE SEALED.
- NOTE NO. 2 CONTRACTION JOINT SCORED 1/3 THE DEPTH OF THE CONCRETE. JOINT SHALL BE SEALED.

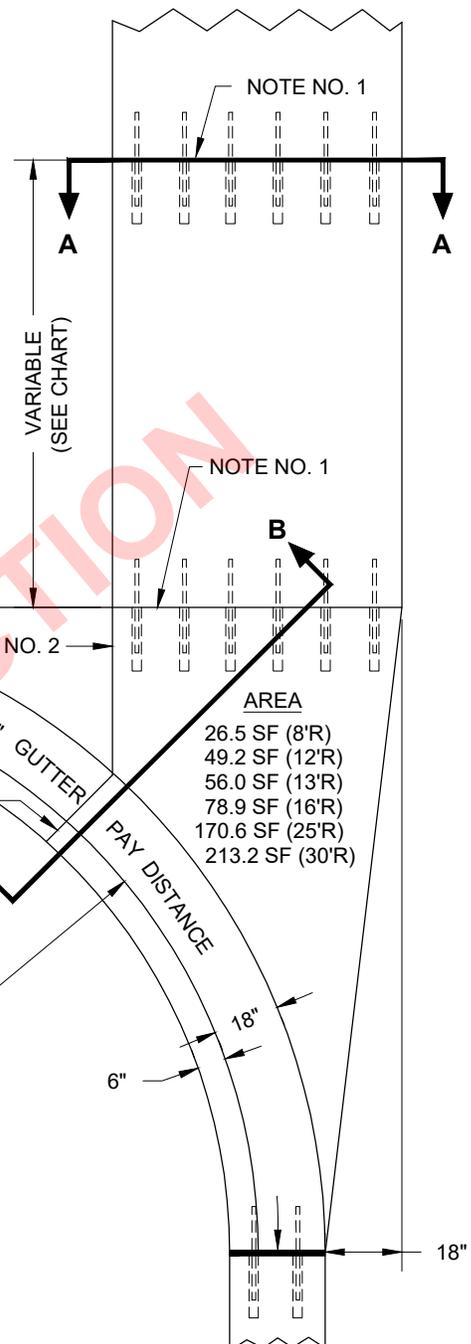


RADIUS EQUAL TO DISTANCE FROM FACE OF CURB TO RIGHT OF WAY LINE OF WIDEST STREET OF INTERSECTION UNLESS OTHERWISE SPECIFIED

- NOTE NO. 1 FOR NEW CONSTRUCTION WHEN SPANDREL IS POURED SEPARATELY OR FOR VALLEY GUTTER REPAIRS, 18" NO. 5 DEFORMED BARS SHALL BE DRILLED IN 1' ON CENTER.
- NOTE NO. 2 CONTRACTION JOINT SCORED $\frac{1}{3}$ THE DEPTH OF THE CONCRETE. ALL JOINTS SHALL BE SEALED.
- NOTE NO. 3 **3/4" EXPANSION JOINT WITH DRILLED IN 1/2"X12" SMOOTH REINFORCING STEEL OR #4 REINFORCING STEEL. WHEN USING 5/8" DRILL BIT, BOND BREAKER MATERIAL MAY BE ELIMINATED. ALL JOINTS SHALL BE SEALED.**



| STR. WIDTH | PVMT. WIDTH | JT. SPACING |
|------------|-------------|-------------|
| 28' | 25' | 8.3' |
| 32' | 29' | 9.7' |
| 37' | 34' | 8.5' |
| 38' | 35' | 8.8' |
| 40' | 37' | 9.3' |
| 44' | 41' | 8.2' |
| 48' | 45' | 9.0' |
| 52' | 49' | 9.8' |



MEASURE CURB & 8" GUTTER

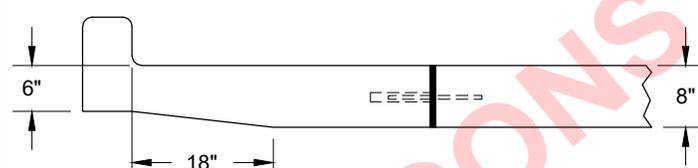
NOTE NO. 2

NOTE NO. 3

NOTE NO. 2

AREA

| |
|-----------------|
| 26.5 SF (8'R) |
| 49.2 SF (12'R) |
| 56.0 SF (13'R) |
| 78.9 SF (16'R) |
| 170.6 SF (25'R) |
| 213.2 SF (30'R) |



SECTION B-B
TRANSITION TO AN 8" VALLEY GUTTER

PLAN VIEW

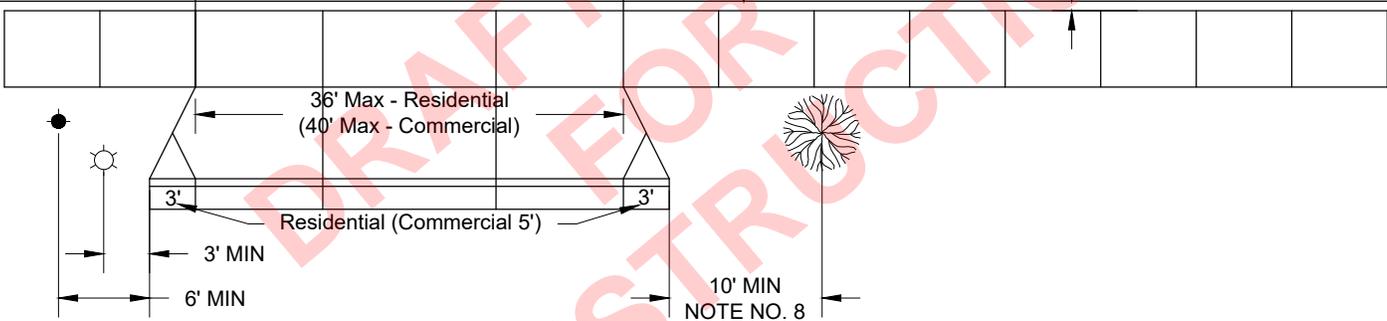
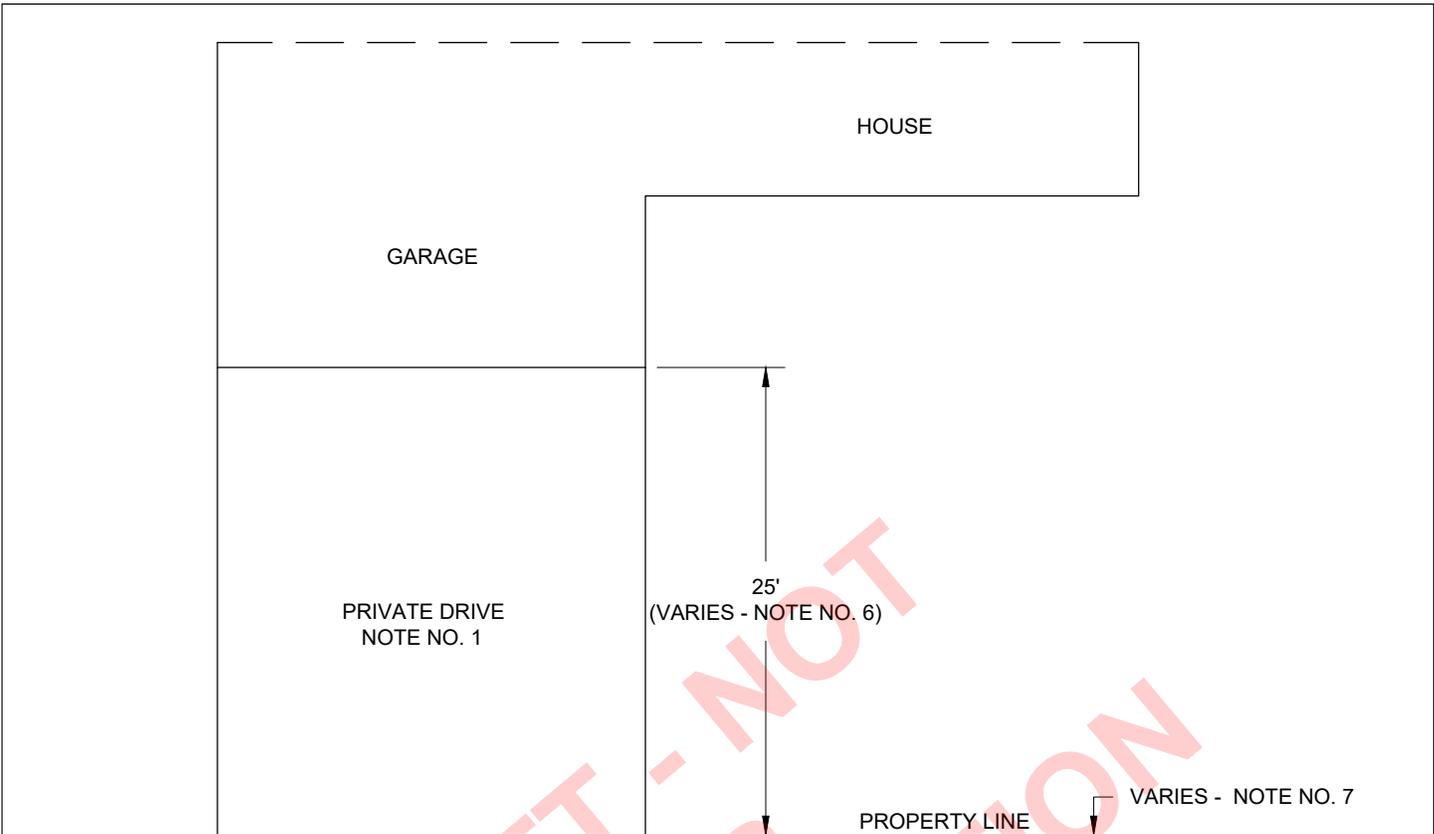
NOTE: AGGREGATE BASE AS PER SECTION 601



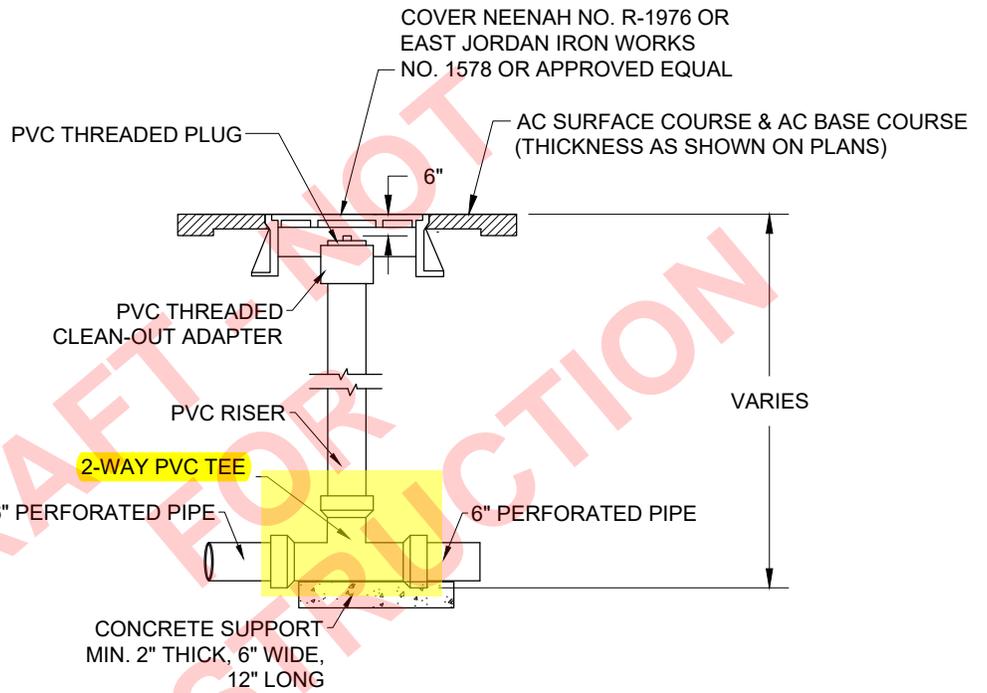
VALLEY GUTTER

SCALE:
Not to Scale
DATE:
2/2023

STANDARD
DETAIL NO.
600-16



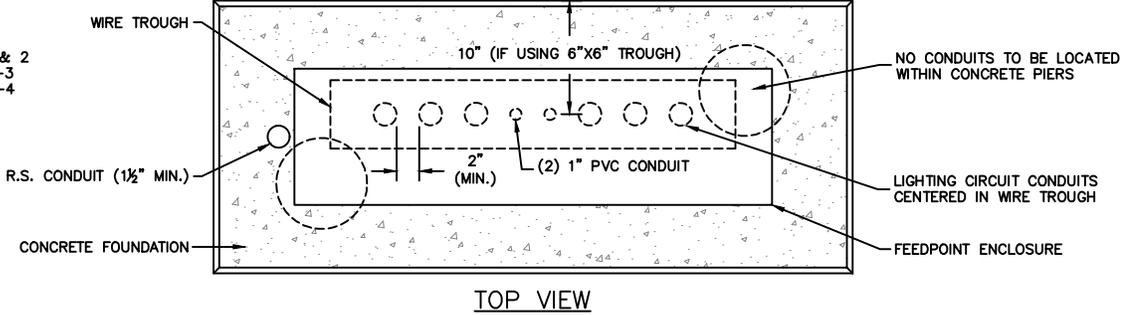
- NOTE NO. 1 PRIVATE DRIVE IMPROVEMENTS ARE REQUIRED PRIOR TO DRIVEWAY INSTALLATION UNLESS APPROVED BY THE ENGINEER
- NOTE NO. 2 DRIVEWAYS SHALL BE PLACED ON THE OWNER'S PROPERTY AND SHALL NOT EXTEND INTO ANOTHER PROPERTY OWNER'S PROPERTY, OR PAST THE PROJECTED PROPERTY LINE WITHIN THE R/W UNLESS APPROVED BY THE ENGINEER
- NOTE NO. 3 WHEN WIDENING A RADIUS-TYPE DRIVEWAY, THE WIDENING SHALL BE INSTALLED AS A RADIUS-TYPE DRIVEWAY, FLARES MIXED WITH RADII SHALL NOT BE ALLOWED, UNLESS APPROVED BY THE ENGINEER
- NOTE NO. 4 NEW CONSTRUCTION DRIVEWAYS AND WIDENINGS SHALL NOT BE BUILT WITHIN 6 FEET OF A FIRE HYDRANT OR WITHIN 3 FEET OF A STREET LIGHT OR POWER POLE, UNLESS APPROVED BY THE ENGINEER
- NOTE NO. 5 NEW CONSTRUCTION DRIVEWAYS AND WIDENING SHALL NOT BE BUILT WITHIN 10 FEET OF ANY TREE IN THE RIGHT-OF-WAY, UNLESS APPROVED BY THE CITY FORESTER
- NOTE NO. 6 BUILDING SETBACK REQUIREMENTS VARY BASED ON ZONING DISTRICTS; HOWEVER, A 25-FOOT FRONT YARD SETBACK IS TYPICALLY REQUIRED FOR RESIDENTIALLY ZONED PROPERTIES
- NOTE NO. 7 TYPICALLY, NEW RESIDENTIAL DRIVEWAYS SHALL USE 4.5' WALK SET 0.5' FROM PROPERTY LINE. IF 6' SIDEWALK IS USED, WALK SHALL BE SET ON PROPERTY LINE. VERIFY WITH ENGINEER PRIOR TO CONSTRUCTION.
- NOTE NO. 8 RESIDENTIAL ONLY. NON-RESIDENTIAL SEE SIGHT TRIANGLE REQUIREMENTS.



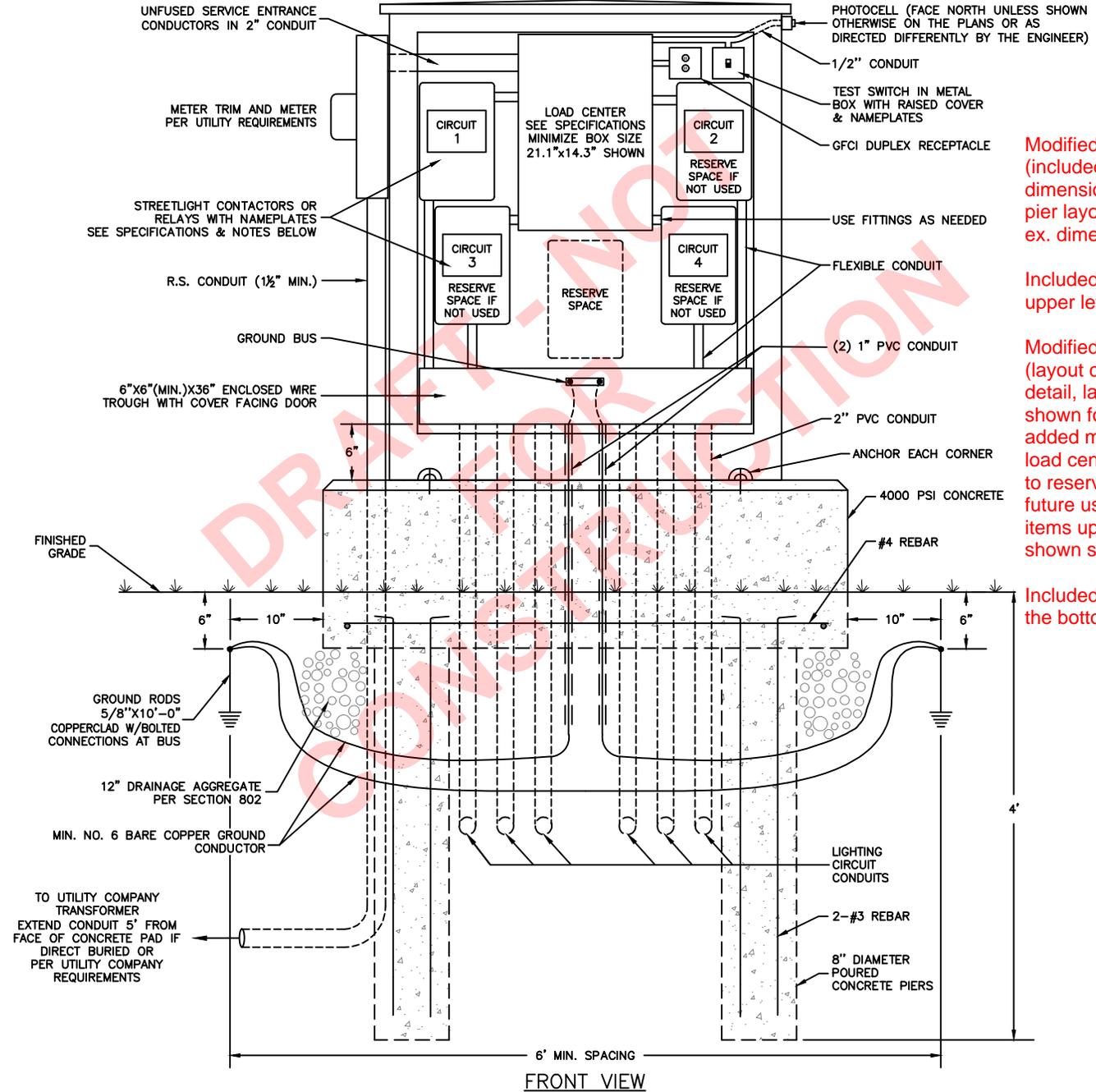
SECTION VIEW

FEED POINT TYPES

- TYPE I = CIRCUIT 1
- TYPE II = CIRCUITS 1 & 2
- TYPE III = CIRCUITS 1-3
- TYPE IV = CIRCUITS 1-4



TOP VIEW



FRONT VIEW

Modified top view (included new dimension and change pier layout, modified ex. dimension)

Included FP types in upper left corner

Modified Front view (layout changes, more detail, larger scale shown for some items, added min. box size for load center, added note to reserve space for future use underground items updated and shown slightly different)

Included notes 1-3 at the bottom

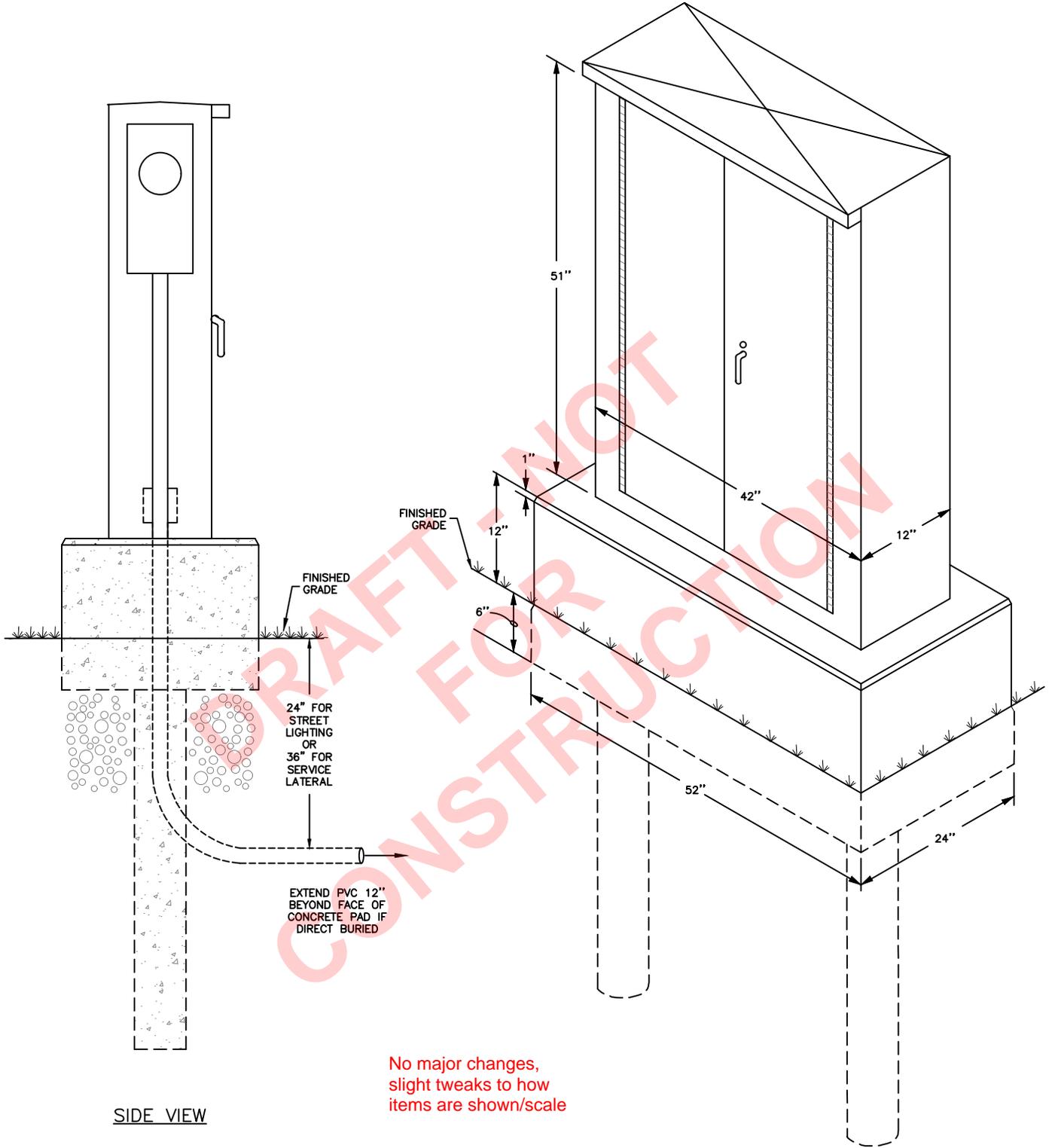
NOTE NO. 1 - THE CIRCUIT WOULD INCLUDE THE ASSOCIATED BREAKER, LIGHTING CONTACTOR/RELAY, CONDUIT, & CONDUCTOR.
 NOTE NO. 2 - FOLLOW LAYOUT OF COMPONENTS WITHIN THE ENCLOSURE AS SHOWN AND RESERVE SPACE FOR FUTURE COMPONENTS.
 NOTE NO. 3 - FOR EXISTING FEEDPOINT REPLACEMENTS, MAINTAIN EXISTING CIRCUITRY AND RELAY NUMBERING.



**PAD MOUNTED FEED POINT DETAIL
(SHEET 1 OF 2)**

SCALE:
Not to Scale
DATE:
12/2025

STANDARD
DETAIL NO.
1003-1



SIDE VIEW

ISOMETRIC VIEW

No major changes,
slight tweaks to how
items are shown/scale



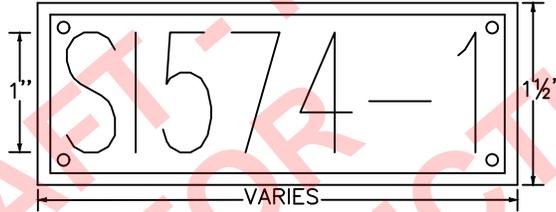
**PAD MOUNTED FEED POINT DETAIL
(SHEET 2 OF 2)**

SCALE:
Not to Scale
DATE:
12/2025

STANDARD
DETAIL NO.
1003-2

Updated to show "SI" in front of first example for 574-1

Dimensions of 3" and 4" for length of plate replaced with Varies



NAME TO MATCH PROJECT NUMBER



NOTE NO.1 - NAMEPLATES TO BE AFFIXED TO CABINET WITH STAINLESS STEEL OR ALUMINUM RIVETS AND 3M ADHESIVE.



FEEDPOINT NAMEPLATE DETAIL

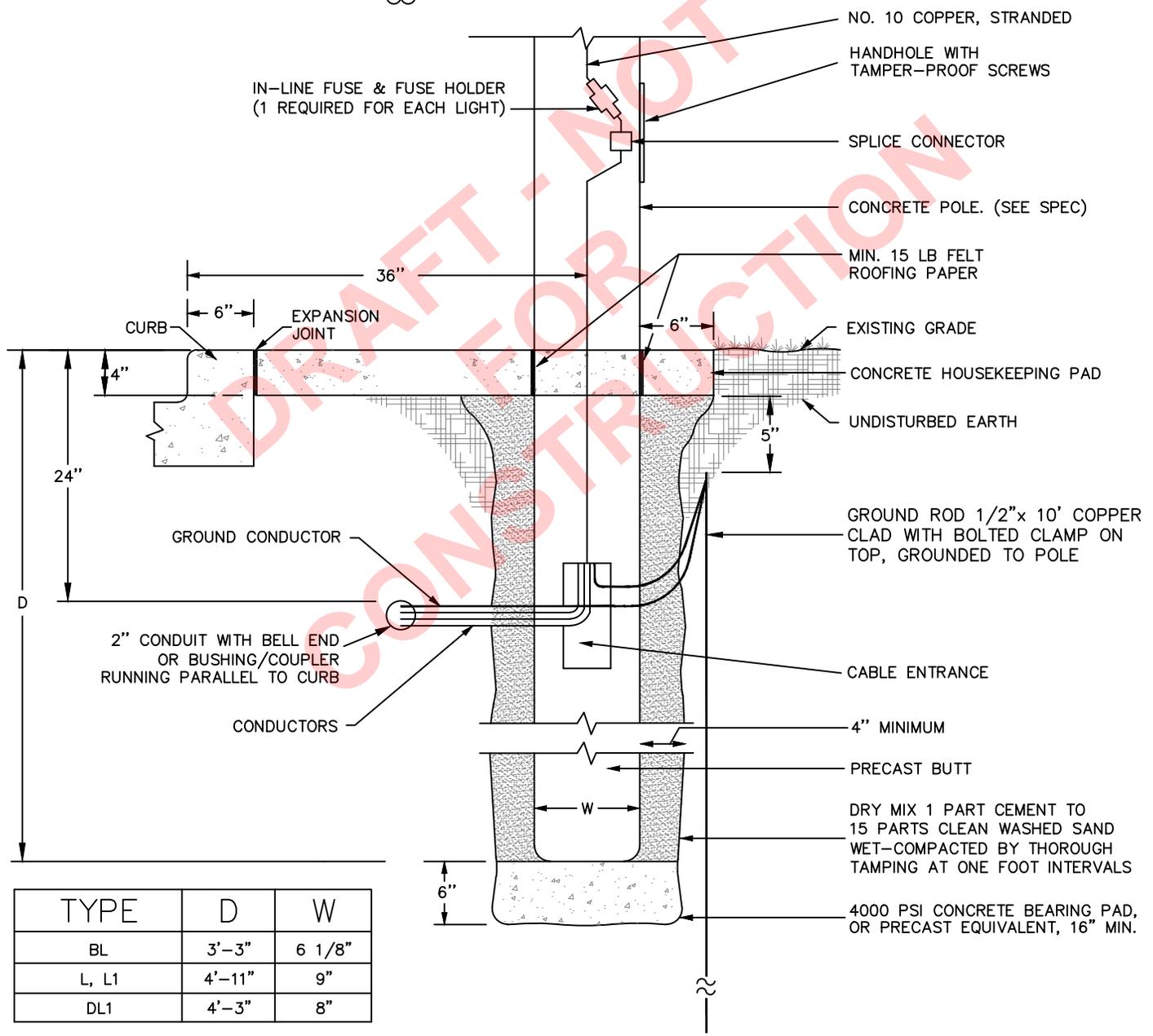
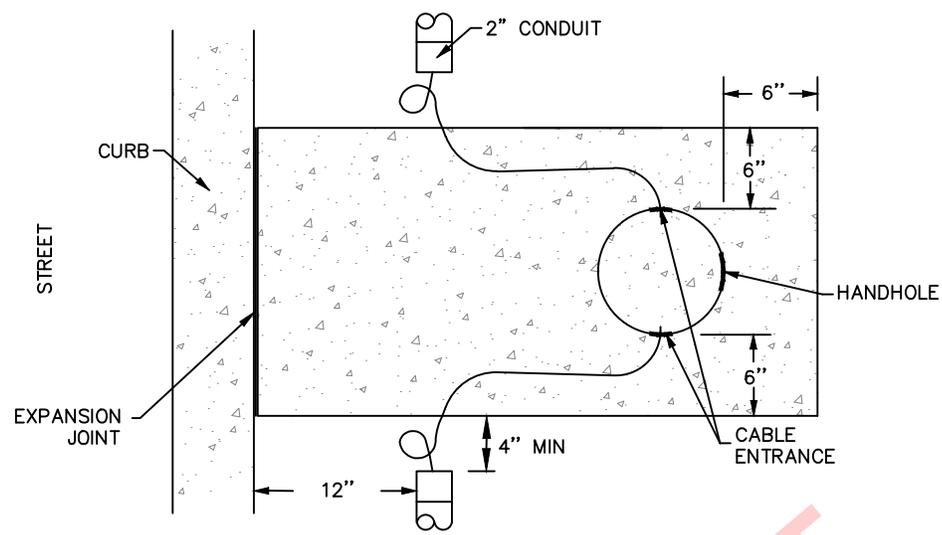
SCALE:
Not to Scale
DATE:
12/2025

STANDARD
DETAIL NO.
1003-5

Updated both views to show more accurately and closer to scale

Top view dimensions and callouts were moved and rearranged

Side view: the way the conduit and conductor is shown coming into and out of the pole was changed to be more accurate, concrete pad callout was replaced with "concrete housekeeping pad", dimensions and callouts were moved and rearranged

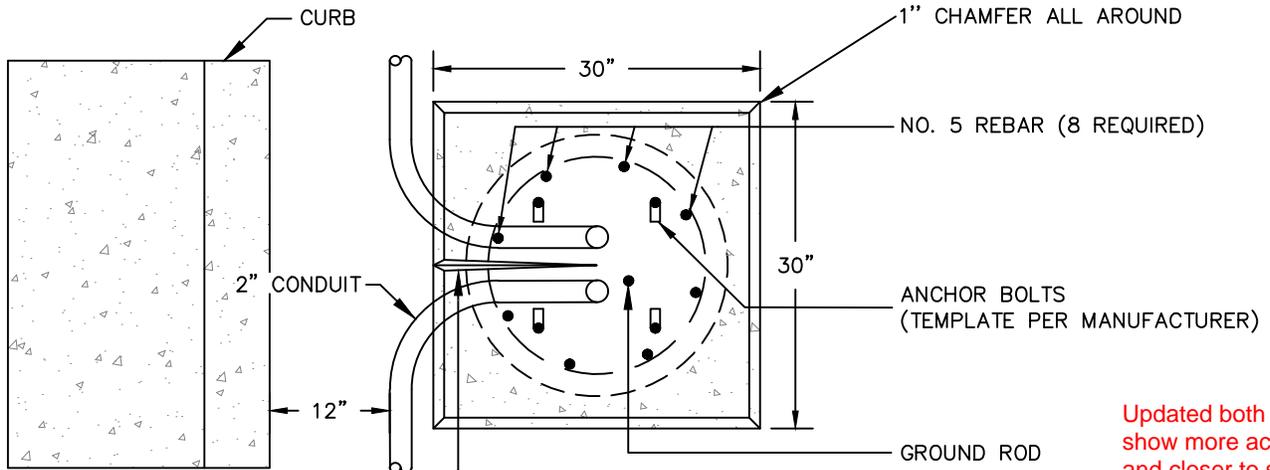


| TYPE | D | W |
|-------|--------|--------|
| BL | 3'-3" | 6 1/8" |
| L, L1 | 4'-11" | 9" |
| DL1 | 4'-3" | 8" |



EMBEDDED BASE DETAIL

| | |
|------------------------|---|
| SCALE: Not to Scale | STANDARD DETAIL NO. 1004-1 |
| DATE: 12/2025 | |



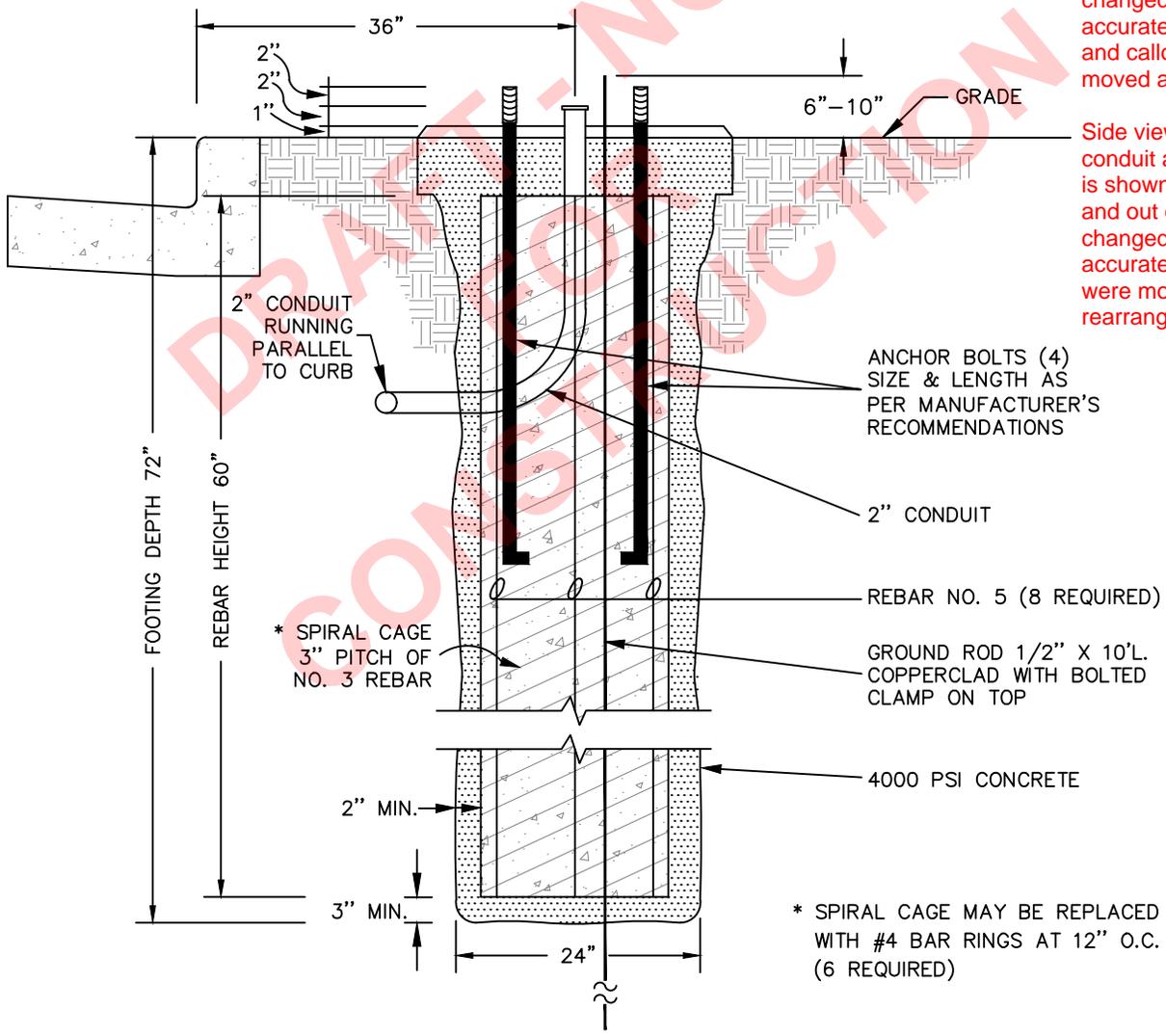
Updated both views to show more accurately and closer to scale

Top view: the way the conduit and conductor is shown coming into and out of the pole was changed to be more accurate, dimensions and callouts were moved and rearranged

Side view: the way the conduit and conductor is shown coming into and out of the pole was changed to be more accurate, and callouts were moved and rearranged

DRAINAGE GROOVE IN CONCRETE
1/2" DEEP - CURB SIDE

TOP VIEW



* SPIRAL CAGE MAY BE REPLACED WITH #4 BAR RINGS AT 12" O.C. (6 REQUIRED)

SIDE VIEW

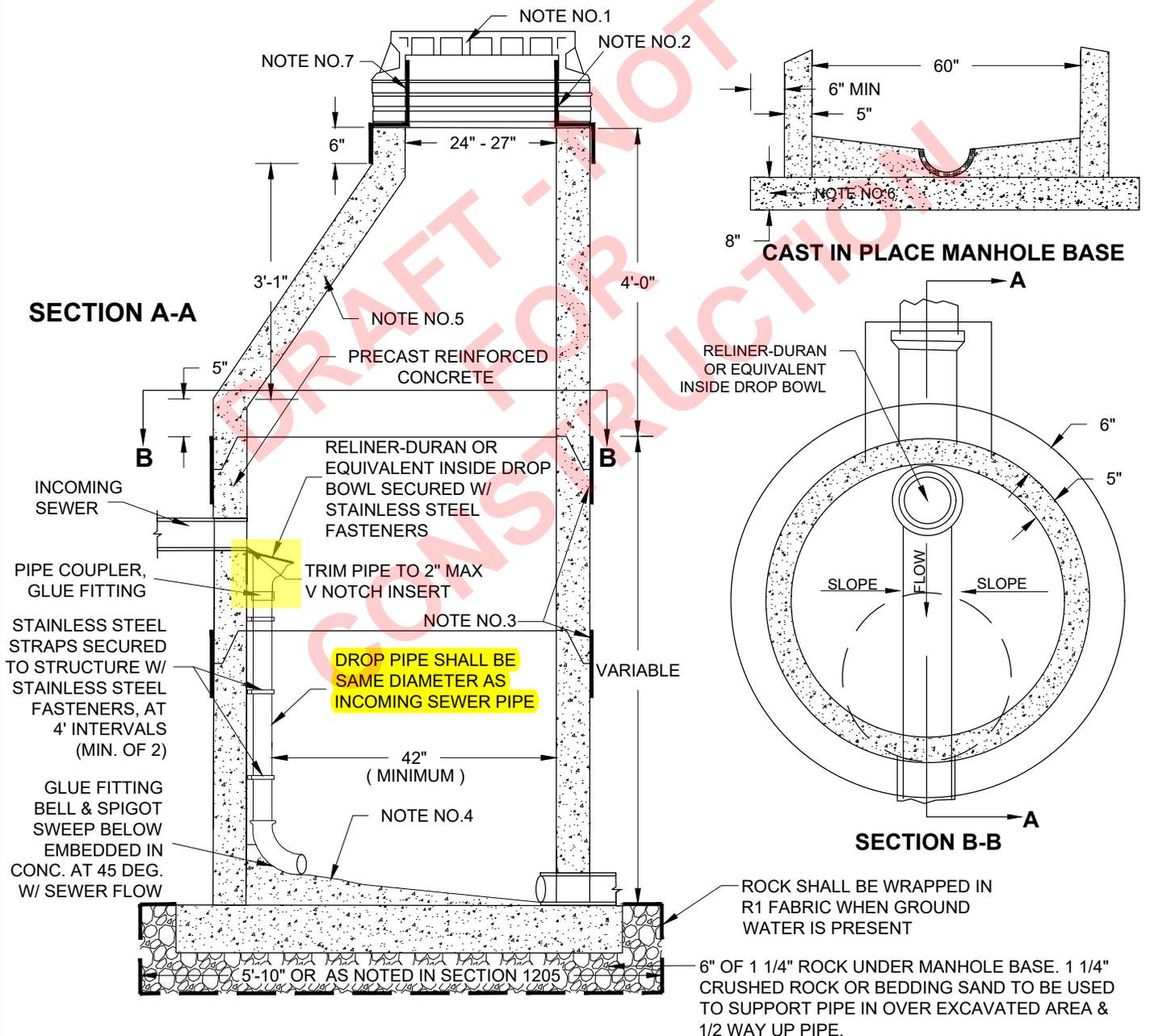


TYPE CL & CL1 BASE DETAIL

SCALE:
Not to Scale
DATE:
12/2025

STANDARD
DETAIL NO.
1004-2

- NOTE NO.1 - MANHOLE CASTING AND COVER SHALL BE AS DEFINED IN SECTION 1205, CENTER OVER FLOW LINE.
- NOTE NO.2 - ALLOWANCE FOR ADJUSTMENT - 0" TO 6" - SEE STANDARD DETAIL NO. 1206-1.
- NOTE NO.3 - P2 GASKETED JOINT FOR 48" MANHOLES, CX-4 JOINT FOR ALL OTHER SIZES OF MANHOLES AND EXTERIOR SEAL BY PRESS-SEAL GASKET CORP. EZ WRAP AND EZ STIK NO. 4 PRIMER, SPECIALTY PRODUCTS "MAC WRAP", INFI-SHIELD EXTERNAL GATOR WRAP, OR AN APPROVED EQUAL.
- NOTE NO.4 - IF PRECAST MANHOLE BASE IS USED, FLOOR SHALL BE GROUTED AND SLOPED, AS SHOWN, FROM 1/2 THE DIAMETER OF THE PIPE. SEE SECTION 1205 FOR PRECAST MANHOLE BASE REINFORCEMENT.
- NOTE NO.5 - DROP MANHOLE SHALL BE MIN 60" INSIDE DIAMETER.
- NOTE NO.6 - CAST IN PLACE MANHOLE BASES SHALL BE DIMENSIONED AS SHOWN UNLESS OTHERWISE INDICATED. BASES SHALL BE REINFORCED WITH NO.4 REBAR SPACED 15" ON CENTER BOTH WAYS.
- NOTE NO.7 - IF REQUIRED PER SECTION 1205, I/I BARRIER AS MANUFACTURED BY AP/M PERMAFORM OR AN APPROVED EQUAL, IF SPECIFIED. ADJUSTMENT RINGS SHALL NOT EXCEED THE HEIGHT OF THE I/I BARRIER.
- NOTE NO.8 - STEPS SHALL NOT BE PLACED IN SANITARY SEWER, STORM SEWER OR AIR RELEASE MANHOLES OR INLETS UNLESS SPECIFIED. IF SPECIFIED, THE MANHOLE STEPS SHALL BE DELTA SUREFOOT OR APPROVED EQUAL. STEPS SHALL BE SPACED 16" ON CENTER.
- NOTE NO.9 - ALL STAINLESS STEEL SHALL BE GRADE 316.
- NOTE NO.10 - INTERIOR OF MANHOLE SHALL BE EPOXY COATED AS PER PLANS



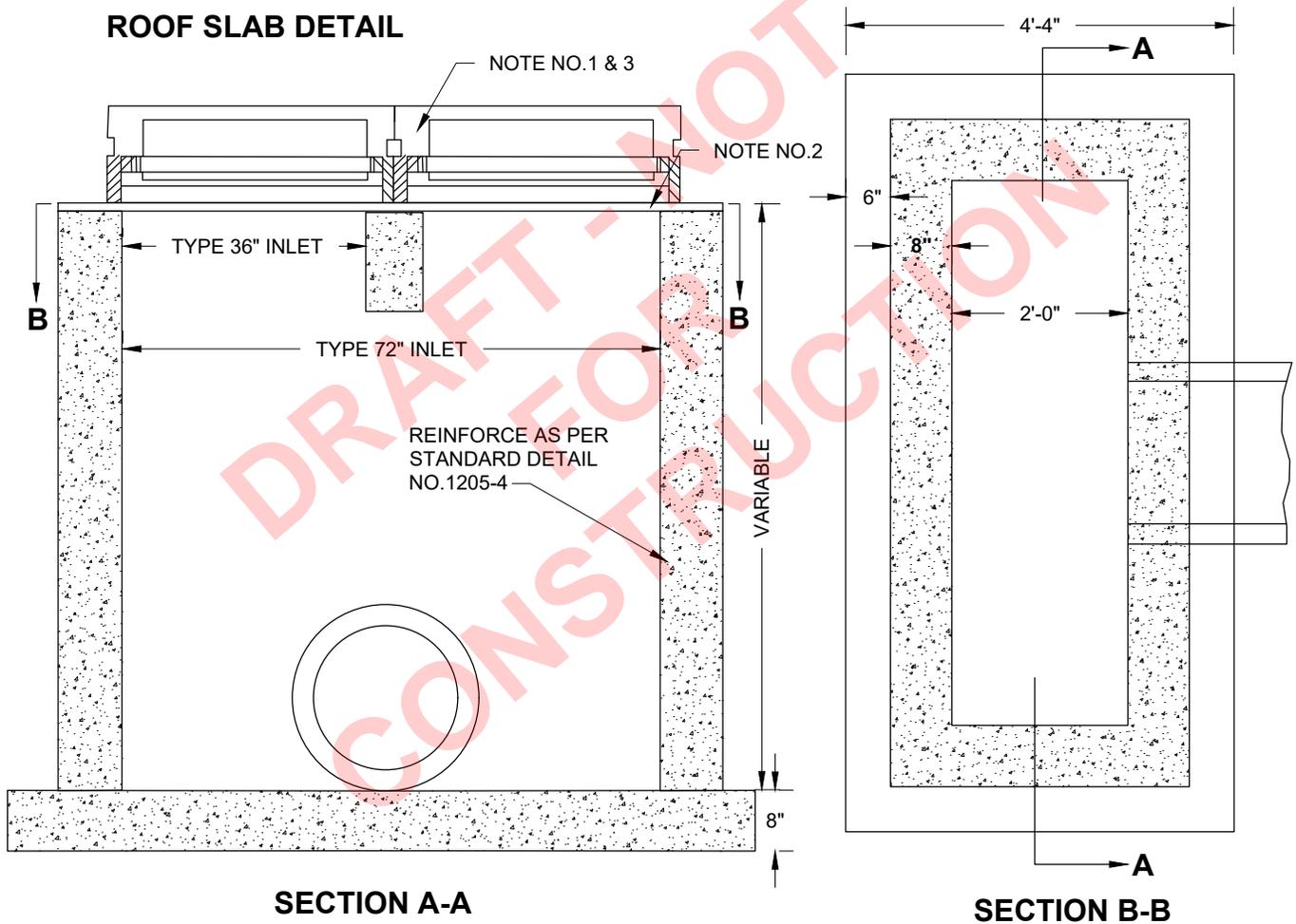
NOTE NO.1 - TYPE 36" INLET CASTING SHALL BE AS DEFINED IN SECTION 1205.
TYPE 72" INLET CASTING SHALL BE AS DEFINED IN SECTION 1205.

NOTE NO.2 - ALLOWANCE FOR ADJUSTMENT SHALL BE 1 1/2" MINIMUM TO 3" MAXIMUM. SEE STANDARD DETAIL NO.1206-1.

NOTE NO.3 - BOLTS FOR CASTING SHALL BE TEMPER FINISH, DOUBLE HEAT TREATED-1038 S.A.E. GRADE 5, WITH CAD-DICHROMATE PLATING.

NOTE NO.4 - STEPS SHALL NOT BE PLACED IN SANITARY SEWER, STORM SEWER OR AIR RELEASE MANHOLES OR INLETS UNLESS SPECIFIED. IF SPECIFIED, THE MANHOLE STEPS SHALL BE DELTA SUREFOOT OR APPROVED EQUAL. STEPS SHALL BE SPACED 16" ON CENTER.

**REMOVED ROOF SLAD
DETAIL AND NOTES,
ROOF SLAB NOT USED**



NOTE NO.1 - TYPE 36" INLET CASTING SHALL BE AS DEFINED IN SECTION 1205.
 TYPE 72" INLET CASTING SHALL BE AS DEFINED IN SECTION 1205.

NOTE NO.2 - ALLOWANCE FOR ADJUSTMENT SHALL BE 1 1/2" MINIMUM TO 3" MAXIMUM. SEE STANDARD DETAIL NO.1206-1.

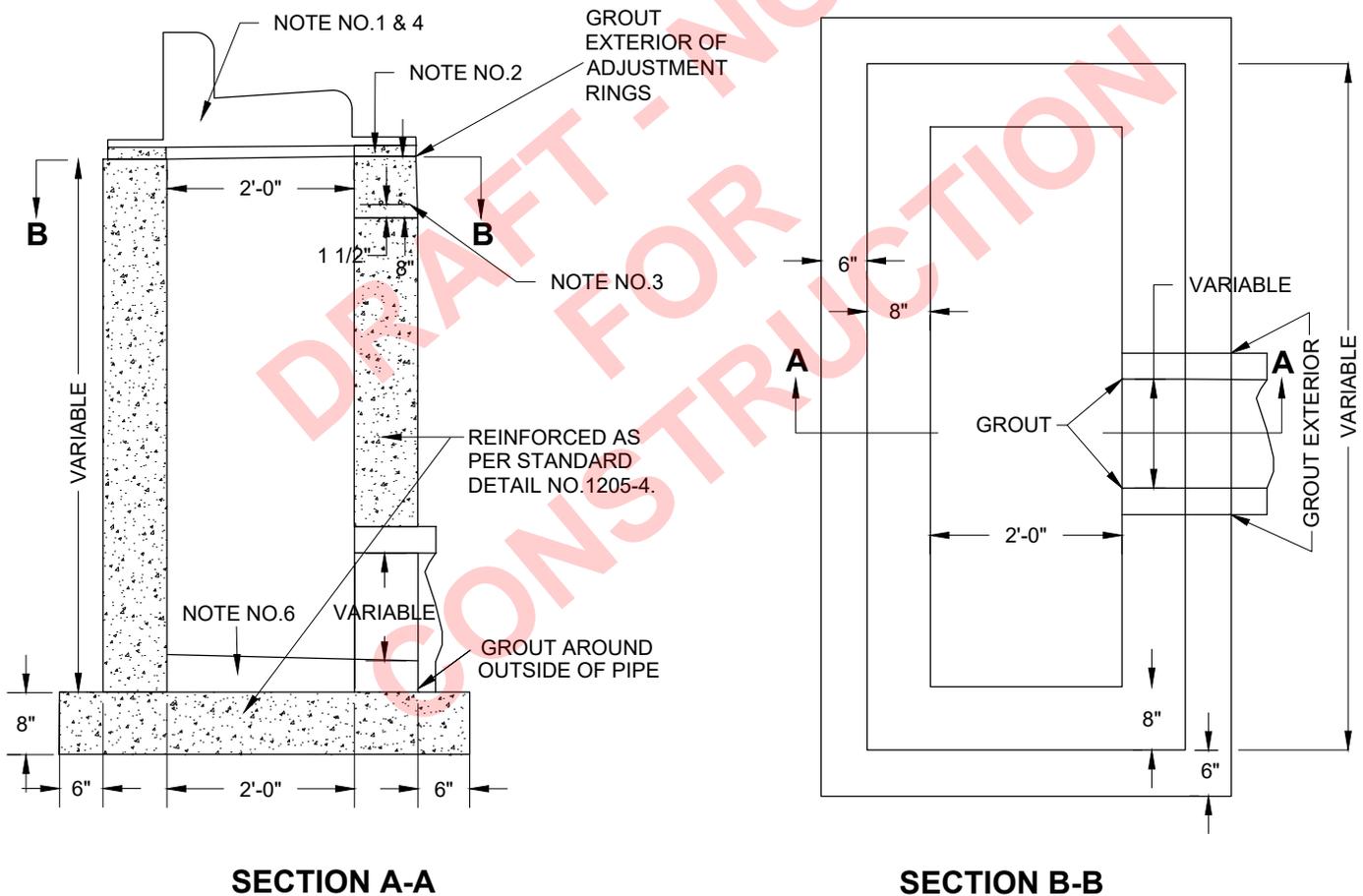
NOTE NO.3 - ALL BARS SHALL BE NO.5 DEFORMED REINFORCING BARS SPACED 6" CENTER TO CENTER BOTH WAYS.

NOTE NO.4 - BOLTS FOR CASTING SHALL BE TEMPER FINISH,DOUBLE HEAT TREATED-1038 S.A.E. GRADE 5, WITH CAD-DICHROMATE PLATING.

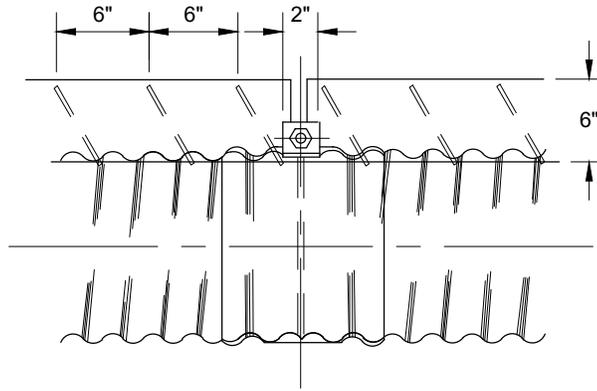
NOTE NO.5 - STEPS SHALL NOT BE PLACED IN SANITARY SEWER, STORM SEWER OR AIR RELEASE MANHOLES OR INLETS UNLESS SPECIFIED. IF SPECIFIED, THE MANHOLE STEPS SHALL BE DELTA SUREFOOT OR APPROVED EQUAL. STEPS SHALL BE SPACED 16" ON CENTER.

NOTE NO.6 - SLOPE FLOOR TO INVERT OF LOWEST PIPE.

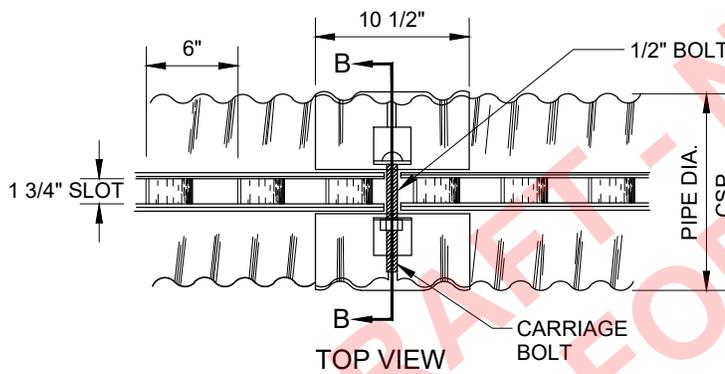
**REVISED TO CLARIFY
 STRUCTURE BUILDS**



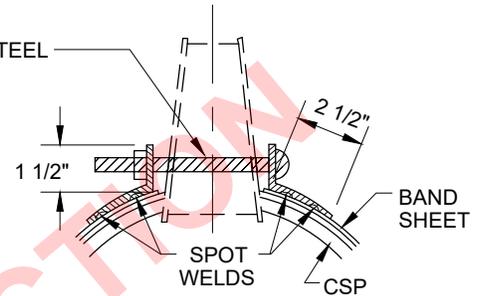
REVISED TO CLARIFY
STRUCTURE BUILDS



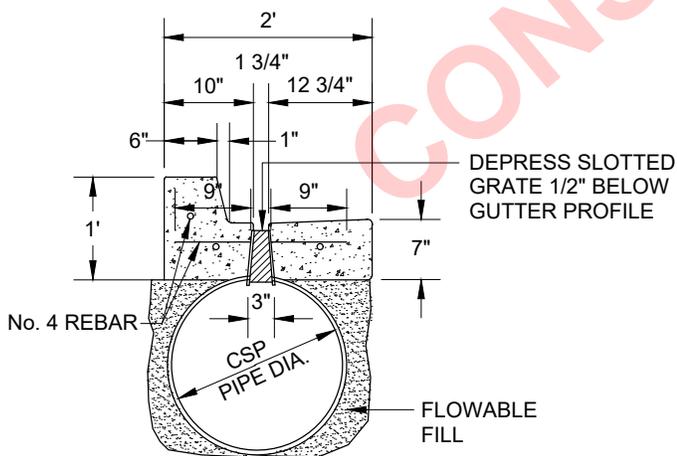
SIDE VIEW



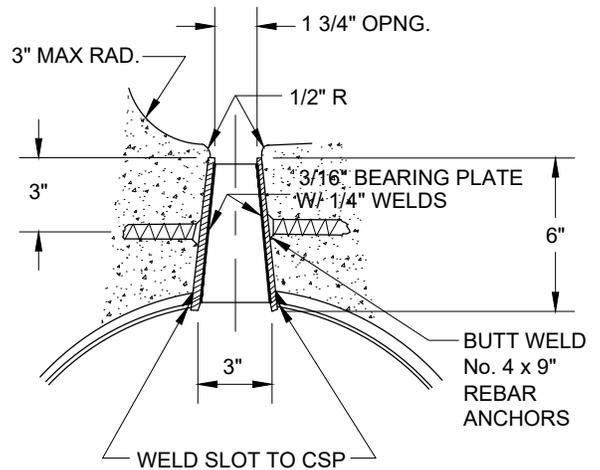
TYPICAL COUPLING BAND



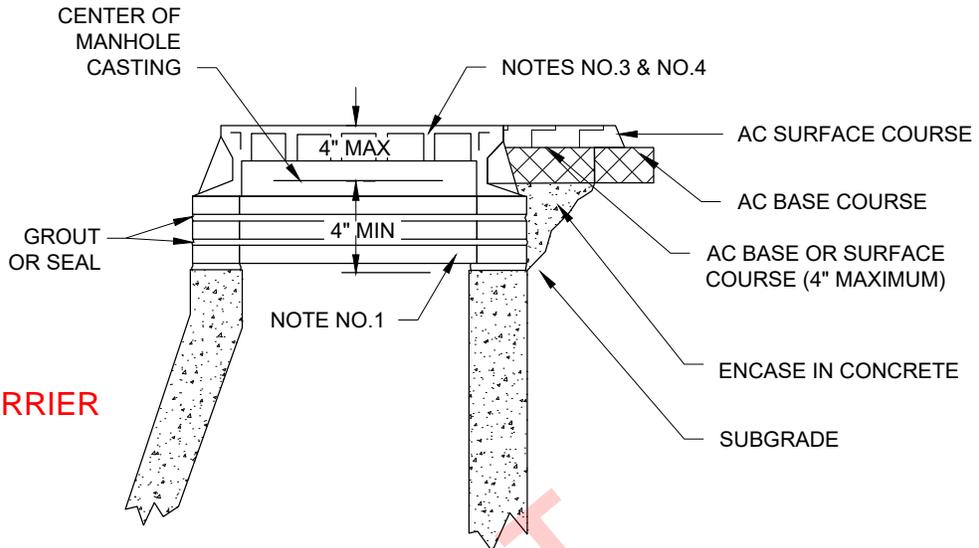
SECTION B-B



SECTION A-A

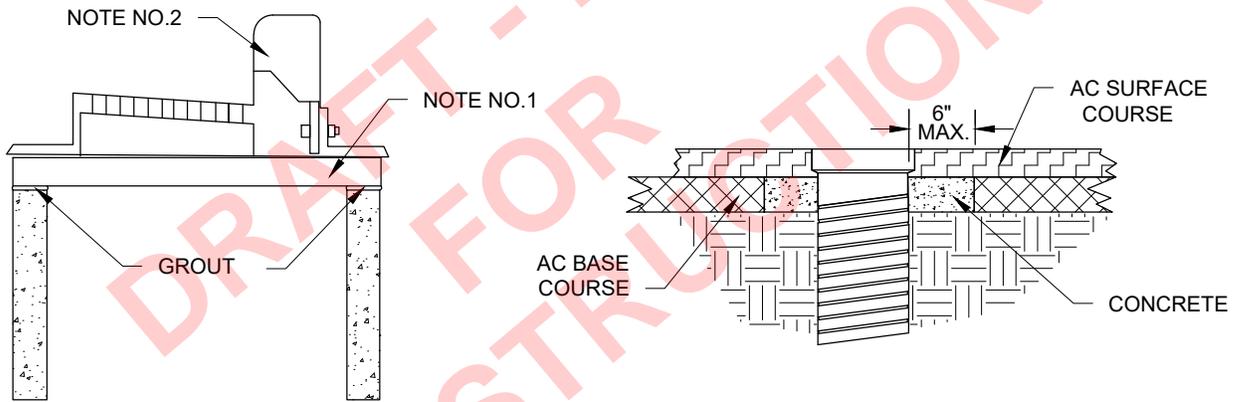


TYPICAL SECTION



REMOVED I/I BARRIER
AND CLARIFY

MANHOLE CASTING STANDARD ADJUSTMENT



INLET STANDARD ADJUSTMENT

VALVE BOX ADJUSTMENT

NOTE NO.1 - USE PRECAST CONCRETE ADJUSTING RINGS FOR ADJUSTMENT OF MANHOLES AND TYPE 24" INLET AND TYPE 24" INLET/ MANHOLE. USE CONCRETE BLOCKS FOR ADJUSTMENT OF TYPE 36" AND TYPE 72" INLETS. GROUT SHALL BE PLACED BETWEEN ALL SURFACES. GROUT ON THE INSIDE EDGE OF ADJUSTING RINGS SHALL HAVE A SMOOTH FINISH.

NOTE NO.2 - INLET BACK SHALL BE ADJUSTED TO CONFORM WITH CURB & GUTTER GRADES AND CURB ALIGNMENT.

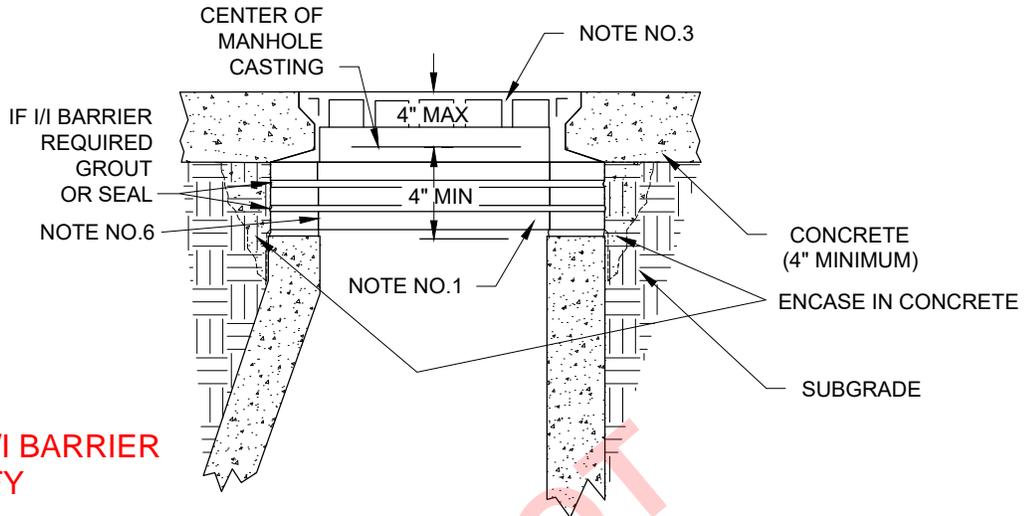
NOTE NO.3 - MANHOLE CASTING SHALL BE ADJUSTED TO CONFORM WITH SLOPE AND GRADE OF PROPOSED CONCRETE OR PAVEMENT.

NOTE NO.4 - MANHOLE CASTING SHALL BE ADJUSTED AFTER THE AC LEVELING COURSE OR THE AC BASE COURSE HAS BEEN PLACED.

NOTE NO.5 - INLET AND MANHOLE CASTINGS SHALL BE CONSIDERED ADJUSTED ONLY WHEN RAISED OR LOWERED BY ADDING OR REMOVING ADJUSTING RINGS OR GROUT.

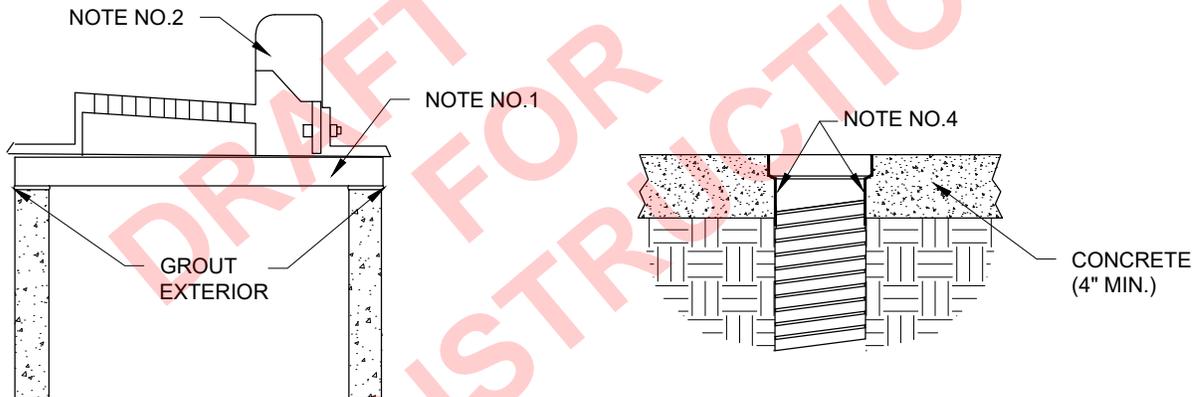
NOTE NO.6 - ADAPTOR RING SHALL BE AMERICAN HIGHWAY PRODUCTS MANHOLE RISER OR AN APPROVED EQUAL.

NOTE NO.7 - ALLOWANCE FOR MANHOLE AND INLET ADJUSTMENT - 0" TO 6".



REMOVED I/I BARRIER
AND CLARIFY

MANHOLE CASTING STANDARD ADJUSTMENT



VALVE BOX ADJUSTMENT

INLET STANDARD ADJUSTMENT

NOTE NO.1 - USE PRECAST CONCRETE ADJUSTING RINGS FOR ADJUSTMENT OF MANHOLES AND TYPE 24" INLET AND TYPE 24" INLET/MANHOLE. USE CONCRETE BLOCKS FOR ADJUSTMENT OF TYPE 36" AND LARGER.

NOTE NO.2 - INLET BACK SHALL BE ADJUSTED TO CONFORM WITH CURB & GUTTER GRADES AND CURB ALIGNMENT.

NOTE NO.3 - MANHOLE CASTING SHALL BE ADJUSTED TO CONFORM WITH SLOPE AND GRADE OF PROPOSED CONCRETE OR PAVEMENT.

NOTE NO.4 - VALVES AND CURB STOP BOXES MUST BE WRAPPED IN ACCORDANCE WITH SECTION 1206.

NOTE NO.5 - INLET AND MANHOLE CASTINGS SHALL BE CONSIDERED ADJUSTED ONLY WHEN RAISED OR LOWERED BY ADDING OR REMOVING ADJUSTING RINGS OR GROUT.

NOTE NO.6 - ALLOWANCE FOR MANHOLE AND INLET ADJUSTMENT - 0" TO 6".