

State of Delaware Department of Transportation  
Maintenance and Operations  
Plans and Specifications for Contract Number  
T2015-034-01  
Sinkhole Repair, Open End, Canal, FY 15 - FY 17



Recommended:

  
Canal District Maintenance Engineer Date 5/27/15

Recommended:

  
Canal District Contracts Engineer Date 5/27/15



Approved:

  
Canal District Engineer Date 5/28/15

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Contract Description

The purpose of this contract is to repair storm drain systems for transportation infrastructure in the Canal District. Work includes the repair of deterioration, damage and/or failures in the storm water drainage system. The work shall be performed on pipe systems, drainage inlets, curbs, manhole and drainage structures and affected pavements as directed by the Engineer. The work includes internal pipe video, flushing and repair as well as external repair work.

The specific work sites are not listed herein, but will be assigned as available by the District Maintenance office via work orders.

**This is a working day contract that will end one year (365 calendar days) from date of Notice To Proceed. This contract may be renewed for two (2) one (1) year periods.**

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## Project Notes

1. Construction of this contract shall conform to Delaware Department of Transportation (DelDOT) Standard Specifications dated August 2001, as amended by the Supplemental Specifications, the Special Provisions and these Plans.
2. The Contractor and all others shall perform all work in a manner that shall ensure the least practical obstruction to the traveling public and shall conform to the requirements of the latest version of the Manual entitled "Delaware Manual on Uniform Traffic Control Devices For Streets And Highways (DE MUTCD)", in effect at the time of advertisement for bids.
3. No utility relocation involvement is anticipated. Should any conflicts be encountered during construction requiring adjustment and/or relocation of the agencies' existing facilities, the necessary relocation work shall be accomplished by the respective agencies' forces, as directed by the District Engineer. Any adjustments and/or relocations on municipally owned facilities shall be done by the State's contractor in accordance with the respective agencies' standard specifications as directed by the District Engineer.
4. No environmental permits are required for this work provided no jurisdictional wetlands or waters are impacted. If there is a question as to whether or not a water or wetland is jurisdictional, contact the DelDOT Environmental Section at 302-760-2264.
5. It is anticipated that all work will occur within DelDOT's existing right of way or easement areas. Should the need occur to trespass onto private property; it will be the responsibility of the contractor's project manager to secure such trespass needs. The contractor may contact DelDOT's inspection representative for this contract to arrange ROW stakeouts (if needed).
6. No work near or within railroad Right-of-Way is anticipated. If any railroad property or facilities are near or within the proposed limits of work or if the proposed work encroaches upon the railroad's Right-of-Way, the contractor shall be responsible for obtaining the required clearances and insurances for each involved railroad in accordance with the appropriate DelDOT Maintenance of Railroad Traffic item. DelDOT's Railroad Section Manager must be contacted at (302) 760-2183 to coordinate the execution of the appropriate agreements and authorizations required from any railroad company involved, including coordination for railroad flagging, if necessary.
7. The contractor shall not trespass on private property unless the Department has acquired a "Temporary Trespass Agreement" from the property owner. If the work is within a permanent easement, the work shall not begin until the adjacent property owners have been notified. Prior to starting work on private property, the Contractor shall notify affected property owners of proposed work dates. The Contractor shall provide all residents who live adjacent to the work zone with a minimum 48 hour prior written notice for the start of construction work. This notification shall include the scope of work, working hours, anticipated start and completion dates, contractor name and

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address, and DeIDOT contact numbers. Failure to give proper notice will result in suspension of work requiring notice, until proper notice is provided.

8. The Contractor shall submit two-week "look ahead" schedules to the Engineer no later than noon of each Thursday. Failure to comply will result in the suspension of all contract work with times charges to be assessed.
9. The Contractor shall be responsible for coordinating with the Traffic Section relating to any impacts to Traffic Section facilities (including but not limited to traffic loops, junction wells, etc.) at least four weeks in advance of the start of the construction activity. Prior to initiating any work on this contract (or sites), the Project Manager shall be responsible for preparing and submitting for approval of the Safety Section, a Maintenance of Traffic Plan. Sufficient time shall be provided for the review and approval of the plan. The Maintenance of Traffic Plan shall include proposed time restrictions on the closure of travel lanes subject to the approval of the Safety Section. Typically, the work shall be done using Typical Application 11A of the Delaware Manual on Uniform Traffic Control Devices For Streets And Highways (DE MUTCD). Restricted working hours will be included on the work orders and will be in effect on state numbered roads as dictated by traffic volumes. For locations requiring a flagging operation, the flagger will be paid the fixed hourly rate per Item 743050.

If a road closure is required, the Contractor shall be required to submit the proposed detour route to the Traffic Engineer for approval. The Contractor shall coordinate the closure with the Engineer. The detour route must be approved by the Engineer prior to closure. All Traffic Control Devices shall be compliant as per NCHRP Report 350. The Contractor shall be responsible for furnishing and maintaining the Maintenance of Traffic apparatus at the closure (i.e. Type III Barricade, Road Closed signs, etc) and all advance warning signs. The Contractor shall be responsible for placement of detour trailblazers. If necessary, the Engineer will assign the detour route.
10. The Contractor is responsible for ensuring any required documents and analysis as part of the adopted Work Zone Safety and Mobility Procedures and Guidelines has been completed prior to any work starting on this contract.
11. Work located in Municipalities requires Town Agreements. Work in these locations cannot commence before obtaining them. To obtain a Town Agreement, the contractor must work with DeIDOT's TEAM Support at (302) 760-2251.
12. The work will be scheduled via work orders from the department. Work sites will vary in complexity. Typically, the work will involve repairing and/or replacing drainage inlets in or off the roadway, repairing and/or replacing drainage pipes in or off the roadway, removing and replacing curb and/or sidewalk and restoration. The sites will be in Area 9 and Area 10 (Canal District) in New Castle County, Delaware (reference pages 13 and 14). The work orders will indicate the work to be performed at each site. Any questions pertaining to any locations, during construction, shall be referred to the Engineer or his representative.

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13. Pipe failures will typically be repaired in one of two ways at the discretion of the Engineer or representative. The minimum repair will be to plug lift holes or seams as directed and wrap the pipe with an approved geo-textile material fastened securely around the pipe with epoxy-coated tie wire. For pipes in roadways, or in cases of severe joint or pipe dislocation, a concrete collar shall be placed after the wrapping the pipe with geo-textile as stated above. The collar (reference page 15) shall consist of a wrap of 4 x 4 inch welded wire fabric offset from the pipe wall with cement brick as required, and a concrete collar. The collar shall surround the length of the pipe that has failed (top, bottom and sides). Any geo-textile, welded wire fabric, mortar for plugging lift holes or seams using non-shrink grout, lumber for form work or miscellaneous hardware or material required for pipe repairs, labor and equipment shall be incidental to Items 208000 and 602002. No concrete shall be released or placed until the depth of the excavation and the character of the foundation material, the adequacy of the forms and false-work, and the placing of reinforcement have been inspected and approved by the Engineer or representative.
14. An approved concrete sealant shall be used to seal the exterior and interior of the drainage inlet and shall be incidental to Item 710001.
15. Clearing and grubbing of trees and shrubs less than 6 inches in diameter and within 400 square feet shall be incidental to the applicable repair or replacement item. Other clearing and grubbing will be negotiated or performed by Force Account procedures.
16. All topsoil (Item 908003) shall be of the pre-sifted variety to remove any sticks, rocks or other contaminants.
17. All replacement pipes shall be the same size and material as the pipe that was removed or as directed by the Engineer or representative. Removal and disposal of existing pipe to an approved location is incidental to Item 208000.
18. The Contractor shall protect all driveways from damage due to Contractor's equipment and shall be responsible for all such damage done by Contractor's equipment.
19. Underground utilities may be present at all locations. Therefore, all standard practices and procedures regarding utilities shall be followed. Contractor is required to contact Miss Utility prior to starting each work order.
20. Six inch PCC Sidewalk will be required at all driveways as per PCC Sidewalk standard detail and as directed by the Engineer or representative.
21. Payment for wheel chair ramps will be per Item 705001 or Item 705002.
22. Excavation, removal and disposal of existing drainage inlets, sidewalk, curb and gutter, pipe, etc, payment shall be incidental to the price bid or negotiated for the applicable replacement item. Excavation for repair and placement of drainage inlets and placement of sidewalk, curb and gutter, and GABC, shall be incidental to the price bid

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for those items. Excavated material not needed on the project shall be removed from the site at the Contractor's expense.

- 23. The Contractor will be advised of work to be performed or deleted by letter with work orders. The work order will indicate the location, and the allowable time to perform the work based on an estimate of the items and quantities. Time to perform the work assigned per work order shall be developed by the following method and Items:

Internal Pipe Repairs

Legend:

- 2 Days = Startup time, from date of issue, of each new work order location
1 Day = Time to video inspect 400 ft of a drainage system (pipes, inlets & manholes)
1 Day = Time to repair 12 pipe joints
1/2 Day = Restoration for associated sinkhole (Topsoil, grass seed, straw mulch, and/or site cleanup)

Example: A work order with the following repair items issued to the Contractor on Friday, May 1, 2009

- A = 300 ft of drainage system (video inspection only)
B = 18 pipe joints repairs
C = Restoration (Topsoil, grass seed, straw mulch and site cleanup)

Formula:

Time To Complete = 2 days startup + A(1 day/400 ft video inspect) + B(1 day/12 pipe joint repairs) + 1/2 day restoration
= 2 days startup + (300 ft of video inspect)(1 day/400 ft of video inspect) + (18 pipe joint repairs)(1 day/12 pipe joint repairs) + 1/2 day restoration
= 2 + 0.75 + 1.5 + 0.5

Time To Complete = 4.75 = 5.0 Days

The first day charged for the work order in this example is Monday, May 4th. Completion of all construction activities is required before the end of Wednesday, May 13th. Liquidated damages are assessed starting Thursday, May 14th, and remain in effect until all work is completed and accepted by the department.

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**Sinkhole Repairs**

Legend:

4 Days = Startup time, from date of issue, of each new work order location. This includes contacting Miss Utility.

1 Day = Time to repair one drainage inlet or manhole.

3 Days = Time to remove and replace one drainage inlet.

1 Day = Time to remove and replace one drainage inlet hood.

1 Day = Time to repair 27 ft of pipe (each joint wrap and/or collar counted as 14 ft).

1 Day = Time to remove and replace 55 ft of pipe including backfill.

1 Day = Time to remove and replace 150 ft<sup>2</sup> of 4 inch or 6 inch sidewalk.

1 Day = Time to remove and replace 70 ft of curb and or curb and gutter.

2 Days = Restoration (Topsoil, grass seed, straw mulch, and/or hot mix patch placement, site cleanup.).

\*1 Day = Time to remove and replace 538 ft<sup>2</sup> of hot mix patching, for hot mix quantities greater than 108 ft<sup>2</sup>. Hot mix patching quantities less than 108 ft<sup>2</sup> are considered incidental to the work, and shall offer no additional time for completion.

Example: A work order with the following repair items issued to the Contractor on Friday, June 1, 2007

A = 1 drainage inlets repairs

B = 1 drainage inlet, remove and replace

C = 1 drainage inlet hood, remove and replace

D = 92 ft of pipe repair

E = 92 ft of pipe removal and replacement

F = 40 ft<sup>2</sup> of 6 inch sidewalk removal and replacement

G = 10 ft of curb replacement

H = 86 ft<sup>2</sup> of hot mix patching.

Formula:

$$\text{Time To Complete} = 4 \text{ days startup} + A(1 \text{ day/CB repair}) + B(3 \text{ days/CB replacement}) + C(1 \text{ day/Hood}) + D/(27 \text{ ft/day}) + E/(55 \text{ ft/day}) + F/(150 \text{ ft}^2/\text{day}) + G/(70 \text{ ft/day}) + H/(538 \text{ ft}^2/\text{day}) + 2 \text{ restoration}$$

$$= 3 \text{ days startup} + (1 \text{ CB})(1 \text{ day/CB repair}) + (1 \text{ CB})(3 \text{ days/CB replacement}) + (1 \text{ Hood})(1 \text{ day/hood}) + (91 \text{ ft Pipe Repair})/(27 \text{ ft/day}) + (91 \text{ ft Pipe Replacement})/(55 \text{ ft/day}) + (40 \text{ ft}^2)/(150 \text{ ft}^2/\text{day}) + (10 \text{ ft curb})/(70 \text{ ft/day}) + *(86 \text{ ft}^2 \text{ patching})/(538 \text{ ft}^2/\text{day}) 0 + 2 \text{ restoration}$$

$$= 3 + 1 + 3 + 1 + 3.33 + 1.67 + 0.26 + 0.14 + 0 + 2$$

Time To Complete = 14.4 = **15.0 Days**

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The first day charged for the work order in this example is Monday, June 4<sup>th</sup>. Completion of all construction activities is required before the end of Friday, June 22<sup>nd</sup>. Liquidated damages are assessed starting Monday, June 25<sup>th</sup>, and remain in effect until all work is completed and accepted by the department.

24. Prosecution and progress of work:

The Contractor shall commence work indicated on the work order no later than the third day after issuance unless required materials are not available. Non-availability of materials shall be verified by at least three (3) different sources. Verification shall be formal and supplied by the Contractor in writing.

Issuance of each work order constitutes the notice to proceed with the work described on the work order.

If there is a verified non-availability of materials, time charges shall commence on the first (1st) working day following the delivery date of said materials.

The Contractor shall have up to eighteen (18) active work orders at any one time until all assigned work has been completed. The Contractor shall be required to have simultaneous operations up to the limit of eighteen (18) active work orders. The District will attempt to issue the work orders grouped together by location. The Contractor shall be required to work in multiple areas concurrently to engage in the limit of eighteen (18) work orders simultaneously. The Contractor is required to have a minimum of three viable working crews readily available to work on this contract unless otherwise directed by the Engineer or representative. Each crew is required to have a qualified superintendent as outlined in Section 105.07 of the Standard Specifications and at least two (2) qualified equipment operators.

Failure to complete assigned work orders in the calculated time constitutes "Failure to Pursue the Work" and subjects the Contractor to liquidated damages as outlined in Subsection 108.09 of the Standard Specifications. If work on a specific work order is not completed within the allotted time, liquidated damages will be assessed in accordance with Subsection 108.09 and based on the total value of that work order.

A final inspection will be performed in accordance with Subsection 105.20 on each work order and if the work is satisfactorily completed it will be accepted by the department. When seeding is required on the work order, a full stand of grass will be required. The stand shall be established for a minimum of seven days prior to final inspection.

25. Each work order shall be considered a single unit of work. Upon completion of each single unit of work and acceptance by the department, one itemized invoice will be prepared by the department for that unit. A summary of the work orders will also be provided. The Contractor shall review and approve the invoices and summary. Payment will be monthly for the completed invoices as outlined in Section 109.07.

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26. The following changes to the Standard Specifications are applicable to this contract:
- (a) Delete the second sentence of subsection 104.05 and subsections A through E.
  - (b) Under subsection 108.02. A progress schedule will not be required prior to the preconstruction meeting for the contract.
27. Replacement of all drainage inlets or pipes will be subject to Section 710.10 of Standard Specifications.
28. Paragraph three of Section 406.05 of the standard specifications shall be deleted. When patching is required, the removal of pavement material (hot mix, graded aggregate base course, etc) shall be paid for under Section 406, hot-mix patching. For patches needed to work on pipe crossings, material removed below the pavement box will be paid for by Section 208. For patches needed to work on structures, removal of material below the pavement box will be incidental to Section 708 or 710.
29. The Contractor shall submit pipe video media files to the Department in MPEG format via a DVD or CD data storage disk. The file naming convention for the MPEGs shall indicate both work order number and location (for example, "37037 Theodora Court.mpg"). Each work order shall have a separate folder directory with the following naming convention: "DVD Drive:/37037 Theodora Court".
30. Depending on fund availability, the Department reserves the right to increase or decrease quantities of items specified in this contract. Such additions or subtractions shall not be cause for an increase or decrease in contract unit bid prices. When total alterations involve an increase or decrease of more than 50 percent in the quantity of any contract item, either party to the contract shall be entitled to demand a Supplemental Agreement on that portion of the work.
31. Item 302007, Graded Aggregate Base Course, Type B, shall be used as base material under all curb, sidewalk and pavement (reference page 16).
32. Payment for Item 602002, Portland Cement Concrete Masonry Class B, will be made based on the actual measured quantity placed. Epoxy coated reinforcing, bonding agent, ties, inserts, etc as required by the Engineer or representative shall be incidental to the concrete work.
33. All additional work shall be performed by contract unit prices. In the case where contract prices are not available, prices are to be negotiated or performed by Force Account procedures.
34. At the discretion of the Engineer or representative, there may be periodic winter shutdowns due to inclement weather and/or low temperatures. During winter shutdowns, the Contractor shall not be charged time for issued work orders.

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35. The Contractor and their heirs, successors, assigns and agents guarantee the specific locations listed in this contract against the failure of the pipe repair for three (3) years from the date of acceptance by the department. This is a good faith guarantee which shall not be cause for the department to retain the completion security, but failure to comply will affect future work with the department.
36. All flaggers utilized by the Contractor for this project shall be ATSSA certified. All flaggers shall have certification cards with them while working. Absence of a certification card will be justification for flagger dismissal from the site and corresponding suspension of work. All construction and Contractor vehicles and self-propelled equipment shall be equipped with an operating roof mounted amber flashing light.
37. ½ inch cork expansion material shall be placed on each end of replaced curb, sidewalk and drainage inlets as well as intermittently as required in the standard specifications. Payment for Item 762002, Saw Cutting Concrete, Full-Depth shall be full compensation for furnishing and placing the ½ inch cork expansion material.

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Quantity Summary

Item	Description	Unit	Quantity
202000	Excavation and Embankment	C.Y.	160
208000	Excavation and Backfill for Pipe Trenches	C.Y.	1,570
210000	Type C Borrow, Trench and Structure Backfill	C.Y.	160
302007	GABC, Type B	C.Y.	95
302008	GABC, Type B, Patching	C.Y.	160
401821	WMA, Superpave, Type C, 160 Gyration, Patching	T	990
401822	WMA, Superpave, Type B, 160 Gyration, Patching	T	580
406001	Warm-Mix Patching	S.Y.- IN.	3,795
602002	Portland Cement Concrete Masonry, Class B	C.Y.	95
602016	Portland Cement Concrete Masonry, Class C	C.Y.	20
605573	Steel Plates, 4' x 6' x 3/4"	EA	70
612002	RCP 15" Diameter, Class III	L.F.	120
612003	RCP 18" Diameter, Class III	L.F.	120
612005	RCP 24" Diameter, Class III	L.F.	40
612520	Corrugated Polyethylene Pipe, Type S, 15"	L.F.	40
612523	Corrugated Polyethylene Pipe, Type S, 18"	L.F.	40
612526	Corrugated Polyethylene Pipe, Type S, 36"	L.F.	40
612529	Pipe Video Inspection	L.F.	4,200
612530	Corrugated Polyethylene Pipe, Type S or D, 42"	L.F.	40
612531	Corrugated Polyethylene Pipe, Type S or D, 48"	L.F.	40
612535	Cleaning Drain Pipe, 15" - 24" Diameter	L.F.	3,300
612536	Cleaning Drain Pipe, Greater than 24" Diameter	L.F.	1,225
612537	Heavy Cleaning of Drainage Pipe	HOUR	55
612539	Pressure Grouting Pipe Joints, 15" - 24" Diameter	EACH	40
612540	Pressure Grouting Pipe Joints, Greater than 24" Diameter	EACH	30
612541	Pipe Point Repair, 15" - 24" Diameter	L.F.	15
612542	Pipe Point Repair, Greater than 24" Diameter	L.F.	15
612552	Spray Applied Cementitious Mortar for Pipe, 24" - 48"	L.F.	800
612553	Spray Applied Cementitious Mortar for Pipe, Greater than 48"	L.F.	700
701010	PCC Curb, Type 1-8	L.F.	250
701020	Integral PCC Curb and Gutter, Type 1-8	L.F.	100
701021	Integral PCC Curb and Gutter, Type 2	L.F.	415
705001	PCC Sidewalk, 4"	S.F.	60
705002	PCC Sidewalk, 6"	S.F.	60

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705007	Sidewalk Surface Detectable Warning System	S.F.	35
705009	Curb Ramp, Type 2, 3 and / or 4	S.F.	85
708050	Drainage Inlet, 34" X 18"	EACH	20
708051	Drainage Inlet, 34" X 24"	EACH	20
708060	Replace Drainage Inlet Grates	EACH	20
708061	Replace Drainage Inlet Frames	EACH	20
710001	Adjusting and Repairing Existing Drainage Inlet	EACH	165
712005	Riprap, R-4	S.Y.	70
713003	Geotextiles, Riprap	S.Y.	70
714003	Ditching	L.F.	135
743006	Plastic Drums	EA-DAY	5,280
743009	Furnish and Maintain Truck Mounted Attenuator, Type I	EA-DAY	10
743010	Furnish and Maintain Truck Mounted Attenuator, Type II	EA-DAY	10
743024	Temporary Warning Signs and Plaques	EA-DAY	515
743050	Flagger, New Castle County, State	HOUR	1,125
743062	Flagger, New Castle County, State, Overtime	HOUR	235
762001	Saw Cutting, Hot-Mix	L.F.	3,300
762002	Saw Cutting, Concrete, Full Depth	L.F.	480
763000	Initial Expense	L.S.	1
908003	Topsoil, 4"	S.Y.	3,135
908016	Permanent Seeding, Subdivision	S.Y.	3,135

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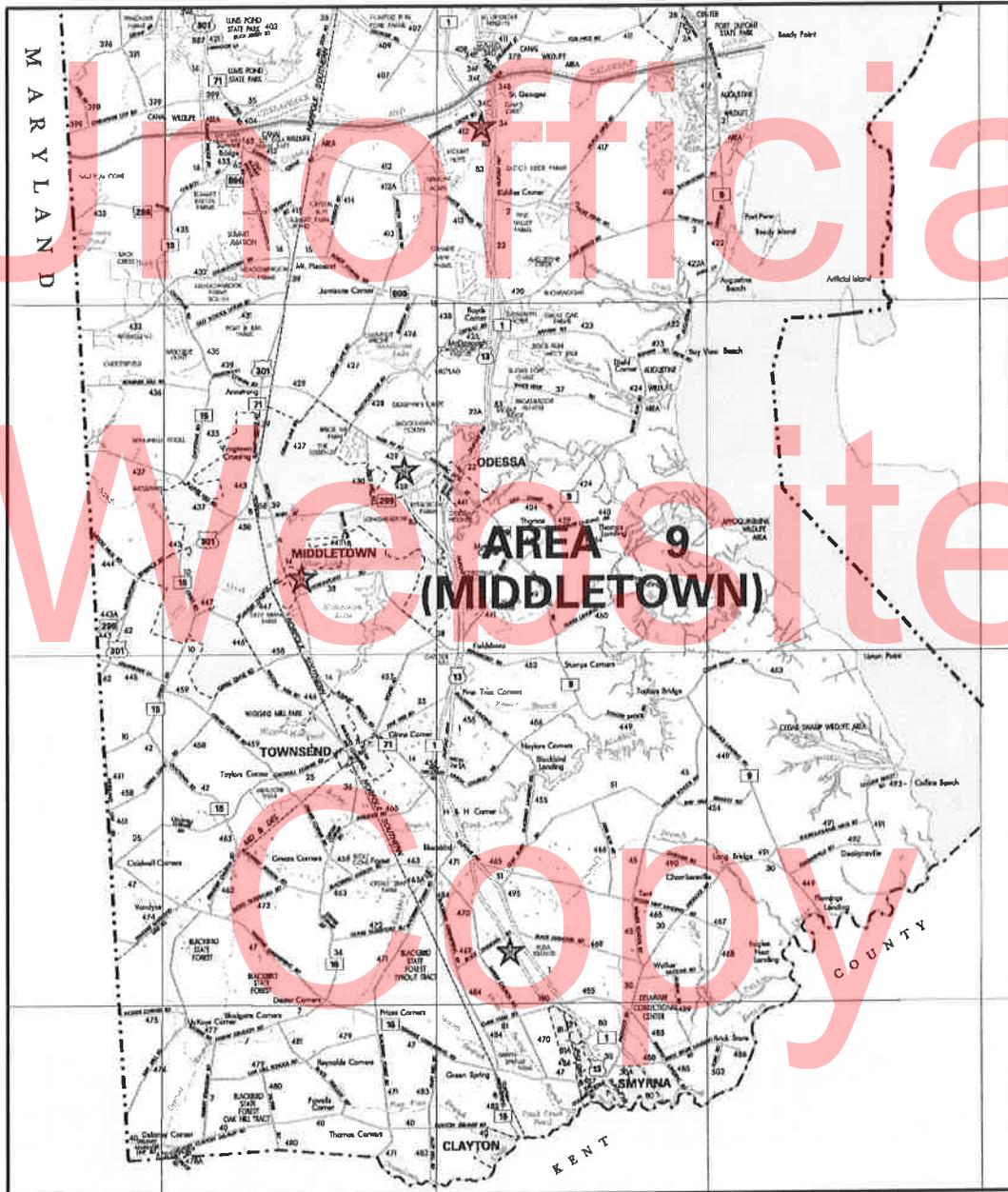
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AREA 9

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AREA 10

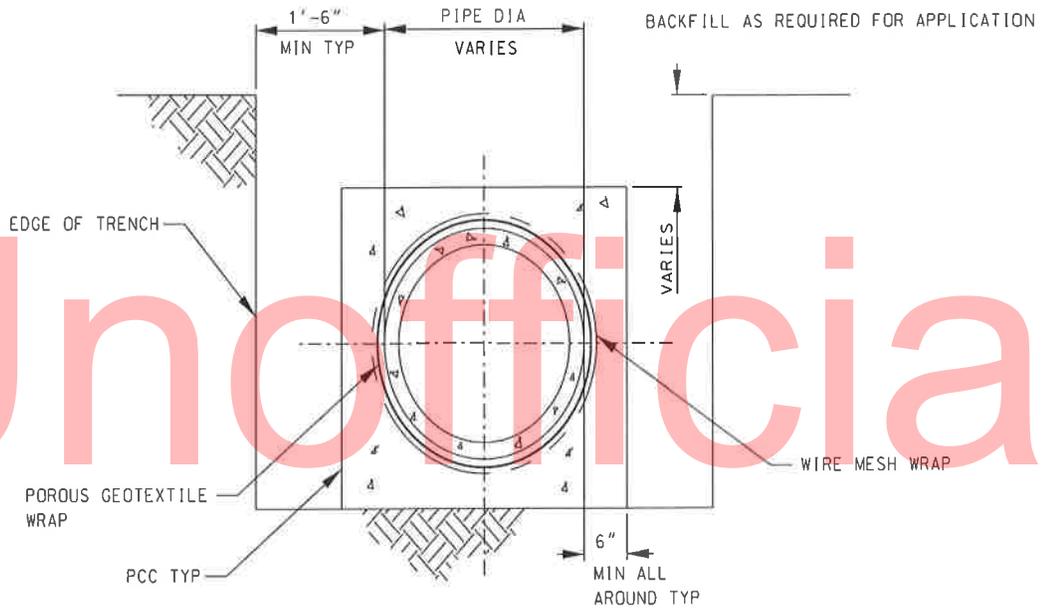
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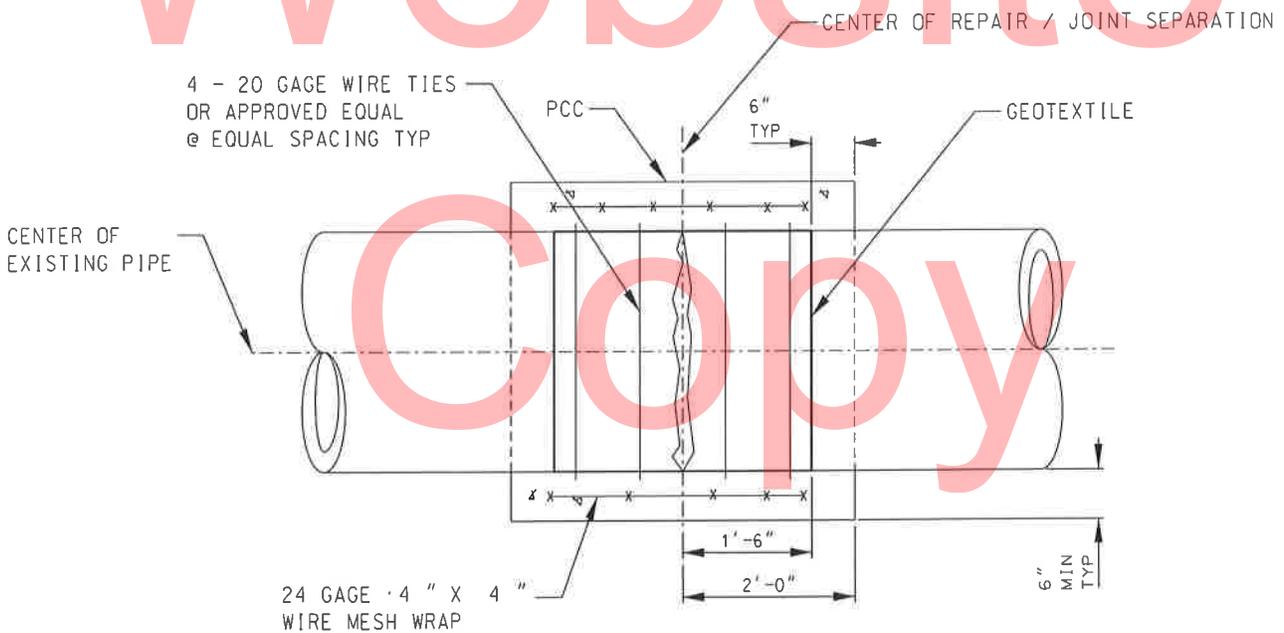
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CONCRETE PIPE REPAIR DETAIL

NOT TO SCALE



SECTION

NOT TO SCALE

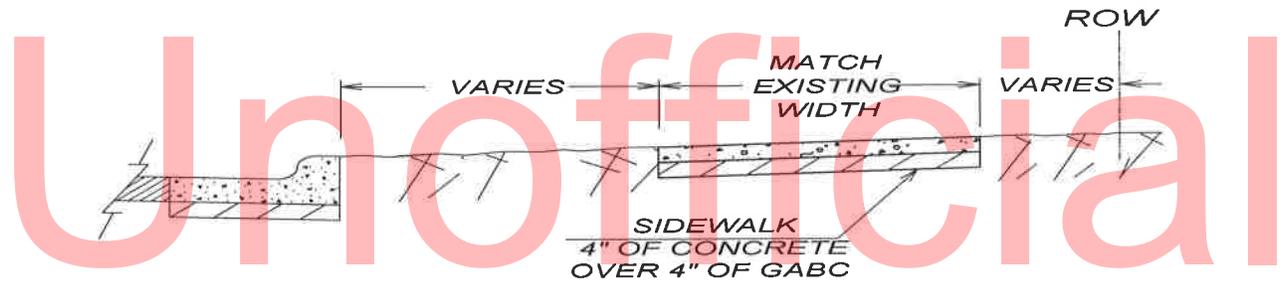
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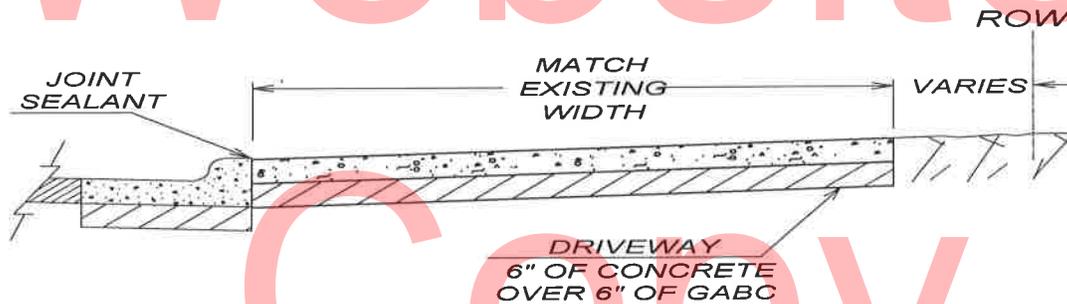
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TYPICAL SIDEWALK SECTION

NOT TO SCALE



TYPICAL DRIVEWAY SECTION

NOT TO SCALE