NYS Office of General Services
Serving New York

STATE OF NEW YORK
OFFICE OF GENERAL SERVICES
DESIGN AND CONSTRUCTION GROUP
THE GOVERNOR NELSON A. ROCKEFELLER
EMPIRE STATE PLAZA
ALBANY, NY 12242

ADDENDUM NO. 4 TO PROJECT NO. 44288

CONSTRUCTION WORK, HVAC WORK, PLUMBING WORK, ELECTRICAL WORK
REPAIR UNDERGROUND STEAM TUNNELS
WILLARD DRUG TREATMENT CENTER
7116 COUNTY ROUTE 132
WILLARD, NY

March 14, 2013

NOTE: This Addendum forms a part of the Contract Documents. Insert it in the Project Manual. Acknowledge receipt of this Addendum in the space provided on the Bid Form.

CONSTRUCTION DRAWINGS

1. Drawing G-002, noted "REVISED DRAWING 02/22/2013": Add the following General Note:

   "19. CONSTRUCTION TRADE TO PROVIDE ½ HORSE POWER TEMPORARY SUMP PUMPS AT THE LOCATIONS INDICATED TO RECEIVE SUMP PITS AND SUMP PUMPS. SUMP PUMPS ARE TO REMAIN IN PLACE UNTIL PERMANENT SUMP PUMPS ARE INSTALLED AND OPERATIONAL. PUMP WATER TO THE NEAREST CATCH BASIN OR STORM MANHOLE. MAXIMUM ANTICIPATED DISTANCE TO THE NEAREST CATCH BASIN OR STORM MANHOLE IS 135 FEET."

   "20. NO ON-SITE SOILS MEET THE GRADATION REQUIREMENTS OF SELECTED FILL OR SUBBASE MATERIAL. THEY WILL ONLY BE PERMITTED FOR USE AS BACKFILL WITHIN LANDSCAPED AREAS PROVIDED THAT THEY ARE FREE OF ORGANIC MATERIAL AND ARE DEEMED ACCEPTABLE BY THE DIRECTOR'S REPRESENTATIVE. AREAS OF UNSUITABLE MATERIAL WILL REQUIRE MATERIAL REPLACEMENT."

   "21. C-CONTRACTOR IS TO PROVIDE HARD BARRIERS AT THE JUNCTURE OF TUNNEL A WITH TUNNEL C', O, M, N, AND P AND THEN ABATE ASBESTOS AND CLEAN TUNNEL A, EAST OF THE HARD BARRIER SHOWN ON DWG. H-101, PRIOR TO COMMENCING WITH OTHER ABATEMENT WORK."

2. Drawing G-002, noted "REVISED DRAWING 02/22/2013": Revise note heading "GENERAL DESCRIPTION OF THE WORK" to read "GENERAL DESCRIPTION OF THE WORK (C, H, P AND E WORK COMBINED)".

3. Drawing G-002, noted "REVISED DRAWING 02/22/2013": Add the following to GENERAL DESCRIPTION OF THE WORK (C, H, P AND E WORK COMBINED):
   - TUNNEL LIGHTING AND RACEWAYS
   - PIPING INSULATION

4. Drawing G-002, noted “REVISED DRAWING 02/22/2013": Replace GENERAL TUNNEL CONDITION NOTES #8 with: "CONSTRUCTION CONTRACTOR TO DISPOSE OF ANY EXISTING DEBRIS AND SOIL DEPOSITS THAT ARE ENCOUNTERED PRIOR TO STARTING WORK IN ANY GIVEN AREA. THE ENTIRE INTERIOR SURFACE OF EACH TUNNEL SHALL BE PRESSURE WASHED TO REMOVE ANY DIRT OR DEBRIS PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITIES AND AFTER ALL WORK IS COMPLETED. CONTRACTOR SHALL MAKE PROVISIONS FOR REMOVAL OF 10 CY OF DEBRIS FROM THE TUNNEL."

5. Drawing G-003, noted "REVISED DRAWING 02/22/2013": Remove GENERAL CRACK REPAIR NOTES number 2.

6. Drawing H-101, noted “REVISED DRAWING 02/22/2013": Replace Note AA-3 with the following:
   “CONTRACTOR SHALL PREPARE A SITE SPECIFIC VARIANCE FOR ASBESTOS CONTAMINATION REMOVAL AND CLEANING WORK IN TUNNEL C’, TUNNEL O, TUNNEL O’, TUNNEL P, THE PORTION OF TUNNEL A EAST OF THE EXISTING HARD WALL BARRIER NEAR TUNNEL M, THE JUNCTION OF TUNNEL A AND TUNNEL P, AND FOR THE REMOVAL AND CLEANUP OF ACM DEBRIS FROM THE FLOOR OF THE SERVICE VAULTS AT MH1, MH2, MH-3, MH-4, MH-5 AND MH-6. CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF EXISTING VISIBLE ASBESTOS TSI GROUND DEBRIS ON THE FLOOR OF TUNNEL SEGMENTS C’, O, O’, P, TUNNEL A EAST OF THE EXISTING HARD WALL BARRIER NEAR TUNNEL M AND AT THE JUNCTION WITH TUNNEL P, AND FROM THE FLOOR OF SERVICE VAULTS AT MH1, MH2, MH3, MH4, MH5 AND MH6. AFTER REMOVAL OF DEBRIS CONTRACTOR SHALL PROPERLY CLEAN TUNNEL SEGMENTS 10 FEET PAST THE OCCURRENCE OF ACM DEBRIS. IN THE TUNNEL A’ SERVICE VAULTS CLEAN ACCESSIBLE DEBRIS IN THE CLAY ARCH SEGMENTS. AFTER COMPLETION OF DEBRIS CLEANUP, CONTRACTOR SHALL DISPOSE OF ALL POROUS, NON-CLEANABLE ASBESTOS CONTAMINATED ITEMS. CONTRACTOR SHALL ABATE APPROXIMATELY 1,628 LINEAR FEET OF PAPER WRAPPED FIBERGLASS PIPE INSULATION IN AREAS REQUIRING CLEANING OF ACM DEBRIS AS FOLLOWS: 600 FEET FROM TUNNEL A EAST OF THE EXISTING HARD WALL BARRIER; 23 LINEAR FEET FROM TUNNEL M; 120 LINEAR FEET FROM TUNNEL N; AND 885 LINEAR FEET FROM TUNNEL P.”

7. Drawing H-101, noted “REVISED DRAWING 02/22/2013": Replace Note AA-8 with the following:
   “CONTRACTOR SHALL MAKE ALL NECESSARY PROVISIONS TO PUMP WATER FROM TUNNELS O, O’, P, TUNNEL A AT THE HARD WALL BARRIER AT THE JUNCTION WITH TUNNEL M, FROM THE EASTERN TERMINUS OF TUNNEL A AT THE JUNCTION WITH TUNNEL P, AND FROM THE SERVICE VAULTS TO TUNNEL A’. CONTRACTOR SHALL MAKE PROVISIONS TO PUMP THREE INCHES OF WATER DAILY FROM THESE TUNNEL SEGMENTS. CONTRACTOR SHALL DISCHARGE THE WATER AT STORM WATER MANHOLES AS APPROVED BY THE DIRECTOR’S REPRESENTATIVE, ASSUMING A DISTANCE OF 500 FEET FROM THE APPROPRIATE TUNNEL ACCESS. ALL WATER SHALL BE FILTERED IN ACCORDANCE WITH NYSDOL CODE RULE 56 PRIOR TO DISCHARGE”

8. Drawing H-101, noted “REVISED DRAWING 02/22/2013", Table 2: Revise number of ACM Insulated Pipes in Tunnel Segment M and Segment N to 3.

9. Drawing H-101, noted “REVISED DRAWING 02/22/2013", TABLE 2, TUNNEL SEGMENT H: Revise the following:
    a. NUMBER OF LOCATIONS FOR STANCHION REPAIR, REPLACEMENT OR RESETTING - Change quantity to 7.
    b. APPROXIMATE QUANTITY ACM PIPE INSULATION FOR ABATEMENT, LINEAR FEET - Change quantity to 63.

10. Drawing S-101P, noted “REVISED DRAWING 02/22/2013", Remove clouded leadered note pointing to tunnel A’, which begins “TUNNEL A’ TO BE FILLED…”

11. Drawing S-514 noted “REVISED DRAWING 02/22/2013", Detail 2: Remove clouded leadered note pointing to the clay arch tunnel.

12. Drawing S-514 noted “REVISED DRAWING 02/22/2013", Detail 2: Add the following note: "3. CONTRACTOR TO INFILL TUNNEL A’ WITH 8” BRICK AT JUNCTURE WITH MANHOLE MH6."

13. Drawing number S-521 noted “REVISED DRAWING 3/13/2013” accompany this Addendum and supersede the same originally issued drawing.

CONSTRUCTION SPECIFICATIONS

1. SECTION 028213, Asbestos Abatement: Replace Section 028213 in the Project Manual with the accompanying section 028213, printed 03/13/2013 (13 pages).

2. SECTION 033001: Replace SECTIOM 033001 in the Project Manual with the accompanying section 033001, printed 3/13/2013 (7 pages).

3. SECTION 310000: Replace SECTION 310000 in the Project Manual with the accompanying section 310000, printed 3/13/2013 (9 pages).

HVAC DRAWINGS

1. Drawing M-001: Add the following GENERAL NOTES:

    "14**.** HAZARDOUS MATERIALS HAVE BEEN IDENTIFIED IN THE WORK ZONES. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS TO PROTECT HIS WORKERS, THE PUBLIC, INMATES, NEW YORK STATE EMPLOYEES AND THE ENVIRONMENT WHEN WORK EFFORS ARE RELATED TO HAZARDOUS MATERIALS. FOR ADDITIONAL INFORMATION SEE THE COMPLETE ASBESTOS, PCB, LEAD AND MICROBIAL REPORTS PERFORMED BY WATTS ARCHITECTURE & ENGINEERING, P.C. OF BUFFALO, NY, IN THE APPENDIX OF THE PROJECT MANUAL."

    "15. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING A SECURE WORK ZONE IN ACCORDANCE WITH FACILITY SECURITY REQUIREMENTS."

    "16. SEE GENERAL DESCRIPTION OF THE WORK (C, H, P AND E WORK COMBINED) AND GENERAL TUNNEL CONDITION NOTES ON DRAWING G-002."

    "17. CONSTRUCTION CONTRACTOR IS RESPONSIBLE FOR EXCAVATION AND BACKFILL BEYOND 5 FEET FROM TUNNELS."

"18. NO ON-SITE SOILS MEET THE GRADATION REQUIREMENTS OF SELECTED FILL OR SUBBASE MATERIAL. THEY WILL ONLY BE PERMITTED FOR USE AS BACKFILL WITHIN LANDSCAPED AREAS PROVIDED THAT THEY ARE FREE OF ORGANIC MATERIAL AND ARE DEEMED ACCEPTABLE BY THE DIRECTOR'S REPRESENTATIVE. AREAS OF UNSUITABLE MATERIAL WILL REQUIRE MATERIAL REPLACEMENT."

"19. H-CONTRACTOR IS NOT TO PERFORM WORK IN TUNNELS C', M, O, O', P OR A (EAST OF HARD BARRIER SHOWN ON C-CONTRACT DRAWING H-101), PRIOR TO C-CONTRACTOR ABATING AND CLEANING THE AREAS OF HAZARDOUS MATERIALS."

2. DRAWING M-102, noted "REVISED DRAWING 02/22/2013": Revise all occurrences of 5" to 6" (32 PSI OPERATING PRESSURE).

3. DRAWING M-102, noted "REVISED DRAWING 02/22/2013": Add the following leadered note to the two steam line tie-in points:
"PROVIDE GATE VALVES AT CONNECTION POINTS FOR BOTH STEAM AND CONDENSATE"

4. DRAWING M-501, noted "REVISED DRAWING 02/22/2013", Detail 5: Replace Detail 5 with the accompanying drawing M-503, dated 3/13/2013.

5. DRAWING M-501, noted "REVISED DRAWING 02/22/2013", Detail 6: Revise two occurrences of 5" to read 6".

6. DRAWING M-501, noted "REVISED DRAWING 02/22/2013", Detail 9: Remove Detail 9 from the drawing.

7. Add the accompanying DRAWING M-502, dated 3/13/2013, to the HVAC DRAWINGS.

HVAC SPECIFICATIONS

1. DOCUMENT 000110 TABLE OF CONTENTS:
   a. Page 2, add "230523 Valves " under "DIVISION 23 HEATING VENTILATION AND AIR CONDITIONING" heading.

2. SECTION 230523: Add the accompanying SECTION 230523 VALVES to the Project Manual, printed 3/13/2013 (2 pages).

3. SECTION 310000: Replace SECTION 310000 in the Project Manual with the accompanying section 310000, printed 3/13/2013 (7 pages).

4. SECTION 230593: Page 3, revise ARTICLE 3.03 to read "PRESSURE TESTING OF STEAM AND CONDENSATE PIPING".

PLUMBING DRAWINGS

1. Drawing P-001, noted "REVISED DRAWING 02/22/2013": Add the following GENERAL NOTES:

"14**.** HAZARDOUS MATERIALS HAVE BEEN IDENTIFIED IN THE WORK ZONES. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS TO PROTECT HIS WORKERS, THE PUBLIC, INMATES, NEW YORK STATE EMPLOYEES AND THE ENVIRONMENT WHEN WORK EFFORS ARE RELATED TO HAZARDOUS MATERIALS. FOR ADDITIONAL INFORMATION SEE THE COMPLETE ASBESTOS, PCB, LEAD AND MICROBIAL REPORTS PERFORMED BY WATTS ARCHITECTURE & ENGINEERING, P.C. OF BUFFALO, NY, IN THE APPENDIX OF THE PROJECT MANUAL."

"15. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING A SECURE WORK ZONE IN ACCORDANCE WITH FACILITY SECURITY REQUIREMENTS."

"16. SEE GENERAL DESCRIPTION OF THE WORK (C, H, P AND E WORK COMBINED) AND GENERAL TUNNEL CONDITION NOTES ON DRAWING G-002."

"17. CONSTRUCTION CONTRACTOR IS RESPONSIBLE FOR EXCAVATION AND BACKFILL BEYOND 5 FEET FROM TUNNELS AND MANHOLES"

"18. NO ON-SITE SOILS MEET THE GRADATION REQUIREMENTS OF SELECTED FILL OR SUBBASE MATERIAL. THEY WILL ONLY BE PERMITTED FOR USE AS BACKFILL WITHIN LANDSCAPED AREAS PROVIDED THAT THEY ARE FREE OF ORGANIC MATERIAL AND ARE DEEMED ACCEPTABLE BY THE DIRECTOR'S REPRESENTATIVE. AREAS OF UNSUITABLE MATERIAL WILL REQUIRE MATERIAL REPLACEMENT."

"19. P-CONTRACTOR IS NOT TO PERFORM WORK IN TUNNELS C', M, O, O', P OR A (EAST OF HARD BARRIER SHOWN ON C-CONTRACT DRAWING H-101), PRIOR TO C-CONTRACTOR ABATING AND CLEANING THE AREAS OF HAZARDOUS MATERIALS."

2. Drawing P-501, noted "REVISED DRAWING 02/22/2013", Detail 1: Revise leadered note indicating "PRESSURE PLATE" to read "MECHANICAL MODULAR SEAL".

3. Drawing P-501, noted "REVISED DRAWING 02/22/2013", Detail 3: Revise Detail 3 title to read: "CLEANOUT DETAIL".

PLUMBING SPECIFICATIONS

1. DOCUMENT 000110 TABLE OF CONTENTS:
   a. Page 2, add "DIVISION 33 UTILITIES" under the SITE AND INFRASTRUCTURE SUBGROUP.
   b. Page 2, add "331102 Plastic Water Pipe And Fittings " under "DIVISION 33 UTILITIES" heading.

2. SECTION 310000: Replace SECTION 310000 in the Project Manual with the accompanying section 310000, printed 3/13/2013 (6 pages).

3. SECTION 221100: Replace SECTION 221100 in the Project Manual with the accompanying section 221100, printed 3/13/2013 (3 pages).

4. SECTION 221429: Page 1, remove ARTICLE 1.01 from SECTION 221429.

5. SECTION 230700, printed date 2/22/2013, replaced by Addendum1: Remove the following:
   - Page 1, Paragraphs 1.01 A and B.
   - Page 3, Paragraph 3.02 B.
   - Page 4, Paragraph 3.03 D.
   - Page 7, Article 3.08.

6. SECTION 230700, printed date 2/22/2013, replaced by Addendum 1: Page 6, replace ARTICLE 3.07 HOT SERVICE INSULATION SCHEDULE with the following:

	SERVICE AND TEMPERATURES	**INSULATION MATERIAL**	**PIPE SIZES (INCHES)**	**MINIMUM (NOMINAL) INSULATION THICKNESS (INCHES)**
F	Water and other fluids 105 F to 250 F.	Fibrous Glass	6 & Less	2
G	Steam (MPS) to 16 to 125 psig	Fibrous Glass	1-1/4 to 4 5 & Up	3 3-1/2

7. SECTION 331102: Add the accompanying SECTION 331102 PLASTIC WATER PIPE AND FITTINGS to the Project Manual, printed 3/13/2013 (4 pages).

ELECTRICAL DRAWINGS

1. Drawing E-001: Add the following GENERAL NOTES:

   "22**.** HAZARDOUS MATERIALS HAVE BEEN IDENTIFIED IN THE WORK ZONES. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS TO PROTECT HIS WORKERS, THE PUBLIC, INMATES, NEW YORK STATE EMPLOYEES AND THE ENVIRONMENT WHEN WORK EFFORS ARE RELATED TO HAZARDOUS MATERIALS. FOR ADDITIONAL INFORMATION SEE THE COMPLETE ASBESTOS, PCB, LEAD AND MICROBIAL REPORTS PERFORMED BY WATTS ARCHITECTURE & ENGINEERING, P.C. OF BUFFALO, NY, IN THE APPENDIX OF THE PROJECT MANUAL."

   "23. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING A SECURE WORK ZONE IN ACCORDANCE WITH FACILITY SECURITY REQUIREMENTS."

   "24. SEE GENERAL DESCRIPTION OF THE WORK (C, H, P AND E WORK COMBINED) AND GENERAL TUNNEL CONDITION NOTES ON DRAWING G-002."

   "25. NO ON-SITE SOILS MEET THE GRADATION REQUIREMENTS OF SELECTED FILL OR SUBBASE MATERIAL. THEY WILL ONLY BE PERMITTED FOR USE AS BACKFILL WITHIN LANDSCAPED AREAS PROVIDED THAT THEY ARE FREE OF ORGANIC MATERIAL AND ARE DEEMED ACCEPTABLE BY THE DIRECTOR'S

REPRESENTATIVE. AREAS OF UNSUITABLE MATERIAL WILL REQUIRE MATERIAL REPLACEMENT."

"26. ELECTRIC CONTRACTOR TO PROVIDE TEMPORARY WIRING FOR ELECTRICAL POWER TO THE CONSTRUCTION CONTRACTOR'S TEMPORARY SUMP PUMPS, IN ADDITION TO TEMPORARY WIRING CALLED OUT IN SPECIFICATION SECTION 015000, ARTICLE 1.03. SEE DRAWING G-002, GENERAL NOTE 19 FOR LOCATIONS. DRAWING G-002, GENERAL NOTE 19 HAS BEEN ADDED BY THIS ADDENDUM."

"27. E-CONTRACTOR IS NOT TO PERFORM WORK IN TUNNELS C', M, O, O', P OR A (EAST OF HARD BARRIER SHOWN ON C-CONTRACT DRAWING H-101), PRIOR TO C-CONTRACTOR ABATING AND CLEANING THE AREAS OF HAZARDOUS MATERIALS."

ELECTRICAL SPECIFICATIONS

1. SECTION 310000: Replace SECTION 310000 in the Project Manual with the accompanying section 310000, printed 3/13/2013 (6 pages).

END OF ADDENDUM

James Dirolf, P.E.
Director of Design

SECTION 028213

ASBESTOS ABATEMENT

1.01 SUMMARY

A. This Section specifies the procedures for disturbance and removal of existing asbestos-containing materials (ACM) and disposal of removed materials. The results of the testing for ACM are listed in the Pre-Renovation Survey for Asbestos-Containing Materials, Poly-Chlorinated Biphenyls in Caulk, Lead-Based Paint, and Microbial Contamination dated November 2011. Also see Document 003126.

1. The Building Asbestos Survey report was compiled by a licensed firm, utilizing an ELAP certified laboratory.
2. In order to determine asbestos content, samples were analyzed by polarized light microscopy (PLM) and/or transmission electron microscopy (TEM).
3. The report is intended for State Design and estimate purposes only, and is included to provide bidders with the same information available to the State.
4. The Bulk Samples are representative of like materials in the Work area. All ACM may not have been sampled.
5. ACM materials are indicated on Drawing H-101 and the Pre-Renovation Survey Report. Locations of access manholes and vaults providing access to the tunnel system are provided on Drawing H-101.

A. Vaults and Manholes

ACM-tar paper is present on the exterior of the tunnels. This material is likely to be encountered on the exterior of the access manholes and vault hatches. The contractor shall handle any tar paper on the exterior of manholes and vault hatches to be repaired or rebuilt as ACM material.

1) Contractor shall remove and properly dispose of ACM tar paper on the outside of designated manholes and vaults for their reconstruction. Designated manholes and vaults are to be excavated and exposed for reconstruction. Contractor shall excavate to expose the designated manholes and vaults to avoid damage. Designated manholes are MH7, MH15 and MH18. Designated vaults for riser reconstruction are MH22 and MH23.
2) Contractor shall properly remove and dispose of ACM Tar Paper at approximately one foot square areas on the outside of the tunnels at locations proposed for new sump pump, steam line and electrical penetrations onto the tunnel system. Contractor shall coordinate locations and excavations to expose the tunnel walls with plumbing, HVAC and electrical contractors to avoid damage to the ACM tar paper and to the tunnels. There are 5 plumbing, 1 electrical and 2 steam line penetrations.

B. Steam Line Tunnels Interior

<u>Tunnel A</u>

1) 326 stanchions to be repaired. TSI to be removed at all 326 stanchions. Pipe diameters vary from 2 inch to 15 inch.

Approximately 2,445 linear feet of pipe insulation will need to be abated.

2) Approximately 3,055 square feet of ACM-expansion joint tar paper is present on the tunnel expansion joint exterior at 176 joints. Contractor shall remove non-ACM joint filler board, tar and ACM tar paper at each expansion joint. The ACM tar paper occurs on the exterior of all tunnel expansion joints. The tunnel walls are approximately eight (8) inches thick. All removed expansion joint filler board, tar and removed ACM tar paper shall be properly disposed of as ACM debris. Work must be done from inside of the tunnel.
3) Protect existing TSI on pipes not abated at designated areas for repair to the concrete tunnel joints, wall, ceiling and/or floors.
4) Approximately 20 linear feet ACM debris on the tunnel floor at the eastern terminus of Tunnel A at the junction of Tunnel P shall be removed and disposed of. After removal of the debris 30 feet of the tunnel floor shall be properly cleaned and decontaminated.
5) Approximately 450 linear feet ACM debris on the floor of Tunnel A at the existing hard wall Barrier at the junction with Tunnel M shall be removed and properly disposed of.
6) Three feet of TSI shall be removed from all piping at the eastern terminus of Tunnel A at the junction with Tunnel A' and Tunnel P to allow for tie-in for new piping.
7) Contractor shall make all necessary provisions to pump water from Tunnel A at the existing hard wall barrier at the junction with Tunnel M and at the eastern terminus of Tunnel A at the junction with Tunnel P. All necessary provisions shall be made to pump three (3) inches of water daily from the tunnel. Pumped water shall be discharged at storm water manholes as approved by the Director's representative, assuming a distance of approximately 500 feet from the tunnel access.

Tunnel B

1) No stanchions to be repaired. Thus no ACM-pipe insulation abatement for stanchion repair required.
2) Approximately 98 square feet of ACM-expansion joint tar paper is present on the tunnel expansion joint exterior at seven (7) joints. Contractor shall remove non-ACM joint filler board, tar and ACM tar paper at each expansion joint. The ACM tar paper occurs on the exterior of all tunnel expansion joints. The tunnel walls are approximately eight (8) inches thick. All removed expansion joint filler board, tar and removed ACM tar paper shall be properly disposed of as ACM debris. Work must be done from inside of the tunnel.
3) Protect existing TSI on pipes not abated at designated areas for repair to the concrete tunnel joints, wall, ceiling and/or floors.

Tunnel C

1) No stanchions to be repaired. Thus no ACM-pipe insulation abatement for stanchion repair required.
2) No ACM-expansion joint tar paper expansion joint abatement required.
3) No ACM pipe wrap is present in Tunnel C.

Tunnel C'

1) Tunnel C' shall be blocked off at the entrance to Tunnel A and at the west exit from Tunnel C' with the construction of hard wall isolation barriers. Contractor shall construct and plasticize the hard wall isolation barriers per Code Rule 56-7.11(b). The hard wall barriers shall be constructed of 3/8" thick pressure treated plywood or pressure treated oriented strand board with pressure treated wood stud framing. Studs shall be spaced 18 inches. The perimeter of the hard wall isolation barriers to the tunnel wall shall be sealed with non-toxic silicone caulk. An access hatch shall be incorporated into the eastern hard wall isolation barrier, at the junction with Tunnel A. The hard wall isolation barriers shall remain in place after completion of abatement work. Asbestos hazard warning signs shall be placed on each barrier.
2) All TSI on pipes in Tunnel C' shall be abated and disposed of as ACM debris. ACM TSI insulation is present on four pipes. Pipe diameters vary from two to eight inches. Approximately 960 linear feet of pipe insulation will require abatement from Tunnel C'. No stanchions proposed to be repaired in Tunnel C'.
3) No ACM-expansion joint tar paper expansion joint abatement required in Tunnel C'. Tunnel C' is constructed of set stone blocks with no expansion joints.
4) Approximately 20 linear feet ACM debris on the dirt floor to Tunnel C'. Contractor shall remove and dispose of approximately 20 linear feet ACM debris on the tunnel floor.
5) After the removal of all ACM debris from the floor of Tunnel C', remove two (2) inches of soil and dispose of as ACM debris. After removal of the ACM debris, two (2) inches of soil and all visual occurrence of ACM debris in the soil, two (2) layers of 6-mil poly sheeting shall be placed on the tunnel floor. The poly sheeting shall extend six inches up the sides of the tunnel wall and shall be affixed using non-toxic construction adhesive.

Tunnel D

1) 6 stanchions to be repaired. However, All ACM piping previously removed from Tunnel D. Thus no ACM-pipe insulation abatement required.
2) Approximately 98 square feet of ACM-expansion joint tar paper is present on the tunnel expansion joint exterior at seven (7) joints. Contractor shall remove non-ACM joint filler board, tar and ACM tar paper at each expansion joint. The ACM tar paper occurs on the exterior of all tunnel expansion joints. The tunnel walls are approximately eight (8) inches thick. All removed expansion joint filler board, tar and removed ACM tar paper shall be properly disposed of as ACM debris. Work must be done from inside of the tunnel.
3) Protect existing TSI on pipes not abated at designated areas for repair to the concrete tunnel joints, wall, ceiling and/or floors

Tunnel E (Previous Burial, No Work Required)

1) No ACM-pipe insulation abatement required.
2) No ACM-expansion joint tar paper expansion joint abatement required.

Tunnel F

1) TSI to be removed at 1 stanchion location to be repaired. Approximately 12 linear feet of ACM-black asphalt pipe wrap, friable white pipe insulation and ACM elbows, approximately 4 inch diameter**.**
2) Approximately 28 square feet of ACM-expansion joint tar paper is present on the tunnel expansion joint exterior at two (2) joints. Contractor shall remove non-ACM joint filler board, tar and ACM tar paper at each expansion joint. The ACM tar paper occurs on the exterior of all tunnel expansion joints. The tunnel walls are approximately eight (8) inches thick. All removed expansion joint filler board, tar and removed ACM tar paper shall be properly disposed of as ACM debris. Work must be done from inside of the tunnel.
3) Protect existing TSI on pipes not abated at designated areas for repair to the concrete tunnel joints, wall, ceiling and/or floors.

Tunnel G

1) TSI to be removed at 15 stanchions location to be repaired. Approximately 90 linear feet of ACM-black asphalt pipe wrap, friable white pipe insulation and ACM elbows, approximately 4 inch diameter.
2) Approximately 113 square feet of ACM-expansion joint tar paper is present on the tunnel expansion joint exterior at seven (7) joints. Contractor shall remove non-ACM joint filler board, tar and ACM tar paper at each expansion joint. The ACM tar paper occurs on the exterior of all tunnel expansion joints. The tunnel walls are approximately eight (8) inches thick. All removed expansion joint filler board, tar and removed ACM tar paper shall be properly disposed of as ACM debris. Work must be done from inside of the tunnel.
3) Protect existing TSI on pipes not abated at designated areas for repair to the concrete tunnel joints, wall, ceiling and/or floors.

Tunnel H

1) No stanchions to be repaired. Thus no ACM-pipe insulation abatement for stanchion repair required.
2) Approximately 141 square feet of ACM-expansion joint tar paper is present on the tunnel expansion joint exterior at ten (10) joints. Contractor shall remove non-ACM joint filler board, tar and ACM tar paper at each expansion joint. The ACM tar paper occurs on the exterior of all tunnel expansion joints. The tunnel walls are approximately eight (8) inches thick. All removed expansion joint filler board, tar and removed ACM tar paper shall be properly disposed of as ACM debris. Work must be done from inside of the tunnel.
3) Protect existing TSI on pipes not abated at designated areas for repair to the concrete tunnel joints, wall, ceiling and/or floors.

Tunnel I

1) Contractor shall remove and properly dispose of nine feet of existing TSI from each of five pipes in the space at the end of

Tunnel I. The butt ends of the TSI shall be repaired with wettable cloth.

2) No stanchions to be repaired. Thus no ACM-pipe insulation abatement for stanchion repair required. Protect existing TSI on pipes.
3) Approximately 15 square feet of ACM-expansion joint tar paper is present on the tunnel expansion joint exterior at one (1) joint. Contractor shall remove non-ACM joint filler board, tar and ACM tar paper at each expansion joint. The ACM tar paper occurs on the exterior of all tunnel expansion joints. The tunnel walls are approximately eight (8) inches thick. All removed expansion joint filler board, tar and removed ACM tar paper shall be properly disposed of as ACM debris. Work must be done from inside of the tunnel.
4) No repair work to the concrete required in Tunnel I.
5) Protect existing TSI on pipes not abated at designated areas for repair to the concrete tunnel joints, wall, ceiling and/or floors

Tunnel J

1) No stanchions to be repaired. Thus no ACM-pipe insulation abatement for stanchion repair required.
2) Approximately 15 square feet of ACM-expansion joint tar paper is present on the tunnel expansion joint exterior at one (1) joint. Contractor shall remove non-ACM joint filler board, tar and ACM tar paper at each expansion joint. The ACM tar paper occurs on the exterior of all tunnel expansion joints. The tunnel walls are approximately eight (8) inches thick. All removed expansion joint filler board, tar and removed ACM tar paper shall be properly disposed of as ACM debris. Work must be done from inside of the tunnel.
3) Protect existing TSI on pipes not abated at designated areas for repair to the concrete tunnel joints, wall, ceiling and/or floors.

Tunnel K

1) TSI to be removed at 20 stanchions location to be repaired. Approximately 300 linear feet of ACM-black asphalt pipe wrap, friable white pipe insulation and ACM elbows, approximately 4 inch diameter to 10 inch diameter.
2) Approximately 141 square feet of ACM-expansion joint tar paper is present on the tunnel expansion joint exterior at three (3) joints. Contractor shall remove non-ACM joint filler board, tar and ACM tar paper at each expansion joint. The ACM tar paper occurs on the exterior of all tunnel expansion joints. The tunnel walls are approximately eight (8) inches thick. All removed expansion joint filler board, tar and removed ACM tar paper shall be properly disposed of as ACM debris. Work must be done from inside of the tunnel.
3) Protect existing TSI on pipes not abated at designated areas for repair to the concrete tunnel joints, wall, ceiling and/or floors.

Tunnel L

1) TSI to be removed at 11 stanchions locations to be repaired. Approximately 165 linear feet of ACM-black asphalt pipe wrap,

friable white pipe insulation and ACM elbows, approximately 4 inch diameter.

2) Approximately 96 square feet of ACM-expansion joint tar paper is present on the tunnel expansion joint exterior at two (2) joints. Contractor shall remove non-ACM joint filler board, tar and ACM tar paper at each expansion joint. The ACM tar paper occurs on the exterior of all tunnel expansion joints. The tunnel walls are approximately eight (8) inches thick. All removed expansion joint filler board, tar and removed ACM tar paper shall be properly disposed of as ACM debris. Work must be done from inside of the tunnel.
3) Protect existing TSI on pipes not abated at designated areas for repair to the concrete tunnel joints, wall, ceiling and/or floors.

Tunnel M

1) No stanchions to be repaired. Thus no ACM-pipe insulation abatement for stanchion repair required.
2) Approximately 15 square feet of ACM-expansion joint tar paper is present on the tunnel expansion joint exterior at one (1) joint. Contractor shall remove non-ACM joint filler board, tar and ACM tar paper at each expansion joint. The ACM tar paper occurs on the exterior of all tunnel expansion joints. The tunnel walls are approximately eight (8) inches thick. All removed expansion joint filler board, tar and removed ACM tar paper shall be properly disposed of as ACM debris. Work must be done from inside of the tunnel.
3) No repair work to the concrete required in Tunnel M.
4) Protect existing TSI on pipes not abated at designated areas for repair to the concrete tunnel joints, wall, ceiling and/or floors

Tunnel N

1) No stanchions to be repaired. Thus no ACM-pipe insulation abatement for stanchion repair required.
2) Approximately 56 square feet of ACM-expansion joint tar paper is present on the tunnel expansion joint exterior at four (4) joints. Contractor shall remove non-ACM joint filler board, tar and ACM tar paper at each expansion joint. The ACM tar paper occurs on the exterior of all tunnel expansion joints. The tunnel walls are approximately eight (8) inches thick. All removed expansion joint filler board, tar and removed ACM tar paper shall be properly disposed of as ACM debris. Work must be done from inside of the tunnel.
3) Protect TSI on pipes not abated at designated areas for repair to the concrete tunnel wall joints, ceiling and/or floors.

Tunnel O

1) TSI to be removed at 16 stanchion locations to be repaired. Approximately 144 linear feet of ACM-black asphalt pipe wrap, friable white pipe insulation and ACM elbows, varies from 2 inch to 4 inch in diameter.

2) Approximately 113 square feet of ACM-expansion joint tar paper is present on the tunnel expansion joint exterior at eight (8) joints. Contractor shall remove non-ACM joint filler board, tar and ACM tar paper at each expansion joint. The ACM tar paper occurs on the exterior of all tunnel expansion joints. The tunnel walls are approximately eight (8) inches thick. All removed expansion joint filler board, tar and removed ACM tar paper shall be properly disposed of as ACM debris. Work must be done from inside of the tunnel.
3) Protect TSI on pipes not abated at designated areas for repair to the concrete tunnel wall, joints, ceiling and/or floors.
4) Clean and decontaminate entire tunnel area.
5) Contractor shall make all necessary provisions to pump water from Tunnel O. All necessary provisions shall be made to pump three (3) inches of water daily from the tunnel. Pumped water shall be discharged at storm water manholes as approved by the Director's representative, assuming a distance of approximately 500 feet from the tunnel access.

Tunnel O'

1) No stanchions to be repaired. Thus no ACM-pipe insulation abatement for stanchion repair required.
2) Approximately 184 square feet of ACM-expansion joint tar paper is present on the tunnel expansion joint exterior at 13 joints. Contractor shall remove non-ACM joint filler board, tar and ACM tar paper at each expansion joint. The ACM tar paper occurs on the exterior of all tunnel expansion joints. The tunnel walls are approximately eight (8) inches thick. All removed expansion joint filler board, tar and removed ACM tar paper shall be properly disposed of as ACM debris. Work must be done from inside of the tunnel.
3) Approximately 80 linear feet ACM debris on the tunnel floor shall be removed and properly disposed of.
4) Protect TSI on pipes not abated at designated areas for repair to the concrete tunnel wall joints, ceiling and/or floors.
5) Clean and decontaminate entire tunnel area.
6) Contractor shall make all necessary provisions to pump water from Tunnel O'. All necessary provisions shall be made to pump three (3) inches of water daily from the tunnel. Pumped water shall be discharged at storm water manholes as approved by the Director's representative, assuming a distance of approximately 500 feet from the tunnel access.

Tunnel P

1) TSI to be removed at 44 stanchion locations to be repaired. Approximately 264 linear feet of ACM-black asphalt pipe wrap, friable white pipe insulation and ACM elbows, 2 inch to 4 inch in diameter.
2) Approximately 342 square feet of ACM-expansion joint tar paper is present on the tunnel expansion joint exterior at 23 joints. Contractor shall remove non-ACM joint filler board, tar and ACM tar paper at each expansion joint. The ACM tar paper occurs on the exterior of all tunnel expansion joints. The tunnel walls are approximately eight (8) inches thick. All removed

expansion joint filler board, tar and removed ACM tar paper shall be properly disposed of as ACM debris. Work must be done from inside of the tunnel.

3) Approximately 430 linear feet ACM debris on the tunnel floor shall be removed and properly disposed of.
4) Protect TSI on pipes not abated at designated areas for repair to the concrete tunnel joints, wall, ceiling and/or floors.
5) Contractor shall make all necessary provisions to pump water from Tunnel P. All necessary provisions shall be made to pump three (3) inches of water daily from the tunnel. Pumped water shall be discharged at storm water manholes as approved by the Director's representative, assuming a distance of approximately 500 feet from the tunnel access.

Tunnel A' (Clay Arch Section)

1) Remove and properly disposed of three feet of existing TSI on all pipes at tie-in location for new piping at the junction of Tunnel P and Tunnel A', and remove three feet of TSI on all pipes at the access manhole to Tunnel A' where a block wall will be constructed to abandon the tunnel. Removed TSI shall be disposed of as ACM debris.
2) Remove and properly dispose of existing asbestos TSI ground debris on the floor of service vaults at MH1, MH2, MH3, MH4, MH5 and MH6. In the Tunnel A' service vaults clean accessible debris in the clay arch segments. After completion of debris cleanup, contractor shall dispose of all porous, non-cleanable asbestos contaminated items.
3) Contractor shall make all necessary provisions to pump water from the Tunnel A' service vaults. All necessary provisions shall be made to pump three (3) inches of water daily from the service vaults. Pumped water shall be discharged at storm water manholes as approved by the Director's representative, assuming a distance of approximately 500 feet from the tunnel access.

B. Type of Asbestos Abatement Project:

1. Large Asbestos Abatement Project: An asbestos project involving the removal, disturbance, repair or handling of more than 160 square feet or 260 linear feet of ACM.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Existing Hazardous Material Information: Document 003126.

B. Summary of the Work: Section 011000.

C. Construction Facilities and Temporary Controls: Section 015000.

D. Removals, Cutting, and Patching: Section 017329.

1.03 REFERENCES

A. New York State Department of Environmental Conservation (DEC) 6NYCRR:
1. Part 360 Solid Waste Management Facilities.

2. Part 364 Waste Transporter Permits.
3. Part 370 Hazardous Waste Management System-General.
4. Part 371 Identification and Listing of Hazardous Wastes.
5. Part 372 Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities.
6. Part 373 Hazardous Waste Management Facilities.

B. Occupational Safety and Health Administration (OSHA): Asbestos Regulations (29 CFR Part 1926.1101).

C. U.S. Environmental Protection Agency (USEPA):
1. National Emission Standards for Hazardous Air Pollutants; Asbestos NESHAP Revision; Final Rule.
2. Asbestos Emergency Response Act (AHERA) (40 CFR Part 763, Subpart E).

D. New York State Department of Labor (DOL): Industrial Code Rule 56.

1.04 DEFINITIONS

A. Authorized Personnel: Facility or the Director's Representative, and all other personnel who are authorized officials of any regulating agency, be it State, Local, Federal or Private entity who possess legal authority for enforcement or inspection of the work.

B. Clearance Criteria: Shall be determined and established by a Certified Asbestos Project Monitor with an independent testing lab employed by the Director's Representative, conforming to all standards set forth by all authorities having jurisdiction, mentioned in the references, and issue the certification of cleaning.

C. Site Specific Variance: Relief in accordance with section 30 of the Labor Law from specific sections of Industrial Code Rule 56 for a specific project.

D. Phase I & II: Asbestos Project phases as defined and subcategorized in ICR 56-2.

1.05 ABBREVIATIONS

A. ASTM: American Society for Testing and Materials
1916 Race Street
Philadelphia, PA 19103

B. CFR: Code of Federal Regulations
Government Printing Office
Washington, DC 20402

C. DOL: New York State Department of Labor
Harriman State Office Building Campus
Albany, NY 12240

D. NIOSH: National Institute for Occupational Safety and Health
Building J.N.E. Room 3007
Atlanta, GA 30333

E. OSHA: Occupational Safety and Health Administration
200 Constitution Avenue

Washington, DC 20210

F. USEPA: United States Environmental Protection Agency
401 M Street SW
Washington, DC 20460

1.06 ASBESTOS SITE SPECIFIC VARIANCE

A. If an additional site specific variance is sought, the application must be submitted by the contractor's NYS DOL Certified Asbestos Project Designer with 14 days after the Contract Agreement is approved by the Comptroller. Forward the required forms to the Department of Labor for their action.

1.07 SUBMITTALS

A. Asbestos Site Specific Variance Submittals; if an additional site specific variance is sought submit the following:
1. One copy of the completed DOSH-751 and DOSH-465 forms.
2. One copy of the New York State Department of Labor site specific variance decision.

B. Quality Control Submittals:
1. Notification Compliance Data: Within 2 days after notification is sent to the regulatory agencies submit one copy of each notice sent to each regulatory agency (USEPA and DOL).
2. Asbestos Removal Company Data: Name and address of proposed asbestos removal company and abatement contractor license issued by DOL.
3. Asbestos Worker Certification Data: Name and address of proposed asbestos abatement workers and licenses issued by DOL.
4. Work Plan: For information only, submit one copy of the work plan required under Quality Assurance Article.
5. Waste Transporter Permit: One copy of transporter's current waste transporter permit from NYS DEC (NYS Part 364 Permit).
6. Landfill: Landfill to be used for ACM disposal shall be licensed to receive asbestos waste by NYS DEC (NYS Part 360 Permit) and by USEPA. Out of state landfills shall provide licenses from local agencies having jurisdiction.
7. Negative Air Pressure Equipment: Copy of manufacturer's and performance data of all units and HEPA filters used.

C. Asbestos Work Closeout Submittals:
1. Waste Shipment Records and Disposal Site Receipts: Copy of waste shipment record and disposal site receipt showing that the ACM has been properly disposed.
    a. Waste shipment record and disposal site receipt must be received within 35 days of the ACM waste leaving the Site. If receipts are not received within the specified time period, the Director's Representative will notify USEPA in writing within 45 days of the ACM waste leaving the Site.

D. Contract Closeout Submittals:
1. Daily Log: Submit copy of Project Monitor's daily air sample log and a copy of Asbestos Abatement Contractor's Daily project log.

2. Air Monitoring Data: Submit copy of air test results and chain of custody.

1.08 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with the referenced standards.

B. Pre-Work Conference: Before the Work of this Section is scheduled to commence, a conference will be held by the Director's Representative at the Site for the purpose of reviewing the Contract Documents, discussing requirements for the Work, and reviewing the Work procedures.
1. The conference shall be attended by the Contractor, the asbestos removal subcontractor, and the testing laboratory employed by the Director.

C. Work Plan: At the conclusion of the pre-work conference, before the physical abatement Work begins, prepare a detailed work plan.
1. The work plan shall include, but not be limited to, work procedures, types of equipment, details of equipment used, decontamination unit locations, crew size, and emergency procedures for fire and medical emergencies and for failure of containment barriers.
2. If a site specific variance is sought, do not finalize the work plan until the Department of Labor decision is received.

1.09 PROJECT CONDITIONS

A. In addition to the postings required by law, post at the entrance to the abatement area the following documents:
1. Copy of the printed Work plan.
2. Copy of Industrial Code Rule 56.

B. Shut-down of Air Handling System: Complete the Work of this Section within the time limitation allowed for shut-down of the air handling system serving the work area.
1. The air handling system will not be restarted until approval of the air monitoring tests following the last cleaning.
2. If total shut down of the system is not acceptable, follow all regulations for local isolation and provision for temporary HVAC as per DOL regulations.

C. Maintain electric services to those portions of the building and remaining facility not a part of the asbestos abatement work area at all times. Follow all regulations for electric power shut down exemptions as per DOL regulations.

D. Do not obstruct any aisle or passageway so as to reduce its required width as an exit.

1.10 HEALTH AND SAFETY

A. Where in the performance of the work, workers, supervisory personnel or sub-contractors may encounter, disturb, or otherwise function in the immediate vicinity of contaminated items and materials, all personnel shall take appropriate continuous measures as necessary to protect all ancillary building occupants from the potential ACM exposure.

1. Such measures shall include the procedures and methods described herein and shall be in compliance with all applicable regulations of Federal, State and Local agencies.

1.11 FIRE PROTECTION, EMERGENCY EGRESS AND SECURITY

A. Establish emergency and fire exits from the work area containment. Provide first aid kits and two full sets of protective clothing and respirators for use by qualified emergency personnel outside of the work area.

B. Provide a logbook throughout the entire term of the project. All persons who enter the regulated abatement work area or enclosure shall sign the logbook. Document any intrusion or incident in the log book.

1.12 PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT

A. Workers must wear personal protective equipment for all projects as per OSHA and DOL regulations. Provide respiratory protection in accordance with OSHA regulation 1910.134 and ANSI Z88.2.

B. Workers must be trained as per OSHA and DOL requirements, have medical clearance and must have recently received pulmonary function test (PFT) and respirator fit tested by a trained professional.
1. A personal air sampling program shall be in place as required by OSHA.
2. The use of respirators must also follow a complete respiratory protection program as specified by OSHA.

PART 2 PRODUCTS

2.01 DISPOSAL BAGS

A. Type: Minimum 6 mil thick, black, and preprinted with a Caution Label.

2.02 EQUIPMENT

A. Temporary lighting, heating, hot water heating units, ground fault interrupters, and all other equipment on site shall be UL listed.

B. All electrical equipment shall be in compliance with the National Electric Code, Article 305 - Temporary Wiring.

2.04 GLOVE BAGS

A. Type: Minimum 6 mil thick, clear, fire retardant polyethylene. Select glove bag sizes appropriate for the size and location of the project.

2.05 NEGATIVE AIR PRESSURE UNITS

A. Type: Local exhaust system, capable of maintaining negative air pressure within the containment, and provides for HEPA filtration of efficiency not less than 99.97 percent with 0.3 micron particles. Equip the unit with filter alarms lights and operation time meter.

2.06 PLASTIC SHEETS

A. Type: Minimum 6 mil thick, clear, fire retardant polyethylene.

2.07 RESPIRATORS

A. Type: As approved by the Mine Safety and Health Administration (MSHA), Department of Labor, or the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services.

2.08 VACUUM CLEANERS

A. Type: Vacuums equipped with HEPA filters.

PART 3 EXECUTION

3.01 ASBESTOS-CONTAINING MATERIAL HANDLING AND REMOVAL PROCEDURES

A. Comply with the standards referenced in Part 1 of this Section.

3.02 CLEAN UP PROCEDURES

A. Comply with the standards referenced in Part 1 of this Section.

3.03 PROJECT AIR SAMPLING, MONITORING AND ANALYSIS

A. Air Sampling and Analysis: The Director will employ the services of an independent testing laboratory to perform air sample monitoring. The laboratory shall use the methods described in standards referenced in Part 1 of this Section.
   1. The equipment, duration, flow rate, calibration of equipment, number and location of samples are as per ICR 56-4.
   2. Air sampling technician shall be on site to observe and maintain air sampling equipment for the duration of the air sampling collection.
   3. Period of time permitted between completion of air sample collection and receipt of results on the project site shall be equal or less than 48 hours.

B. If air samples collected outside the regulated work area indicate airborne fiber concentrations at or above 0.01 fibers per cubic centimeter, or the established background level, which ever is greater, work shall stop immediately for inspection of barriers and negative air ventilation systems. Clean up surfaces outside the regulated work area using HEPA filter equipped vacuums and wet cleaning methods. Work methods shall be altered to reduce fiber concentrations to acceptable levels.

C. Elevated air sample results, if any, along with background and all other air sample results collected during Phase IIA through Phase IIC shall be submitted to the Commissioner of appropriate Asbestos Control Bureau within the same business day of receipt of results.

3.04 FINAL CLEANING AND CLEARANCE PROCEDURES

A. Negative Pressure Ventilation: Negative air pressure machines if used, shall remain in continuous operation during the entire length of the project.

B. Cleaning and Visual Inspection: After first, second, third cleaning and required waiting/settling and drying periods, perform a final visual inspection.
   1. Final clearance air sampling shall commence after the waiting/settling and drying time as per ICR 56 has elapsed.

C. Project Monitor Visual Inspection: The Director will employ the services of a DOL certified asbestos project monitor employed by an independent testing laboratory to perform visual inspection as required by ICR 56.

D. Final Clearance Air Sampling: The Director will employ the services of an independent testing laboratory to perform final air sampling.
   1. The laboratory shall use the methods described in standards referenced in Part 1 of this Section.
   2. The equipment, duration, flow rate, calibration of equipment, number and location of samples are as per ICR 56-4.
   3. If initial Post-Abatement (Clearance Air) Monitoring results do not comply with the standards referenced in Part 1 of this Section the Contractor shall either re-clean or order a full set of TEM analysis.
      a. Results of the TEM analysis will be conclusive, and if the results do not comply with the standards referenced in Part 1 of this Section, the Contractor shall re-clean and additional full set of air samples will be collected and analyzed until the standards are met.
      b. All satisfactory PCM clearance air sample results along with background air sample results, if they are greater than or equal to 0.01 fibers per cubic centimeter, shall be submitted to the Commissioner of appropriate Asbestos Control Bureau within two business days of receipt of satisfactory clearance air results.
      c. All satisfactory TEM results of previously unsatisfactory PCM clearance air sample results, along with the unsatisfactory PCM results shall be submitted to the Commissioner of appropriate Asbestos Control Bureau within two business days of receipt of satisfactory clearance air results.
   4. Prior to removal of isolation barriers the Director's Representative at the site will receive an affidavit from the air monitoring laboratory certifying the final air samples comply with the standards referenced in Part 1 of this Section.

E. Dismantling of Regulated Abatement Work Area:
   1. Remove all tools and equipment after proper decontamination as per Part 1 of this section.
   2. Dismantle and remove each tent enclosure and air lock and any barriers only after final clearance air monitoring has been performed and satisfactory results obtained.
   3. All remaining polyethylene, duct tape, expandable foam and other barrier materials shall be bagged, wrapped, containerized and labeled as asbestos waste.
   4. Remove all temporary hard walled barriers from site.

5. Dismantle any remote decontamination units and plastic sheeting shall be disposed as asbestos waste.
6. Remove all waste generated to the holding area, lockable trailer or dumpster.
7. Contractor's Supervisor shall certify in writing to the Director that abatement work is complete and no debris/residue remains.

3.05 DISPOSAL OF ASBESTOS-CONTAINING MATERIAL AND RELATED DEBRIS

A. Remove all waste generated as part of the asbestos project from the project site within ten calendar days from the site after completion of Phase IIC of the project or within one day of the waste disposal container/trailer becomes full, whichever occurs first.

B. Transport and dispose of all the asbestos-containing waste, related debris, and waste water to the approved disposal site.

C. All generated waste removed from the site must be documented, accounted for and disposed of in compliance with the requirements of USEPA NESHAP.

D. Comply also with the standards referenced in Part 1 of this Section.

3.06 RESTORATION

A. Remove temporary decontamination facilities and restore area designated for these facilities to its original condition or better.

B. Where existing work is damaged or contaminated, restore work to its original condition or better.

END OF SECTION

SECTION 033001

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Concrete Formwork: Section 031100.

B. Steel Concrete Reinforcement: Section 032100.

C. Concrete Rehabilitation: Section 030131.

D. Joint Sealers: Section 079200

1.02 REFERENCES

A. Except as shown or specified otherwise, the Work of this Section shall conform to the requirements of Specifications for Structural Concrete for Buildings ACI 301-05 of the American Concrete Institute.

1.03 DEFINITIONS (Amendments to ACI 301, Section 1.2):

A. Exposed Construction: Exposed to view.

B. SCC: Self-Consolidating Concrete

1.04 SUBMITTALS

A. Self-Consolidating Concrete (SCC) 5000 psi Mix Product Data:
   1. Concrete design mix with name and location of batching plant.
   2. Portland Cement: Brand and manufacturer's name. ASTM C-150 Type I/II.
   3. Fly Ash: Name and location of source, and NYSDOT test numbers. ASTM C-618, Class F.
   4. Air-entraining Admixture: Brand and manufacturer's name. ASTM C-260.
   5. High Range Water Reducer: Brand and manufacturer's name. ASTM C-494, Type F
   6. Aggregates: Name and location of source, and NYSDOT test numbers. ASTM C-33 (Natural Sand, Crushed Gravel, Crushed Stone) 3/8" Max.
   7. Chemical Curing and Anti-Spalling Compound: Brand and manufacturer's name, and application instructions.
   8. Bonding Agent (Adhesive): Brand and manufacturer's name, and preparation and application instructions.
   9. 4 - Cylinder Compression Tests. ASTM C 31.
   10. Slump/Spread – 26" to 30". ASTM C 143.
   11. Air – 3% to 6%. ASTM C 231.
   12. Temperature. ASTM C 1064.

13. 1 - J Ring Testing – ASTM C 1621.
14. Waterstop: Brand and manufacturer's name, and installation instructions.

B. Shop Drawings: Placing drawings for bar reinforcement.

C. Normal Concrete 3000psi Mix Product Data:
1. Concrete design mix with name and location of batching plant.
2. Portland Cement: Brand and manufacturer's name.
3. Fly Ash: Name and location of source, and DOT test numbers.
4. Air-entraining Admixture: Brand and manufacturer's name.
5. Water-reducing Admixture: Brand and manufacturer's name.
6. Aggregates: Name and location of source, and DOT test numbers.
8. Chemical Hardener (Dustproofing): Brand and manufacturer's name, and application instructions.
9. Chemical Curing and Anti-Spalling Compound: Brand and manufacturer's name, and application instructions.
10. Bonding Agent (Adhesive): Brand and manufacturer's name, and preparation and application instructions.
11. Expansion Joint: 2 Part Joint:
A. Pre-Formed Expansion Joint Closed Cell High Temperature CEVA Metazeal. Chase Construction Products, www.chasecorp.com; 26 Summer Street Bridgewater, MA 02324 Tel: 508.819.4200 Fax: 508.697.6419.
B. ST-524 Poly-Foam Injection Resin, Urethane Foam. Strata-Tech, Inc. www.strata-tech.com; 3601 104th Street Des Moines, Iowa 50322 Tel: 515.251.7770 Fax: 515.251.7705.
12. Waterstop: Brand and manufacturer's name, and installation instructions.

D. Quality Control Submittals:
1. Certificates: Affidavit required under Quality Assurance Article.

1.05 QUALITY ASSURANCE

A. Concrete batching plant shall be currently approved as a concrete supplier by the New York State Department of Transportation. Concrete batching plant shall be ACI Certified to produce SCC.

B. Fly ash supplier shall be currently approved as a fly ash supplier by the New York State Department of Transportation.

C. Certifications: Affidavit by the bar reinforcement manufacturer certifying that bar material meets the contract requirements.

D. Source Quality Control: The Director reserves the right to inspect and approve the following items, at his own discretion, either with his own forces or with a designated inspection agency:
1. Batching and mixing facilities and equipment.
2. Sources of materials.

1.06 STORAGE

A. Store materials so as to insure the preservation of their quality and fitness for the Work. Materials, even though accepted prior to storage, are subject to inspection and shall meet the requirements of the Contract before their use in the Work.

PART 2 PRODUCTS

2.01 MATERIALS (Amendments to ACI 301, Section 4, for Normal Weight Concrete):

A. Water-reducing Admixture: ASTM C 494, Type A, and on the New York State Department of Transportation's current "Approved List".

B. Fly Ash: ASTM C 618, including Table 1A (except for footnote A), Class F except that loss on ignition shall not exceed 4.0 percent.

C. Chemical Curing and Anti-Spalling Compound: ASTM C-309, Type 1D, Class B, with a minimum 18 percent total solids content. No thinning of material allowed.

1. SureCure Emulsion, Kaufman Products, Inc. 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.
2. Cure & Seal by Symons Corp., 200 East Touhy Ave., PO Box 5018, Des Plaines, IL 60017-5018, (847) 298-3200.
3. "Kure N Seal W" by Sonneborn/ BASF Building Systems, 889 Valley Park Dr., Shakopee, MN 55379, (800) 433-9517.
4. Day-Chem Cure & Seal 26 percent (J-22) by Dayton Superior Corp., 721 Richard St., Miamisburg, OH 45342, (800) 745-3700.
5. Acrylseal HS by Master Builders/ BASF Building Systems, 23700 Chagrin Blvd., Cleveland, OH 44122, (800) 628-9990.

D. Chemical Hardener (Dustproofing): Colorless aqueous solution of magnesium-zinc fluosilicate. Approved products include:

1. Lapidolith by Sonneborn/ BASF Building Systems, 889 Valley Park Dr., Shakopee, MN 55379, (800) 433-9517.
2. Surfhard by The Euclid Chemical Co., 19218 Redwood Rd., Cleveland, OH 44110, (216) 531-9222.
3. Pena-Lith by W.R. Meadows, Inc., PO Box 543, Elgin, IL 60121, (847) 683-4500.
4. FluoHard by L & M Construction Chemicals, Inc., 14851 Calhoun Rd., Omaha, NE 68152, (402) 453-6600.
5. Armortop by Anti Hydro International, Inc., 265 Badger Ave., Newark, NJ 07108, (800) 777-1773.
6. Diamond by Kaufman Products, Inc., 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.

E. Expansion Joint: 2 Part Joint:

A. Pre-Formed Expansion Joint Closed Cell High Temperature CEVA Metazeal. Chase Construction Products, www.chasecorp.com; 26

Summer Street Bridgewater, MA 02324 Tel: 508.819.4200 Fax: 508.697.6419.
B. ST-524 Poly-Foam Injection Resin, Urethane Foam. Strata-Tech, Inc. www.strata-tech.com; 3601 104th Street Des Moines, Iowa 50322 Tel: 515.251.7770 Fax: 515.251.7705.

F. Chamfer Strips: Wood, metal, PVC or rubber; one inch chamfer.

G. Epoxy Bonding Agent (Adhesive): 100 percent solids epoxy-resin-base bonding compound, complying with ASTM C 881, Types I, II, IV and V, Grade 2 (horizontal areas) or Grade 3 (overhead/vertical areas), and Class B (40-60 degrees Fahrenheit) or Class C (60 degree Fahrenheit and above).
1. SurePoxy HM Series by Kaufman Products, Inc., 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.
2. Sikadur Hi-Mod 32 by Sika Corporation, 201 Polito Avenue, Lyndhurst, NJ 07071, (800) 933-7452.
3. Epogrip by Sonneborn/ BASF Building Systems, 889 Valley Park Drive, Shakopee, MN 55379, (800) 433-9517.

H. Waterstop: Water swelling sealant; minimum 3/4 inch wide by 3/8 inch thick, unless otherwise indicated; minimum tensile strength (ASTM D 412) 100 psi minimum ultimate elongation (ASTM D 412) 500 percent.
1. MC-2010M by Adeka Ultra Seal Corporation, PO Box 459, Spearfish, SD 57783, (605) 642-3959.
2. Volclay Waterstop RX-101 by Colloid Environmental Technologies Company, Building Materials Division, 1350 W. Shure Drive, Arlington Heights, IL 60004, (708) 392-5800.

2.02 PROPORTIONING (Amendments to ACI 301, Sections 4 & 7):

A. Compressive Strength: Minimum 3000 psi, unless shown or specified otherwise.

B. Durability: Concrete shall be air-entrained. Design air content shall be 6 percent by volume, with an allowable tolerance of plus or minus 1.5 percent for total air content. Entrained air shall be provided by use of an approved air-entraining admixture. Air-entrained cement shall not be used.

C. Slump:
1. Self Consolidating Concrete Slump (Puddle width): Between 26 and 30 inches.
2. 3000 psi Normal Weight Concrete: Between 2 inches and 4 inches.

D. Admixtures: Do not use admixtures in concrete unless specified or approved in writing by the Director's Representative.

E. Selection of Proportions: Concrete proportions shall be established on the basis of previous field experience or laboratory trial batches, unless otherwise approved in writing by the Director. Proportion mix with a minimum cement content of 564 pounds per cubic yard for 3000 psi concrete. Self Consolidating Concrete portions shall adhere to the mix design.

1. Optional Material: Fly ash may be substituted for (Portland) cement in normal weight concrete up to a maximum of 15 percent by weight of the required minimum (Portland) cement. If fly ash is incorporated in a concrete design mix, make necessary adjustments to the design mix to compensate for the use of fly ash as a partial replacement for (Portland) cement.
   a. Adjustments shall include the required increase in air-entraining admixture to provide the specified air content.
   b. Lower early strength of the concrete shall be considered in deciding when to remove formwork.

2.03 REINFORCEMENT (Amendments to ACI 301, Section 3):

A. Bar Reinforcement: ASTM A 615, Grade 60, deformed steel bars.

B. Bar Supports: Galvanized steel or AISI Type 430 stainless steel, and without plastic tips.

C. Tie Wire: Black annealed wire, 16-1/2 gage or heavier.

2.04 JOINTS AND EMBEDDED ITEMS (Amendments to ACI 301, Section 5.3.2.6):

A. Obtain bond at construction joints by the use of bonding agent (adhesive) or the use of cement grout.

B. Obtain 6” minimum depth for drilling and grouting of reinforcement bars into concrete for reinforcement lapping.

2.05 PRODUCTION (Amendments to ACI 301, Section 5):

A. Provide ready-mixed concrete, either central-mixed or truck-mixed.

B. Provide ready-mixed SCC, central-mixed.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Do not use items of aluminum for mixing, chuting, conveying, forming or finishing concrete, except magnesium alloy tools may be used for finishing.

B. Keep excavations free of water. Do not deposit concrete in water.

C. Hardened concrete, reinforcement, forms, and earth which will be in contact with fresh concrete shall be free from frost at the time of concrete placement.

D. Prior to placement of concrete, remove all hardened concrete spillage and foreign materials from the space to be occupied by the concrete.

3.02 FORMWORK (Amendments to ACI 301, Section 2):

A. Chamfer all exposed external corners of concrete.

3.03 PLACING REINFORCEMENT (Amendments to ACI 301, Section 3):

A. At the time concrete is placed, reinforcement shall be free of mud, oil, loose rust, loose mill scale, and other materials or coatings that may adversely affect or reduce the bond.

3.04 PLACING CONCRETE (Amendments to ACI 301, Section 5):

A. Operation of truck mixers and agitators and discharge limitations shall conform to the requirements of ASTM C 94 and established industry standards for the placement of SCC.

B. Do not allow concrete to free fall more than 4 feet.

C. Pumping will be required to place SCC inside the tunnel at the repair locations.

3.05 FINISHING FORMED SURFACES (Amendments to ACI 301, Section 5.3.3):

A. Finish Schedule: Except where indicated otherwise on the Drawings, provide the finishes below:
   1. Rough Form Finish for concrete surfaces not exposed to view.
   2. Smooth Form Finish for concrete surfaces exposed to view.

3.06 FINISHING SLABS (Amendments to ACI 301, Section 5.3.4):

A. Slabs On Grade: Provide key type joints unless otherwise shown. Tool exposed joints.

B. Finish Schedule: All concrete surfaces shall form smooth form finishes.

C. Finishing, General: Provide monolithic finishes on concrete floors and slabs without the addition of mortar or other filler material. Finish surfaces in true planes, true to line, with particular care taken during screeding to maintain an excess of concrete in front of the screed so as to prevent low spots. Screed and darby concrete to true planes while plastic and before free water rises to the surface. Do not perform finishing operations during the time free water (bleeding) is on the surface.

3.07 CURING AND PROTECTION (Amendments to ACI 301, Section 5.3.6):

A. Maintain concrete surfaces in a moist condition for at least 7 days after placing, except where otherwise indicated. Do not use curing compound.

3.08 FIELD QUALITY CONTROL (Amendments to ACI 301, Section 1):

A. Make available to the Director's Representatives whatever test samples are required to make tests. Furnish shipping boxes for compression test cylinders.

END OF SECTION

SECTION 221100

PLUMBING PIPING

PART 1 GENERAL

1.01 SUBMITTALS

A. Product Data:
   1. Catalog sheets and specifications indicating manufacturer name, type, applicable reference standard, schedule, or class for specified pipe and fittings.

PART 2 PRODUCTS

2.01 COPPER AND BRASS PIPE, TUBING AND FITTINGS

A. Drainage Tube, Type DWV: ASTM B 306.

B. Wrot Copper Drainage Tube Fittings, Solder Joint: ASME B16.29.

C. Cast Copper Alloy Drainage Fittings, Solder Joint: ASME B16.23.

D. Unions: Cast bronze, 150 lb Class, bronze to bronze seats, threaded or solder joint..

2.02 PACKING MATERIALS FOR BUILDING CONSTRUCTION PENETRATIONS

A. Mechanical Modular Seals: Thunderline Corp.'s Link Seal wall and floor seals designed for the service of piping system in which installed.

2.03 PIPE SLEEVES

A. Type A: Schedule 40 steel pipe.

2.04 JOINING AND SEALANT MATERIALS

A. Solder: Solid wire type conforming to the following:
   1. Type 3: Lead-free tin-silver solder (ASTM B 32 Alloy Grade E, AC, or HB); Engelhard Corp.'s Silvabrite 100, Federated Fry Metals' Aqua Clean, or J.W. Harris Co. Inc.'s Stay-Safe Bridgit.

B. Soldering Flux for Soldered Joints: All-State Welding Products Inc.'s Duzall, Engelhard Corp.'s General Purpose Liquid or Paste, Federated Fry Metals' Water Flow 2000, or J.W. Harris Co. Inc.'s Stay-Clean.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install piping at approximate locations indicated, and at maximum height.

B. Install piping clear of door swings, and above sash heads.

C. Make allowances for expansion and contraction.

D. Allow for a minimum of one inch free air space around pipe or pipe covering, unless otherwise specified.

E. Install horizontal piping with a constant pitch, and without sags or humps.
   1. Drainage Piping: Pitch 1/8 inch per foot downward, in direction of flow, unless otherwise noted.

3.02 DRAINAGE SYSTEMS

A. Fittings:
   1. Use long turn drainage pattern fittings, unless space conditions prohibit their use; in such cases, short turn pattern fittings may be used.
   2. Vertical Offsets: Make vertical offsets with 45 degree elbows, or 1/8 bends.
   3. Tucker Fittings: Tucker fittings may only be installed in vertical piping.

B. Cleanouts:
   1. Install cleanouts with sufficient side and end clearance to allow for the removal of the cleanout plug, and the use of cleaning tools.
   2. Lubricate cleanout plugs with anti-seize lubricant.

3.03 PIPE JOINT MAKE-UP

A. Threaded Joint: Make up joint with a pipe thread compound applied in accordance with manufacturer's printed application instructions for the intended service.

B. Soldered Joint: Thoroughly clean tube end and inside of fitting with emery cloth, sand cloth, or wire brush. Apply flux to the pre-cleaned surfaces. Install fitting, heat to soldering temperature, and join the metals with type solder specified. Remove residue.

C. Dissimilar Pipe Joint:
   1. Joining Copper and PVC Pipe: Make up connection with threaded adapters as recommended by manufacturers of piping being joined.

3.04 PIPING PENETRATIONS

A. Diameter of Sleeves and Core Drilled Holes:
   1. Unless otherwise specified, size holes thru floors and walls in accordance with the through penetration fire stopping system being used.
   2. Size holes thru tunnel walls in accordance with the following:
      a. Mechanical Modular Seals: Size holes in accordance with the manufacturer's recommendations.

B. Length of Sleeves (except as shown otherwise on Drawings):

1. Walls and Partitions: Equal in length to total finished thickness of wall or partition.

C. Packing of Sleeves and Core Drilled Holes:
1. Provide mechanical modular seals.

3.05 PIPE AND FITTING SCHEDULE

A. Sump Piping within tunnel:
1. DWV copper tubing, with cast brass or wrot copper drainage pattern fittings, and joints made with Type 3 solder.

END OF SECTION

SECTION 230523

VALVES

PART 1 GENERAL

1.01 ABBREVIATIONS

A. IBBM: Iron body, bronze mounted.

B. OS&Y: Outside screw and yoke.

C. WOG: Water, oil, gas.

D. WSP: Working steam pressure.

1.02 SUBMITTALS

A. Product Data: Manufacturer's catalog sheets and specifications for each valve type.

PART 2 PRODUCTS

2.01 VALVES - GENERAL

A. Valve Standardization: Valves from one or more manufacturers may be used, however valves supplied for each specific valve type shall be the product of one manufacturer.

B. Valves shall be first quality, free from all imperfections and defects, with body markings indicating manufacturer and rating.

C. Valve parts of same manufacturer, size and type shall be interchangeable.

D. Manually operated gate valves shall be of rising stem type, unless otherwise specified.

E. Valves which use packing, shall be capable of being packed when wide open and under full working pressure.

F. Size valves the same size as the piping in which they are installed, unless specified otherwise.

2.02 GATE VALVES

A. Type A: 125 psig WSP, 200 psig WOG, bronze body, union bonnet, solid wedge disc, and threaded ends. Acceptable Valves: Crane428UB, Hammond IB617, Jenkins 47CU, Milwaukee 1152, Nibco T134, and Stockham B105.

B. Type C: 125 psig WSP, 200 psig WOG up to 12 inch size, and 150 psig WOG for 14 inch and 16 inch sizes; IBBM OS&Y, bolted bonnet, solid wedge disc, and threaded or flanged ends depending on size. Acceptable Valves: Crane 464-1/2 & 465-1/2, Hammond IR1140, Milwaukee F2885, Nibco T6170 & F6170, and Stockham G620 & G623

PART 3 EXECUTION

3.01 INSTALLATION

A. General: Install valves at locations noted on the drawings or specified.

3.02 VALVE APPLICATION SCHEDULE

A. Schedule of valve applications for the different services is as follows:
   1. Steam (LPS & MPS) 125 psig and Less:
      a. 4 inch and Less: A or C gates.
      b. 5 inch and Up: C gates.

END OF SECTION

SECTION 310000

EARTHWORK

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Cast-In-Place Concrete: Section 033001.

B. Site Restoration: Section 310101.

C. Rock Removal: Section 312316.

1.02 DEFINITIONS

A. The following terms shall have the meanings ascribed to them in this Article, wherever they appear in this Section.

1. Earth Excavation: The removal of all surface and subsurface material not classified as rock (as defined below).
2. Rock: Limestone, sandstone, shale, granite, and similar material in solid beds or masses in its original or stratified position which can be removed only by blasting operations, drilling, wedging, or use of pneumatic tools, and boulders with a volume greater than 1.0 cu yd. Concrete building foundations and concrete slabs, not indicated, with a volume greater than 1.0 cu yd shall be classified as rock.
   a. Limestone, sandstone, shale, granite, and similar material in a broken or weathered condition which can be removed with an excavator or backhoe equipped with a bucket with ripping teeth or any other style bucket shall be classified as earth excavation.
   b. Masonry building foundations, whether indicated or not, shall be classified as earth excavation.
3. Subgrade Surface: Surface upon which subbase or topsoil is placed.
4. Subbase: Select granular material or subbase course Type 2 which is placed immediately beneath pavement or concrete slabs.
5. Maximum Density: The dry unit weight in pounds per cubic foot of the soil at “Optimum Moisture Content” when determined by ASTM D 698 (Standard Proctor)..
6. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
7. Landscaped Areas: Areas not covered by structures, walks, roads, paving, or parking.
8. Unauthorized Excavation: The removal of material below required elevation indicated on the Drawings or beyond lateral dimensions indicated or specified without specific written direction by the Director’s Representative.

1.03 SUBMITTALS

A. Product Data:
   1. Filter Fabric: Manufacturer's catalog sheets, specifications, and installation instructions.

B. Quality Control Submittals:
   1. Excavation Procedure: Submit a lay out drawing or detailed outline of intended excavation procedure for the Director's information. This submittal will not relieve the Contractor of responsibility for the successful performance of intended excavation methods.
   2. Subbase Materials: Name and location of source and the DOT Source Number. If the material is not being taken from an approved DOT Source the results of the gradation and soundness tests performed by an ASTM certified soils laboratory will be required.
   3. Other Aggregates: Name and location of source and soil laboratory test results.

1.04 PROJECT CONDITIONS

A. Protect existing trees and plants during performance of the Work unless otherwise indicated. Box trees and plants indicated to remain within the grading limit line with temporary steel fencing or solidly constructed wood barricades as required. Protect root systems from smothering. Do not store excavated material, or allow vehicular traffic or parking within the branch drip line. Restrict foot traffic to prevent excessive compaction of soil over root systems.

B. On-site soils do not meet the gradation requirements of selected fill.

C. Cold Weather Requirements:
   1. Excavation: When freezing temperatures are anticipated, do not excavate to final required elevations for concrete work unless concrete can be placed immediately.
   2. Backfilling: If backfill is being placed during freezing temperatures the backfilling operations shall be monitored by the Director's Representative and the following procedures shall be followed:
      a. Frozen ground shall be removed in its entirety from beneath and five feet beyond the area of fill placement.
      b. The fill material placed shall consist of Selected Fill and shall be free of all frozen chunks that exceed four inches in size. The material transported to the project site shall only consist of material excavated from below the frost depth.
      c. At the end of the work day, the area of fill placement shall be covered with insulated blankets, or left unprotected. Other means of protection (hay, wood chips, etc.) may also be used for protection provided it is approved by the Director's Representative.
      d. Following work day, remove the insulated blankets and/or strip the area of all frozen material as specified previously.

e. Upon establishing the subgrade elevations, protect the grades with insulated blankets or place additional material that will adequately insulate the exposed earth surface from frost. This additional fill or protective material shall be stripped just prior to pouring concrete.

PART 2 PRODUCTS

2.01 MATERIALS

A. Subbase Course Type 2: Stockpiled, crushed ledge rock or approved blast furnace slag. Comply with the gradation and material requirements specified below:

Sieve		Percent Passing
Sieve Size	Size opening (mm)	
2 inch	50.8	100
1/4 inch	6.35	25-60
No. 40	0.425	5-40
No. 200	0.075	0-10

1. Magnesium Sulfate Soundness Test: 20 percent maximum loss by weight after four test cycles.
2. Plasticity Index: The plasticity index of the material passing the No. 40 mesh sieve shall not exceed 5.0.
3. Elongated Particles: Not more than 30 percent, by weight, of the particles retained on a 1/2 inch sieve shall consist of flat or elongated particles. A flat or elongated particle is defined as one which has its greatest dimension more than three times its least dimension.

B. Selected Fill: Sound, durable, sand, gravel, stone, or blends of these materials, free from organic and other deleterious materials. Comply with the gradation requirements specified below:

Sieve		Percent Passing
Sieve Size	Size opening (mm)	
4 inch	101.6	100
No. 40	0.425	0-70
No. 200	0.075	0-15

C. Suitable Material (Fill and Backfill for Landscaped Areas): Material consisting of mineral soil (inorganic), blasted or broken rock and similar materials of natural or man-made origin, including mixtures thereof. Maximum particle size will not exceed 2/3 of the specified layer thickness prior to compaction. NOTE: Material containing cinders, industrial waste, sludge, building rubble, land fill, muck, and peat will be considered unsuitable for fill and backfill, except topsoil and organic silt may be used as suitable material in landscaped areas provided it is placed in the top layer of the subgrade surface.

D. Cushion Material: Shall consist of clean, hard, durable, uncoated particles, free from lumps of clay and all deleterious substances and shall meet the following gradation requirements:

Sieve Size		Percent Passing
Sieve Size	Size opening (mm)	
1/4 inch	6.35	100
No. 60	0.25	0-35
No. 100	0.15	0-10

E. No. 2 Coarse Aggregate: Crushed Stone that complies with material requirements of DOT Article 703-02 and meets the following gradation.

Sieve		Percent Passing
Sieve Size	Size opening (mm)	
1-1/2 inch	38.1	100
1 inch	25.4	90-100
1/2 inch	12.7	0-15

F. Marker Tape: FL Industries Blackburn/Holub's Type YT6, or Seton Nameplate Corporations Type 6 ELE, imprinted with message suited to item buried below.

2.02 GEOTECHNICAL FABRICS

A. Filter Fabric (GeoTextile)
1. Drainage and Erosion Control: Amoco 1199 & 2019, Maccaferri MacTex MX140 & MX155, Mirafi 140N & 160N, Fiberweave 403 & 404 or equivalent.

PART 3 EXECUTION

3.01 CLEARING AND GRUBBING

A. Clear and grub the site in locations indicated on the drawings of trees, shrubs, brush, other prominent vegetation, debris, and obstructions except for those items indicated to remain. Completely remove stumps and roots protruding through the ground surface.

B. Fill depressions caused by the clearing and grubbing operations in accordance with the requirements for filling and backfilling, unless further excavation is indicated.

3.02 REMOVAL OF TOPSOIL

A. Remove existing topsoil from areas where excavation or fill is required.

B. Stockpile approved topsoil where directed until required for use. Place, grade, and shape stockpiles for proper drainage.

3.03 UNDERGROUND UTILITIES

A. Locate existing underground utilities prior to commencing excavation work. Determine exact utility locations by hand excavated test pits. Support and protect utilities to remain in place.

B. Do not interrupt existing utilities that are in service until temporary or new utilities are installed and operational.

C. Utilities abandoned beneath and five feet laterally beyond the structure's proposed footprint shall be removed in their entirety. Excavations required for their removal shall be backfilled and compacted as specified herein.

D. Utilities located outside the limits specified above may be abandoned in place provided their ends are adequately plugged as described below.
   1. Permanently close open ends of abandoned underground utilities exposed by excavations, which extend outside the limits of the area to be excavated.
   2. Close open ends of metallic conduit and pipe with threaded galvanized metal caps or plastic plugs or other approved method for the type of material and size of pipe. Do not use wood plugs.
   3. Close open ends of concrete and masonry utilities with concrete or flow-able fill.

3.04 EXCAVATION

A. Excavate earth as required for the Work.

B. Install and maintain all erosion and sedimentation controls during all earthwork operations as specified on the Contract Drawings or as directed by local officials. If the erosion and sedimentation controls specified by the local officials are more stringent than those specified on the Contract Drawings contact the Director's Representative.

C. Maintain sides and slopes of excavations in a safe condition until completion of backfilling. Comply with Code of Federal Regulations Title 29 - Labor, Part 1926 (OSHA).
   1. Trenches: Deposit excavated material on one side of trench only. Trim banks of excavated material to prevent cave-ins and prevent material from falling or sliding into trench. Keep a clear footway between excavated material and trench edge. Maintain areas to allow free drainage of surface water.

D. Excavation for Structures: Conform to elevations indicated. Excavate to a vertical tolerance of plus or minus 1 inch. Extend excavation a sufficient lateral distance to provide clearance to execute the Work.

F. Pipe Trenches: Open only enough trench length to facilitate laying pipe sections. Unless otherwise indicated on the Drawings, excavate trenches approximately 24 inches wide plus the outside pipe diameter, equally divided on each side of pipe centerline. Cut trenches to cross section, elevation, profile, line, and grade indicated. Accurately grade and shape trench bottom for uniform bearing of pipe.

G. Unauthorized Excavations: Unless otherwise directed, backfill unauthorized excavation under footings, foundation bases, and retaining walls with compacted select granular material without altering the required footing elevation. Elsewhere, backfill and compact unauthorized excavation as specified for authorized excavation of the same classification, unless otherwise directed by the Director's Representative.

1. Unauthorized excavations under structural Work such as footings, foundation bases, and retaining walls shall be reported immediately to the Director before any concrete or backfilling Work commences.

H. Notify the Director's Representative upon completion of excavation operations. Do not proceed with the Work until the excavation is inspected and approved. Inspection of the excavation by the Director's Representative will be made on 3 working days notice.

3.05 DEWATERING

A. Prevent surface and subsurface water from flowing into excavations and trenches and from flooding the site and surrounding area.

B. Do not allow water to accumulate in excavations or trenches. Remove water from all excavations immediately to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades and foundations. Furnish and maintain pumps, sumps, suction and discharge piping systems, and other system components necessary to convey the water away from the Site.

C. Convey water removed from excavations, and rain water, to collecting or run-off area. Cut and maintain temporary drainage ditches and provide other necessary diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches.

D. Provide temporary controls to restrict the velocity of discharged water as necessary to prevent erosion and siltation of receiving areas.

3.06 PLACING FILTER FABRIC

A. Place and overlap filter fabric in accordance with the manufacturer's installation instructions, unless otherwise shown.

B. Cover tears and other damaged areas with additional filter fabric layer extending 3 feet beyond the damage.

C. Do not permit traffic or construction equipment directly on filter fabric.

D. Backfill over filter fabric within two weeks after placement. Backfill in accordance with the fabric manufacturer's instructions and in a manner to prevent damage to the fabric.

3.07 PLACING FILL AND BACKFILL

A. Excavations: Backfill as promptly as practicable, but only after approval by the Director's Representative. Do not backfill with excavated material unless it meets the requirements of this Section.

B. Place backfill and fill materials in layers not more than 8 inches thick in loose depth unless otherwise specified. Before compaction, moisten or aerate each layer as necessary to facilitate compaction to the required density. Do not place backfill or fill material on surfaces that are muddy, frozen, or covered with ice.
   1. Place fill and backfill against confined areas (such as trenches) not easily accessible by larger compaction equipment, in maximum six inch thick (loose depth) layers.

C. Prevent wedging action of backfill against structures by placing backfill uniformly around structure to approximately same elevation in each layer. Place backfill against walls of structures containing basements or crawl spaces only after the first floor structural members are in place.

D. Under Pavements and Walks:
   1. Up to Subgrade Surface Elevation: Place selected fill when fill or backfill is required.
   2. Subbase Material: Place as indicated.

E. Landscaped Areas: Place suitable material when required to complete fill or backfill areas up to subgrade surface elevation. Do not use suitable material within 10 feet of structures, use selected fill. Do not use material containing rocks over four inches in diameter within the top 12 inches of suitable material.

F. Plastic Pipe in Trenches: Place cushion material a minimum of six inches deep under pipe, 12 inches on both sides, and 12 inches above top of pipe. Complete balance of backfill as specified.

G. Marker Tape: Install marker tape 4 inches below finish grade directly over the following:
   1. Conduit.
   2. Pre-insulated steam line.

3.08 COMPACTION

A. All materials with exception of open graded stone (No. 2 Crushed Stone):
   1. Compact each layer of fill and backfill for the following area classifications to the percentage of maximum density specified below and at a moisture content suitable to obtain the required densities, but at not less than three percent drier or more than two percent wetter than the optimum content as determined by ASTM D 698 (Standard Proctor).

a. Structures (entire area within ten feet outside perimeter): 95 percent.
b. Landscaped Areas: 90 percent.
c. Pavements and Walks: 95 percent.
d. Pipes: 95 percent.
e. Pipe Bedding: 95 percent.If a compacted layer fails to meet the specified percentage of maximum density, the layer will be re-compacted and retested. If compaction cannot be achieved the material/layer will be removed and replaced. No additional material may be placed over a compacted layer until the specified density is achieved

3.09 GRADING

A. Rough Grading: Trim and grade excavations required by this Contract, to a level of four inches below the finish grades indicated unless otherwise specified herein or where greater depths are indicated. Provide smooth uniform transition to adjacent areas.

B. Finish Grading: Finish surfaces free from irregular surface changes, and as follows:
1. Grassed Areas: Finish areas to receive topsoil to within 1 inch above or below the required subgrade surface elevations.
2. Walks and Pavements: Place and compact subbase material as specified. Shape surface of areas to required line, grade and cross section, with the finish surface not more than 1/2 inch above or below the required subbase elevation.

3.10 RESTORATION

A. Restore pavements, walks, curbs, lawns, and other exterior surfaces damaged during performance of the Work to match the appearance and performance of existing corresponding surfaces as closely as practicable.

B. Topsoil and seed or sod damaged lawn areas. Water as required until physical completion of the Work.

3.11 DISPOSAL OF EXCESS AND UNSUITABLE MATERIALS

A. Remove from State property and dispose of excess and unsuitable materials, including materials resulting from clearing and grubbing and removal of existing improvements.

B. Transport excess and unsuitable materials, including materials resulting from clearing and grubbing and removal of existing improvements, to spoil areas on State property designated by the Director's Representative, and dispose of such materials as directed.

3.12 FIELD QUALITY CONTROL

A. Compaction Testing: Notify the Director's Representative at least 3 working days in advance of all phases of filling and backfilling operations. Compaction testing will be performed by the Director's Representative to ascertain the compacted density of the fill and backfill materials. Compaction testing will be performed on certain layers of the fill and backfill as determined by the Director's Representative. If a compacted layer fails to meet the specified percentage of maximum density, the layer shall be re-compacted and will be retested. No additional material may be placed over a compacted layer until the specified density is achieved.

3.13 PROTECTION

A. Protect graded areas from traffic and erosion, and keep them free of trash and debris.

END OF SECTION

SECTION 310000

EARTHWORK

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Rock Removal: Section 312316.

1.02 DEFINITIONS

A. The following terms shall have the meanings ascribed to them in this Article, wherever they appear in this Section.

1. Earth Excavation: The removal of all surface and subsurface material not classified as rock (as defined below).
2. Rock: Limestone, sandstone, shale, granite, and similar material in solid beds or masses in its original or stratified position which can be removed only by blasting operations, drilling, wedging, or use of pneumatic tools, and boulders with a volume greater than 1.0 cu yd. Concrete building foundations and concrete slabs, not indicated, with a volume greater than 1.0 cu yd shall be classified as rock.
    a. Limestone, sandstone, shale, granite, and similar material in a broken or weathered condition which can be removed with an excavator or backhoe equipped with a bucket with ripping teeth or any other style bucket shall be classified as earth excavation.
    b. Masonry building foundations, whether indicated or not, shall be classified as earth excavation.
3. Subgrade Surface: Surface upon which subbase or topsoil is placed.
4. Subbase: Select granular material or subbase course Type 2 which is placed immediately beneath pavement or concrete slabs.
5. Maximum Density: The dry unit weight in pounds per cubic foot of the soil at “Optimum Moisture Content” when determined by ASTM D 698 (Standard Proctor)..
6. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
7. Landscaped Areas: Areas not covered by structures, walks, roads, paving, or parking.
8. Unauthorized Excavation: The removal of material below required elevation indicated on the Drawings or beyond lateral dimensions indicated or specified without specific written direction by the Director’s Representative.

1.03 SUBMITTALS

A. Quality Control Submittals:
   1. Excavation Procedure: Submit a lay out drawing or detailed outline of intended excavation procedure for the Director's information. This submittal will not relieve the Contractor of responsibility for the successful performance of intended excavation methods.
   2. Other Aggregates: Name and location of source and soil laboratory test results.

1.04 PROJECT CONDITIONS

A. Cold Weather Requirements:
   1. Excavation: When freezing temperatures are anticipated, do not excavate to final required elevations for concrete work unless concrete can be placed immediately.
   2. Backfilling: If backfill is being placed during freezing temperatures the backfilling operations shall be monitored by the Director's Representative and the following procedures shall be followed:
      a. Frozen ground shall be removed in its entirety from beneath and five feet beyond the area of fill placement.
      b. The fill material placed shall consist of Selected Fill and shall be free of all frozen chunks that exceed four inches in size. The material transported to the project site shall only consist of material excavated from below the frost depth.
      c. At the end of the work day, the area of fill placement shall be covered with insulated blankets, or left unprotected. Other means of protection (hay, wood chips, etc.) may also be used for protection provided it is approved by the Director's Representative.
      d. Following work day, remove the insulated blankets and/or strip the area of all frozen material as specified previously.
      e. Upon establishing the subgrade elevations, protect the grades with insulated blankets or place additional material that will adequately insulate the exposed earth surface from frost.

B. On-site soils do not meet the gradation requirements of selected fill.

PART 2 PRODUCTS

2.01 MATERIALS

A. Selected Fill: Sound, durable, sand, gravel, stone, or blends of these materials, free from organic and other deleterious materials. Comply with the gradation requirements specified below:

Sieve		Percent Passing
Sieve Size	**Size opening (mm)**	
4 inch	101.6	100

Sieve		Percent Passing
Sieve Size	Size opening (mm)	
No. 40	0.425	0-70
No. 200	0.075	0-15

B. Cushion Material: Shall consist of clean, hard, durable, uncoated particles, free from lumps of clay and all deleterious substances and shall meet the following gradation requirements:

Sieve Size		Percent Passing
Sieve Size	Size opening (mm)	
1/4 inch	6.35	100
No. 60	0.25	0-35
No. 100	0.15	0-10

C. Marker Tape: FL Industries Blackburn/Holub's Type YT6, or Seton Nameplate Corporations Type 6 ELE, imprinted with message suited to item buried below.

PART 3 EXECUTION

3.01 UNDERGROUND UTILITIES

A. Do not interrupt existing utilities that are in service until temporary or new utilities are installed and operational.

3.02 EXCAVATION

A. Excavate earth as required for the Work.

B. Maintain sides and slopes of excavations in a safe condition until completion of backfilling. Comply with Code of Federal Regulations Title 29 - Labor, Part 1926 (OSHA).

1. Trenches: Deposit excavated material on one side of trench only. Trim banks of excavated material to prevent cave-ins and prevent material from falling or sliding into trench. Keep a clear footway between excavated material and trench edge. Maintain areas to allow free drainage of surface water.

C. Conduit: Provide sufficient trench width for installation and to accommodate special backfill when specified.

D. Unauthorized Excavations: Unless otherwise directed, backfill unauthorized excavation under footings, foundation bases, and retaining walls with compacted select granular material without altering the required footing elevation. Elsewhere, backfill and compact unauthorized excavation as specified for authorized excavation of the same classification, unless otherwise directed by the Director.

1. Unauthorized excavations under structural Work such as footings, foundation bases, and retaining walls shall be reported immediately to the Director before any concrete or backfilling Work commences.

E. Notify the Director's Representative upon completion of excavation operations. Do not proceed with the Work until the excavation is inspected and approved. Inspection of the excavation by the Director's Representative will be made on 3 working days notice.

3.03 DEWATERING

A. Prevent surface and subsurface water from flowing into excavations and trenches and from flooding the site and surrounding area.

B. Do not allow water to accumulate in excavations or trenches. Remove water from all excavations immediately to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades and foundations. Furnish and maintain pumps, sumps, suction and discharge piping systems, and other system components necessary to convey the water away from the Site.

C. Convey water removed from excavations, and rain water, to collecting or run-off area. Cut and maintain temporary drainage ditches and provide other necessary diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches.

D. Provide temporary controls to restrict the velocity of discharged water as necessary to prevent erosion and siltation of receiving areas.

3.04 PLACING FILL AND BACKFILL

A. Excavations: Backfill as promptly as practicable, but only after approval by the Director's Representative. Do not backfill with excavated material unless it meets the requirements of this Section.

B. Place backfill and fill materials in layers not more than 8 inches thick in loose depth unless otherwise specified. Before compaction, moisten or aerate each layer as necessary to facilitate compaction to the required density. Do not place backfill or fill material on surfaces that are muddy, frozen, or covered with ice.
   1. Place fill and backfill against foundation walls, and in confined areas (such as trenches) not easily accessible by larger compaction equipment, in maximum six inch thick (loose depth) layers.

C. Prevent wedging action of backfill against structures by placing backfill uniformly around structure to approximately same elevation in each layer. Place backfill against walls of structures containing basements or crawl spaces only after the first floor structural members are in place.

D. Under Pavements and Walks:
   1. Up to Subgrade Surface Elevation: Place selected fill when fill or backfill is required.

2. Subbase Material: Subbase for pavement restoration to be placed and compacted by Construction Trade.

E. Rigid Non-Metallic Conduit: Except where concrete encasement is required, place cushion material a minimum of four inches deep under conduit, four inches on both sides, and 12 inches over top of conduit. Complete balance of backfill as specified.

F. Pipe Tunnels: Place selected fill a minimum of 12 inches on both sides and over top of tunnel.

G. Marker Tape: Install marker tape 4 inches below finish grade directly over the following:
1. Conduit.

3.05 COMPACTION

A. All materials:
1. Compact each layer of fill and backfill for the following area classifications to the percentage of maximum density specified below and at a moisture content suitable to obtain the required densities, but at not less than three percent drier or more than two percent wetter than the optimum content as determined by ASTM D 698 (Standard Proctor).
a. Pipes and Tunnels: 95 percent.
b. Pipe Bedding: 95 percent.If a compacted layer fails to meet the specified percentage of maximum density, the layer will be re-compacted and retested. If compaction cannot be achieved the material/layer will be removed and replaced. No additional material may be placed over a compacted layer until the specified density is achieved

3.06 GRADING

A. Rough Grading: Trim and grade excavations required by this Contract, to a level of four inches below the finish grades indicated unless otherwise specified herein or where greater depths are indicated. Provide smooth uniform transition to adjacent areas.

3.07 DISPOSAL OF EXCESS AND UNSUITABLE MATERIALS

A. Remove from State property and dispose of excess and unsuitable materials, including materials resulting from clearing and grubbing and removal of existing improvements.

B. Transport excess and unsuitable materials, including materials resulting from clearing and grubbing and removal of existing improvements, to spoil areas on State property designated by the Director's Representative, and dispose of such materials as directed.

3.08 FIELD QUALITY CONTROL

A. Compaction Testing: Notify the Director's Representative at least 3 working days in advance of all phases of filling and backfilling operations. Compaction testing will be performed by the Director's Representative to ascertain the compacted density of the fill and backfill materials. Compaction testing will be performed on certain layers of the fill and backfill as determined by the Director's Representative. If a compacted layer fails to meet the specified percentage of maximum density, the layer shall be re-compacted and will be retested. No additional material may be placed over a compacted layer until the specified density is achieved.

3.09 PROTECTION

A. Protect graded areas from traffic and erosion, and keep them free of trash and debris.

END OF SECTION

SECTION 310000

EARTHWORK

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Rock Removal: Section 312316.

1.02 DEFINITIONS

A. The following terms shall have the meanings ascribed to them in this Article, wherever they appear in this Section.

1. Earth Excavation: The removal of all surface and subsurface material not classified as rock (as defined below).
2. Rock: Limestone, sandstone, shale, granite, and similar material in solid beds or masses in its original or stratified position which can be removed only by blasting operations, drilling, wedging, or use of pneumatic tools, and boulders with a volume greater than 1.0 cu yd. Concrete building foundations and concrete slabs, not indicated, with a volume greater than 1.0 cu yd shall be classified as rock.
    a. Limestone, sandstone, shale, granite, and similar material in a broken or weathered condition which can be removed with an excavator or backhoe equipped with a bucket with ripping teeth or any other style bucket shall be classified as earth excavation.
    b. Masonry building foundations, whether indicated or not, shall be classified as earth excavation.
3. Subgrade Surface: Surface upon which subbase or topsoil is placed.
4. Subbase: Select granular material or subbase course Type 2 which is placed immediately beneath pavement or concrete slabs.
5. Maximum Density: The dry unit weight in pounds per cubic foot of the soil at “Optimum Moisture Content” when determined by ASTM D 698 (Standard Proctor)..
6. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
7. Landscaped Areas: Areas not covered by structures, walks, roads, paving, or parking.
8. Unauthorized Excavation: The removal of material below required elevation indicated on the Drawings or beyond lateral dimensions indicated or specified without specific written direction by the Director’s Representative.

1.03 SUBMITTALS

C. Quality Control Submittals:
   1. Excavation Procedure: Submit a lay out drawing or detailed outline of intended excavation procedure for the Director's information. This submittal will not relieve the Contractor of responsibility for the successful performance of intended excavation methods.
   2. Other Aggregates: Name and location of source and soil laboratory test results.

1.04 PROJECT CONDITIONS

A. On-site soils do not meet the gradation requirements of selected fill.

B. Cold Weather Requirements:
   1. Excavation: When freezing temperatures are anticipated, do not excavate to final required elevations for concrete work unless concrete can be placed immediately.
   2. Backfilling: If backfill is being placed during freezing temperatures the backfilling operations shall be monitored by the Director's Representative and the following procedures shall be followed:
      a. Frozen ground shall be removed in its entirety from beneath and five feet beyond the area of fill placement.
      b. The fill material placed shall consist of Selected Fill and shall be free of all frozen chunks that exceed four inches in size. The material transported to the project site shall only consist of material excavated from below the frost depth.
      c. At the end of the work day, the area of fill placement shall be covered with insulated blankets, or left unprotected. Other means of protection (hay, wood chips, etc.) may also be used for protection provided it is approved by the Director's Representative.
      d. Following work day, remove the insulated blankets and/or strip the area of all frozen material as specified previously.
      e. Upon establishing the subgrade elevations, protect the grades with insulated blankets or place additional material that will adequately insulate the exposed earth surface from frost.

PART 2 PRODUCTS

2.01 MATERIALS

A. Selected Fill: Sound, durable, sand, gravel, stone, or blends of these materials, free from organic and other deleterious materials. Comply with the gradation requirements specified below:

Sieve		Percent Passing
Sieve Size	Size opening (mm)	
4 inch	101.6	100

Sieve		Percent Passing
Sieve Size	Size opening (mm)	
No. 40	0.425	0-70
No. 200	0.075	0-15

BCushion Material: Shall consist of clean, hard, durable, uncoated particles, free from lumps of clay and all deleterious substances and shall meet the following gradation requirements:

Sieve Size		Percent Passing
Sieve Size	Size opening (mm)	
1/4 inch	6.35	100
No. 60	0.25	0-35
No. 100	0.15	0-10

C. Marker Tape: FL Industries Blackburn/Holub's Type YT6, or Seton Nameplate Corporations Type 6 ELE, imprinted with message suited to item buried below.

PART 3 EXECUTION

3.01 CLEARING AND GRUBBING

A. Fill depressions caused by the clearing and grubbing operations in accordance with the requirements for filling and backfilling, unless further excavation is indicated.

3.02 REMOVAL OF TOPSOIL

A. Remove existing topsoil from areas where excavation or fill is required.

B. Stockpile approved topsoil where directed until required for use. Place, grade, and shape stockpiles for proper drainage.

3.03 UNDERGROUND UTILITIES

A. Do not interrupt existing utilities that are in service until temporary or new utilities are installed and operational.

B. Utilities abandoned beneath and five feet laterally beyond the structure's proposed footprint shall be removed in their entirety. Excavations required for their removal shall be backfilled and compacted as specified herein.

C. Utilities located outside the limits specified above may be abandoned in place provided their ends are adequately plugged as described below.

1. Permanently close open ends of abandoned underground utilities exposed by excavations, which extend outside the limits of the area to be excavated.

2. Close open ends of metallic conduit and pipe with threaded galvanized metal caps or plastic plugs or other approved method for the type of material and size of pipe. Do not use wood plugs.

3.04 EXCAVATION

A. Excavate earth as required for the Work.

B. Maintain sides and slopes of excavations in a safe condition until completion of backfilling. Comply with Code of Federal Regulations Title 29 - Labor, Part 1926 (OSHA).
1. Trenches: Deposit excavated material on one side of trench only. Trim banks of excavated material to prevent cave-ins and prevent material from falling or sliding into trench. Keep a clear footway between excavated material and trench edge. Maintain areas to allow free drainage of surface water.

C. Pipe Trenches: Open only enough trench length to facilitate laying pipe sections. Unless otherwise indicated on the Drawings, excavate trenches approximately 24 inches wide plus the outside pipe diameter, equally divided on each side of pipe centerline. Cut trenches to cross section, elevation, profile, line, and grade indicated. Accurately grade and shape trench bottom for uniform bearing of pipe.

D. Unauthorized Excavations: Unless otherwise directed, backfill unauthorized excavation under footings, foundation bases, and retaining walls with compacted select granular material without altering the required footing elevation. Elsewhere, backfill and compact unauthorized excavation as specified for authorized excavation of the same classification, unless otherwise directed by the Director.
1. Unauthorized excavations under structural Work such as footings, foundation bases, and retaining walls shall be reported immediately to the Director before any concrete or backfilling Work commences.

E. Notify the Director's Representative upon completion of excavation operations. Do not proceed with the Work until the excavation is inspected and approved. Inspection of the excavation by the Director's Representative will be made on 3 working days notice.

3.05 DEWATERING

A. Prevent surface and subsurface water from flowing into excavations and trenches and from flooding the site and surrounding area.

B. Do not allow water to accumulate in excavations or trenches. Remove water from all excavations immediately to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades and foundations. Furnish and maintain pumps, sumps, suction and discharge piping systems, and other system components necessary to convey the water away from the Site.

C. Convey water removed from excavations, and rain water, to collecting or run-off area. Cut and maintain temporary drainage ditches and provide other necessary diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches.

D. Provide temporary controls to restrict the velocity of discharged water as necessary to prevent erosion and siltation of receiving areas.

3.06 PLACING FILL AND BACKFILL

A. Excavations: Backfill as promptly as practicable, but only after approval by the Director's Representative. Do not backfill with excavated material unless it meets the requirements of this Section.

B. Place backfill and fill materials in layers not more than 8 inches thick in loose depth unless otherwise specified. Before compaction, moisten or aerate each layer as necessary to facilitate compaction to the required density. Do not place backfill or fill material on surfaces that are muddy, frozen, or covered with ice.
   1. Place fill and backfill against foundation walls, and in confined areas (such as trenches) not easily accessible by larger compaction equipment, in maximum six inch thick (loose depth) layers.

C. Prevent wedging action of backfill against structures by placing backfill uniformly around structure to approximately same elevation in each layer. Place backfill against walls of structures containing basements or crawl spaces only after the first floor structural members are in place.

D. Landscaped Areas: Place selected fill when required to complete fill or backfill areas up to subgrade surface elevation.

E. Under Pavements and Walks:
   1. Up to Subgrade Surface Elevation: Place selected fill when fill or backfill is required.
   2. Subbase Material: Subbase for pavement restoration to be placed and compacted by Construction Trade.

F. Plastic Pipe in Trenches: Place cushion material a minimum of six inches deep under pipe, 12 inches on both sides, and 12 inches above top of pipe. Complete balance of backfill as specified.

G. Pipe Tunnels: Place selected fill a minimum of 12 inches on both sides and over top of tunnel.

H. Marker Tape: Install marker tape 4 inches below finish grade directly over the following:
   1. Pre-insulated steam line.

3.07 COMPACTION

A. All materials:

1. Compact each layer of fill and backfill for the following area classifications to the percentage of maximum density specified below and at a moisture content suitable to obtain the required densities, but at not less than three percent drier or more than two percent wetter than the optimum content as determined by ASTM D 698 (Standard Proctor).

a. Landscaped Areas: 90 percent.

b. Pipes and Tunnels: 95 percent.

c. Pipe Bedding: 95 percent.If a compacted layer fails to meet the specified percentage of maximum density, the layer will be re-compacted and retested. If compaction cannot be achieved the material/layer will be removed and replaced. No additional material may be placed over a compacted layer until the specified density is achieved

3.08 GRADING

A. Rough Grading: Trim and grade excavations required by this Contract, to a level of four inches below the finish grades indicated unless otherwise specified herein or where greater depths are indicated. Provide smooth uniform transition to adjacent areas.

B. Finish Grading: Finish surfaces free from irregular surface changes, and as follows:

1. Grassed Areas: Finish areas to receive topsoil to within 1 inch above or below the required subgrade surface elevations.

3.09 DISPOSAL OF EXCESS AND UNSUITABLE MATERIALS

A. Remove from State property and dispose of excess and unsuitable materials, including materials resulting from clearing and grubbing and removal of existing improvements.

B. Transport excess and unsuitable materials, including materials resulting from clearing and grubbing and removal of existing improvements, to spoil areas on State property designated by the Director's Representative, and dispose of such materials as directed.

3.10 FIELD QUALITY CONTROL

A. Compaction Testing: Notify the Director's Representative at least 3 working days in advance of all phases of filling and backfilling operations. Compaction testing will be performed by the Director's Representative to ascertain the compacted density of the fill and backfill materials. Compaction testing will be performed on certain layers of the fill and backfill as determined by the Director's Representative. If a compacted layer fails to meet the specified percentage of maximum density, the layer shall be re-compacted and will be retested. No additional material may be placed over a compacted layer until the specified density is achieved.

3.11 PROTECTION

A. Protect graded areas from traffic and erosion, and keep them free of trash and debris.

END OF SECTION

SECTION 310000

EARTHWORK

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Rock Removal: Section 312316.

1.02 DEFINITIONS

A. The following terms shall have the meanings ascribed to them in this Article, wherever they appear in this Section.
   1. Earth Excavation: The removal of all surface and subsurface material not classified as rock (as defined below).
   2. Rock: Limestone, sandstone, shale, granite, and similar material in solid beds or masses in its original or stratified position which can be removed only by blasting operations, drilling, wedging, or use of pneumatic tools, and boulders with a volume greater than 1.0 cu yd. Concrete building foundations and concrete slabs, not indicated, with a volume greater than 1.0 cu yd shall be classified as rock.
      a. Limestone, sandstone, shale, granite, and similar material in a broken or weathered condition which can be removed with an excavator or backhoe equipped with a bucket with ripping teeth or any other style bucket shall be classified as earth excavation.
      b. Masonry building foundations, whether indicated or not, shall be classified as earth excavation.
   3. Subgrade Surface: Surface upon which subbase or topsoil is placed.
   4. Subbase: Select granular material or subbase course Type 2 which is placed immediately beneath pavement or concrete slabs.
   5. Maximum Density: The dry unit weight in pounds per cubic foot of the soil at “Optimum Moisture Content” when determined by ASTM D 698 (Standard Proctor)..
   6. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
   7. Landscaped Areas: Areas not covered by structures, walks, roads, paving, or parking.
   8. Unauthorized Excavation: The removal of material below required elevation indicated on the Drawings or beyond lateral dimensions indicated or specified without specific written direction by the Director’s Representative.

1.03 SUBMITTALS

A. Quality Control Submittals:
   1. Excavation Procedure: Submit a lay out drawing or detailed outline of intended excavation procedure for the Director’s information. This

submittal will not relieve the Contractor of responsibility for the successful performance of intended excavation methods.

2. Other Aggregates: Name and location of source and soil laboratory test results.

1.04 PROJECT CONDITIONS

A. Protect existing trees and plants during performance of the Work unless otherwise indicated. Box trees and plants indicated to remain within the grading limit line with temporary steel fencing or solidly constructed wood barricades as required. Protect root systems from smothering. Do not store excavated material, or allow vehicular traffic or parking within the branch drip line. Restrict foot traffic to prevent excessive compaction of soil over root systems.

B. On-site soils do not meet the gradation requirements of selected fill.

C. Cold Weather Requirements:

1. Excavation: When freezing temperatures are anticipated, do not excavate to final required elevations for concrete work unless concrete can be placed immediately.
2. Backfilling: If backfill is being placed during freezing temperatures the backfilling operations shall be monitored by the Director's Representative and the following procedures shall be followed:
   a. Frozen ground shall be removed in its entirety from beneath and five feet beyond the area of fill placement.
   b. The fill material placed shall consist of Selected Fill and shall be free of all frozen chunks that exceed four inches in size. The material transported to the project site shall only consist of material excavated from below the frost depth.
   c. At the end of the work day, the area of fill placement shall be covered with insulated blankets, or left unprotected. Other means of protection (hay, wood chips, etc.) may also be used for protection provided it is approved by the Director's Representative.
   d. Following work day, remove the insulated blankets and/or strip the area of all frozen material as specified previously.
   e. Upon establishing the subgrade elevations, protect the grades with insulated blankets or place additional material that will adequately insulate the exposed earth surface from frost.

PART 2 PRODUCTS

2.01 MATERIALS

A. Selected Fill: Sound, durable, sand, gravel, stone, or blends of these materials, free from organic and other deleterious materials. Comply with the gradation requirements specified below:

Sieve		Percent Passing
Sieve Size	Size opening (mm)	
4 inch	101.6	100
No. 40	0.425	0-70
No. 200	0.075	0-15

B. Cushion Material: Shall consist of clean, hard, durable, uncoated particles, free from lumps of clay and all deleterious substances and shall meet the following gradation requirements:

Sieve Size		Percent Passing
Sieve Size	Size opening (mm)	
1/4 inch	6.35	100
No. 60	0.25	0-35
No. 100	0.15	0-10

PART 3 EXECUTION

3.01 CLEARING AND GRUBBING

A. Clear and grub the site in locations indicated on the drawings of trees, shrubs, brush, other prominent vegetation, debris, and obstructions except for those items indicated to remain. Completely remove stumps and roots protruding through the ground surface.

B. Fill depressions caused by the clearing and grubbing operations in accordance with the requirements for filling and backfilling, unless further excavation is indicated.

3.02 REMOVAL OF TOPSOIL

A. Remove existing topsoil from areas where excavation or fill is required.

B. Stockpile approved topsoil where directed until required for use. Place, grade, and shape stockpiles for proper drainage.

3.03 UNDERGROUND UTILITIES

A. Do not interrupt existing utilities that are in service until temporary or new utilities are installed and operational.

3.04 EXCAVATION

A. Excavate earth as required for the Work.

B. Install and maintain all erosion and sedimentation controls during all earthwork operations as specified on the Contract Drawings or as directed by local officials. If the erosion and sedimentation controls specified by the local

officials are more stringent than those specified on the Contract Drawings contact the Director's Representative.

C. Maintain sides and slopes of excavations in a safe condition until completion of backfilling. Comply with Code of Federal Regulations Title 29 - Labor, Part 1926 (OSHA).

1. Trenches: Deposit excavated material on one side of trench only. Trim banks of excavated material to prevent cave-ins and prevent material from falling or sliding into trench. Keep a clear footway between excavated material and trench edge. Maintain areas to allow free drainage of surface water.

D. Stockpile excavated materials classified as suitable material where directed, until required for fill. Place, grade, and shape stockpiles for proper drainage as approved by the Director's Representative.

E. Piping (other than Bell and Spigot): Provide sufficient trench width for installation and to accommodate special backfill when specified.

F. Unauthorized Excavations: Unless otherwise directed, backfill unauthorized excavation under footings, foundation bases, and retaining walls with compacted select granular material without altering the required footing elevation. Elsewhere, backfill and compact unauthorized excavation as specified for authorized excavation of the same classification, unless otherwise directed by the Director.

1. Unauthorized excavations under structural Work such as footings, foundation bases, and retaining walls shall be reported immediately to the Director before any concrete or backfilling Work commences.

G. Notify the Director's Representative upon completion of excavation operations. Do not proceed with the Work until the excavation is inspected and approved. Inspection of the excavation by the Director's Representative will be made on 3 working days notice.

3.05 DEWATERING

A. Prevent surface and subsurface water from flowing into excavations and trenches and from flooding the site and surrounding area.

B. Do not allow water to accumulate in excavations or trenches. Remove water from all excavations immediately to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades and foundations. Furnish and maintain pumps, sumps, suction and discharge piping systems, and other system components necessary to convey the water away from the Site.

C. Convey water removed from excavations, and rain water, to collecting or run-off area. Cut and maintain temporary drainage ditches and provide other necessary diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches.

D. Provide temporary controls to restrict the velocity of discharged water as necessary to prevent erosion and siltation of receiving areas.

3.06 PLACING FILL AND BACKFILL

A. Excavations: Backfill as promptly as practicable, but only after approval by the Director's Representative. Do not backfill with excavated material unless it meets the requirements of this Section.

B. Place backfill and fill materials in layers not more than 8 inches thick in loose depth unless otherwise specified. Before compaction, moisten or aerate each layer as necessary to facilitate compaction to the required density. Do not place backfill or fill material on surfaces that are muddy, frozen, or covered with ice.
   1. Place fill and backfill against foundation walls, and in confined areas (such as trenches) not easily accessible by larger compaction equipment, in maximum six inch thick (loose depth) layers.

C. Prevent wedging action of backfill against structures by placing backfill uniformly around structure to approximately same elevation in each layer. Place backfill against walls of structures containing basements or crawl spaces only after the first floor structural members are in place.

D. Under Pavements and Walks:
   1. Up to Subgrade Surface Elevation: Place selected fill when fill or backfill is required.
   2. Subbase Material: Subbase for pavement restoration to be placed and compacted by Construction Trade.

E. Landscaped Areas: Place selected fill when required to complete fill or backfill areas up to subgrade surface elevation.

F. Plastic Pipe in Trenches: Place cushion material a minimum of six inches deep under pipe, 12 inches on both sides, and 12 inches above top of pipe. Complete balance of backfill as specified.

G. Pipe Tunnels: Place selected fill a minimum of 12 inches on both sides and over top of tunnel.

3.08 COMPACTION

A. All materials:
   1. Compact each layer of fill and backfill for the following area classifications to the percentage of maximum density specified below and at a moisture content suitable to obtain the required densities, but at not less than three percent drier or more than two percent wetter than the optimum content as determined by ASTM D 698 (Standard Proctor).
      a. Landscaped Areas: 90 percent.
      b. Pavements: 95 percent.
      c. Pipes: 95 percent.

d. Pipe Bedding: 95 percent.If a compacted layer fails to meet the specified percentage of maximum density, the layer will be re-compacted and retested. If compaction cannot be achieved the material/layer will be removed and replaced. No additional material may be placed over a compacted layer until the specified density is achieved

3.09 GRADING

A. Rough Grading: Trim and grade excavations required by this Contract, to a level of four inches below the finish grades indicated unless otherwise specified herein or where greater depths are indicated. Provide smooth uniform transition to adjacent areas.

B. Finish Grading: Finish surfaces free from irregular surface changes, and as follows:

1. Grassed Areas: Finish areas to receive topsoil to within 1 inch above or below the required subgrade surface elevations.

3.11 DISPOSAL OF EXCESS AND UNSUITABLE MATERIALS

A. Remove from State property and dispose of excess and unsuitable materials, including materials resulting from clearing and grubbing and removal of existing improvements.

B. Transport excess and unsuitable materials, including materials resulting from clearing and grubbing and removal of existing improvements, to spoil areas on State property designated by the Director's Representative, and dispose of such materials as directed.

3.12 FIELD QUALITY CONTROL

A. Compaction Testing: Notify the Director's Representative at least 3 working days in advance of all phases of filling and backfilling operations. Compaction testing will be performed by the Director's Representative to ascertain the compacted density of the fill and backfill materials. Compaction testing will be performed on certain layers of the fill and backfill as determined by the Director's Representative. If a compacted layer fails to meet the specified percentage of maximum density, the layer shall be re-compacted and will be retested. No additional material may be placed over a compacted layer until the specified density is achieved.

3.13 PROTECTION

A. Protect graded areas from traffic and erosion, and keep them free of trash and debris.

END OF SECTION

SECTION 331102

PLASTIC WATER PIPE AND FITTINGS

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Excavation: Section 310000.

1.02 SUBMITTALS

A. Product Data: Manufacturer's specifications with detailed information regarding dimensions, pressure rating, fittings and installation instructions. Manufacturer's data must indicate compliance with the standards specified herein.

PART 2 PRODUCTS

2.01 GENERAL

A. Provide pipe and fittings approved by the National Sanitation Foundation (NSF) for use with potable water.

B. Each length of pipe (coils at 5 feet intervals) shall be marked to identify size, material type and grade, pressure rating, ASTM Designation, manufacturer, and NSF approval.

2.02 POLYVINYL CHLORIDE (PVC) PIPE – Used underground outside tunnels.

A. Comply with AWWA Specification C900 for nominal pipe diameters 4 inches through 12 inches and with AWWA Specification C905 for nominal pipe diameters 14 inches through 36 inches.

B. Pipe Material: PVC 1120 meeting ASTM cell classification 12454-B..

C. Pipe used underground in sizes 1-1/2 inches and larger shall be joined using rubber gasketed bells or couplings. Pipe under 1-1/2 inches shall be joined by solvent cementing.

D. PVC pipe, SDR-PR; (Standard Dimension Ratio-Pressure Rated): ASTM D 2241.

E. PVC Pipe with integral bell-end for solvent cementing: ASTM D 2672.

F. Pipe shall be of the size, schedule, SDR, and pressure rating shown on the drawings or specified below.

PRESSURE RATINGS FOR PVC 1120 AND PVC 1220 NON-THREADED PIPE AT 23 DEGREES C (73.40 F)			
SDR	**PR (PSI)**	**SIZE (IN)**	**SCH.40 PR (PSI)**
41	100	3	260

2.03 PLASTIC FITTINGS

A. Provide fittings of the same size and pressure rating as the pipe to which they are connected.

B. Provide fittings as recommended by the pipe manufacturer to comply with the appropriate Standard listed below:

PE Fused Socket Type, SDR 11: ASTM D 2683.

Insert Type for PE pipe: ASTM D 2609.

C. Provide stainless steel clamps with insert type fittings for PE pipe.

2.04 SOLVENT CEMENT AND JOINTS

A. Solvent Cement for Joining PVC Pipe and Fittings: ASTM D 2564.

B. Rubber Gasketed Joints: ASTM D 3139.

PART 3 EXECUTION

3.01 INSPECTION

A. Inspect pipe and fittings before installation. Remove defective materials from the site.

3.02 GENERAL

A. Install pipe in accordance with the manufacturer's recommendations.

B. Underground Pipe: Install in accordance with ASTM D 2774.

C. PVC Pipe with Solvent Cemented Joints: Install in accordance with ASTM D 2855.

D. Pipe with Heat Fused Joints: Install in accordance with ASTM D 2657.

3.03 INSTALLATION

A. Install pipe as indicated on the Drawings.

B. Pipe in Trenches:

1. Keep trenches free from water.
2. Grade and shape trench bottom to insure a firm uniform bearing for the entire trench length. Provide a minimum cover of 4'-6" to finished grade unless otherwise shown on the drawings.
3. Cut pipe as recommended by the manufacturer.
4. Lay pipe on a continuously rising grade from low points to high points at service lines, air release valves or hydrants.
5. At each joint, dig a bell hole sufficiently wide and deep to allow the pipe barrel to bear uniformly on the trench bottom.
6. Construct concrete thrust blocks behind bends, tees, caps and plugs as shown on the drawings. Cast concrete against undisturbed earth.

3.04 PROTECTING PIPE

A. During the progress of the Work keep pipe clean from all sediment, debris, and other foreign material.

B. Close all open ends of pipes and fittings securely with removable plugs at end of Work day, during storms, when the Work is left at any time, and at such times as the Director's Representative may direct.

3.05 PERFORMANCE

A. Description: Before testing, backfill or otherwise brace the pipe barrels between joints to prevent movement under pressure.

B. Hydrostatic Test: Before testing, backfill or otherwise brace the pipe barrels between joints to prevent movement under pressure.
1. After the water main has been disinfected and before the pipe joints, fittings, valves, or other appurtenances are covered, expel and test the water main for two hours at 1.5 times the pressure rating(s) listed for the various types of pipe specified in Part 2.
2. Remove all defective pipe, fittings, valves and appurtenances and replace with sound pipe, fittings, valves, or appurtenances, and repair all joints showing visible leaks until tight and repeat the test until satisfactory to the Director's Representative.

C. Leakage Test:
1. Conduct a leakage test after the pressure test has been satisfactorily completed.
2. Leakage is defined as the quantity of water to be supplied into the laid pipe, or any valved section thereof, necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled.
3. The duration of each leakage test shall be two hours.
4. During the leakage test subject the pipe to its rated pressure.
5. No pipe installation will be accepted until the leakage is not more than the number of gallons per hour as determined by the following formula:

$$\frac{L - ND \times \sqrt{P}}{7400}$$

in which:

L = allowable leakage in gallons per hour

N = number of joints in length of pipe line tested

D = nominal diameter of pipe, inches

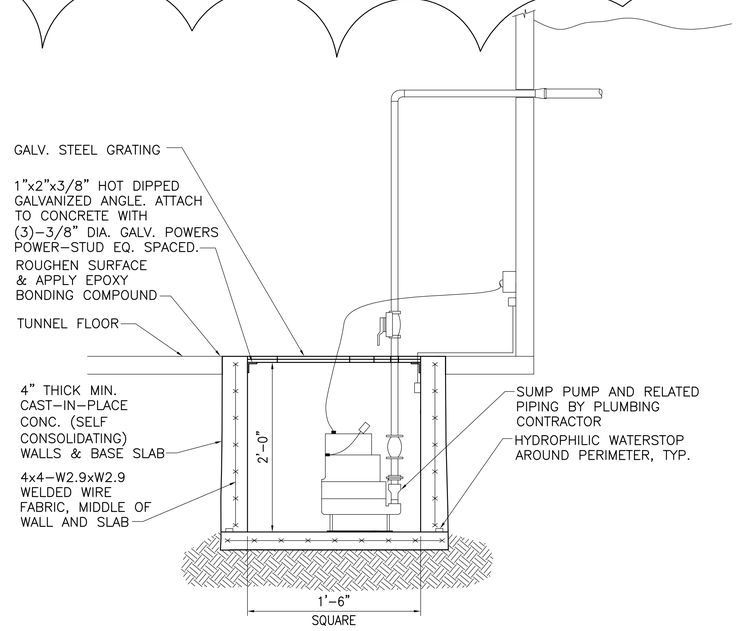
P = average test pressure during the leakage test (PSI)

6. Should any test of pipe disclose leakage greater than that computed by the above formula, locate and repair the defects so that the leakage is within the specified allowance. The hydrostatic and leakage tests shall be made on such lengths of pipe and in such manner as the Director's Representative shall direct and in his presence. Keep trenches free from water to the satisfaction of the Director's Representative until the completion of the tests.

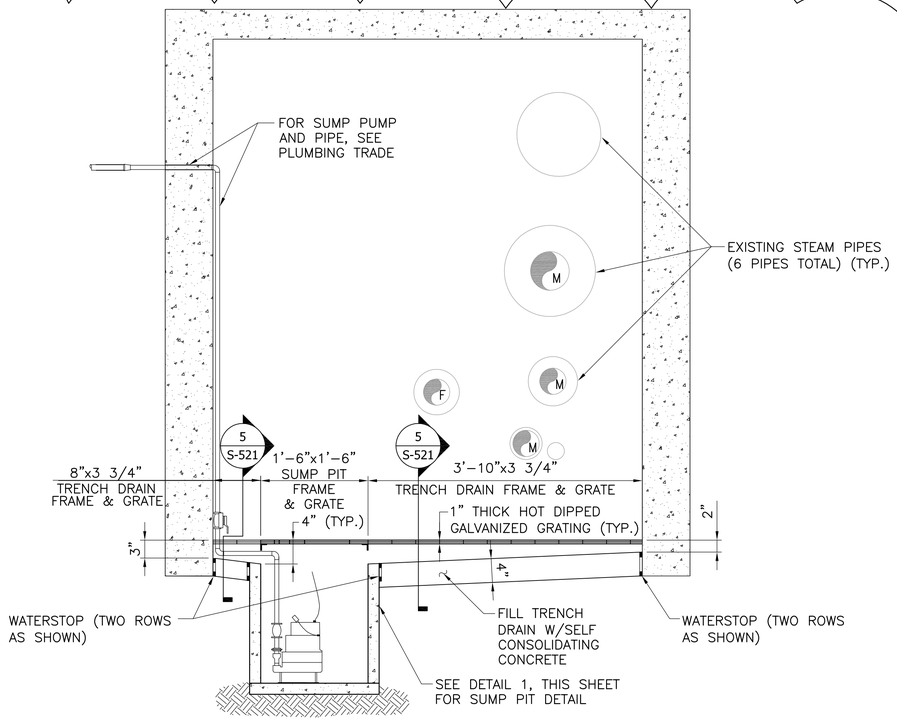
D. Connections:

1. Make connections between the pipe lines installed under this contract and the existing pipe lines or structures shown on the drawings. Should it be impossible to make a connection shown on the drawings because the pipe with which the connection is shown to be made has not yet been installed, lay the pipe to a point directed by the Director's Representative and plug or cap the end in a satisfactory manner; identify the terminal point with a stake extending above ground marked to indicate the pipe size and service.

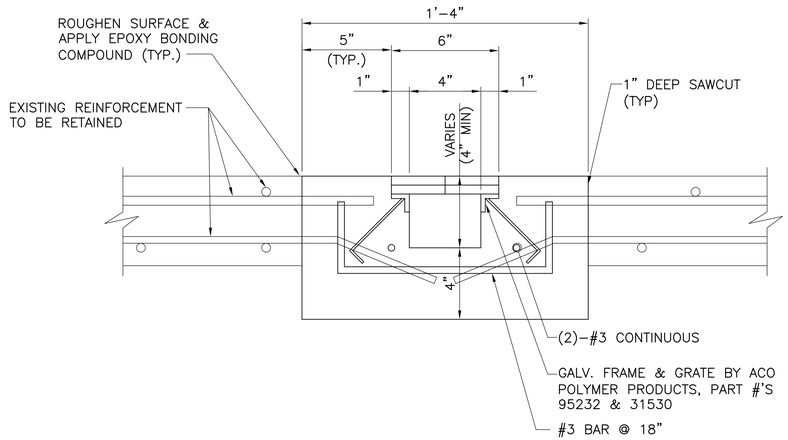
END OF SECTION



1 SUMP PUMP DETAIL
SCALE: NONE



4 SUMP PUMP DETAIL @ STA. A47+75
SCALE: 3"=1'–0"



5 SECTION
SCALE: 3"=1'–0"

1

NYS OFFICE OF GENERAL SERVICES
Serving New York
ANDREW M. CUOMO
Governor
ROANN M. DESTITO
Commissioner

CONSULTANT

GPI
GREENMAN-PEDERSEN, INC.
CONSULTING ENGINEERS
80 WOLF ROAD, SUITE 300
ALBANY, NY 12205
TEL: (518) 453–9431
FAX: (518) 453–9458
WWW.GPINET.COM

CONTRACT:
CONSTRUCTION

TITLE:
REPAIR UNDERGROUND STEAM TUNNELS

LOCATION:
WILLARD DRUG TREATMENT CENTER
7116 COUNTY ROUTE 132
WILLARD, NEW YORK

CLIENT:
DEPARTMENT OF CORRECTIONS AND COMMUNITY SUPERVISION

REVISED DRAWING
3/13/2013

MARK	DATE	DESCRIPTION
1	03/12/2013	ADDENDUM 4
	02/06/2013	BID DOCUMENT

PROJECT NUMBER:	44288–C
DESIGNED BY:	M. BORGEL
DRAWN BY:	F. CUOCCIO
FIELD CHECK:	
APPROVED:	

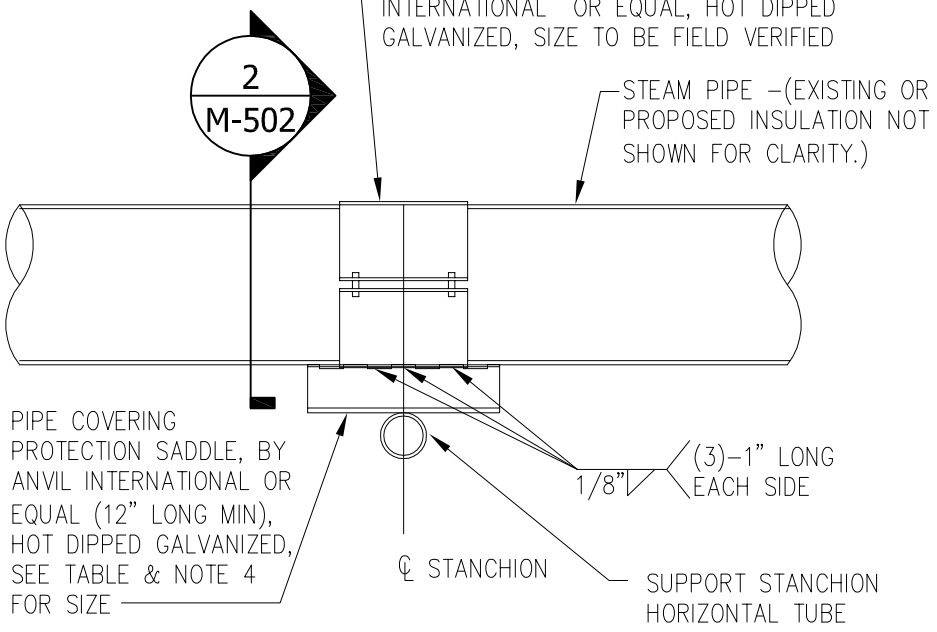
SHEET TITLE:
MISCELLANEOUS DETAILS

DRAWING NUMBER:
S–521

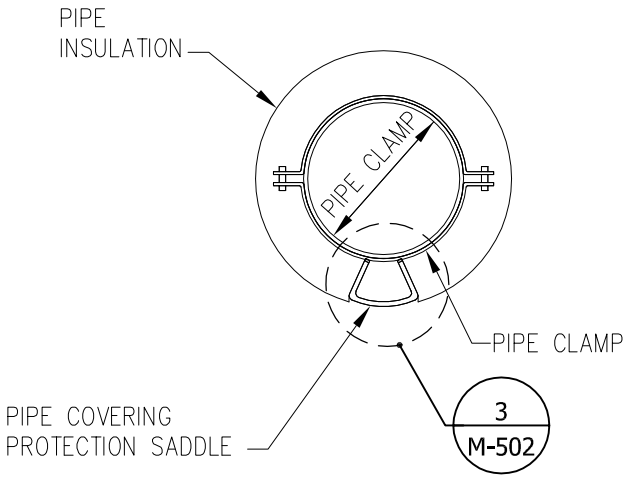
SHEET 162 OF 197

PIPE SADDLE TABLE	
INSULATION THICKNESS	PART #
2"	FIG 162
3"	FIG 164
3 1/2"	FIG 165

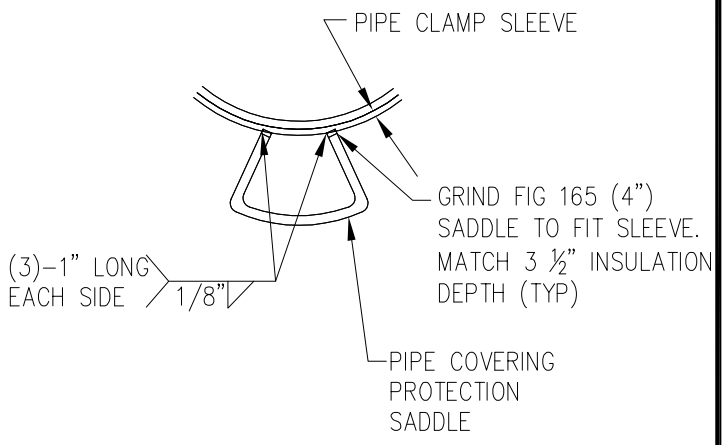
NOTES:
1. CUT INSULATION TO FIT SNUG AROUND PIPE SADDLE AND SEAL JOINT.
2. REFER TO CONSTRUCTION CONTRACT DRAWINGS FOR PIPE CONFIGURATIONS DRAWINGS AND STANCHION REPAIR LOCATION DRAWINGS.
3. CLAMP & SADDLE ARE TO BE PROVIDED FOR EACH ACTIVE PIPE AT ALL STANCHION REPAIR LOCATIONS.
4. WHERE TWO SIZES OF PIPE SADDLES ARE REQUIRED ON THE SAME SUPPORT, USE THE LARGER SADDLE.



1 PIPE CLAMP & SADDLE DETAIL
NOT TO SCALE



2 SECTION
NOT TO SCALE



3 ENLARGED DETAIL
NOT TO SCALE

ADDENDUM #4 REFERENCE DRAWING: M-103

NYS OFFICE OF GENERAL SERVICES
Serving New York

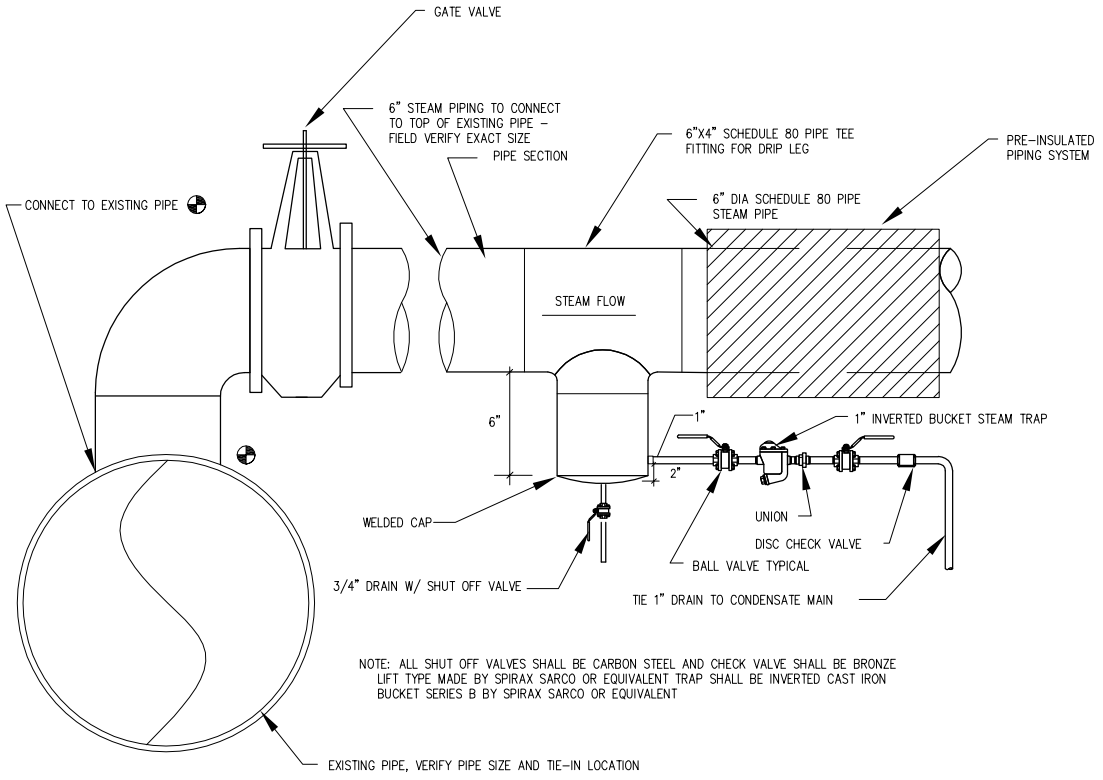
SHEET TITLE: PIPE SADDLE DETAILS

PROJECT: REPAIR UNDERGROUND STEAM TUNNELS

CONTRACT:	HVAC
PROJ. NO:	44288-H
DATE:	03/13/2013
DRAWN:	MJB
APPROVED:	KSP

DWG NO: M-502

8.5x11 PLOT SHEET



LOCATED AT BASE OF STEAM PIPING IN EXISTING TUNNEL

5 DRIP AND TRAP DETAIL

NOT TO SCALE

ADDENDUM #4	REFERENCE DRAWING: M-501
SHEET TITLE:	DRIP AND TRAP DETAIL
PROJECT:	REPAIR UNDERGROUND STEAM TUNNELS

NYS OFFICE OF GENERAL SERVICES

Serving New York

CONTRACT:	HVAC
PROJ. NO:	44288-H
DATE:	03/13/2013
DRAWN:	SJV
APPROVED:	JPH

DWG NO: M-503

8.5x11 PLOT SHEET