Part 1 General

1.1 SUMMARY

.1 Section includes descriptions for demolishing, salvaging, recycling and removing site work items identified for removal in whole or in part, and for backfilling trenches and excavations resulting from site demolition activities.

1.2 RELATED REQUIREMENTS

.1 Section 02 41 13.13 - Paving Removal

.2 Section 02 42 00 - Removal and Salvage of Construction Materials

.3 Section 31 23 33.01 - Excavating, Trenching and Backfilling

1.3 PRICE AND PAYMENT PROCEDURES

.1 Measurement Procedures: Coordinate with Section 01 74 19 - Construction Waste Management and Disposal, and as follows:

.1 Measure removal of asphaltic concrete pavement in square metres in accordance with Section 02 41 13.13 - Paving Removal.

.2 Measure removal of Portland cement concrete pavement in square.

.3 Measure removal of base and sub-base pavement materials in square metres cubic metres in place.

.4 Measure removal of culverts, pipe sewers and drains in.

.1 End points of measurements will be at centres of maintenance holes or catch basins or open ends of pipes, as applicable.

.5 Measure removal of maintenance holes and catch basins in units.

.6 Measure removal of fences and curbs in metres.

1.4 DEFINITIONS

.1 Selective Demolition: Sequencing demolition activities to allow separation and sorting of selected site materials.

.2 Hazardous Substances: dangerous substances, dangerous goods, hazardous commodities and hazardous products, including but not limited to: asbestos PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well being or environment if handled improperly.

1.5 REFERENCE STANDARDS

.1 Canada Green Building Council (CaGBC)

.1 LEED® Reference Guide for Building Design and Construction, Version 4

.2 Department of Justice Canada (Jus)

.1 Canadian Environmental Assessment Act (CEAA), 2012

.2 Canadian Environmental Protection Act (CEPA), 2012

.1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations

.2 SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations

.3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34

.4 Motor Vehicle Safety Act (MVSA), 1995

.5 Hazardous Materials Information Review Act, 1985

.3 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S660- [08], Standard for Nonmetallic Underground Piping for Flammable and Combustible Liquids

.2 ULC/ORD-C58.15- [1992], Overfill Protection Devices for Flammable Liquid Storage Tanks

.3 ULC/ORD-C58.19- [1992], Spill Containment Devices for Underground Flammable Liquid Storage Tanks

.4 United States Environmental Protection Agency (EPA)

.1 EPA CFR 86.098-10, Emission standards for 1998 and later model year Otto-cycle heavy-duty engines and vehicles

.2 EPA CFR 86.098-11, Emission standards for 1998 and later model year diesel heavy-duty engines and vehicles

.1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices

.5 Quinte West Engineering Standards

1.6 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate with Owner’s representative for the material ownership including the following:

.1 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor 's property and shall be removed from Project site.

.2 Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during demolition remain Owner's property:

.1 Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.

.2 Coordinate with Owner's representative, who will establish special procedures for removal and salvage operations.

.2 Pre-Demolition Meetings.

.1 Convene meeting 1 week before beginning work under this Section, with Contractor and Consultant in accordance with Section 01 31 19 - Project Meetings to:

.1 Verify project requirements.

.2 Verify existing site conditions adjacent to demolition work

.3 Coordinate with other construction sub trades

.4 Examine existing site conditions adjacent to demolition work, prior to start of Work

.5 Waste reporting requirements

.2 Hold project meetings every week month.

.3 Ensure key personnel, site supervisor, project manager and subcontractor representatives attend.

.4 Representative consultant will provide written verbal notification of change of meeting schedule established upon contract award 24 hours prior to scheduled meeting.

.3 Scheduling:

.1 Employ necessary means to meet project timelines without compromising specified minimum rates of material diversion.

.2 In event of unforeseen delay notify representative and consultant in writing.

1.7 ACTION AND INFORMATIONAL SUBMITTALS

.1 Action Submittals: Provide the following submittals before starting any work of this Section:

.1 Shop Drawings: Submit drawings stamped and signed by professional engineer registered or licensed in Ontario, Canada as follows:

.1 Submit for review and approval selective site demolition drawings, diagrams or details showing sequence of selective site demolition.

.2 Schedule of Selective Site Demolition Activities: Coordinate with Section 01 32 16.16 - Construction Progress Schedule - Critical Path Method (CPM), and indicate the following:

.1 Detailed sequence of selective site demolition and removal work, with starting and ending dates for each activity

.2 Interruption of utility services

.3 Coordination for shutoff, capping, and continuation of utility services

.4 Locations of temporary partitions and means of egress

.3 Proposed Dust Control and Noise Control Measures: Submit statement or drawing that indicates measures proposed for use, proposed locations, and proposed time frame for their operation.

.4 Inventory: Submit a list of items that have been removed and salvaged after selective site demolition is complete

.2 Informational Submittals: Provide the following submittals when requested by the Consultant:

.1 Qualification Data: Submit information for companies and personnel indicating their capabilities and experience to perform work of this Section including; but not limited to, lists of completed projects with project names and addresses, names and addresses of Consultant and representative consultant, for work of similar complexity and extent.

1.8 QUALITY ASSURANCE

.1 Regulatory Requirements: ensure Work is performed in compliance with CEPA, CEAA, TDGA, and applicable Provincial/Territorial regulations.

.2 Comply with hauling and disposal regulations of Authority Having Jurisdiction.

1.9 SITE CONDITIONS

.1 Environmental protection:

- .1 Ensure Work is done in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Ensure Work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
- .3 Fires and burning of waste or materials is not permitted on site.
- .4 Burying of rubbish waste materials is not permitted.
- .5 Disposal of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers, is not permitted.
- .6 Ensure proper disposal procedures are maintained throughout the project.

.2 Pumping of water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties, is not permitted.

.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction as directed by consultant.

.4 Protect trees, plants and foliage on site and adjacent properties where indicated.

.5 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.

.6 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.

.7 Conduct selective site demolition so Owner's operations will not be disrupted:

- .1 Provide not less than 72 hours' notice to Representative Owner of activities that will affect operations.
- .2 Maintain access to existing walkways, exits, and other adjacent occupied or used facilities:
  - .1 Closing or obstructing walkways, exits, or other occupied or used facilities without written permission from consultant authority having jurisdiction is not permitted.

.8 Consultant assumes no responsibility for Selective Site elements being demolished:

- .1 Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- .2 Before selective site demolition, remove, protect and store salvaged items as directed by Owner:
  - .1 Salvage items as identified by Consultant.

.2 Deliver to Owner as directed.

1.10 EXISTING CONDITIONS

.1 Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work:

.1 Hazardous materials will be as defined in the Hazardous Materials Act.

.2 Hazardous materials will be removed by owner before start of the Work.

.2 If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify representative. Hazardous materials will be removed by owner under a separate contract or as a change to the Work.

.3 If material resembling spray or trowel applied asbestos or other substance be encountered in course of demolition, stop work, take preventative measures, and notify representative immediately. Proceed only after receipt of written instructions have been received from representative.

.4 Site elements that will be demolished are based on their condition on date that tender is accepted.

Part 2 Products

2.1 EQUIPMENT

.1 Equipment and Heavy Machinery:

.1 On-road vehicles to: CEPA-SOR/2003-2, On-Road Vehicle and Engine Emission Regulations and CEPA-SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations.

.2 Off-road vehicles to: EPA CFR 86.098-10 and EPA CFR 86.098-11.

.3 Machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

Part 3 Execution

3.1 EXAMINATION

.1 Survey existing conditions and correlate with requirements indicated to determine extent of selective site demolition required.

.2 Consultant does not guaranty that existing conditions are the same as those indicated in Project Record Documents.

.3 Inventory and record the condition of items being removed and salvaged.

.4 When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element. Promptly submit a written report to Representative.

.5 Engage a professional engineer to perform an engineering survey of condition of adjacent buildings to determine whether removing any site element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective site demolition operations.

.6 Verify that hazardous materials have been remediated before proceeding with site demolition operations.

3.2 PREPARATION

.1 Temporary Erosion and Sedimentation Control:

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to: sediment and erosion control drawings sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during demolition.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work.

.2 Protection of in-place conditions:

.1 Work in accordance with Section 01 35 43 - Environmental Procedures and Erosion and Sedimentation Control Plan and Stormwater Pollution Prevention Plan.

.2 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, adjacent grades properties.

.1 Provide bracing, shoring and underpinning as required.

.2 Repair damage caused by demolition as directed by consultant.

.3 Support affected site elements and, if safety of site element being demolished or adjacent structures or services appears to be endangered, take preventative measures, stop Work and immediately notify Representative.

.4 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.

.3 Surface Preparation:

.1 Disconnect and re-route electrical and service lines within the site to be demolished.

.1 Post warning signs on electrical lines and equipment which must remain energized to serve other properties during period of selective site demolition.

.2 Disconnect and cap designated mechanical services.

.1 Natural gas supply lines: remove in accordance with gas company requirements.

.2 Sewer and water lines: remove to property line as directed by Representative Consultant.

.3 Other underground services: remove and dispose of as directed by Representative in accordance with Section 33 71 73.02 - Underground Electrical Service.

3.3 REMOVAL AND DEMOLITION OPERATIONS

.1 Remove items as indicated.

.2 Disruption of items designated to remain in place is not permitted.

.3 Removal of pavements, curbs and gutters:

.1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Consultant.

.2 Protect adjacent joints and load transfer devices.

.3 Protect underlying and adjacent granular materials.

.4 Excavate at least 300 mm below pipe invert, when removing pipes under existing or future pavement area.

.5 Remove designated trees during demolition.

.1 Obtain written approval of representative prior to removal of trees not designated.

.6 Disposal of Material:

.1 Dispose of materials not designated for salvage or reuse on site as instructed by Representative.

.2 Trim disposal areas to approval of Representative.

.7 Backfill: Backfill in areas as indicated and in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.4 STOCKPILING

.1 Label stockpiles, indicating material type and quantity.

.2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.

.3 Locate stockpiled materials convenient for use in new construction to eliminate double handling wherever possible.

.4 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

3.5 REMOVAL FROM SITE

.1 Remove stockpiled material as directed consultant, when it interferes with operations of project.

.2 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.

3.6 RESTORATION

.1 Restore areas and existing works outside areas of demolition to match condition of adjacent, undisturbed areas.

.2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

3.7 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Remove debris, trim surfaces and leave work site clean, upon completion of Work

.3 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

.3 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section includes descriptions for demolishing, salvaging, recycling and removing of asphalt paving identified in whole or in part, and for backfilling trenches and excavations resulting from site demolition activities a required by scope of work.

1.2 RELATED REQUIREMENTS

.1 Section 02 41 13 - Selective Site Demolition

.2 Section 01 74 19 - Construction Waste Management

.3 Section 01 74 00 - Cleaning

1.3 PRICE AND PAYMENT

.1 Removal of existing asphalt pavement will be measured in square metres of surface actually removed regardless of depth removed, and regardless of number of operations required.

.2 Payment under this item will include operations involved in removing, hauling and stockpiling designated pavement and cleaning of remaining pavement surface.

1.4 REFERENCE STANDARDS

.1 Department of Justice Canada (Jus)

.1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.

.2 Canadian Environmental Protection Act, 1999 (CEPA), c. 33.

.2 Ontario Provincial Standard Specifications

.1 Construction Specification for Removal, OPSS.PROV 510 November 2014

1.5 DEFINITIONS

.1 Demolish: Detach items from existing construction and legally dispose of them off site, unless indicated to be removed and salvaged or removed and reinstalled.

.2 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed, removed and salvaged, or removed and reinstalled

.3 All definitions referenced in the contract drawings or standards listed, shall be defined in accordance with the Ontario Provincial Standards

1.6 ACTION AND INFORMATIONAL SUBMITTALS

.1 Informational Submittals: Provide following submittals during course of work:

.1 Certificates: Submit copies of certified weigh bills, bills of lading or receipts from authorized disposal sites and re use and recycling facilities for material removed from site on monthly basis.

1.7 QUALITY ASSURANCE

.1 Regulatory Requirements: ensure Work is performed in compliance with applicable Provincial regulations.

.2 Comply with hauling and disposal regulations of Authority Having Jurisdiction.

1.8 SITE CONDITIONS

.1 Protect existing site features to remain or identified for salvage or re use; make repairs and restore to a similar condition to existing where damage to these items occurs as directed by Consultant and at no cost to Owner:

.1 Remove and store salvaged materials to prevent contamination.

.2 Store and protect salvaged materials as required for maximum preservation of material.

.3 Handle salvaged materials same as new materials.

.2 Perform pavement removal work to prevent adverse effects to adjacent watercourses, groundwater and wildlife, and to prevent excess air and noise pollution:

.1 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.

.2 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with Authorities Having Jurisdiction.

.3 Protect existing site features and structures, wells, trees, plants and foliage on site and adjacent properties.

Part 2 Products

2.1 EQUIPMENT

.1 Use cold milling, planning or grinding equipment with automatic grade controls capable of operating from stringline, and capable of removing part of pavement surface to depths or grades indicated.

.2 Use excavator or loader for full depth removal and loading of pavement identified to be removed.

Part 3 Execution

3.1 PREPARATION

.1 Verify extent and location of asphalt identified for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities, preserve active utilities traversing site in operating condition.

.3 Temporary Erosion and Sedimentation Control:

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control drawings.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

.4 Prior to beginning removal operation, inspect and verify with Consultant and Departmental Representative areas, depths and lines of asphalt pavement to be removed.

.5 Protection: protect existing pavement not designated for removal, light units and structures from damage. In event of damage, immediately replace or make repairs to approval of Departmental Representative at no additional cost.

3.2 REMOVAL

.1 Remove existing asphalt pavement to lines and grades as indicated by Consultant's approved drawings.

.2 Demolition of pavements, curbs and gutters:

.1 Square up adjacent surfaces to remain in place by saw cutting or other method acceptable to Representative on site.

.2 Protect adjacent joints and load transfer devices.

.3 Protect underlying and adjacent granular materials where they are exposed and identified to remain.

.4 Prevent contamination with base course aggregates, when removing asphalt pavement for subsequent incorporation into hot mix asphalt concrete paving.

.3 Use equipment and methods of removal and hauling which do not damage or disturb underlying pavement.

.4 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.

.5 Suppress dust generated by removal process.

3.3 FINISH TOLERANCES

.1 Where asphalt pavement has been identified to be removed, asphalt pavement shall be removed to full depth.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

.3 Sweep remaining asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand brooming as required.

.4 Waste Management: separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

.2 Removed asphalt pavement which is to be recycled in hot mix asphalt concrete under this contract may be stockpiled at designated asphalt plant site.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 45 00 - Quality Control.

.2 Section 01 74 00 – Cleaning

.3 Section 01 74 19 - Waste Management and Disposal

1.2 REFERENCE STANDARDS

.1 CSA Group (CSA)

.1 CSA A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CAN/CSA A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.3 CAN/CSA G30.18-09 (R2014), Billet-Steel Bars for Concrete Reinforcement.

.2 Quinte West Engineering Standards

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-installation Meetings: convene pre-installation meeting one week prior to beginning concrete works.

.1 Ensure key personnel, attend.

.2 Verify project requirements.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for proprietary materials used in Cast-In-Place Concrete and additives and include product characteristics, performance criteria, physical size, finish, and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Ontario of Canada.

.1 Submit placing drawings prepared in accordance with plans to clearly show size, shape, location, and necessary details of reinforcing.

.2 Submit drawings showing formwork and falsework design to: CSA A23.1/A23.2.

.2 Submit drawings stamped and signed by professional engineer registered or licensed in Ontario, Canada.

.4 Samples:

.5 Provide inspection results for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters found.

.6 Quality Assurance Submittals:

.1 Submit in accordance with Section 01 45 00 - Quality Control

1.5 QUALITY ASSURANCE

.1 Provide to Departmental Representative 4 weeks minimum prior to starting concrete work, valid and recognized certificate from plant delivering concrete.

.2 Quality Control Plan: provide written report to Departmental Representative verifying compliance concrete in place meets performance requirements.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.

.1 Deviations submitted for review by Departmental Representative.

.2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

1.7 AMBIENT CONDITIONS

.1 Placing concrete during rain or weather events damaging to concrete is prohibited.

.2 Protect newly placed concrete from rain or weather events in accordance with CSA A23.1/A23.2.

.3 Cold weather protection:

.1 Maintain protection equipment, in readiness on Site.

.2 Use such equipment when ambient temperature below 5°C, or when temperature may fall below 5°C before concrete cured.

.3 Placing concrete upon or against surface at temperature below 5°C is prohibited.

.4 Hot weather protection:

.1 Protect concrete from direct sunlight when ambient temperature above 27°C.

.2 Prevent forms of getting too hot before concrete placed. Apply accepted methods of cooling not to affect concrete adversely.

.5 Protect from drying.

Part 2 Products

2.1 DESIGN CRITERIA

.1 Performance: to CSA A23.1/A23.2, and as described in MIXES of PART 2 - PRODUCTS.

2.2 PERFORMANCE CRITERIA

.1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by Departmental Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.

2.3 MATERIALS

.1 Materials to be per Quinte West Specifications and OPSS 1350

2.4 MIXES

.1 Mix Design to be per Quinte West Specifications and OPSS 1350

Part 3 Execution

3.1 PREPARATION

.1 Provide Departmental Representative 24 hours notice before each concrete pour.

.2 Place concrete reinforcing in accordance with Shop Drawings.

.3 During concreting operations:

.1 Development of cold joints not allowed.

.2 Concrete delivery and handling to facilitate placing with minimum of rehandling, and without damage to existing structure or Work.

.4 Protect previous Work from staining.

.5 Clean and remove stains prior to application of concrete finishes.

3.2 INSTALLATION/APPLICATION

.1 Do cast-in-place concrete work in accordance with CSA A23.1/A23.2.

.2 Sleeves and inserts:

.1 Cast in sleeves, ties, slots, anchors, reinforcement, frames, conduit, bolts, waterstops, joint fillers and other inserts required built-in.

.2 Sleeves and openings minimum 100 mm x 100 mm not indicated, reviewed by Departmental Representative.

3.3 FINISHES

.1 Pavements, walks, curbs and exposed site concrete:

.1 Screed to plane surfaces and use floats.

.2 Provide round edges and joint spacings using standard tools.

.3 Trowel smooth and provide lightly brushed non-slip finish.

3.4 CONTROL JOINTS

.1 Control joints in slabs on grade at locations indicated, to CSA A23.1/A23.2 and install specified joint sealer/filler per shop drawing.

3.5 EXPANSION AND ISOLATION JOINTS

.1 Install premoulded joint filler in expansion and isolation joints full depth of slab flush with finished surface to CSA A23.1/A23.2.

3.6 CURING

.1 Use curing compounds compatible with applied finish on concrete surfaces free of bonding agents and to CSA A23.1/A23.2.

3.7 SEALING APPLICATION

.1 After curing complete, apply poly-siloxane resin blend sealer at 4 m^2/L.

.2 Cure concrete surfaces in accordance with CSA A23.1/A23.2

3.8 SITE TOLERANCES

.1 Concrete floor slab finishing tolerance to CSA A23.1/A23.2.

3.9 FIELD QUALITY CONTROL

.1 Concrete testing: to CSA A23.1/A23.2 by testing laboratory designated and paid for by Departmental Representative.

3.10 CLEANING

.1 Clean in accordance with Section 01 74 00 – Cleaning.

.2 Use trigger operated spray nozzles for water hoses.

.3 Designate cleaning area for tools to limit water use and runoff.

.4 Waste Management:

.1 Construction and Demolition Waste Management: prepare Construction Waste Management plan in accordance with Section 01 74 19 - Waste Management and Disposal.

.2 Provide appropriate area on job site where concrete trucks can be safely washed.

.3 Disposal of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location posing health or environmental hazard is prohibited.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

.1 Environmental Product Declaration (EPD): Third-party verified documentation with the supporting Product Category Rule (PCR) and Life cycle assessment information. Prepared in accordance with ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.

.1 Industry-wide (generic) EPD with third-party certification (Type III), including external verification in which the manufacturer is explicitly recognized as the participant by the program operator.

.2 Product-specific Type III EPD -- Products with third-party certification (Type III), including external verification in which the manufacturer is explicitly recognized as the participant by the program operator.

.2 Thermal Resistance: Means long-term thermal resistance (LTTR) in accordance with CAN/ULC-S770 or ASTM C1303/C1303M.

1.2 REFERENCE STANDARDS

.1 ASTM International (ASTM):

.1 ASTM C578-19 Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS):

.1 Safety Data Sheets (SDS)

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate work of other Subcontractors adjacent and penetrating board insulation which must be completed before or after insulation work.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's product literature, and data sheets for each type of board insulation. Include product characteristics, performance criteria, physical sizes, and limitations.

.2 Submit WHMIS SDS

.3 Shop Drawings: If requested.

.4 Samples: When requested, submit sample 300 x 300 mm x full board thickness of each type of board insulation.

.5 Certificates: When requested, submit manufacturer's product certificates certifying materials comply with specified performance characteristics and criteria and physical requirements.

.6 Test Reports: Submit certified test reports showing compliance with specified performance characteristics and physical properties.

.7 Manufacturer's Instructions: Submit manufacturer's installation instructions.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Perform in accordance with Section 01 61 00 - Common Product Requirements.

.1 Deliver board insulation marked with its thermal resistance value, associated reference standard number, Type, and Class. Packaged in accordance with the associated reference standard.

.2 Storage and Handling Requirements:

.1 Store materials in a clean, dry area and in accordance with manufacturer's recommendations.

.2 Store and protect plastic insulation from sunlight except as necessary during installation, protect from ignition sources, hydrocarbons, other petroleum derivatives, and other products that may cause degeneration.

Part 2 Products

2.1 INSULATION

.1 Extruded polystyrene (XPS): To CAN/ULC-701, for applications below grade, vertically and horizontally

.1 Type: 4.

.2 Compressive strength: Minimum 210 kPa.

.3 Board thickness: 50 mm as indicated on drawings.

.4 Size: Manufacturer's largest standard size.

.5 Edges: shiplapped.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: Verify that conditions of substrate previously installed are clean, dry, smooth, and acceptable for application of board insulation in accordance with manufacturer's instructions.

.1 Inspect substrates in presence of consultant.

.2 Inform Consultant of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from consultant.

3.2 INSTALLATION - GENERAL

.1 Cut and trim insulation neatly to fit spaces. Butt joints tightly.

.2 In multi-layered applications, offset vertical and horizontal joints.

.3 Use only insulation boards free from chipped or broken edges.

.4 Use largest possible boards to reduce number of joints.

.5 Do not enclose, cover, or perform backfilling of insulation until it has been reviewed and accepted by consultant.

3.3 CLEANING

.1 Progress Cleaning: Perform in accordance with Section 01 74 00 - Cleaning.

.2 Final Cleaning: Perform in accordance with Section 01 74 00 – Cleaning upon completion.

.3 Waste Management: Perform in accordance with Section 01 74 19 - Waste Management and Disposal

3.4 PROTECTION

.1 Temporarily protect installed board insulation from inclement weather and sunlight in excess of 2 weeks.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 00 - Cleaning

1.2 REFERENCE STANDARDS

.1 ASTM International (ASTM)

.1 ASTM D4791-10, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

.2 Quinty West Engineering Design Standards

.1 Section 4.0, January 2012

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Upon request, submit manufacturer's instructions, printed product literature and data sheets for aggregate materials and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:

.1 Submit samples upon request.

.2 Allow continual sampling by Departmental Representative during production.

.3 Provide Departmental Representative with access to source and processed material for sampling.

.4 Provide front end loader or other suitable equipment including trained operator for stockpile sampling as necessary. Move samples to storage place as directed by Departmental Representative.

.5 Supply new or clean sample bags or containers according appropriate to aggregate materials.

.6 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

.4 Sustainable Design Submittals:

.1 Erosion and Sedimentation Control: submit copy of erosion and sedimentation control plan in accordance with authorities having jurisdiction.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.

.2 Transportation and Handling: handle and transport aggregates to avoid segregation, contamination, and degradation.

.3 Storage: store washed materials or materials excavated from underwater 24 hours minimum to allow free water to drain and for materials to attain uniform water content.

Part 2 Products

2.1 MATERIALS

.1 Materials to comply with Quinte West Engineering Design Standards and OPSS 1010

.2 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, free from adherent coatings and injurious amounts of disintegrated pieces or other deleterious substances.

.3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:

- .1 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
- .2 Reclaimed asphalt pavement.
- .3 Reclaimed concrete material.

.4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:

- .1 Crushed rock.
- .2 Gravel and crushed gravel composed of naturally formed particles of stone.
- .3 Light weight aggregate, including slag and expanded shale.
- .4 Reclaimed asphalt pavement.
- .5 Reclaimed concrete material.

2.2 SOURCE QUALITY CONTROL

.1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling 4 weeks minimum before starting production.

.2 If materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate alternative source.

.3 Advise Departmental Representative 4 weeks minimum in advance of proposed change of material source.

.4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions are acceptable for topsoil stripping.

- .1 Visually inspect substrate in presence of Departmental Representative.
- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with topsoil stripping. only after unacceptable conditions have been remedied.

3.2 PREPARATION

.1 Topsoil stripping:

.1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.

.2 Begin topsoil stripping of areas as indicated after area has been cleared of weeds, brush, grasses and removed from site.

.3 Strip topsoil to depths as indicated. Avoid mixing topsoil with subsoil.

.4 Stockpile in locations as directed by Departmental Representative. Stockpile height not to exceed 2 m.

.5 Dispose of topsoil off site.

.2 Aggregate source preparation:

.1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as approved by authority having jurisdiction.

.2 Where clearing is required, leave screen of trees between cleared area and roadways as directed.

.3 Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.

.4 When excavation is completed dress sides of excavation to nominal slope, and provide drains or ditches as required to prevent surface standing water.

.5 Trim off and dress slopes of waste material piles and leave site in neat condition.

.6 Provide silt fence or other means to prevent contamination of existing watercourse or natural wetland features.

.3 Processing:

.1 Process aggregates uniformly using methods that prevent contamination, segregation and degradation.

.2 Blend aggregates, as required, including reclaimed materials that meet physical requirements of specification is permitted in order to satisfy gradation requirements for material and, percentage of crushed particles, or particle shapes specified.

.4 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate gradation.

.5 Where necessary, screen, crush, wash, classify and process aggregates with suitable equipment to meet requirements.

.1 Use only equipment approved in writing by Departmental Representative.

.6 Stockpiling:

.1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Departmental Representative. Do not stockpile on completed pavement surfaces.

.2 Stockpile aggregates in sufficient quantities to meet project schedules.

.3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.

.4 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative.

.5 Do not cone piles or spill material over edges of piles.

.6 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

.3 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.

.4 Leave any unused aggregates in neat compact stockpiles as directed by Departmental Representative.

.5 Waste Management: separate waste materials in accordance with waste management plan.

.6 For temporary or permanent abandonment of aggregate source, restore source to condition meeting requirements of authority having jurisdiction.

.7 Restrict public access to temporary or permanently abandoned stockpiles by means acceptable to Departmental Representative.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 United States Environmental Protection Agency (EPA)/Office of Water

.1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 STRIPPING OF TOPSOIL

.1 Ensure that procedures are conducted in accordance with applicable Provincial and Municipal requirements.

.2 Remove topsoil before construction procedures commence to avoid compaction of topsoil.

.3 Handle topsoil only when it is dry and warm.

.4 Remove vegetation from targeted areas by non-chemical means and dispose of stripped vegetation by alternative disposal composting.

.5 Remove brush from targeted area by non-chemical means and dispose of through mulching.

.6 Strip topsoil to depths as directed by consultant.

.1 Avoid mixing topsoil with subsoil.

.7 Pile topsoil by mechanical hoe in berms in locations as directed by consultant.

.1 Stockpile height not to exceed 2.5 - 3 m.

.8 Dispose of unused topsoil off-site

.9 Protect stockpiles from contamination and compaction.

.10 Cover topsoil that has been piled for long term storage, with trefoil or grass to maintain agricultural potential of soil.

3.3 PREPARATION OF GRADE

.1 Verify that grades are correct and notify consultant if discrepancies occur do not begin work until instructed by consultant.

.1 Grade area only when soil is dry to lessen soil compaction.

.2 Grade soil establishing natural contours and eliminating uneven areas and low spots, ensuring positive drainage.

3.4 PLACING OF TOPSOIL

.1 Place topsoil only after consultant has accepted subgrade.

.2 Spread topsoil during dry conditions by mechanical hoe in uniform layers not exceeding 150 mm, over unfrozen subgrade free of standing water.

.3 Establish traffic patterns for equipment to prevent driving on topsoil after it has been spread to avoid compaction.

.4 Cultivate soil following spreading procedures.

3.5 CLEANING

.1 Proceed in accordance with Section 01 74 00 - Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 - Submittal Procedures

.2 Section 31 23 33.01 - Excavating, Trenching and Backfilling

.3 Section 01 29 83 - Payment Procedures for Testing Laboratory Services

.4 Section 01 74 00 – Cleaning

.5 Section 01 74 19 - Waste Management and Disposal

1.2 REFERENCE STANDARDS

.1 ASTM International

.1 ASTM D698-07e1, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m^3).

.2 Underwriters' Laboratories of Canada (ULC)

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Sustainable Design Submittals:.

.1 Erosion and Sedimentation Control: submit copy of erosion and sedimentation control plan in accordance with authorities having jurisdiction.

1.4 EXISTING CONDITIONS

.1 Examine subsurface investigation report.

.2 Known underground and surface utility lines and buried objects are as indicated on site plan.

.3 Refer to dewatering in Section 31 23 33.01 - Excavating, Trenching and Backfilling.

Part 2 Products

2.1 MATERIALS

.1 Fill material: In accordance with of Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Excavated or graded material existing on site suitable to use as fill for grading work if approved by Departmental Representative.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for rough grading installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 STRIPPING OF TOPSOIL

.1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.

.2 Commence topsoil stripping of areas as indicated after area has been cleared of brush, grasses, weeds and removed from site.

.3 Strip topsoil to depths as indicated. Avoid mixing topsoil with subsoil.

.4 Stockpile in locations as directed by Departmental Representative. Stockpile height not to exceed 2 m.

.5 Dispose of unused topsoil off site.

3.3 GRADING

.1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.

.2 Rough grade to depths below finish grades as indicated on drawings.

.3 Slope rough grade away from building as indicated.

.4 Grade ditches to depth as indicated.

.5 Prior to placing fill over existing ground, scarify surface to depth of 150 mm minimum before placing fill over existing ground. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.

.6 Compact filled and disturbed areas to corrected maximum dry density to ASTM D698, as follows:

.1 85 % under landscaped areas.

.2 95 % under paved and walk areas.

.7 Do not disturb soil within branch spread of trees or shrubs to remain.

3.4 TESTING

.1 Inspection and testing of soil compaction will be carried out by testing laboratory designated by ULC. Costs of tests will be paid by Owner in accordance with Section 01 29 83 - Payment Procedures for Testing Laboratory Services.

.2 Submit testing procedure, frequency of tests, to Departmental Representative for review.

3.5 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

3.6 PROTECTION

.1 Protect existing trees, fencing, landscaping, bench marks, buildings, pavement, surface or underground utility lines which are to remain as directed by Departmental Representative. If damaged, restore to original or better condition unless directed otherwise.

.2 Maintain access roads to prevent accumulation of construction related debris on roads.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 35 29.06 - Health and Safety Requirements

.3 Section 01 74 19 - Waste Management and Disposal

.4 Section 02 41 13 - Selective Site Demolition

.5 Section 330516 - Maintenance Holes and Catch Basin Structures

.6 Section 331416 - Site Water Utility Distribution Piping

.7 Section 333111 - Public Sanitary Sewerage Gravity Piping

.8 Section 334100 - Storm Utility Drainage Piping

1.2 MEASUREMENT PROCEDURES

.1 Excavated materials will be measured in cubic metres in their original location.

.1 Common excavation quantities measured will be actual volume removed within following limits:

.1 Width for excavation for structures as indicated.

.2 Depth from ground elevation immediately prior to excavation, to elevation as indicated by Consultant.

.2 Rock quantities measured will be actual volume removed within following limits:

.1 Width for trench excavation as indicated.

.2 Width for excavation for structures to be bounded by vertical planes up to 500 mm outside of and parallel to neat lines of footings as indicated.

.3 Depth from rock surface elevations immediately prior to excavation, to elevation as indicated.

.4 Where design elevation is less than 300 mm below original rock surface, depth will be considered to be 300 mm below original rock surface.

.5 Volume of individual boulders and rock fragments will be determined by measuring three maximum mutually perpendicular dimensions.

.2 Excavated materials associated with trenched utility items under Section 331416, 333111, and 334100 will not be measured for payment. Excavation and backfill costs for those items will be included in the unit rates for those items.

.3 Backfilling to authorized excavation limits will be measured in tonnes for each type of material specified.

1.3 REFERENCE STANDARDS

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.2 CSA Group (CSA)

.1 CAN/CSA-A3000-03, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.1 CSA-A3001-03, Cementitious Materials for Use in Concrete.

.2 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

1.4 DEFINITIONS

.1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.

.1 Rock: solid material in excess of 1.00 $m^3$and which cannot be removed by means of heavy-duty mechanical excavating equipment. Frozen material not classified as rock.

.2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.

.2 Unclassified excavation: excavation of deposits of whatever character encountered in Work.

.3 Topsoil:

.1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

.2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters in any dimension.

.4 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.5 Borrow material: material obtained from locations outside area to be graded and required for construction of fill areas or for other portions of Work.

.6 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.

.7 Unsuitable materials:

.1 Weak, chemically unstable, and compressible materials.

.2 Frost susceptible materials

.1 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.

.8 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Quality Control: in accordance with Section 01 45 00 - Quality Control.

.1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article of this Section.

.2 Submit to Departmental Representative written notice when bottom of excavation is reached.

.3 Submit to Departmental Representative report as described in PART 3 of this Section.

.3 Preconstruction Submittals:

.1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.

.2 Submit records of underground utility locates, indicating clearance record from utility authority, location plan of existing utilities as found in field, and location plan of relocated and abandoned services.

1.6 QUALITY ASSURANCE

.1 Qualification Statement: submit proof of insurance coverage for professional liability.

.2 Submit design and supporting data at least 1 weeks prior to beginning Work.

.3 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in Ontario, Canada.

.4 Keep design and supporting data on site.

.5

.6 Do not use soil material until written report of soil test results are reviewed by Departmental Representative.

.7 Health and Safety Requirements:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.

1.8 EXISTING CONDITIONS

.1 Examine soil report available at from Departmental Representative.

.2 Buried services:

.1 Before commencing work establish location of buried services on and adjacent to site.

.2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.

.3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.

.4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.5 Prior to beginning excavation Work, notify applicable Departmental Representative establish location and state of use of buried utilities and structures. authorities having jurisdiction to clearly mark such locations to prevent disturbance during Work.

.6 Confirm locations of buried utilities by careful soil hydrovac methods.

.7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.

.8 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before re-routing or removing. Costs for such Work to be paid per contract rates.

.9 Record location of maintained, re-routed and abandoned underground lines.

.10 Confirm locations of recent excavations adjacent to area of excavation.

.3 Existing buildings and surface features:

.1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey benchmarks and monuments which may be affected by Work.

.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative

.3 Where required for excavation, cut roots or branches as directed by Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 Material to be per Quinte West Engineering Design Standards, Section 4.0, January 2012

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction and sediment and erosion control drawings.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 SITE PREPARATION

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

.2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly in accordance with Section 02 41 13 - Selective Site Demolition.

3.3 PREPARATION/PROTECTION

.1 Protect existing features and applicable local regulations.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative approval.

.4 Protect buried services that are required to remain undisturbed.

3.4 STOCKPILING

.1 Stockpile fill materials in areas designated by Departmental Representative.

.1 Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

.3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

3.5 DEWATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while Work is in progress.

.2 Protect open excavations against flooding and damage due to surface run-off.

.3 Dispose of water in runoff areas and in manner not detrimental to public and private property, or portion of Work completed or under construction.

.4 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.

3.6 EXCAVATION

.1 Advise Departmental Representative at least 7 days in advance of excavation operations for initial cross sections to be taken.

.2 Excavate to lines, grades, elevations and dimensions as indicated by Consultant.

.3 Remove concrete, demolished foundations and rubble, paving, walks and other obstructions encountered during excavation in accordance with Section 02 41 13 - Selective Site Demolition.

.4 Excavation must not interfere with bearing capacity of adjacent foundations.

.5 Do not disturb soil within branch spread of trees or shrubs that are to remain.

.1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.

.6 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.

.7 Keep excavated and stockpiled materials safe distance away from edge of trench.

.8 Restrict vehicle operations directly adjacent to open trenches.

.9 Dispose of surplus and unsuitable excavated material off site.

.10 Do not obstruct flow of surface drainage or natural watercourses.

.11 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.12 Notify Departmental Representative when bottom of excavation is reached.

.13 Obtain Consultant approval of completed excavation.

.14 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Consultant.

.15 Correct unauthorized over-excavation as follows:

.1 Fill under bearing surfaces and footings as directed by the geotechnical consultant.

.2 Fill under other areas as directed by the geotechnical consultant.

.16 Hand trim make firm and remove loose material and debris from excavations.

.1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

.2 Clean out rock seams and fill with concrete mortar or grout to approval of Consultant.

.17 Install geotextiles as directed by the Geotechnical Consultant.

3.7 FILL TYPES AND COMPACTION

.1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D698

.1 Exterior side of perimeter walls: use Type 3 fill to subgrade level. Compact to 95 % of corrected maximum dry density.

.2 Within building area: use Type 2 to underside of base course for floor slabs. Compact to 100 % of corrected maximum dry density.

.3 Under concrete slabs: provide thickness per shop drawings.

3.8 BEDDING AND SURROUND OF UNDERGROUND SERVICES

.1 Place and compact granular material for bedding and surround of underground services as indicated, pr otherwise directed per Section 33 41 00 - Storm Utility Drainage Piping Section 33 31 11 - Public Sanitary Sewerage Gravity Piping and Section 33 14 16 - Site Water Utility Distribution Piping.

.2 Place bedding and surround material in unfrozen condition.

3.9 BACKFILLING

.1 Do not proceed with backfilling operations until completion of following:

.1 Consultant has inspected and approved installations.

.2 Consultant has inspected and approved of construction below finish grade.

.3 Inspection, testing, approval, and recording location of underground utilities.

.4 Removal of concrete formwork.

.5 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.

.2 Areas to be backfilled to be free from debris, snow, ice, water, and frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow, or debris.

.4 Place backfill material in uniform layers not exceeding 300 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.5 Backfilling around installations:

.1 Place bedding and surround material as specified elsewhere.

.2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.

.3 Place layers simultaneously on both sides of installed Work to equalize loading.

.4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:

.1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Departmental Representative:

.6 Place unshrinkable fill in areas as indicated.

.7 Consolidate and level unshrinkable fill with internal vibrators.

.8 Install drainage system in backfill as directed by Departmental Representative.

3.10 RESTORATION

.1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 19 - Waste Management and Disposal, trim slopes, and correct defects as directed by Departmental Representative.

.2 Clean and reinstate areas affected by Work as directed by Departmental Representative.

.3 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 hours.

.4 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 05 16 - Aggregate Materials

.2 Section 32 11 16.01 - Granular Sub-base

1.2 REFERENCE STANDARDS

.1 ASTM International (ASTM):

.1 ASTM C117- [17], Standard Test Methods for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing

.2 ASTM C131/C131M- [20], Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

.3 ASTM C136/C136M- [19], Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

.4 ASTM D698- [12], Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft ^{3}) (600kN-m/m ³)

.5 ASTM D1557- [12], Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft ^{3}) (2,700kN-m/m ³)

.6 ASTM D1883- [16], Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils

.7 ASTM D4318- [17el], Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils

.2 Canadian General Standards Board (CGSB):

.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series

.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric

1.3 MEASUREMENT AND PAYMENT

.1 Measure granular base in tonnes of material incorporated into Work and accepted in writing by consultant.

.2 Measure excavation of base, sub-base and sub-grade materials to correct deficiencies in sub-grade discovered during proof rolling as common excavation.

.1 Measure backfill of sub-grade with common materials approved in writing by Consultant, as common excavation and sub-grade compaction

.2 Measure backfill of subgrade with sub-base material and replacement of sub-base material to Section 32 11 16.01 - Granular Sub-base.

.3 Measure subsequent replacement of base materials under this Section.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements 31 05 16 - Aggregate Materials.

.2 Storage and Handling Requirements:

- .1 Stockpile minimum 50 % of total aggregate required prior to beginning operation.
- .2 Store materials in clean dry location and in accordance with manufacturer's recommendations.

Part 2 Products

2.1 MATERIALS

.1 Granular base: material in accordance with Section 31 05 16 - Aggregate Materials and the following requirements:

- .1 Crushed stone or gravel.
- .2 Gradations to conform to OPSS MUNI 1010

Part 3 Execution

3.1 PLACEMENT AND INSTALLATION

.1 Place granular base after sub-base or subgrade surface is inspected and approved in writing by consultant.

.2 Placing:

- .1 Construct granular base to depth and grade in areas indicated.
- .2 Ensure no frozen material is placed.
- .3 Place material only on clean unfrozen surface, free from snow and ice.
- .4 Begin spreading base material on crown line or on high side of one-way slope.
- .5 Place material using methods which do not lead to segregation or degradation of aggregate.
- .6 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
- .7 Place material to full width in uniform layers not exceeding 200 mm compacted thickness.
  - .1 Consultant may authorize thicker lifts (layers) if specified compaction can be achieved.

.8 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.

.9 Remove and replace that portion of layer in which material becomes segregated during spreading.

.3 Compaction Equipment:

.1 Ensure compaction equipment is capable of obtaining required material densities.

.2 Efficiency of equipment not specified to be proved at least as efficient as specified equipment at no extra cost and written approval must be received from consultant before use.

.3 Equipped with device that records hours of actual work, not motor running hours.

.4 Compacting:

.1 Compact to density not less than 100 % maximum dry density to ASTM D698.

.2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.

.3 Apply water as necessary during compacting to obtain specified density.

.4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved in writing by consultant.

.5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

.5 Proof rolling:

.1 For proof rolling use standard roller of 45 400 kg gross mass with four pneumatic tires each carrying 11 350 kg and inflated to 620 kPa. Four tires arranged abreast with centre to centre spacing of 730 mm.

.2 Obtain written approval from consultant to use non standard proof rolling equipment.

.3 Proof roll at level in granular base as indicated.

.1 If use of non standard proof rolling equipment is approved, consultant to determine level of proof rolling.

.4 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.

.5 Where proof rolling reveals areas of defective subgrade:

.1 Remove base, sub-base and subgrade material to depth and extent as directed by consultant.

.2 Backfill excavated subgrade with common material and compact in accordance with Section 32 11 16.01 - Granular Sub-Base.

.3 Replace sub-base material and compact in accordance with Section 32 11 16.01 - Granular Sub-base.

.4 Replace base material and compact in accordance with this Section.

.6 Where proof rolling reveals defective base or sub-base, remove defective materials to depth and extent as directed by consultant and replace with new materials in accordance with Section 32 11 16.01 - Granular Sub-base and this Section at no extra cost.

3.2 SITE TOLERANCES

.1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

3.3 CLEANING

.1 Progress Cleaning: Clean in accordance with Section 01 74 00 - Cleaning.

.2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

3.4 PROTECTION

.1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by consultant.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31000001 - Earthwork - Short Form.

.2 Section 01 74 00 - Cleaning

1.2 MEASUREMENT AND PAYMENT

.1 Asphalt concrete pavement will be measured in square metres of asphalt surface in place.

.2 Granular base will be measured by tonne of material places as evidenced by weigh bills.

1.3 REFERENCE STANDARDS

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-88, Sieves Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2-M88, Sieves Testing, Woven Wire, Metric.

.2 Quinte West Engineering Standers Tender Documents for Unit Price Contracts

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for asphalt paving mix, and aggregate and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:

.1 Submit asphalt concrete mix design and trial mix test result for review.

.2 Inform Departmental Representative of proposed source of aggregates.

.4 Test and Evaluation Reports:

.1 Materials to be tested by accredited testing laboratory approved by Departmental Representative.

.2 Submit test certificates showing suitability of materials at least 4 weeks prior to commencing work.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with with manufacturer's written instructions.

.2 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations.

Part 2 Products

2.1 MATERIALS

.1 Granular base material: As per Quinte West Engineering Standards and OPSS 1010.

.2 Asphalt concrete aggregates:

.1 As per Quinte West Engineering Standards.

.3 Mineral filler for asphalt concrete:

.4 To follow Quinte West Engineering Standards Material Specification for Hot Mix asphalt types. Asphalt cement: to follow Quinte West Engineering Standards Material Specification for Hot Mix asphalt types.

.5 Asphalt prime: to follow Quinte West Engineering Standards Material Specification for Hot Mix asphalt types.

.6 Asphalt tack coat: to follow Quinte West Engineering Standards Material Specification for Hot Mix asphalt types.

2.2 EQUIPMENT

.1 Pavers: mechanical self-powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.

.2 Rollers: sufficient number of rollers of type and weight to obtain specified density of compacted mix.

.3 Vibratory rollers for parking lots and driveways:

.1 Minimum drum diameter: 750 mm.

.2 Maximum amplitude of vibration (machine setting): 0.5 mm for lifts less than 40 mm thick.

.4 Haul trucks: of sufficient number and of adequate size, speed and condition to ensure orderly and continuous operation and as follows:

.1 Boxes with tight metal bottoms.

.2 Covers of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.

.3 In cool weather or for long hauls, insulate entire contact area of each truck box.

.5 Suitable hand tools.

2.3 MIX DESIGN

.1 Mix design to follow Quinte West Engineering Standards Material Specification for Hot Mix asphalt types.

.2 Job mix formula to be provided to Departmental Representative.

.1 Design of mix: To follow Quinte West Engineering Standards Material Specification for Hot Mix asphalt types. Do not change job-mix without prior approval of Departmental Representative. When change in material source

proposed, new job-mix formula will be provided to be reviewed by Departmental Representative.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for asphalt paving installation in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate in presence of Departmental Representative.
- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 SUBGRADE PREPARATION AND INSPECTION

.1 Temporary Erosion and Sedimentation Control:

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control drawings.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

.2 Verify grades of subgrade drains and other items set in paving area for conformity with elevations and sections before placing granular base material.

.3 Obtain written approval of subgrade by Departmental Representative before placing granular base.

3.3 GRANULAR BASE

.1 Place granular base material on clean unfrozen surface, free from snow and ice.

.2 Place granular base to compacted thicknesses as indicated. Do not place frozen material.

.3 Place in layers not exceeding 150 mm compacted thickness. Compact to density not less than 98% corrected maximum dry density.

.4 Finished base surface to be within 10 mm of specified grade, but not uniformly high or low.

3.4 PLANT AND MIXING REQUIREMENTS

.1 In accordance with Quinte West Engineering Standards for Hot Mix asphalt types.

3.5 ASPHALT CONCRETE PAVING

.1 Obtain written approval of base from Departmental Representative before placing asphalt mix.

.2 Place asphalt mix only when base or previous course is dry and air temperature is above 5 degrees C and rising.

.3 Place asphalt concrete in compacted layers not exceeding 50 mm.

.4 Minimum 135 degrees C mix temperature required when spreading.

.5 Maximum 160 degrees C mix temperature permitted at any time.

.6 Compact each course with roller as soon as it can support roller weight without undue cracking or displacement.

.7 Compact parking lot and driveway asphalt concrete to density not less than 92 % of density obtained with Hot Mix asphalt specimens prepared in accordance with Quinte West Engineering Standards Material Specification for Hot Mix asphalt types. Roll until roller marks are eliminated.

.8 Keep roller speed slow enough to avoid mix displacement and do not stop roller on fresh pavement.

.9 Moisten roller wheels with water to prevent pick up of material.

.10 Compact mix with hot tampers or other equipment approved in writing by Departmental Representative, in areas inaccessible to roller.

.11 Finish surface to be within 10 mm of design elevation and with no irregularities greater than 10 mm in 4.5 m.

.12 Repair areas showing checking, rippling or segregation as directed by Departmental Representative.

3.6 JOINTS

.1 Remove surplus material from surface of previously laid strip. Do not deposit on surface of freshly laid strip.

.2 Paint contact surfaces of existing structures such as manholes, curbs or gutters with bituminous material prior to placing adjacent pavement.

.3 For cold joints, cut back to full depth vertical face and tack face with hot asphalt.

.4 For longitudinal joints, overlap previously laid strip with spreader by 25 to 50 mm.

3.7 TESTING

.1 Inspection and testing of asphalt pavement will be carried out by designated testing laboratory.

.2 Costs of tests will be paid by owner.

3.8 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 00 - Cleaning

3.9 PROTECTION

.1 Keep vehicular traffic off newly paved areas until paving surface temperature has cooled below 38 degrees C.

.1 Do not permit stationary loads on pavement until 24 hours after placement.

.2 Provide access to buildings as required.

.1 Arrange paving schedule so as not to interfere with normal use of premises.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 - Submittal Procedures

.2 Section 03 30 00 - Cast-in-Place Concrete

.3 Section 31 05 16 - Aggregate Materials

.4 Section 31 23 33.01 - Excavating, Trenching and Backfilling

1.2 REFERENCE STANDARDS

.1 ASTM International

.1 ASTM C117-13, Standard Test Method for Materials Finer than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136/C136M-14, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM C 309 03, Liquid Membrane Forming Compounds for Curing Concrete.

.4 ASTM D1751, Standard Specification For Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

.5 ASTM D698-12e2, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft^3) (600 kN-m/m^3).

.2 CSA Group

.1 CSA-A23.1-14 /A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete, Including Update No. 1 2015.

.2 CSA B651-2012 Accessible Design for the Built Environment.

.3 Quinte West Engineering Standards

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Upon request, submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, and limitations.

.3 Inform Departmental Representative of proposed source of materials and provide access for sampling minimum 4 weeks prior to commencing work.

.4 If materials have been tested by accredited testing laboratory testing laboratory approved by Departmental Representative within previous 2 months and have passed tests equal to requirements of this specification, submit test certificates from testing laboratory showing suitability of materials for this project.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 SUSTAINABLE REQUIREMENTS

.1 Materials and products in accordance with Section 01 47 15 - Sustainable Requirements: Construction.

2.2 MATERIALS

.1 To comply with Quinte West Engineering Standards, January 2012

.2 Concrete mixes and materials: in accordance with Section 03 30 00 - Cast-in-Place Concrete.

.3 Curing Compound and Joint filler: in accordance with Section 03 30 00 - Cast-in-Place Concrete.

.4 Granular base: material to Section 31 05 16 - Aggregate Materials following requirements:

.1 OPSD 1010

.2 Crushed stone or gravel.

.3 Gradations: within limits specified.

.5 Non-staining mineral type form release agent: chemically active release agents containing compounds reacting with free lime to provide water-soluble soap.

.6 Fill material: to Section 31 05 16 - Aggregate Materials following requirements:

.1 OPSD 1010

.2 Crushed stone or gravel.

.3 Gradations: within limits specified.

.7 Curing Agent: to ASTM C309, Type 1.

.8 Expansion Joint Filler: Premoulded bituminuous fibre board, conforming to ASTM D1751.

.9 Tactile Walking Surface Indicators: Cast iron with truncated domes to CSA B651.

Part 3 Execution

3.1 GRADE PREPARATION

.1 To comply with Quinte West Engineering Standards.

.2 Do grade preparation work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.3 Construct embankments using excavated material free from organic matter or other objectionable materials.

.1 Dispose of surplus and unsuitable excavated material off site.

.4 Place fill in maximum 150 mm layers and compact to minimum 95 % of maximum dry density to ASTM D698.

3.2 GRANULAR BASE

.1 To comply with Quinte West Engineering Standards.

.2 Obtain Departmental Representative's approval of subgrade before placing granular base.

.3 Place granular base material to lines, widths, and depths as indicated.

.4 Compact granular base in maximum 150 mm layers to minimum 100 % of maximum density to ASTM D698.

3.3 CONCRETE

.1 To comply with Quinte West Engineering Standards

.2 Obtain Departmental Representative approval of granular base prior to placing concrete.

.3 Do concrete work in accordance with Section 03 30 00 - Cast-in-Place Concrete.

.4 Immediately after floating, give sidewalk surface uniform broom finish to produce regular corrugations not exceeding 2 mm deep, by drawing broom side to side across sidewalk.

.5 Provide edging as indicated with 10 mm radius edging tool.

.6 Slip-form pavers equipped with string line system for line and grade control may be used if quality of work acceptable to Departmental Representative can be demonstrated. Hand finish surfaces when directed by Departmental Representative.

3.4 TOLERANCES

.1 To comply with Quinte West Engineering Standards.

.2 Finish surfaces to within 3 mm in 3 m as measured with 3 m straightedge placed on surface.

3.5 EXPANSION AND CONTRACTION JOINTS

.1 To comply with Quinte West Engineering Standards

.2 Install tooled transverse contraction joints after floating, when concrete stiff, but still plastic.

.3 Install expansion joints at intervals of indicated by Quinte West Engineering Standards and OPSD.

.4 When sidewalk adjacent to curb, make joints of curb, gutters and sidewalk coincide.

3.6 TACTILE WALKING SURFACE INDICATORS

.1 Install tactile walking surface indicators at curb ramp edges, where indicated on drawings and in accordance with local municipal by-laws.

3.7 CURING

.1 Cure concrete by adding moisture continuously in accordance with CSA-A23.1/A23.2 to exposed finished surfaces for minimum 1 day after placing or sealing moisture in by curing compound as directed by Departmental Representative.

.2 Where burlap used for moist curing, place two prewetted layers on concrete surface and keep continuously wet during curing period.

.3 Apply curing compound evenly to form continuous film, in accordance with manufacturer's requirements.

3.8 BACKFILL

.1 Allow concrete to cure for 7 days prior to backfilling.

.2 Backfill to designated elevations with material as directed by Departmental Representative.

.1 Compact and shape to required contours as indicated.

3.9 CLEANING

.1 Proceed in accordance with Section 01 74 00 - Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 ASTM International

.1 ASTM E1360 90 [2000] e1, Standard Practice for Specifying Color by Using the Optical Society of America Uniform Color Scales System.

.2 ASTM D4797 88[2004] Standard Test Methods for Chemical and Gravimetric Analysis of White and Yellow Thermoplastic Traffic Marking Containing Lead Chromate and Titanium Dioxide.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Safety Data Sheets (SDS).

.3 Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual - [current edition].

.1 MPI #32, Traffic Markings Paint, Alkyd.

.2 MPI #97, Latex Traffic Marking Paint.

.4 South Coast Air Quality Management District (SCAQMD)

.1 SCAQMD Rule 1113-[16], Architectural Coatings.

1.2 MEASUREMENT AND PAYMENT

.1 Pavement marking: measured by lump sum.

.2 Supply of paint: measured in litres.

.3 Symbols and letters: measured in [units].

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's printed product literature and data sheets for pavement markings and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit 2 copies of WHMIS SDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.3 Samples:

.1 Submit to Consultant following material sample quantities at least 4 weeks prior to commencing work.

.1 Sampling to MPI Painting Manual.

.2 Mark samples with name of project and its location, paint manufacturer's name and address, name of paint, MPI specification number and formulation number and batch number.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operations and Maintenance Data: submit information on materials relative to work of this Section for inclusion in operations and maintenance manual and as follows:

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

.1 Alkyd Traffic Paint and Markings:

.1 To MPI #32, Alkyd traffic marking meeting requirements of ASTM D4797

.2 Traffic Marking Coatings: maximum VOC limit 450 g/L to SOR/2009-264Schedule 1 and to GS-11 Standard to SCAQMD Rule 1113

.3 Colour: to ASTM E1360, yellow white blue in accordance with MPI Architectural Painting Specification Manual

.2 Thinner: to MPI listed manufacturer

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates and surfaces to receive pavement markings acceptable for product installation in accordance with MPI instructions prior to pavement markings application

.2 Pavement surface: dry, free from water, frost, ice, dust, oil, grease and other deleterious materials.

.3 Proceed with Work only after unacceptable conditions rectified.

3.2 EQUIPMENT REQUIREMENTS

.1 Paint applicator: approved pressure type [mobile] with positive shut-off distributor capable of applying paint in single, double and dashed lines and capable of applying marking components uniformly, at rates specified, and to dimensions as indicated.

.2 Distributor: capable of applying reflective glass beads as overlay on freshly applied paint.

3.3 APPLICATION

.1 Pavement markings: laid out by contractor.

.2 Unless otherwise approved by consultant, apply paint when air temperature minimum 10 degrees C, wind speed maximum 60 km/h and no rain forecast within next 4 hours.

.3 Apply traffic paint evenly at rate of 3 m^2/L to form minimum 8 mil dry film thickness, in accordance with MPI Architectural Painting Specification Manual "Preparation of Surfaces" and "Application" for "Approved Product" listing

.4 Do not thin paint unless approved by consultant].

.5 Symbols and letters to dimensions indicated.

.6 Paint lines of uniform colour and density with sharp edges.

.7 Thoroughly clean distributor tank before refilling with paint of different colour.

3.4 TOLERANCE

.1 Paint markings: within plus or minus 12 mm of dimensions indicated.

.2 Remove incorrect markings in accordance with Section 32 01 11.01 - Pavement Cleaning and Marking Removal.

3.5 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

.1 Remove insulation material spilled during installation and leave work area ready for application of wall board.

3.6 PROTECTION

.1 Protect pavement markings until dry.

.2 Repair damage to adjacent materials caused by pavement marking application.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 23 33.01 - Excavating Trenching and Backfilling.

.2 Section 01 74 00 – Cleaning

.3 Section 01 74 19 - Waste Management and Disposal

.4 Section 33 31 13 - Sanitary Sewage.

.5 Section 33 41 00 - Storm Sewer.

.6 Section 03 30 00 09- Cast-in-Place Concrete

1.2 MEASUREMENT PROCEDURES

.1 Excavation and backfill in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling, costs to be included as part of items in this section.

.2 Measure maintenance holes and catch basins in units

.3 Measure adjusting tops of existing maintenance holes or catch basins in units adjusted.

1.3 REFERENCE STANDARDS

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.2 CSA Group

.1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CAN/CSA-A165 Series-04 (R2009), CSA Standards on Concrete Masonry Units (Consists of A165.1, A165.2 and A165.3).

.3 CAN/CSA-A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.4 CSA G30.18-09, Carbon Steel Bars for Concrete Reinforcement.

.3 Ontario Provincial Standard Specifications (OPSS)

.1 OPSS MUNI 407-November 2021, Construction Specification For Maintenance Hole, Catch Basin, Ditch Inlet And Valve Chamber Installation.

.2 OPSS MUNI 408 November 2021 Adjusting or Rebuilding Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers

.3 OPSS.MUNI 410 November 2018, PIPE SEWER INSTALLATION IN OPEN CUT

.4 Quinte West Engineering Standards

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for maintenance holes and catch basin structures and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Submit drawings provided by approved supplier departmental Representative

1.5 QUALITY ASSURANCE

.1 Certifications:

.1 Submit manufacturer's test data and certification at least 4 weeks prior to beginning Work. Include manufacturer's drawings, information and shop drawings where pertinent.

.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations.

.2 Store and protect maintenance holes and catch basin structures from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove crates, padding, pallets, packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

.1 Precast maintenance hole units: to Quinte West Engineering Standards and OPSS MUNI 407, circular or oval.

.1 Top sections eccentric cone or flat slab top type with opening offset for vertical ladder installation.

.2 Precast catch basin sections: Quinte West Engineering Standards and OPSS MUNI 407.

.3 Joints: made watertight using rubber rings, bituminous compound, epoxy resin cement or cement mortar.

.4 Mortar:

.1 Masonry Cement: to CAN/CSA-A3002.

.5 Ladder rungs: to CSA G30.18, No.25M billet steel deformed bars, hot dipped galvanized to ASTM A123/A123M.

.1 Rungs to be safety pattern (drop step type).

.6 Adjusting rings: to ASTM C478M.

.7 Concrete Brick: to CAN/CSA-A165 Series.

.8 Drop maintenance hole pipe: same as sewer pipe.

.9 Galvanized iron sheet: approximately 2 mm thick.

.10 Steel gratings, I-beams, and fasteners: as indicated.

.11 Frames, gratings, covers to dimensions as indicated by Quinte West Engineering Standards

.12 Granular bedding and backfill in accordance with recommendations of Geotechnical Report.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for maintenance holes and catch basin structures installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 EXCAVATION AND BACKFILL

.1 Excavate and backfill in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling and as indicated.

.2 Obtain approval of Departmental Representative before installing, maintenance holes or catch basins.

3.3 CONCRETE WORK

.1 Do concrete work in accordance with Section 03 30 00 09- Cast-in-Place Concrete.

.2 Place concrete reinforcement in accordance with Section 03 30 00 09- Cast-in-Place Concrete.

.3 Position metal inserts in accordance with dimensions and details as indicated.

3.4 INSTALLATION

.1 Construct units in accordance with details indicated, plumb and true to alignment and grade.

.2 Dewater excavation to approval of Departmental Representative and remove soft and foreign material before placing concrete base.

.3 Set precast concrete base on 150 mm minimum of granular bedding compacted to 100 % corrected maximum dry density.

.4 Precast units:

- .1 Make each successive joint watertight with Departmental Representative's approved rubber ring gaskets, bituminous compound, cement mortar, epoxy resin cement, or combination of these materials.
- .2 Clean surplus mortar and joint compounds from interior surface of unit as work progresses.
- .3 Plug lifting holes with concrete plugs set in cement mortar or mastic compound.

.5 For sanitary sewers:

- .1 Place stub outlets and bulkheads at elevations and in positions indicated.
- .2 Bench to provide smooth U-shaped channel.
  - .1 Side height of channel to be full diameter of sewer.
  - .2 Slope adjacent floor at 1 in 20.
  - .3 Curve channels smoothly.
  - .4 Slope invert to establish sewer grade.

.6 Compact granular backfill to 100 % corrected maximum dry density.

.7 Installing units in existing systems:

- .1 Where new unit is installed in existing run of pipe, ensure full support of existing pipe during installation, and install new unit as specified.
- .2 Make joints watertight between new unit and existing pipe.
- .3 Where deemed expedient to maintain service around existing pipes and when systems constructed under this project are ready for operation, complete installation with appropriate breakouts, removals, redirection of flows, blocking unused pipes or other necessary work.

.8 Set frame and cover to required elevation per OPSS MUNI 408.

.9 Place frame and cover on top section to elevation as indicated.

- .1 If adjustment required use concrete ring.

.10 Clean units of debris and foreign materials.

- .1 Remove fins and sharp projections.
- .2 Prevent debris from entering system.

.11 Install safety platforms in maintenance holes having depth of 5 m or greater, as indicated.

3.5 ADJUSTING TOPS OF EXISTING UNITS

.1 Remove existing gratings, frames and store for re-use at locations designated by Departmental Representative.

.1 Adjustments to follow OPSS MUNI 408.

3.6 FIELD QUALITY CONTROL

.1 Testing to be per OPSS.MUNI 410 Pipe Sewer Installation in Open Cut.

3.7 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

.3 Waste Management: separate waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Section 01 74 00 – Cleaning

.3 Section 01 74 19 - Waste Management and Disposal

1.2 MEASUREMENT PROCEDURES

.1 Measure water main including trenching and backfilling, in metres of each size of pipe installed.

.1 Horizontal measurement will be made over surface, through valves and fittings, after work has been completed.

.2 Measure lateral connections from water main to hydrants as water main and include curb valve and adjustable valve box.

.2 Measure hydrants including excavation, backfilling granular bedding, surround material and concrete., in units installed.

.3 Measure service connections including trenching, backfilling granular bedding, surround material and concrete., in metres of each size of pipe installed.

.4 Measure valves in units installed including excavation and backfilling valves and valve boxes and thrust blocks and including all granular bedding, surround material and concrete.

.5 Measure valve chambers including excavation and backfilling granular bedding, surround material and concrete, in units installed.

1.3 REFERENCE STANDARDS

.1 Department of Justice Canada (Jus)

.1 SOR/2018-196 Prohibition of Asbestos and Products Containing Asbestos Regulations.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.3 CAN/CGSB-34.1-94, Pipe, Asbestos Cement, Pressure.

.4 CGSB 41-GP-25M-77, Pipe, Polyethylene, for the Transport of Liquids.

.3 CSA Group (CSA)

.1 CAN/CSA-A257 Series-09, Standards for Concrete Pipe (Consists of A257.0, A257.1, A257.2, A257.3 and A257.4).

.2 CAN/CSA-A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.3 CAN/CSA-B137 Series-09, Thermoplastic Pressure Piping Compendium. (Consists of B137.0, B137.1, B137.2, B137.3, B137.4, B137.4.1, B137.5, B137.6, B137.8, B137.9, B137.10, B137.11 and B137.12).

.1 CAN/CSA-B137.1-09, Polyethylene Pipe, Tubing, and Fittings for Cold-Water Pressure Services.

.2 CAN/CSA-B137.3-09, Rigid Polyvinyl Chloride (PVC) Pipe for Pressure Applications.

.4 CSA G30.18-09, Carbon and Steel Bars for Concrete Reinforcement.

.4 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S520-07, Standard for Fire Hydrants.

.2 CAN/ULC-S543-09, Standard for Internal-Lug, Quick Connect Couplings for Fire Hose.

.5 Quinte West Engineering Standards – Section 10.0

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for distribution piping materials and include product characteristics, performance criteria, physical size, finish, and limitations.

.2 Pipe certification to be on pipe.

.3 Shop Drawings:

.1 Submit drawings to establish conformance with MW-19.15

.4

1.5 CLOSEOUT SUBMITTALS

.1 Submit data to produce record drawings, including directions for operating valves, list of equipment required to operate valves, details of pipe material, location of air and vacuum release valves, hydrant details.

.1 Include top of pipe, horizontal location of fittings and type, valves, valve boxes, valve chambers and hydrants.

.2 Operation and Maintenance Data: submit operation and maintenance data for pipe, valves, valve boxes, valve chambers and hydrants for incorporation into manual.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect water distribution piping from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove pallets, packaging materials, padding, crates, as specified with Section 01 74 19 - Waste Management and Disposal.

1.7 SCHEDULING OF WORK

.1 Schedule Work to minimize interruptions to existing services.

.2 Submit schedule of expected interruptions for approval and adhere to interruption schedule as approved by Departmental Representative.

.3 Notify Departmental Representative minimum of 24 hours in advance of interruption in service.

.4 Do not interrupt water service unless otherwise authorized.

.5 Notify fire department of planned or accidental interruption of water supply to hydrants.

.6 Provide and post "Out of Service" sign on hydrant not in use.

.7 Advise local police department of anticipated interference with movement of traffic.

Part 2 Products

2.1 PIPE, JOINTS AND FITTINGS

.1 Polyvinyl chloride pressure pipe: Quinte West Water Distribution Products.

2.2 PIPE PROTECTION

.1 Provide means of protection for iron pipe in corrosive soils in accordance with local practices.

2.3 VALVES AND VALVE BOXES

.1 Valves and valve boxes per Quinte West approved Water Distribution Products.

2.4 SERVICE CONNECTIONS

.1 Quinte West approved Water Distribution Products list.

.1 Granular material per Quinte West Engineering Standards.

2.5 BACKFILL MATERIAL

.1 per Quinte West Engineering Standards

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for distribution piping installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

.1 Clean pipes, fittings, valves, hydrants, and appurtenances of accumulated debris and water before installation.

.1 Inspect materials for defects to approval of Departmental Representative.

.2 Remove defective materials from site as directed by Departmental Representative.

3.3 TRENCHING

.1 Do trenching work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Ensure trench depth allows coverage over pipe of 2.4 m minimum from finished grade or as indicated.

3.4 GRANULAR BEDDING

.1 Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness to depth as indicated below bottom of pipe.

.2 Do not place material in frozen condition.

.3 Shape bed true to grade to provide continuous uniform bearing surface for pipe.

.4 Shape transverse depressions in bedding as required to suit joints.

.5 Compact each layer full width of bed to 100% maximum density.

.6 Fill authorized or unauthorized excavation below design elevation of bottom of specified bedding in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.5 PIPE INSTALLATION

.1 Terminate building water service 1m outside building wall opposite point of connection to main.

.1 Install coupling necessary for connection to building plumbing.

.2 If plumbing is already installed, make connection; otherwise cap or seal end of pipe and place temporary marker to locate pipe end.

.2 Lay pipes to manufacturer’s standard instructions and specifications.

.1 Do not use blocks except as specified.

.3 Join pipes in accordance with manufacturer's recommendations.

.4 Bevel or taper ends of PVC pipe to match fittings.

.5 Handle pipe by methods recommended by pipe manufacturer. Do not use chains or cables passed through pipe bore so that weight of pipe bears on pipe ends.

.6 Lay pipes on prepared bed, true to line and grade.

.1 Ensure barrel of each pipe is in contact with shaped bed throughout its full length.

.2 Take up and replace defective pipe.

.3 Correct pipe which is not in true alignment or grade or pipe which shows differential settlement after installation greater than 10 mm in 3 m.

.7 Face socket ends of pipe in direction of laying. For mains on grade of 2 % or greater, face socket ends up-grade.

.8 Do not exceed permissible deflection at joints as recommended by pipe manufacturer.

.9 Keep jointing materials and installed pipe free of dirt and water and other foreign materials.

.1 Whenever work is stopped, install a removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.

.10 Position and join pipes with equipment and methods approved by Departmental Representative.

.11 Cut pipes in approved manner as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.

.12 Align pipes before jointing.

.13 Install gaskets to manufacturer's recommendations. Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.

.14 Avoid displacing gasket or contaminating with dirt or other foreign material.

.1 Remove disturbed or contaminated gaskets.

.2 Clean, lubricate and replace before jointing is attempted again.

.15 Complete each joint before laying next length of pipe.

.16 Minimize deflection after joint has been made.

.17 Apply sufficient pressure in making joints to ensure that joint is completed to manufacturer's recommendations.

.18 Ensure completed joints are restrained by compacting bedding material alongside and over installed pipes or as otherwise approved by Departmental Representative.

.19 When stoppage of work occurs, block pipes in an approved manner to prevent creep during down time.

.20 Recheck plastic pipe joints assembled above ground after placing in trench to ensure that no movement of joint has taken place.

.21 Do not lay pipe on frozen bedding.

.22 Do hydrostatic and leakage test and have results approved by Departmental Representative before surrounding and covering joints and fittings with granular material.

.23 Backfill remainder of trench.

3.6 VALVE INSTALLATION

.1 Install valves to manufacturer's recommendations at locations as indicated.

.2 Support valves located in valve boxes or valve chambers by means of Bedding same as adjacent pipe. Valves not to be supported by pipe.

.3 Install underground post-type indicator valves as indicated.

3.7 SERVICE CONNECTIONS

.1 Terminate building water service 1 m outside building wall opposite point of connection to main.

.1 Install coupling necessary for connection to building plumbing.

.2 If plumbing is already installed, make connection, otherwise cap or seal end of pipe and place temporary marker to locate pipe end.

.2 Do not install service connections until satisfactory completion of hydrostatic and leakage tests of water main.

.3 Construct service connections at right angles to water main unless otherwise directed.

.4 Tappings on ductile iron, or PVC-C900 pipe, to be compliant with Quinte West Engineering Standards

3.8 THRUST BLOCKS AND RESTRAINED JOINTS

.1 Place concrete thrust blocks between valves, tees, plugs, caps, bends, changes in pipe diameter, reducers, hydrants and fittings and undisturbed ground as indicated or as directed by Departmental Representative.

.2 Keep joints and couplings free of concrete.

.3 Do not backfill over concrete within 24 hours after placing.

.4 For restrained joints: only use restrained joints approved by Departmental Representative.

3.9 HYDROSTATIC AND LEAKAGE TESTING

.1 Do tests in accordance with Quinte West Engineering Standards and OPSS

.2 Provide labour, equipment and materials required to perform hydrostatic and leakage tests hereinafter described.

.3 Notify Departmental Representative at least 24 hours in advance of proposed tests.

.1 Perform tests in presence of Departmental Representative.

.4 Upon completion of pipe laying and after Departmental Representative has inspected Work in place, surround and cover pipes between joints with approved granular material placed as directed by Departmental Representative

.5 Locate and repair defects if leakage is greater than amount specified.

.6 Repeat test until leakage is within specified allowance for full length of water main.

3.10 BACKFILL

.1 Place backfill material, above pipe surround, in uniform layers not exceeding 300 mm compacted thickness up to grades as indicated.

.2 Do not place backfill in frozen condition.

.3 Under paving and walks, compact backfill to at least 95% corrected maximum dry density.

.1 In other areas, compact to at least 90% corrected maximum dry density.

3.11 HYDRANT FLOW TESTS

.1 Conduct flow tests on every hydrant to determine fire flows prior to painting hydrant caps and ports.

3.12 PAINTING OF HYDRANTS

.1 After installation, paint hydrants red.

.2 After hydrant flow tests, paint caps and ports to meet colour selections approved by authority having jurisdiction.

3.13 FLUSHING AND DISINFECTING

.1 Flushing and disinfecting operations: carried out by specialist contractor.

.1 Notify Departmental Representative at least 4 days in advance of proposed date when disinfecting operations will begin.

.2 Flush water mains through per Quinte West Engineering Standards, Section 10.0

.3 Open and close valves, hydrants and service connections to ensure thorough flushing.

.4 When flushing has been completed introduce strong solution of chlorine as approved by local water authority into water main and ensure that it is distributed throughout entire system.

.5 Disinfect water mains to the requirements of local authority.

.6 Rate of chlorine application to be proportional to rate of water entering pipe.

.7 Chlorine application to be close to point of filling water main and to occur at same time.

.8 Operate valves, hydrants and appurtenances while main contains chlorine solution.

.9 Flush line and test line per Quinte West Engineering Standards, Section 10.0

3.14 SURFACE RESTORATION

.1 After installing and backfilling over water mains, restore surface to original condition as directed by Departmental Representative.

3.15 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

.3 Waste Management: separate waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 23 33.01 - Excavating Trenching and Backfilling.

.2 Section 01 74 00 - Cleaning

1.2 MEASUREMENT AND PAYMENT

.1 Measure excavation and backfill under Section 31 23 33.01 - Excavating Trenching and Backfilling.

.2 Measure supply and installation of sanitary sewer including testing and granular bedding and surround and including excavation and backfilling horizontally from manhole face to manhole face in metres of each size pipe and depth class installed.

.1 .

1.3 REFERENCE STANDARDS

.1 Departmental of Justice Canada (Jus)

.1 SOR/2018-196 Prohibition of Asbestos and Products Containing Asbestos Regulations.

.2 American National Standards Institute/American Water Works Association (ANSI/AWWA)

.1 ANSI/AWWA C111/A21.11-07, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.4 CSA Group (CSA)

.1 CSA A3000-08, Cementitious Materials Compendium.

.2 CSA A257 Series-09, Standards for Concrete Pipe and Manhole Sections.

.3 CAN/CSA-B70-06, Cast Iron Soil Pipe, Fittings, and Means of Joining.

.4 CSA B1800-11, Thermoplastic Non-pressure Pipe Compendium.

.1 CSA B182.1-11, Plastic Drain and Sewer Pipe and Pipe Fittings.

.2 CSA B182.2-11, PSM Type Polyvinylchloride PVC Sewer Pipe and Fittings.

.3 CSA B182.6-11, Profile Polyethylene (PE) Sewer Pipe and Fittings for Leak-Proof Sewer Applications.

.4 CSA B182.11-11, Standard Practice for the Installation of Thermoplastic Drain, Storm, and Sewer Pipe and Fittings.

.5 Quinte West Engineering Standards

.6 Province of Ontario

.1 OPSS.MUNI.410 Pipe Sewer Installation in Open Cut

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Scheduling:

.1 Schedule Work to minimize interruptions to existing services and maintain existing sewage flows during construction.

.2 Submit schedule of expected interruptions for approval and adhere to approved schedule.

.3 Notify Departmental Representative 24hours minimum in advance of any interruption in service.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for pipes, and backfill and include product characteristics, performance criteria, physical size, finish, and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Ontario, Canada.

.4 Samples:

.1 Inform Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of bedding materials and provide access for sampling.

.2 Submit for testing at least two (2) weeks prior to beginning Work, samples of materials proposed for use as follows:

.1 Granular Backfill

.2 Asphalt reinstatement.

.5 Certificates:

.1 Certification to be marked on pipe.

.6 Test and Evaluation Reports:

.1 Submit manufacturer's test data and certification 2 weeks minimum before beginning Work.

.7 Sustainable Design Submittals:

.1 Erosion and Sedimentation Control: submit copy of erosion and sedimentation control plan in accordance with authorities having jurisdiction.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations.

.2 Store and protect pipes from damage.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 CONCRETE PIPE

.1 Reinforced circular concrete pipe and fittings: to as indicated.

.2 Lifting holes:

.1 Pipe 900 mm and less diameter - no lift holes.

.2 Pipe greater than 900 mm diameter - lift holes not to exceed two in a piece of pipe.

.3 Provide prefabricated plugs to seal lift holes watertight after installation of pipe.

2.2 PLASTIC PIPE

.1 Type PSM Polyvinyl Chloride (PVC): to CSA B182.2.

.1 Standard Dimensional Ratio (SDR):as indicated.

.2 Locked-in gasket and integral bell system.

.2 Acrylonitrile - Butadiene - Styrene (ABS): to CSA B182.2.

.3 Corrugated High Density Polyethylene (HDPE): to CSA B182.6.

.1 Classes as indicated.

2.3 SERVICE CONNECTIONS

.1 Type PSM Poly (Vinyl) Chloride: to CSA B182.2.

.2 Plastic pipe: to CSA B182.1, with push-on joints.

2.4 CEMENT MORTAR

.1 Portland cement: to CSA A3000.

.2 Mix mortar 1 part by volume of cement to two parts of clean, sharp sand mixed dry.

.1 Add only sufficient water after mixing to give optimum consistency for placement.

.2 Do not use additives.

2.5 PIPE BEDDING AND SURROUND MATERIALS

.1 Granular material to comply with Quinte West Engineering Standards

2.6 BACKFILL MATERIAL

.1 As indicated.

.2 In accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for sewer pipe installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

.1 Temporary Erosion and Sedimentation Control:

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction and sediment and erosion control drawings.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

.2 Clean pipes and fittings of debris and water before installation and remove defective materials from site to approval of Departmental Representative.

.3 Clean and dry pipes and fittings before installation.

.4 Obtain Departmental Representative's approval of pipes and fittings prior to installation.

3.3 TRENCHING

.1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Protect trench from contents of sewer or sewer connection.

.3 Trench alignment and depth require approval of Departmental Representative prior to placing bedding material and pipe.

3.4 GRANULAR BEDDING

.1 Place bedding in unfrozen condition.

.2 Place granular bedding materials in uniform layers not exceeding 150 mm compacted thickness to depth as indicated.

.3 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe.

.1 Do not use blocks when bedding pipe.

.4 Shape transverse depressions as required to suit joints.

.5 Compact each layer full width of bed to at least 95 % corrected maximum dry density.

.6 Fill excavation below bottom of specified bedding adjacent to manholes or structures with compacted bedding material.

3.5 INSTALLATION

.1 Lay and join pipes in accordance with manufacturer's recommendations and to approval of Departmental Representative.

.2 Handle pipe using methods approved by Departmental Representative.

.1 Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.

.3 Lay pipes on prepared bed, true to line and grade, with pipe invert smooth and free of sags or high points.

.4 Begin laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.

.5 Joint deflection permitted within limits recommended by pipe manufacturer.

.6 Water to flow through pipe during construction, only as permitted by Departmental Representative.

.7 Whenever Work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.

.8 Install plastic pipe and fittings in accordance with CSA B182.11.

.9 Pipe jointing:

.1 Install gaskets in accordance with manufacturer's written recommendations.

.2 Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.

.3 Align pipes before joining.

.4 Maintain pipe joints free from mud, silt, gravel, and foreign material.

.5 Avoid displacing gasket or contaminating with dirt or foreign material. Gaskets so disturbed to be removed, cleaned, and lubricated and replaced before joining is attempted.

.6 Complete each joint before laying next length of pipe.

.7 Minimize joint deflection after joint has been made to avoid joint damage.

.8 At rigid structures, install pipe joints not more than 1.2 m from side of structure.

.9 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.

.10 When stoppage of Work occurs, block pipes as directed by Departmental Representative to prevent creep during down time.

.11 Plug lifting holes with prefabricated plugs approved by Departmental Representative, set in shrinkage compensating grout.

.12 Cut pipes as required for special inserts, fittings or closure pieces as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.

.13 Make watertight connections to manholes.

.1 Use shrinkage compensating grout when suitable gaskets are not available.

.14 Use prefabricated saddles or field connections approved by Departmental Representative, for connecting pipes to existing sewer pipes.

.1 Joints to be structurally sound and watertight.

3.6 PIPE SURROUND

.1 Place surround material in unfrozen condition.

.2 Upon completion of pipe laying, and after Departmental Representative has inspected pipe joints, surround and cover pipes as indicated.

.1 Leave joints and fittings exposed until field testing is completed.

.3 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated.

.4 Place layers uniformly and simultaneously on each side of pipe.

.5 Compact each layer from pipe invert to mid height of pipe to at least 100 % corrected maximum dry density.

.6 Compact each layer from mid height of pipe to underside of backfill to at least 100 % corrected maximum dry density.

.7 When field test results are acceptable to Departmental Representative, place surround material at pipe joints.

3.7 BACKFILL

.1 Place backfill material in unfrozen condition.

.2 Place backfill material, above pipe surround in uniform layers not exceeding 300 mm compacted thickness up to grades as indicated.

.3 Under paving and walks, compact backfill to at least 95 % corrected maximum dry density.

.1 In other areas, compact to at least 90 % corrected maximum dry density.

3.8 SERVICE CONNECTIONS

.1 Install pipe to CSA B182.1 manufacturer's instructions and specifications.

.2 Maintain grade for 100 and 125 mm diameter sewers at 1% unless directed otherwise by Departmental Representative.

.3 Service connections to main sewer: standard Tee Departmental Representative approved saddles.

.1 Do not use break-in and mortar patch-type joints.

.4 Service connection pipe: not to extend into interior of main sewer.

.5 Make up required horizontal and vertical bends from 45 degrees bends or less, separated by straight section of pipe with minimum length of 4 pipe diameters.

.1 Use long sweep bends where applicable.

.6 Plug service laterals with watertight caps or plugs as approved by Departmental Representative.

.7 Place location marker at ends of plugged or capped unconnected sewer lines.

.1 Each marker: 38 x 89 mm stake extending from pipe end at pipe level to 0.6 m above grade.

.2 Paint exposed portion of stake red.

3.9 FIELD TESTING

.1 Repair or replace pipe, pipe joint or bedding found defective.

.2 When directed by Departmental Representative, Deflection testing per OPSS.MUNI.400 may be requested

.3 Remove foreign material from sewers and related appurtenances by flushing with water.

.4 Perform infiltration and exfiltration testing as soon as practicable after jointing and bedding are complete, and service connections have been installed.

.5 Do infiltration and exfiltration test to OPSS.MUNI.410.

.6 Do infiltration and exfiltration testing as specified herein and as directed by Departmental Representative.

.1 Perform tests in presence of Departmental Representative.

.2 Notify Departmental Representative 24 hours minimum in advance of proposed tests.

.7 Carry out tests on each section of sewer between successive manholes including service connections.

.8 Install watertight bulkheads in suitable manner to isolate test section from rest of pipeline.

.9 Exfiltration test:

.1 Per OPSS.MUNI.410.

.10 Infiltration test:

.11 Per OPSS.MUNI.410

.12 Television and photographic inspections:

.1 Carry out inspection of installed sewers by video camera, digital camera or by other related means.

.2 Provide means of access to permit Departmental Representative to do inspections.

.3 Payment for inspection services in accordance with Measurement and Payment.

.4 Inspection to comply with Quinte West Engineering Standards.

3.10 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 00 - Cleaning.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Section 01 33 00 - Submittal Procedures

.3 Section 01 74 00 - Cleaning

1.2 PRICE AND PAYMENT PROCEDURES

.1 Measurement procedures:

.1 Measure excavation and backfill under Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Measure supply and installation of storm sewer including testing and including excavation and backfilling and granular bedding and surround horizontally from manhole face to manhole face in metres of each pipe size and depth class installed.

1.3 REFERENCE STANDARDS

.1 Department of Justice Canada (Jus)

.1 SOR/2018-196 Prohibition of Asbestos and Products Containing Asbestos Regulations.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-M89, Sieves, Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.3 CAN/CGSB-34.9-94, Asbestos-Cement Sewer Pipe.

.3 CSA Group (CSA)

.1 CAN/CSA-A3000-08, Cementitious Materials Compendium.

.2 CSA A257 Series-M92 (R2009), Standards for Concrete Pipe.

.3 CAN/CSA-B1800-06, Thermoplastic Non-pressure Pipe Compendium - B1800 Series.

.4 CSA G401-07, Corrugated Steel Pipe Products.

.5 Quinte West Engineering Standards.

.4 Province of Ontario

.1 OPSS.MUNI.410 Pipe Sewer Installation in Open Cut.

1.4 SCHEDULING

.1 Schedule Work to minimize interruptions to existing services and to maintain existing flow during construction.

.2 Submit schedule of expected interruptions for approval and adhere to approved schedule.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for pipes, and backfill and include product characteristics, performance criteria, physical size, finish, and limitations.

.3 Shop Drawings:

.1 .

.2 Submit drawings stamped and signed by professional engineer registered or licensed in Ontario, Canada.

.4 Samples:

.1 Inform Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of bedding materials and provide access for sampling.

.2 Submit to Departmental Representative for testing, at least 2 weeks prior to beginning Work, following samples of materials proposed for use: granular bedding and backfill and asphalt reinstatement.

.5 Certification to be marked on pipe.

.6 Test and Evaluation Reports: submit manufacturer's test data and certification at least 2 weeks prior to beginning Work.

.7 Manufacturer's Instructions: submit to Departmental Representative copy of manufacturer's installation instructions upon request.

.8 Sustainable Design Submittals:

.1 Erosion and Sedimentation Control: submit copy of erosion and sedimentation control plan in accordance with authorities having jurisdiction.

.2 .

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations.

.2 Store and protect pipes from damage.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 CONCRETE PIPE

.1 Reinforced circular concrete pipe and fittings: to CSA A257 as indicated diameter, and strength classification, designed for flexible rubber gasket joints to CSA A257.

.2 Lifting holes:

.1 Pipe 900 mm and less diameter: no lift holes.

.2 Pipe greater than 900 mm diameter: lift holes not to exceed two in piece of pipe.

.3 Provide prefabricated plugs to effectively seal lift holes after installation of pipe.

2.2 PLASTIC PIPE

.1 Type PSM Poly Vinyl Chloride (PVC): to CAN/CSA-B1800.

.1 Standard Dimensional Ratio (SDR): as indicated.

.2 Locked-in gasket and integral bell system.

.2 Corrugated polyethylene pipe: high density to ASTM F405.

.3 Acrylonitrile - Butadiene - Styrene (ABS): to CAN/CSA-B1800.

2.3 PIPE BEDDING AND SURROUND MATERIAL

.1 Granular material in accordance with Quinte West Engineering Standards

2.4 BACKFILL MATERIAL

.1 As indicated on drawings and in geotechnical report.

.2 In accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

Part 3 Execution

3.1 PREPARATION

.1 Temporary Erosion and Sedimentation Control:

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control drawings and requirements of authorities having jurisdiction.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

.2 Clean pipes and fittings of debris and water before installation and remove defective materials from site to approval of Departmental Representative.

3.2 TRENCHING

.1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Protect trench from contents of sewer.

.3 Trench alignment and depth to approval of Departmental Representative prior to placing bedding material and pipe.

.4 Water jetting of backfill under haunches of corrugated steel pipe may be permitted if recommended by manufacturer and approved by Departmental Representative.

3.3 GRANULAR BEDDING

.1 Place bedding in unfrozen condition.

.2 Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness to depth as indicated.

.3 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe.

.1 Do not use blocks when bedding pipes.

.4 Shape transverse depressions as required to suit joints.

.5 Compact each layer full width of bed to at least 100 % corrected maximum dry density.

.6 Fill excavation below bottom of specified bedding adjacent to manholes or catch basins with compacted bedding material.

3.4 INSTALLATION

.1 Lay and join pipe in accordance with manufacturer's recommendations and to approval of Departmental Representative.

.2 Handle pipe using methods approved by Departmental Representative.

.1 Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.

.3 Lay pipes on prepared bed, true to line and grade with pipe inverts smooth and free of sags or high points.

.1 Ensure barrel of each pipe is in contact with shaped bed throughout its full length.

.4 Begin laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.

.5 Joint deflection permitted within limits recommended by pipe manufacturer.

.6 Water to flow through pipes during construction only as permitted by Departmental Representative.

.7 Whenever Work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.

.8 Install plastic pipe and fittings in accordance with CAN/CSA-B1800.

.9 When any stoppage of Work occurs, restrain pipes as directed by Departmental Representative, to prevent "creep" during down time.

.10 Plug lifting holes with Departmental Representative approved prefabricated plugs, set in shrinkage compensating grout.

.11 Cut pipes as required for special inserts, fittings or closure pieces, as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.

.12 Make watertight connections to manholes and catch basins.

.1 Use shrinkage compensating grout when suitable gaskets are not available.

.13 Use prefabricated saddles or approved field connections for connecting pipes to existing sewer pipes.

.1 Joint to be structurally sound and watertight.

.14 Temporarily plug open upstream ends of pipes with removable watertight concrete, steel or plastic bulkheads.

3.5 PIPE SURROUND

.1 Place surround material in unfrozen condition.

.2 Upon completion of pipe laying, and after Departmental Representative has inspected pipe joints, surround and cover pipes as indicated.

.1 Leave joints and fittings exposed until field testing is completed.

.3 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated.

.4 Place layers uniformly and simultaneously on each side of pipe.

.5 Compact each layer from pipe invert to mid height of pipe to at least 100 % corrected maximum dry density.

.6 Compact each layer from mid height of pipe to underside of backfill to at least 100 % corrected maximum dry density.

.7 When field test results are acceptable to Departmental Representative, place surround material at pipe joints.

3.6 BACKFILL

.1 Place backfill material in unfrozen condition.

.2 Place backfill material, above pipe surround, in uniform layers not exceeding 300 mm compacted thickness up to grades as indicated.

.3 Under paving and walks, compact backfill to at least 95 % corrected maximum dry density. In other areas, compact backfill to at least 90 % corrected maximum dry density.

.4 Place unshrinkable backfill in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.7 FIELD TESTS AND INSPECTIONS

.1 Repair or replace pipe, pipe joint or bedding found defective.

.2 Deflection testing per OPSS.MUNI.410 may be requested to ensure that pipe is free of obstruction directed by Departmental Representative.

.3 Remove foreign material from sewers and related appurtenances by flushing with water.

.4 Television and photographic inspections:

.1 Carry out inspection of installed sewers by television camera, photographic camera or by other related means.

.2 Provide means of access to permit Departmental Representative to do inspections.

.3 Payment for inspection services in accordance with Price and Payment Procedures.

.4 Inspection to comply with Quinte West Engineering Standards.

3.8 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 00 - Cleaning.

END OF SECTION

Approved: 2011-06-30

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 05 16 - Aggregate Materials

1.2 REFERENCE STANDARDS

.1 ASTM International (ASTM):

.1 ASTM C117- [17], Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing

.2 ASTM C131/C131M- [20], Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

.3 ASTM C136/C136M- [19], Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

.4 ASTM D422- [63(2007)], Standard Test Method for Particle-Size Analysis of Soils

.5 ASTM D698- [12], Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft ^{3}) (600kN-m/m ³)

.6 ASTM D1557- [12], Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft ^{3}) (2,700kN-m/m ³)

.7 ASTM D1883- [16], Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils

.8 ASTM D4318- [17el], Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils

.2 Canadian General Standards Board (CGSB):

.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series

.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric

1.3 MEASUREMENT AND PAYMENT

.1 Measure granular sub-base in tonnes of material incorporated into Work and accepted by Consultant.

.2 Measure excavation of sub-base and subgrade materials to correct deficiencies in subgrade discovered during proof rolling as common excavation.

.1 Measure backfill of subgrade with common materials as common excavation and subgrade compaction.

.2 Measure backfill of subgrade with sub-base material and replacement of sub-base material.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations.

Part 2 Products

2.1 MATERIALS

.1 Granular sub-base material: in accordance with Section 31 05 16 - Aggregate Materials and the following requirements:

.1 Crushed, pit run or screened stone, gravel or sand.

.2 Gradations to be within limits specified when tested to ASTM C136/C136M and ASTM C117. Sieve sizes to CAN/CGSB-8.1.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: Verify conditions of substrate previously installed under other Sections or Contracts are acceptable for granular sub-base installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Consultant.

.2 Inform Consultant of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied [and after receipt of written approval to proceed from Consultant.

3.2 PLACING

.1 Place granular sub-base after subgrade is inspected and approved by Consultant.

.2 Construct granular sub-base to depth and grade in areas indicated.

.3 Ensure no frozen material is placed.

.4 Place material only on clean unfrozen surface, free from snow or ice.

.5 Begin spreading sub-base material on crown line or high side of one-way slope.

.6 Place granular sub-base materials using methods which do not lead to segregation or degradation.

.7 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.

.8 Place material to full width in uniform layers not exceeding 200 mm compacted thickness.

.1 Consultant may authorize thicker lifts if specified compaction can be achieved.

.9 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.

.10 Remove and replace portion of layer in which material has become segregated during spreading.

3.3 COMPACTION

.1 Compaction equipment to be capable of obtaining required material densities.

.2 Efficiency of equipment not specified to be proved at least as efficient as specified equipment at no extra cost and written approval must be received from Consultant before use.

.3 Equipped with device that records hours of actual work, not motor running hours.

.4 Compact to density of not less than 100 % maximum dry density in accordance with ASTM D698 and ASTM D1557.

.5 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.

.6 Apply water as necessary during compaction to obtain specified density.

.7 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Consultant.

.8 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.4 PROOF ROLLING

.1 For proof rolling use standard roller of 45400 kg gross mass with four pneumatic tires each carrying 11350 kg and inflated to 620 kPa. Four tires arranged abreast with centre to centre spacing of 730 mm maximum.

.2 Obtain written approval from Consultant to use non standard proof rolling equipment.

.3 Proof roll at level in sub-base as indicated.

.1 If non standard proof rolling equipment is approved, Consultant will determine level of proof rolling.

.4 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.

.5 Where proof rolling reveals areas of defective subgrade:

.1 Remove sub-base and subgrade material to depth and extent as directed by Consultant.

.2 Backfill excavated subgrade with sub-base material and compact in accordance with this section.

.3 Replace sub-base material and compact.

.6 Where proof rolling reveals areas of defective sub-base, remove and replace in accordance with this section at no extra cost.

3.5 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

3.6 SITE TOLERANCES

.1 Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly high or low.

3.7 PROTECTION

.1 Maintain finished sub-base in condition conforming to this section until succeeding base is constructed, or until granular sub-base is accepted by Consultant.

END OF SECTION