1.1 GENERAL

.1 Section Includes:
  .1 Materials and installation for fertilizing and preserving root systems of plants affected by changing grades or excavation.

.2 Related Sections:
  .1 Section 01 33 00 - Submittal Procedures.
  .2 Section 01 35 29 - Health and Safety Requirements.
  .3 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  .4 Section 32 92 19.16 - Hydraulic Seeding.

REFERENCES

.1 Canadian Standards Association (CSA International):
  .1 CSA G30.5-M1983(R1998), Welded Steel Wire Fabric for Concrete Reinforcement.

.2 Department of Justice Canada (Jus):
  .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
  .2 Fertilizers Act (R.S. 1985, c. F-10).
  .3 Fertilizers Regulations (C.R.C., c. 666).
  .4 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

.3 Health Canada - Pest Management Regulatory Agency (PMRA):
  .1 National Standard for Pesticide Education, Training and Certification in Canada (1995).

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS):
  .1 Material Safety Data Sheets (MSDS).

DEFINITION

.1 Mycorrhiza : association between fungus and roots of plants. This symbiosis

enhances plant establishment in newly landscaped and imported soils.

SUBMITTALS

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

.2 Submit monthly written reports on maintenance during warranty period, to the Departmental Representative identifying:
- .1 Maintenance work carried out.
- .2 Development and condition of plant material.
- .3 Preventative or corrective measures required which are outside Contractor's responsibility.

QUALITY ASSURANCE

.1 Health and Safety:
- .1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.

DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:
- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Separate for reuse and recycling and place in designated containers Steel Metal Plastic waste in accordance with Waste Management Plan.
- .5 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by

the Departmental Representative.

.6 Divert unused wood materials from landfill by alternative disposal composting mulching approved by the Departmental Representative.

.7 Divert unused stone and aggregate materials from landfill to local quarry facility approved by the Departmental Representative.

.8 Divert unused plastic materials from landfill to local recycling facility approved by the Departmental Representative.

.9 Place materials defined as hazardous or toxic in designated containers.

.10 Dispose of unused fertilizer material at official hazardous material collections site approved by the Departmental representative.

.11 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.

.12 Do not dispose of unused fertilizer material into sewer system, into streams, lakes, onto ground or in any other location where they will pose health or environmental hazard.

.13 Ensure emptied containers are sealed and stored safely.

.14 Fold up metal banding, flatten and place in designated area for recycling.

SCHEDULING

.1 Obtain approval from the Departmental Representative of schedule indicating beginning of Work.

MAINTENANCE DURING WARRANTY PERIOD

.1 From time of acceptance by the Departmental Representative to end of warranty period, perform following maintenance operations:

.1 Water to maintain soil moisture

conditions for optimum growth and health of plant material without causing erosion.

.2 Apply pesticides in accordance with National Standard for Pesticide Education, Training and Certification in Canada, Federal, Provincial, and Municipal regulations as and when required to control insects, fungus and disease. Obtain product approval from the Departmental Representative prior to application.

.3 Apply fertilizer in early spring at rate of 0.025 kg of nitrogen/m2 at manufacturer's suggested rate.

.4 Remove dead, broken or hazardous branches from plant material. Dispose of debris through alternative disposal composting mulching.

1.2 MATERIALS

MATERIALS

.1 Fill:

.1 Type (A): clean, natural river sand and gravel material, free from silt, clay, loam, friable or soluble materials and organic matter.

.2 Type (B): excavated pervious soil, free from roots, rocks larger than 75 mm, building debris, and toxic ingredients (salt, oil, etc.). Excavated material shall be approved by the Departmental representative before use as fill.

.2 Coarse washed stones: 35-75 mm diameter clean round hard stone.

.3 Fertilizer:

.1 To Canada Fertilizer Act and Fertilizers Regulations.

.2 Complete, commercial, slow release with 35 % of nitrogen content in water-insoluble form.

.4 Anti-desiccant: commercial, wax-like emulsion.

.5 Filter Cloth:
.1 Type 1: 100 % non-woven needle punched polyester, 2.75 mm thick, 240 g/m2 mass.
.2 Type 2: biodegradable burlap.

.6 Wood posts Recycled composite plastic posts: 38 x 89 x 2400 mm length, untreated wood.

1.3 EXECUTION

IDENTIFICATION AND PROTECTION

.1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.

.2 Identify plants and limits of root systems to be preserved as approved by the Departmental Representative.

.3 Protect plant and root systems from damage, compaction and contamination resulting from construction as approved by the Departmental Representative.

.4 Ensure no pruning is done inside drip line. If pruning inside drip line is required consult an arborist or Canadian Certified Horticultural Technician (CCHT) as approved by the Departmental Representative.

ROOT CURTAIN SYSTEM

.1 Identify limits for required construction excavation as approved by the Departmental Representative.

.2 Prior to construction excavation, hand dig trench minimum 500 mm wide x 1500 mm deep, along perimeter of excavation limits.

.3 Prune exposed roots cleanly at side of trench nearest plants to be preserved. Pruned ends to point obliquely downwards.

.4 Install wooden posts recycled composite plastic posts and welded wire fabric against construction edge of trench.

.5 Securely attach Type 2 filter fabric on

plant side of wire mesh.

.6 Prepare homogeneous mixture of fertilizer, parent material and organic matter:
- .1 Add organic matter to mixture to achieve 7-9 % organic matter content by weight.
- .2 Incorporate with mixture grade 2:12:8 ratio fertilizer (dry) at rate of 1.5 kg/m^3.

.7 Backfill with homogeneous mixture between curtain wall and plants to be preserved in layers not exceeding 150 mm in depth. Compact each layer to 85 % Standard Proctor Density.

.8 Protect root curtain from damage during construction operations.

.9 Water plants and root curtain sufficiently during construction to maintain optimum soil moisture condition until backfill operations are complete.

.10 Protect root curtain before during backfill operations. Ensure root curtain is cut down to 300 mm below finished grade and remove cut material.

TRENCHING AND TUNNELING FOR UNDERGROUND SERVICES

.1 Centre line location and limits of trench/tunnel excavation to be approved by the Departmental representative prior to excavation. Tunnel excavation to extend 2000 mm from edge of trunk on either side.

.2 Excavate manually within zone of root system. Do not sever roots greater than 40 mm diameter except at greater than 500 mm below existing grade. Protect roots, and cut roots cleanly with sharp disinfected tools.

.3 Excavate tunnel under centre of tree trunk using methods and equipment approved by the Departmental representative.

.4 Minimum acceptable depth to top of tunnel: 1000 mm.

.5 Backfill for tunnel and trench to 85 % Standard Proctor Density. Avoid damage to trunk and roots of tree.

.6 Complete tunneling and backfilling at tree within 2 weeks of beginning Work.

LOWERING GRADE AROUND EXISTING TREE

.1 Begin Work in accordance with schedule approved by the Departmental representative.

.2 Cut slope not less than 500 mm from tree trunk to new grade level retaining wall.

.3 Excavate to depths as indicated. Protect from damage root zone which is to remain.

.4 When severing roots at excavation level, cut roots with sharp tools.

.5 Cultivate excavated surface manually to 15 mm depth.

.6 Prepare homogeneous soil mixture consisting by volume of:
- .1 60 % excavated soil cleaned of roots, plant matter, stones, debris.
- .2 25 % coarse, clean sterile sand.
- .3 15 % organic matter.
- .4 Grade 2:12:8 fertilizer at rate of 1.5 kg/m^3.

.7 Place soil mixture over area of excavation to finished grade level. Compact to 85 % Standard Proctor Density.

.8 Water entire root zone to optimum soil moisture level.

.9 Install surface cover of seeding sodding in accordance with Section 32 92 19.16 - Hydraulic Seeding.

PRUNING

.1 Prune crown to compensate for root loss while maintaining general form and character of plant. Dispose of debris through alternative disposal composting mulching.

ANTI-DESICCANT

.1 Apply anti-desiccant to foliage where applicable and as directed by the Departmental representative.

END OF SECTION

1.1 GENERAL

PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION

.1 Granular based material: supplied by the Departmental Representative at borrow pit stockpile.

RELATED REQUIREMENTS

.1 Not used.

REFERENCES

.1 ASTM International:
- .1 ASTM C117-04, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
- .2 ASTM C131-06, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- .3 ASTM C136-06, 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 D698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft;) (600kN-m/m;).
- .6 ASTM D1557-09, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft;) (2,700kN-m/m;).
- .7 ASTM D1883-07e2, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
- .8 ASTM D4318-10, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

.2 Canada Green Building Council (CaGBC):
.1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations (including Addendum 2007).

.3 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.

.4 U.S. Environmental Protection Agency (EPA) / Office of Water:
.1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

.5 New Brunswick Department of Transportation and Infrastructure Standard Specifications (most recent version):
.1 NBDTI Standard Specification Item 201 – Production of Highway Aggregates
.2 NBDTI Standard Specification Item 203 – Aggregate Base/Subbase

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 EPA 832/R-92-2005 authorities having jurisdiction.
.2 Construction Waste Management:
.3 Submit project Waste Management Plan Waste Reduction Workplan highlighting recycling and salvage requirements.

.4 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 50 75% of construction wastes were recycled or salvaged.

.5 Regional Materials: submit evidence that project incorporates required percentage 10 20% of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Storage and Handling Requirements:

.1 Store materials in accordance with manufacturer's recommendations erosion and sedimentation control plan.

.2 Replace defective or damaged materials with new.

.3 Develop Construction Waste Management Plan Waste Reduction Workplan related to Work of this Section.

1.2 MATERIALS

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

.1 New Brunswick Department of Transportation and Infrastructure Standard Specifications, item 201.

1.3 EXECUTION

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 the Departmental Representative.
  .2 Inform the 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 the Departmental Representative.

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 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 construction until permanent vegetation has been established.
  .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

PLACING

.1 To be in accordance with the following:
  .1 New Brunswick Department of Transportation and Infrastructure Standard Specifications, item 203.

.2 Construct granular sub-base to depth and grade in areas indicated.

COMPACTION

.1 To be in accordance with the following:
  .1 New Brunswick Department of Transportation and Infrastructure Standard Specifications, item 203.

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 center to center spacing of 730 mm maximum.

.2 Obtain written approval from the Departmental Representative to use nonstandard proof rolling equipment.

.3 Proof roll at level in sub-base as indicated:
  .1 If nonstandard proof rolling equipment is approved, the Departmental Representative 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 the Departmental Representative.

.6 Where proof rolling reveals areas of defective sub-base, remove and replace in accordance with this section at no extra cost.

1.4 FINAL CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 – 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 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

SITE TOLERANCES

.1 Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly high or low.

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 the Departmental Representative.

END OF SECTION

1.1 GENERAL

PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION

.1 Departmental Representative to supply granular base material at pit barrow stockpile.

RELATED REQUIREMENTS

.1 Not used.

REFERENCES

.1 ASTM International:
- .1 ASTM C117-04, Standard Test Methods for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
- .2 ASTM C131-06, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- .3 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .4 ASTM D698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft;) (600kN-m/m;).
- .5 ASTM D1557-09, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft;) (2,700kN-m/m;).
- .6 ASTM D1883-07e2, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
- .7 ASTM D4318-10, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

.2 Canada Green Building Council (CaGBC):
- .1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and

Major Renovations (including Addendum 2007).

.3 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.

.4 U.S. Environmental Protection Agency (EPA) / Office of Water:
.1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

.5 New Brunswick Department of Transportation and Infrastructure Standard Specifications (most recent version):
.1 NBDTI Standard Specification Item 201 – Production of Highway Aggregates
.2 NBDTI Standard Specification Item 203 – Aggregate Base/Subbase

ACTION AND INFORMATIONAL SUBMITTALS

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

DELIVERY, STORAGE AND HANDLING

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

.2 Storage and Handling Requirements:
.1 Stockpile minimum 50% of total aggregate required prior to beginning operation.
.2 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.3 Replace defective or damaged materials with new.

.4 Store cement in weather tight bins or silos that provide protection from dampness and easy access for inspection and identification of each shipment.

1.2 MATERIALS

.1 Granular base: material in accordance with Section 31 05 16 - Aggregate Materials and following requirements:
.1 New Brunswick Department of Transportation and Infrastructure Standard Specifications, item 201.

1.3 EXECUTION

PREPARATION

.1 Temporary Erosion and Sedimentation Control:
.1 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
.2 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

PLACEMENT AND INSTALLATION

.1 Place granular base after sub-base and subgrade surface is inspected and approved in writing by the Departmental Representative.

.2 Placement and installation of granular base to be in accordance with the following:
.1 New Brunswick Department of Transportation and Infrastructure Standard Specifications, item 203.

.3 Construct granular base to depth and grade in areas indicated.

COMPACTING

.1 To be in accordance with the following:
.1 New Brunswick Department of Transportation and Infrastructure Standard Specifications, item 203.

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 center to center spacing of 730 mm.

.2 Obtain written approval from the Departmental Representative to use nonstandard proof rolling equipment.

.3 Proof roll at level in granular base as indicated:
- .1 If use of nonstandard proof rolling equipment is approved, Departmental Representative 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 the Departmental Representative.
- .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 the Departmental Representative and replace with new materials in accordance with Section 32 11 16.01 - Granular Sub-base and this section at no extra cost.

SITE TOLERANCES

.7 Finished base surface to be within plus or

minus 10 mm of established grade and cross section but not uniformly high or low.

1.4 FINAL CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 – 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 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal:
  .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
  .2 Divert unused granular material from landfill to local quarry facility approved by Departmental Representative Departmental Representative.

PROTECTION

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

END OF SECTION

1.1 GENERAL

RELATED REQUIREMENTS

.1 Section 31 23 33.01 Excavation, Trenching and Backfilling

.2 Section 33 31 13 Public Sanitary Sewerage Piping

.3 Section 33 36 33 Utility Drainage Field

REFERENCES

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

.2 ASTM International

.1 ASTM C 478M-11, Standard Specification for Precast Reinforced Concrete Manhole Sections-Metric.

SCHEDULING

.1 Schedule work to minimize interruptions to existing services.

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 packaged sewage lift 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 New Brunswick of, Canada.

.2 Submit drawings for civil, structural, hydraulic, mechanical, and electrical elements.

CLOSEOUT SUBMITTALS

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

.2 Operation and Maintenance Data: submit operation and maintenance data for sewage lift station for incorporation into manual.

.3 Include information as follows:

.1 Record drawings, wiring diagrams, electrical schematics of equipment as installed.

.2 Interconnections with numbers and wire sizes.

.3 Pump characteristic curves.

.4 Detailed operation and maintenance instructions.

.5 Parts list comprising complete schedule clearly identified to facilitate re-ordering.

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 in clean, dry, well-ventilated area.

.2 Store and protect packaged sewer lift from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

1.2 MATERIALS

DESCRIPTION

.1 Reinforced concrete enclosure.

.1 Pumping system: factory assembled and disassembled for shipment with mating components clearly identified.

.2 Principal items of equipment to include 1 submersible sewage pumping unit, internal piping and valves, liquid level controls, lifting chains, guide bars, debris screen, vents complete with screens, cover, electrical wiring, control panel with circuit breakers and motor starters.

.2 Equipment and installation including as follows:

.1 Installation of excavation protection.

.2 Excavation for sewage lift station.

.3 Placement of bedding material.

.4 Connection of power to control panel as indicated.

.5 Connections to septic tank and force main.

.6 Supply and installation of packaged sewage lift station in accordance with manufacturer's recommendations.

.3 Wet well sewage lift station:

.1 Fully automatic, consisting of simplex submersible pump mounted on lift station bottom.

.1 Ensure control is by series of liquid level bulbs.

.2 Locate control according to electrical drawing.

WET WELL STRUCTURE

.1 Structure: leak free, precast, reinforced concrete with access opening, ladder and designed for following forces:

.1 Dead load of station and components, dynamic and kinetic forces of rotating equipment.

.2 Dead load from soil over structure.

.3 Hydrostatic uplift forces.

.2 Waterproof exterior surfaces below grade in accordance with manufacturer specifications

.3 Materials:

.1 Precast concrete to CAN/CSA-A257.

PUMPS

.1 1 vertical, single stage, bottom suction, non-clog, heavy duty, explosion-proof, totally submersible centrifugal pumps, direct connected to motor by solid stainless steel shaft and fitted with thrust bearings.

.2 Characteristics:

.1 Capacity: 4 L/s minimum.

.2 Total dynamic head: 5.5 m.

.3 Maximum speed: 3450 rpm.

.3 Volute casing: cast iron, minimum grade Class 30, close coupled.

.4 Impeller: bronze, open, in static and dynamic balance. All fasteners to be stainless steel.

PUMP LIFTING SYSTEM

.1 Ensure pumps are complete with sliding guide and brackets, chains and quick leak-proof disconnect to discharge piping, all allowing for withdrawal of pumps.

.2 Include galvanized lifting chain or stainless steel cable for each pump accessible from roof access hatches.

.3 Use galvanized steel pipe as quick rails for pump.

SUBMERSIBLE MOTORS

.1 Motors:

.1 Single phase, 240V, .75hp.

.2 Capable of operating pump at any point on selected impeller curve without exceeding motor nominal rating.

.3 Fully overload protected.

.4 Assembly capable of operating continuously in air without overheating.

.5 Complete with NEMA approved winding temperature sensor.

.2 Motor speed: maximum 3450 rpm.

.3 Motor enclosure and seal housing: corrosion resistant, completely watertight, cast iron.

.4 Bearing: anti-friction type, greasable, with lubrication lines and fittings, 50,000 hours minimum.

.5 Terminal box: watertight, with waterproof cable entry glands mounted at motor.

.6 Shaft seals: double mechanical seals with tungsten/carbide faces.

.7 Motor leads and power cords to be sealed and locked in place using strain bushings. All cables to be waterproof.

PUMP CONTROL SYSTEM

.1 Liquid level switches: shock-proof mercury switches enclosed in leak-proof polypropylene body.

.2 Include independently adjustable control levels as follows:

.1 Pump start level.

.2 Pump stop level.

.3 High water alarm.

PIPING AND VALVES

.1 Schedule 80 PVC pipe fittings and joints.

.2 Butterfly valves: to ANSI/AWWA C504.

.3 Gate valves: solid wedge, Class 125, flanged, to ANSI/AWWA C500.

.4 Check valves: Class 125, flapper type.

ELECTRICAL CONTROL PANEL AND WIRING

.1 Use only CSA approved components.

.2 Electrical equipment in station in accordance with requirements for Hazardous Locations, Class 1, Group D, Division 2.

.3 Ensure panel is complete with required components including:

- .1 main circuit breaker with thermal magnetic trip and suitable current rating for station load.
- .2 motor circuit interruptor with toggle handle for each pump motor with adjustable instantaneous trip.
- .3 magnetic full voltage starter with 120 volts coils and 3 overload relays for each pump.
- .4 time delay-relay, 2 - 50 second range, 10 amp minimum resistive contacts to prevent concurrent starting of pumps after power restoration.
- .5 Dry contacts, normally open, on high water alarm relay for remote indication.

.4 Mount following switches and instrumentation on door of panel:

- .1 Pump mode selector switches for hands-off-automatic operation of each pump.
- .2 Pump sequence selector switch to permit override of automatic pump alternation and selection of either pump to run as lead pump.
- .3 1 high level alarm complete with alarm

relay and red light on panel door.

.5 Terminals in circuit of start float switch of lag pump.

.6 Ground connection lug.

.7 Labels: all components on and inside panel to indicate operating routine.

.8 Schematic wiring diagram: mounted inside panel door, varnish protected.

.9 Conductors: copper.

.10 Control wiring: number 14 AWG minimum, stranded type TEW.

.11 Power wire: number 12 AWG minimum, type RW 90.

.12 Wire:

.1 Numbered with printed permanent indelible identifying plastic tapes to correspond to schematic diagram.

.2 Terminated for external control connections by tubular screw type terminal blocks with barrier and labels.

.3 Equipped with grommet and shields for mechanical protection.

.4 Adequately supported and installed in accordance with written approval of Departmental Representative.

PACKAGE SYSTEM

.1 Precast concrete enclosure complete with components specified.

SOURCE QUALITY CONTROL

.1 Perform operational tests on pumps at factory to check for excessive vibration, for leaks in piping or seals and for correct operation of automatic control system and auxiliary equipment. Pump suction and discharge lines to be coupled to reservoir and pumps to recirculate water for minimum of 1 hour under simulated service conditions.

1.3 EXECUTION

EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for sewage lift 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 Project Manager.

EXCAVATION BACKFILLING AND COMPACTION

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

EQUIPMENT INSTALLATION

.1 Install equipment, piping and controls in accordance with manufacturers' recommendations.

WATERPROOFING

.1 Waterproof exterior of pumping station wet well with Section 07 11 13 Bituminous Dampproofing.

FIELD QUALITY CONTROL

.1 After completion of installation, demonstrate functional operation of systems, including sequence of operation, to approval of Departmental Representative.

.2 Test in presence of Departmental Representative and representative from equipment supplier.

.3 Provide labour and ancillary equipment necessary to fulfill tests.

.4 Test to demonstrate that:

.1 Pumps and equipment run free from heating, or vibration.

.2 Operation meets requirements of these specifications.

.3 Pumps and pumping are free and clear of debris and obstructions.

.5 Replace equipment found defective.

.1 Repeat test until equipment is accepted by Departmental Representative.

DEMONSTRATION

.1 Operating Personnel Training

.1 Provide on site training by qualified personnel for designated operating personnel prior to final commissioning.

.1 Schedule and deliver training in accordance with training plan approved in writing by Departmental Representative.

.2 Include training for 2 designated personnel

on routine maintenance procedures, minor repairs, replacement of parts, including disassembly of major components.

.3 Include safety precaution procedures for systems.

1.4 FINAL CLEANING CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - 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 11 - Cleaning.

END OF SECTION

1.1 GENERAL

RELATED SECTIONS

.1 Not used.

REFERENCES

.1 Agriculture and Agri-Food Canada:
  .1 The Canadian System of Soil Classification, Third Edition, 1998.

.2 Canadian Council of Ministers of the Environment:
  .1 PN1340-2005, Guidelines for Compost Quality.

.3 Canadian Green Building Council (CaGBC):
  .1 LEED Canada-NC Version 1.0-December 2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System For New Construction and Major Renovations.

.4 U.S. Environmental Protection Agency (EPA)/Office of Water:
  .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

DEFINITIONS

.1 Compost:
  .1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner.
  .2 Compost is processed organic matter containing 40% or more organic matter as determined by Walkley-Black or Loss On Ignition (LOI) test.
  .3 Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below (25) (50)), and contain no toxic or growth inhibiting contaminates.
  .4 Composed bio-solids to: CCME

Guidelines for Compost Quality, Category (A) (B).

SUBMITTALS

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

.2 Quality control submittals:
.1 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties as described in PART 2 - SOURCE QUALITY CONTROL.
.2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

QUALITY ASSURANCE

.1 Pre-installation meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements in accordance with Section 01 14 10 – Scheduling and Management of Work.

WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Divert unused soil amendments from landfill to official hazardous material collections site approved by the Departmental Representative.

.3 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

1.2 MATERIALS

TOPSOIL

.1 Topsoil for seeded areas planting beds: mixture of particulates, microorganisms and organic matter which provides suitable medium for supporting intended plant growth:
  .1 Soil texture based on The Canadian System of Soil Classification, to consist of 20 to 70 % sand, minimum 7 % clay, and contain 2 to 10 % organic matter by weight.
  .2 Contain no toxic elements or growth inhibiting materials.
  .3 Finished surface free from:
    .1 Debris and stones over 50 mm diameter.
    .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
  .4 Consistence: friable when moist.

SOIL AMENDMENTS

.1 Fertilizer:
  .1 Fertility: major soil nutrients present in following amounts:
  .2 Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.
  .3 Phosphorus (P): 40 to 50 micrograms of phosphate per gram of topsoil.
  .4 Potassium (K): 75 to 110 micrograms of potassium per gram of topsoil.
  .5 Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
  .6 Ph value: 6.5 to 8.0.

.2 Peatmoss:
  .1 Derived from partially decomposed species of Sphagnum Mosses.
  .2 Elastic and homogeneous, brown in colour.
  .3 Free of wood and deleterious

material which could prohibit growth.

.4 Shredded particle minimum size: 5 mm.

.3 Sand: washed coarse silica sand, medium to course textured.

.4 Organic matter: compost Category A, B in accordance with CCME PN1340, unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.

.5 Use composts meeting Category B requirements for land fill reclamation and large scale industrial applications.

.6 Limestone:
.1 Ground agricultural limestone.
.2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.

.7 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

SOURCE QUALITY CONTROL

.1 Advise Departmental Representative of sources of topsoil and manufactured topsoil to be utilized with sufficient lead time for testing.

.2 Contractor is responsible for amendments to supply topsoil as specified.

.3 Soil testing by recognized testing facility for PH, P and K, and organic matter.

.4 Testing of topsoil will be carried out by testing laboratory designated by Departmental Representative:
.1 Soil sampling, testing and analysis to be in accordance with Provincial standards.

1.3 EXECUTION

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.

STRIPPING OF TOPSOIL

.1 Begin topsoil stripping of areas as indicated by Departmental Representative after area has been cleared of brush weeds and grasses and removed from site.

.2 Strip topsoil to depths as indicated by Departmental Representative Engineer Departmental Representative:

.1 Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.

.3 Stockpile in locations as directed by Departmental Representative:

.1 Stockpile height not to exceed 2 m.

.4 Disposal of unused topsoil is to be in an environmentally responsible manner but not used as landfill as directed by the Departmental Representative.

.5 Protect stockpiles from contamination and compaction.

PREPARATION OF EXISTING GRADE

.1 Verify that grades are correct:
  .1 If discrepancies occur, notify Departmental Representative and do not commence work until instructed by the Departmental Representative.

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

.3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials:
  .1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
  .2 Remove debris which protrudes more than 75 mm above surface.
  .3 Dispose of removed material off site.

.4 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm:
  .1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

.1 Place topsoil after the Departmental Representative has accepted subgrade.

.2 Spread topsoil in uniform layers not exceeding 150 mm.

.3 For sodded areas keep topsoil 15 mm below finished grade.

.4 Spread topsoil as indicated to following minimum depths after settlement:
  .1 150 mm for seeded areas.
  .2 135 mm for sodded areas.
  .3 300 mm for flower beds.
  .4 500 mm for shrub beds.

.5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

FINISH GRADING

.1 Grade to eliminate rough spots and low areas and ensure positive drainage:
  .1 Prepare loose friable bed by means of cultivation and subsequent raking.

.2 Consolidate topsoil to required bulk density using equipment approved by the Departmental Representative:
  .1 Leave surfaces smooth, uniform and firm against deep footprinting.

ACCEPTANCE

.1 The Departmental Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

SURPLUS MATERIAL

.1 Dispose of materials except topsoil not required where directed by the Departmental Representative off site.

1.4 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

1.1 GENERAL

STANDARD

.1 All work of this section shall comply with the requirement of the most recent version of the NBDTI Standard Specification Item 614, except as amended herein.

REFERENCES

.2 New Brunswick Department of Transportation and Infrastructure Standard Specifications (most recent version):
- .1 NBDTI Standard Specification Item 614 – Hydroseeding
- .2 NBDTI Standard Specification Item 616 - Mulching

1.2 MATERIALS

.1 Roadside Mix with Mulch – Hydroseed "B", per the most recent version of the NBDTI Standard Specifications Item 614.

1.3 EXECUTION

GENERAL

.1 As per the requirements of the most recent version of the NBDTI Standard Specification Item 614, and in conformance with the Contract Documents.

END OF SECTION