1. GENERAL

1.1 Operations and Maintenance Manuals

- .1 Operation and maintenance manuals for the project will be produced in part by the Contractor, for completion by the Engineer.
- .2 Manuals are to cover all installed items requiring or likely to require operating, maintenance or repairs.
- .3 The Contractor's work includes:
 - 1 Provision of manufacturers and suppliers information and warranties.
 - .2 Supply of binders and dividers.
- .4 All work described in this section is Contractor's work, except where specifically indicated otherwise.
- .5 The final number of copies required is six (6).
- .6 Deliver two (2) draft manuals to the Engineer before Substantial Completion Inspection. These are in addition to the six (6) final copies. Deliver any outstanding information prior to requesting final inspection.
- .7 One (1) draft manual will remain at the plant after commissioning and the remaining copy will be utilized to finalize the Final copies.
- .8 The Engineer will add his portion to the draft copies for future reproduction by the Contractor.

1.2 Reference Standards

.1 The manual is to conform to the current edition of "Specifications for Operations and Maintenance Manuals: Department of Public Works and Services, Government of Northwest Territories.

2. FORMAT

2.1 Organization

- The completed manual will contain ten (10) chapters. The responsibility for production of each chapter is indicated below:
 - .1 Introduction (by the Engineer)
 - .2 Index (by the Engineer)

- .3 Background, Design Data (by the Engineer)
- .4 Schematic, Functional Data (by the Engineer)
- .5 Components Details (by the Engineer)
- .6 Operating Procedures (by the Engineer)
- .7 Maintenance Procedures (by the Engineer)
- .8 Testing and Certification Data (part by the Contractor)
- .9 Manufacturer Data and Service Information (by the Contractor)
- .10 Appendices (by the Engineer, except as directed otherwise in this section).
- .2 Group information within chapters logically by system, to the greatest possible extent. Organize the information on each system in the most logical fashion, for example, from supply point through to point of use.

2.2 Language

.1 English.

2.3 Testing

- .1 Include all data sheets recording concrete test results, data tests for leakage, drain operation and like information.
- .2 List all items that require periodic inspection by independent inspectors. List the frequency of inspection, the inspection agency to contact, including address and current phone number.
- .3 Include a photocopy of each certificate issued by the independent inspectors who make inspections pursuant to health, safety and other regulations of a similar nature. Indicate where the original of each such certificate is filed and where it is to remain displayed.

2.4 Manufacturer's Warranties (Chapter 8)

- .1 Include the originals of manufacturer's warranties in Copy 1 of the manual.
- .2 Include photocopies in copies 2 through 5.
- .3 Group warranties together to form a section in Chapter 8.

2.5 Manufacturer's Information (Chapter 9)

- .1 Include information needed for operation, maintenance and repair of every component of mechanical and electrical systems, and any other system requiring or likely to require operation or routine maintenance.
- .2 Preface this section with an index. List in order, each item by the manufacturer's name, the pieces of equipment to which it refers, and the tab number of the item. Include supplier's name, address, phone number and fax number.
- .3 Include:
 - .1 Maintenance instructions for finished surfaces and materials
 - .2 Copy of hardware and paint schedules
- 4 Include all service manuals, data sheets and other manufacturer's information for each component.
- .5 Manufacturer's information is to be original in all six (6) copies of the manual. Photocopies are not acceptable.
- .6 On the first page of each inclusion, identify the piece of equipment to which it refers. Include nameplate information such as model, size, capacity, serial number, etc.
- .7 Remove pages from manufacturer's information that are irrelevant to the equipment provided to this project.
- .8 Where tables and curves are given for the full range of sizes, underline in red in all copies, the data that refers to the installed equipment. If more than one size or type in the same table was used, add the identification for each in the margin to assist positive identification. Draw a thick diagonal black line across all data not applicable to equipment provided.
- .9 If any warning instructions are included which, if ignored, could significantly affect the equipment, mark these with red arrows in all copies, to draw the operator's attention.
- .10 Service manuals must be the operating and maintenance type, which give part lists, preferably including an exposed or sectioned drawing for guidance in assembling, installation details, lubrication and operating details. Sales types of brochures which give only a very general description and few details are not acceptable.
- .11 Include all shop drawings that contain essential equipment or system details not available elsewhere. No drawings larger than 11 x 17 should be inserted in the manual: if drawings are larger, reduce them.

- .12 Shop drawings are often made for use with a range of alternate materials and layouts. It is essential that those dimensions layouts, materials, outlet locations, flange sizes, etc. which apply to the equipment installed, shall be underlined or circled in red in all copies. Any features shown but not actually provided, should be crossed out. Place the shop drawing with the applicable service manual and index them as one unit.
- .13 Mount any items that are smaller than 216 mm x 279 mm, on a full page for inclusion in the manual.
- .14 Include heavy-duty plastic folder pages to hold booklets and pamphlets smaller than 216 mm x 279 mm. Supply one (1) holder for each such booklet.
- .15 Include all wiring diagrams complete with wire coding

2.6 Binders

- .1 Supply six (6) binders to the Engineer for incorporation of the Operation and Maintenance manuals.
- .2 Expandable hard covered three post binders, of extra heavy weight capable of withstanding several decades of reasonable use
- .3 Binders must take standard 216 mm x 279 mm size inserts prepared by a standard three-hole punch.
- .4 The expansion slide should be proportional to the binder size, e.g., a 50 mm slide for a 75 mm binder. The purpose of the expansion slide is to allow the pages to lie flat for reading. It must not be used to stuff the binder with more than 75 mm of material. Use more than one binder where necessary.
- .5 Full identification titles must appear on the outer spine and front of binders to permit easy identification. These titles are to be in a permanent form. Plastic lettered tape, gummed labels and similar methods that can become detached are not to be used.
- 6 Covers in a set should be a matching colour. The choice of colour is open.

2.7 Separate Volumes

- .1 If thickness, including inserts by others exceeds 75 mm, break the manual into two or more volumes.
- .2 Identification on outer spine and front shall include Volume of .
- .3 Organize material so that each volume contains separate sub systems

2.8 Dividers

- .1 Provide plastic tabbed medium weight dividers for each chapter outlined in 2.1. Plastic tabs to have chapter name, not number, printed on each face.
- .2 Provide numbered, plastic tabbed medium weight dividers between major sections of equipment manufacturer's material.

1. GENERAL

1.1 Intent

.1 Commission the various processes, mechanical and electrical systems.

1.2 Related Work

- .1 Division 11 Process Equipment
- .2 Division 15 Mechanical
- .3 Division 16 Electrical
- .4 Division 17 Controls and Instrumentation.

1.3 Submissions

- .1 The Contractor shall furnish his detailed methodology and schedule for the commissioning of each system at three (3) weeks prior to planned start of commissioning for the process. The plan shall include the following:
 - .1 detailed schedule of events.
 - .2 detailed list of attendees
 - 3 methods for introducing flow
 - .4 contingency plans in the event of a process malfunction
 - .5 drawings and sketches as required to illustrate the planned sequence of events.

1.4 Coordination

- .1 Coordinate with subcontractors to ensure their attendance as necessary to make any adjustments or to facilitate any minor repairs during commissioning.
- .2 Coordinate with the Engineer and operators of the wastewater treatment plant.

2. PRODUCTS

2.1 Equipment

.1 All equipment shall be satisfactorily installed and tested as per the requirements of Section 01670 – Systems Demonstration prior to commissioning. The electrical and the controls systems and any related services pertaining to each piece of equipment shall be completed and shall be operational.

2.2 Manpower

- .1 Supply all staff required during commissioning necessary to operate the plant processes.
- .2 Once a process has been successfully commissioned, provide supervisory staff to train and supervise the Owner's staff for a period of two full weeks, while still being responsible for the operation of the plant until takeover.
- .3 Be responsible for ensuring that maintenance staff are operating and maintaining systems in a proper manner and keeping schedules up-to-date.

2.3 Systems

- .1 In general, the systems which must be commissioned include, but are not limited to:
 - .1 Service pumps
 - .2 VFDs
 - .3 Fire pump
 - .4 Boilers
 - .5 Standby Generator system
 - .6 Station control system
 - .7 Monitors and alarms.

3. EXECUTION

3.1 Preparation

- .1 Each item of equipment included in the system to be commissioned shall be satisfactorily tested.
- .2 Piping systems shall be finished and tested
- .3 Electrical connections shall be complete and inspected to the satisfaction of the governing authorities.
- .4 Control systems shall be fully operational.
- .5 The plant architectural finishes, painting, heating and ventilation, etc. shall be substantially complete.
- .6 The attendance of equipment manufacturer's representatives, as required during commissioning, shall be arranged

3.2 Commissioning

- .1 Run the entire station for a 24 period prior to testing system performance. Record system performance data as required.
- .2 Operate all systems in automatic and manual-local modes as applicable.
- .3 Ensure all bypasses and backup provisions function satisfactorily.
- .4 Induce all minor and major alarm conditions. Ensure the controls react as designed, the application alarms are annunciated, and the plant dialing system functions.

3.3 Testing

- .1 Pressures and flow readings shall be taken at the extreme points in the distribution system to ensure that all minimum requirements are met.
- .2 Cooperate with the Engineer in undertaking testing sequence to ensure that all variables have been fully tested.
- .3 Record all testing and corresponding data.

3.4 Acceptance

- .1 The commissioning of a continuously operating mechanical or electrical system shall be considered acceptable when the system has operated in a stable manner, satisfying the specified basic design criteria for a period of five (5) consecutive days.
- .2 Where system operated intermittently, commissioning shall be considered acceptable when the system has been operated in a stable manner, satisfying the specified basic design criteria, as often as required during a period of fourteen (14) consecutive days but in no case less than four (4) times.
- .3 When a system has been commissioned satisfactorily, Form 103, below, shall be endorsed by the Contractor, the Engineer, and the manufacturer's representatives for the items of equipment included in the system.

CERTIFICATE OF SATISFACTORY EQUIPMENT PERFORMANCE FORM 103

We certify that the equipment listed below has been continuously operated for at least fourteen (14) consecutive days and that the equipment operates satisfactorily and meets its specified operating criteria. No defects in the equipment were found. The equipment is therefore classed as "conforming".

PROJECT:		
ITEM OF EQUIPMENT:		
TAG NO:		
REFERENCE SPECIFICATION:		
(Authorized Signing Representative of the Supplier)	Date	
(Authorized Signing Representative of the Contractor)	Date	
(Authorized Signing Representative of the Engineer)	Date	
(Authorized Signing Downsontation of the Owner)	Data	
(Authorized Signing Representative of the Owner)	Date	

TAKE-OVER PROCEDURES

1. GENERAL

1.1 Section Includes

Administrative procedures preceding preliminary and final inspections of the Work.

1.2 Related Sections

- .1 Section 01670 Systems Demonstrations.
- .2 Section 01735 Commissioning.

1.3 Inspection And Declaration Procedures

- .1 Contractor's Inspection prior to commissioning the facility: Contractor and all Subcontractors shall conduct an inspection of the Work, identify deficiencies and defects; repair as required to conform to Contract Documents. Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made. Provide fourteen (14) days advance notice when requesting a Substantial Inspection.
- .2 Substantial Completion: submit a written certificate that following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents,
 - .2 Defects have been corrected and deficiencies have been completed,
 - .3 Equipment and systems have been tested, adjusted and balanced and are fully operational,
 - .4 Certificates required by Boiler Inspection Branch, Fire Commissioner, Utility companies etc. have been submitted,
 - .5 Operation of systems have been demonstrated to Owner's personnel, and
 - .6 Work is complete and ready for Substantial Inspection.
- .3 Substantial Inspection: Engineer and Contractor will perform an inspection of the Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
- .4 Final Inspection: when defects or deficiencies are completed, request a final inspection of the Work by Owner, Engineer and Contractor. If Work is deemed incomplete by the Owner and the Engineer, complete outstanding items and request a re-inspection.

TAKE-OVER PROCEDURES

1.4 Re-inspection

- .1 Should status of the Work require re-inspection by Consultant due to failure of Work to comply with Contractor's claims for inspection, Owner will deduct amount of Consultant's compensation for re-inspection services from payment to Contractor. This applies to both Substantial and/or Commissioning.
- 2. PRODUCTS NOT USED
- 3. EXECUTION NOT USED



TABLE OF CONTENTS

DIVISION 2 – SITE WORK

Section No.	Description
02305	Earthwork General Requirements
02362	Steel Pipe Piles

1. GENERAL

1.1 Intent

.1 This Section specifies general requirements common to all earthwork and site grading. Read this Section in conjunction with related Sections which specify requirements for specific types of earthwork.

1.2 Related Sections

.1 Changes in Sub-Surface Conditions:

General Conditions of Contract.

1.3 Definitions

.1 Earthwork: Earthwork means excavating of all types, embankment, compacting, grading, gravel surfacing, culverts and related work.

2. PRODUCTS

2.1 Aggregate Quality, Generally

.1 Aggregate fill materials shall be comprised of clean, sound, hard particles, and be free from silt, clay, soft shale, flaky particles, organic matter and foreign substances.

2.2 Gravel Embankment Material

.1 Gravel: mixture of natural gravel, crushed gravel or crushed stone, and natural or crushed sand, meeting the gradation limits specified below for each type.

Fill Type	Sieve Size	% Passing By Weight
80 mm Gravel	80	100
	50	78 - 95
	20	42 - 82
	10	31 - 70
	5	22 - 60
	2	15 - 47
	0.4	9 - 28
	0.16	5 - 16
	0.063	2 - 9

2.3 Crushed Gravel Surfacing Material

- .1 Crushed Gravel: mixture of crushed gravel or stone and natural or crushed sand, meeting the gradation limits specified below for each type and meeting following requirements:
 - .1 Liquid limit of material passing 0.4 mm sieve shall not exceed 25%.
 - .2 Plasticity index of material passing 0.4 mm sieve shall not exceed 6%.
 - .3 Minimum of 50%, by weight, of material retained on 5 mm sieve shall have at least one face resulting from fracture.

Surfacing Material	Sieve Size	% Passing By Weight
20 mm Crushed Gravel	20	100
	10	64 - 86
	5	42 - 69
	2	24 - 45
	0.8	17 - 37
	0.4	10 - 29
	0.16	5 - 20
	0.063	2 - 8

2.4 Flanged Nestable Culvert

.1 2.0 mm thick hot dip galvanized flanged nestable culvert, 450 mm diameter c/w galvanized nuts, bolts and washers as manufactured by Armtec.

2.5 Culverts

- .1 Galvanized Corrugated Steel Pipe: To Corrugated Steel Pipe Institute Specification No. 501, wall thickness 2.0 mm, corrugations 68 x 13 mm helical
- .2 Couplings to be Armtec "Hugger-Band" complete with "O" ring gaskets conforming to CSA CAN3-G401 and JS 701 polybutene tape sealant or approved equal.

2.6 Repair of Damaged Pipe Coatings

- Repair damaged metallic coating or galvanized surfaces.
- .2 Clean damaged surfaces with wire brush removing loose and cracked splintered coatings. Apply two coats of approved zinc-rich coating conforming to CGSB Standard 1-GP-181M.

3. EXECUTION

3.1 Preparation

- .1 Notify Engineer minimum 2 days prior to beginning operations.
- .2 Prior to commencing operations:
 - .1 Contact all affected utility companies regarding exact location and current status of all utilities, voltage of underground and overhead power lines and location of fuel oil lines.
 - .2 Notify Engineer if any utility lines have been omitted from or incorrectly indicated on Drawings.
 - .3 Identify underground utilities. Stake and flag locations. Identify and flag surface and aerial utilities.
- .3 Expose fuel line(s) to be crossed to confirm horizontal and vertical alignment.
- .4 Expose existing utility lines by hand excavation to confirm location before machine digging within 600 mm of lines.
- .5 Maintain and protect existing above and below grade utilities which pass through work area. Protect active utility lines exposed by excavation, from damage. Hand excavate to final elevations and dimensions.
- .6 Where existing overhead line poles are adjacent to excavations, temporarily support poles in a manner approved by Utility.

3.2 Dewatering

- .1 Maintain site free of water. Provide pumps, piping, temporary drains, trenches, sumps, and related equipment to remove water.
- .2 Do not use sanitary sewers or private property for discharge of water.

3.3 Excavating

- Strip topsoil from areas to be filled.
- .2 Do not excavate under wet conditions or when such conditions are anticipated.

3.4 Material Storage

.1 Excavated topsoil, acceptable and required for use under this Contract: Stockpile on site until required.

3.5 Culvert Installation

- .1 Install flanged nestable culvert around existing 150 mm steel fuel oil line.
- .2 Bed culverts on a minimum thickness of 150 mm of 20 mm crush gravel compacted to a minimum of 95% Standard Proctor Density.
- .3 20 mm crush granular bedding is to be placed on either side of culver and to extend a minimum of 150 mm above the culvert, all compacted to 95% Standard Proctor Density.
- .4 Flanged nestable culvert and normal culvert to be installed according to manufacturers recommendations.

3.6 Embankment

- .1 Ensure embankment areas are free of debris, snow, ice, water and that surfaces are not frozen. Do not backfill over porous, wet, or spongy sub-grade surfaces.
- .2 Place fill materials in layers not exceeding 200 mm.
- .3 Compact each layer of fill to the 98% Standard Proctor Density.
- .4 Take care to prevent damage to or displacement of waterproofing, insulation, weeping tile installation, pipe, conduit and other work.

3.7 Compaction

- .1 Compact fill materials using only mechanical methods. Do not use hydraulic methods.
- .2 Do not perform compaction using vehicles and other equipment not designed for compacting.
- .3 Maintain optimum moisture content of materials being compacted, as required to attain specified compaction density.

3.8 Finish Tolerances

- .1 Finish compacted surface to within +/- 25 mm of established sub-grade and +/- 10 mm of established 20 mm road grade but not uniformly high or low.
- .2 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
- .3 Finish back and side slopes of embankment to a neat condition, true to line and grade.
 - .1 Hand finish slopes that cannot be finished satisfactorily by machine.
 - .2 Remove boulders encountered in cut slopes and fill resulting cavities.

3.9 Maintenance

- .1 Maintain finished base and surfacing material in condition conforming to this section until succeeding base is constructed, or until granular base and surfacing material are accepted by Engineer.
- .2 Include as maintenance, restoration of gravel roadways following thawing of any trenches backfilled under freezing conditions, or any other settlements. Windrow surfacing gravel to one side, place and compact granular base material, replace and re-compact surfacing material. Carry out when ordered by the Engineer and repair operation as necessary.

3.10 Proof Rolling

- .1 Proof roll top of embankment upon completion of final grading and compaction, where ordered by the Engineer.
- .2 For proof rolling use:
 - .1 A heavily-loaded truck having a minimum static weight of 10 tonnes per axle.
- .3 Ground speed 4 km/hour (65 m/min.) to 8 km/hour (133 m/min.).
- .4 Make sufficient passes with proof roller to subject every point on surface to two separate passes of loaded tire.
- .5 Where proof rolling reveals areas of defective subgrade:
 - .1 Remove subgrade material to depth and extent directed.
 - .2 Backfill excavated subgrade with approved embankment material and compact in accordance with this Section.

1. GENERAL

1.1 Work Included

- .1 Excavate and grade for equipment support at pile locations.
- .2 Excavate to cutoff elevations at pile locations.
- .3 Predrill through obstructions and frost.
- .4 Apply grease on piles.
- .5 Place piles and fill with sand slurry.
- .6 Cut off pile tops at required elevations.
- .7 Prepare piles for capping. Install steel cap plates.
- .8 Remove all excavated materials from site or deposit on site where directed by Engineer.

1.2 Related Work

.1 Structural Steel:

Section 05120

1.3 Test Reports

.1 Prior to construction and if requested, provide Engineer with two (2) copies of steel producer's certificate, in accordance with ASTM A252.

1.4 Qualifications

.1 If required by the Engineer, produce satisfactory proof of successful installation experience with this type of foundation, in similar conditions and with piles of similar capacities.

1.5 Inspections

- .1 Inspection of piling work is to be performed by the Engineer.
- .2 Provide free access to all portions of the work and cooperate with the Engineer.
- .3 Notify the Engineer before commencing pile driving in ample time to permit scheduling inspections.
- .4 Pay costs for retesting required due to defective materials or workmanship.

1.6 Existing Subsurface Conditions

Subsurface investigation report is available for inspection at the office of the Engineer.

2. PRODUCTS

2.1 Materials

- .1 Piles: seamless or welded steel pipe with straight spiral lapped body; conforming to ASTM A252, Grade 2; plain ends; diameters and wall thickness as indicated on the Drawings.
- .2 All piles to be 219.1 mm dia. x 8.18 mm thick open ended A53 steel pipe.
- .3 Splices: to CSA G40.21 or as indicated on drawings.
- .4 Welding electrodes to CSA W48.
- .5 Arctic Grade Grout: Sika Arctic 100 or approved alternate
- .6 Slurry Backfill
 - 1. Slurry mixture of clean coarse sand and fresh potable water.
 - 2. Sand to meet following gradation limits Drill cuttings are not acceptable:

Particle Size (mm)	Finer than (%)	
10	100	
5	90 - 100	
2	70 - 100	
0.4	15 - 60	
0.075	0 - 10	

- 3. The slurry to be free of organic and other deleterious material.
- .7 6 mil polyethylene sheets.
- .8 Heavy grease.
- 9 Water: potable, free of salts, minerals and deleterious substances.

2.2 Fabrication

- .1 Supply full length piles to reduce field splicing during installation wherever possible.
- .2 Full length piles may be fabricated from piling material by splicing lengths together. Use complete joint penetration groove welds. Splice locations to be approved by the Engineer.
- .3 Submit details of planned use of pile material stock to Engineer for approval prior to start of fabrication. Reuse cutoff lengths as directed by the Engineer.
- .4 Allowable tolerance on axial alignment to be 0.25% as measured by a 3 m straight edge.
- .5 Allowable deviation from a straight line over total length of fabricated pile to be 5 mm.

- .6 Repair defective welds only on the authority of the Engineer. Welds which show evidence of having been repaired without authorization may be rejected. Do area being repaired to CSA W59A 1977.
- .7 Repair damaged exterior protective coating of piles.
- .8 Do welding to CSA W59.
- .9 Field splices are not to be located within 2.5 metres of the underside of pile cap plate.
- .10 Field splices are to be located so that no more than 50% occur at the same elevation.

2.3 Surface Treatment

- .1 Pipe pile surfaces shall be prime painted. Surfaces to be painted shall be thoroughly cleaned in accordance with SSPCASP2, Hand Tool Cleaning. Surface shall be free of moisture and protected from adverse weather conditions until the paint is dry. Ambient temperatures shall not be less than 50°F (10°C).
- .2 Shop paint shall conform with CGSBA1AGPA81, Air Drying Metal Primer, or shall be any other heavy duty shop primer approved by the Engineer. The dry film thickness shall be 5 mils, applied in two coats of 2.5 mils over peaks.
- .3 Paint shall be kept stirred while being used, and shall be applied with brush or a suitable spray gun. Paint shall be well worked into all joints and open spaces.

3. EXECUTION

3.1 Preparation

.1 Ensure that the site conditions at each pile location are adequate to support driving equipment to properly install piles and permit load testing when required.

3.2 Sequence

.1 Install piles in the most practical sequence.

3.3 Pile Design

Pile design is based on an allowable end bearing strength of 10MPa when adequately embedded into bedrock.

3.4 Pipe Pile Installation

- .1 Confirm depth to bedrock before installing piles
- .2 Ensure piles are of adequate length, including projection and embedment lengths, to minimize field splicing of sections.
- .3 Pile installation to be supervised by a Professional; Engineer registered in the NT/NU

- .4 Auger hole min 50 mm larger in diameter than the steel pile.
- .5 Completely clean out embedment sleeve.
- .6 Fill hole with Arctic Grade grout top of bedrock or to within 2m of the surface whichever is greater.
- .7 Coat the upper 2 m of the steel pile or the entire shaft length above bedrock whichever is less – with heavy grease and wrap the greased portion with 2 layers of 6 mil polyethylene sheets.
- .8 Install pile, open ended, and vibrate to ensure pile end bears directly on the bedrock surface. Take care so as not to disturb shaft walls or knock excavation tailings into the hole during the pile installation.
- .9 Once grout has set fill annulus with slurry backfill.

3.5 Slurry Backfill

- .1 The annular space around the pile shall be filled with a properly mixed and placed sand slurry.
- .2 The backfill slurry shall be prepared in a portable concrete mixer. Mix sand with barely enough potable water to produce a slurry with a consistency of thick mud. Close control of the water content and the batching operation is necessary to ensure that the slurry slump does not exceed 6 inches (150 mm), as determined by standard concrete tests. The temperature of the slurry shall not exceed 4°C when it is placed in the hole.
- .3 Excess water near the top of pile must be removed by pumping and replaced with sand and slurry mixture.
- .4 The slurry must be vibrated or rodded as it is placed to ensure good soil pile contact and eliminate bridging and voids.
- .5 The slurry fill shall be continued up to the ground level.

3.6 Defective Piles

- .1 Engineer, at his discretion, may reject any pile that is out of alignment or out of position, not at the correct elevation, or otherwise fails to meet specified requirements.
- .2 Add new piles to replace rejected as directed by the Engineer at no additional cost to the Owner.