Municipality of Cumberland

Wallace Wastewater Treatment Plant
Sludge De-watering and Aeration Equipment Installation

Specifications and Contract Documents

August 2021

20-3277-1000

Dillon Consulting Limited

PREFACE

These project documents have been prepared for use with and require being read in conjunction with the Standard Specification for Municipal Services as published by the Nova Scotia Road Builders Association - Consulting Engineers of Nova Scotia Joint Committee on Contract Documents. Copies of the Standard Specifications are available from the Joint Committee on Contract Documents, 455 Colby Drive, Dartmouth, Nova Scotia B2V 2K4; Telephone: (902) 430-2534, (902) 233-9362 or e-mail nsmunicipalservices@gmail.com.

MUNICIPALITY OF CUMBERLAND

WALLACE WASTEWATER TREATMENT PLANT
DE- SLUDGING AND AERATION EQUIPMENT INSTALLATION

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DRAWINGS

Generally Entitled: WALLACE WASTEWATER TREATMENT PLANT
DE-SLUDGING AND AERATION EQUIPMENT INSTALLATION

Dated: May 2021

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2	C101 – New Site Plan and Details
3	C102 – Aeration Details

SECTION 00 21 00

INFORMATION TO TENDERERS

PROJECT: WALLACE WASTEWATER TREATMENT PLANT DE-SLUDGING AND AERATION EQUIPMENT INSTALLATION

OWNER: Municipality of Cumberland
1395 Blair Lake Road
Upper Nappan, NS
B4H 3Y4

ENGINEER: DILLON CONSULTING LIMITED
137 Chain Lake Drive, Suite 100
Halifax, Nova Scotia
B3S 1B3

1. Tender Submission

.1 Submit completed Tender Form for above project in sealed envelope marked as follows:

TENDER
Wallace WWTP De-Sludging and Aeration Equipment Installation

Municipality of Cumberland
1395 Blair Lake Road
Upper Nappan, NS
B4H 3Y4

Attention: Justin Waugh-Cress P. Eng.
Director of Engineering & Operations
jwaugh-cress@cumberlandcounty.ns.ca

2. Closing Date & Time

.1 Closing date is Tuesday, September 7, 2021 at 2:00 pm.

2. Tender Opening

.1 Tenders will be publicly opened.

3. Document

.1 A document deposit is not required.

4. Accuracy of Referencing

.1 Indexing and cross-referencing are for convenience only.

5. Conditions of Tendering

.1 Take full cognizance of content of all Contract Documents in preparation of Tender. Refer to Section 00 41 43 - Tender Form, Subsection 3.9 for a complete list of Contract Documents.

6. Tenderers to Investigate

.1 Tenderers will be deemed to have familiarized themselves with existing site and working conditions and all other conditions which may affect performance of the Contract. No plea of

ignorance of such conditions as a result of failure to make all necessary examinations will be accepted as a basis for any claims for extra compensation or an extension of time.

7. Clarification and Addenda

.1 Notify the Owner in writing not less than 5 working days before Tender Closing of omissions, errors or ambiguities found in Contract Documents. If Engineer considers that correction, explanation or interpretation is necessary, a written addendum will be issued. All addenda will form part of the Contract Documents.

.2 Confirm in the tender form that all addenda have been received. Tenderers are solely responsible to obtain and acknowledge the receipt of addenda at time of tender closing.

8. Preparation of Tender

.1 Complete Tender Form provided with Project Documents in ink or by typewriter. Tender all items and fill in all blanks. Have corrections initialled by person signing Tender.

9. Contingency Allowance

.1 A Contingency Allowance is included in Section 00 41 43. This amount covers any cost for extra work as directed by the Owner which is not included in the items in the Schedule of Quantities and Unit Prices. Specific information regarding the use of this Contingency Allowance is provided in CCDC2 2020, subsection GC 4.2.

10. Sub-Contractors and Suppliers

.1 Name suppliers and sub-contractors as set out in the Tender Form. Such suppliers and sub-contractors as are stated therein must be adhered to unless otherwise directed or permitted by the Engineer, in writing.

11. Taxes

.1 Include all taxes except Harmonized Sales Tax in tender unit and total prices.

12. Tender Security

.1 Provide Tender Security with Tender in the amount of ten percent (10%) of the Total Tendered Price in the form of a Certified Cheque or Money Order payable to the Owner, or a Bid Bond on CCDC Form 220.

13. Contract Security

.1 Provide to the Owner Performance, and Labour and Material Payment Bonds, each for fifty percent (50%) of the Total Estimated Contract Price as defined in Section 00 53 43 payable to the Owner, on CCDC form 221 and Form 222 or equivalent.

.2 Such bonds shall be issued by a duly licensed surety company authorized to transact the business of suretyship in Nova Scotia and shall be in good standing until the fulfilment of the Contract.

14. Insurance

.1 Refer to CCDC2 2020 subsection GC 11.1 - INSURANCE, for

insurance required.

.2 As a minimum, General Liability Insurance, Automobile Liability Insurance, All Risk Property Insurance and Contractors Equipment Insurance will be required for this contract.

15. Form of Agreement

.1 Form of Agreement is attached for information purposes only.

16. Return of Tender Security

.1 Tender Security will be returned to:

.1 All unsuccessful Tenderers within 7 days of Award.

.2 Successful Tenderer following receipt by Owner of executed Agreement, specified Contract Security, and Insurance documents.

17. Amendment or Withdrawal of Tender

.1 Tenders may be amended or withdrawn by letter, E-mail or facsimile. Facsimiles, in their entirety, must be received prior to closing time.

.2 Amendment of individual unit prices is the only acceptable price amendment. Amendments shall not disclose either original or revised total price.

.3 Head amendment or withdrawal as follows: "Amendment/Withdrawal of Tender for Wallace Wastewater Treatment Plant De-sludging and Aeration Equipment Installation". Sign and seal as required for Tender, and submit at address given for receipt of Tenders prior to time of Tender Closing.

18. Informal or Unbalanced Tenders

.1 Tenders which in the opinion of the Owner are considered to be informal or unbalanced may be rejected.

19. Right to Accept or Reject any Tender

.1 The Owner reserves the right in its absolute discretion to accept the tender which it deems most advantageous to itself whether such tender complies with the Information to Tenderers or any other document issued by, or on behalf of, the Owner and the right to reject any or all tenders, in each case without giving any notice. The lowest or any tender will not necessarily be accepted. In no event will the Owner be liable for the costs of preparation or submission of a Tender.

.2 Tenders which contain qualifying conditions or otherwise fail to conform to the Information to Tenderers may be disqualified or rejected. The Owner may, however, in its sole discretion, reject or accept tenders, which are non-conforming in any way

including, without limitation, those that do not contain the content, are not in the form required, fail to comply with the process for submission set out herein including requirements for the timely submission of tenders.

.3 The Owner reserves the unqualified right to carry out a comparative evaluation of all or any of the Tenders and evaluate them based on considerations which in the sole opinion of the Owner would yield to the Owner the best value. This evaluation may be on such matters as, but not limited to, the Owner's unfettered assessment as to a Tenderer's past work performance for the Owner or for anyone else, the Tenderer's financial capabilities, completion schedule, or ability to perform the Work.

.4 After the expiry of the period for the submission of tenders, the Owner reserves the right to negotiate with the Tenderers that the Owner deems to have provided the most advantageous tenders. In no event will the Owner be required to offer any modified terms or to permit other Tenderers to submit tenders or proposals with respect to any terms offered or proposed in any negotiations with any Tenderer with whom the Owner has entered into negotiations pursuant to this provision and the Owner shall incur no liability whatsoever to any other Tenderers as a result of such negotiation or modification or for the acceptance of a tender that does not comply with the Information to Tenderers or any other document issued by, or on behalf of, the Owner.

20. General Conditions

.1 Tenderers are hereby notified that the latest update to the Standard Specifications includes Definitions, General Conditions and Supplementary Conditions based on CCDC2 2020 Stipulated Price Contract published by the Canadian Construction Document Committee. As with any publication or any update, Tenderers should carefully review these documents and the Standard Specifications prior to tender closing.

21. Safety Certification

.1 Submit with Tender, a copy of Tenderer's current and valid Letter of Good Standing issued jointly by the Nova Scotia Construction Safety Association and Nova Scotia Environment.

.2 Out of province companies shall submit, with their Tender, a current and valid Letter of Good Standing from their province of origin or from a recognized Safety Association which utilizes an external audit element.

.3 Out of province companies may obtain a Letter of Good Standing from the Nova Scotia Construction Safety Association upon submission of documentation verifying training and compliance with the NS OH&S Act and regulations.

.4 In any event, out of province Tenderers will have to satisfy the Nova Scotia Construction Safety Association in respect to their safety status prior to being awarded a contract.

22. Holdback

.1 Statutory Legislation in Nova Scotia states that holdback percentage is 10% of contract payment. An additional 2.5% of contract payment will be held for a period of one year after Substantial Performance of Work. In addition to performance/warranty bond supplied at the start of the contract.

23. NSE Approval

.1 Contract will not be awarded until Final Approval to Construct is obtained from NSE.

25. Initiation of Construction

.1 Construction shall commence on a date as agreed with the Owner.

***** END OF SECTION 00 21 00 ****

SECTION 00 41 43

TENDER FORM

1. SALUTATION

.1 To: MUNICIPALITY OF CUMBERLAND

1395 Blair Lake Road

Upper Nappan, NS B4H 3Y4

.2 For: Wallace Wastewater Treatment Plant De-Sludging and Aeration Equipment Installation

.3 From: _____

_____

_____

2. TENDERER DECLARES:

.1 That this tender was made without collusion or fraud.

.2 That the proposed work was carefully examined.

.3 That the Tenderer was familiar with local conditions.

.4 That Contract Documents and Addenda No.__-__ to__-__ inclusive were carefully examined.

.5 That all the above were taken into consideration in preparation of this Tender.

.6 That the Tenderer has reviewed all Tender Documents in conjunction with the Municipal Services Specification.

3. TENDERER AGREES:

.1 To enter into a contract to supply all labour, material and equipment and to do all work necessary to construct the Work as described and specified herein for the unit prices stated in Subsection 4 hereunder, Schedule of Quantities and Unit Prices.

.2 That the estimated Contract Price shall be the sum of the products of the tendered unit prices multiplied by the estimated quantities in Subsection 4 hereunder excluding Harmonized Sales Tax (HST).

.3 That this Tender is valid for acceptance for ninety (90) days from the time of Tender Closing.

.4 That measurement and payment for items listed in Subsection 4 hereunder shall be in accordance with corresponding items in Section 01 22 00 Measurement and Payment.

.5 To provide evidence of ability and experience within five (5) working days of request, including: experience in similar work, work currently under contract, senior supervisory staff available for the project, equipment available for use on project, and financial resources.

.6 To execute in triplicate the Form of Agreement and forward same together with the specified contract security and insurance documents to the Owner within 14 days of written notice of award.

.7 That failure to enter into a formal contract and give specified insurance documents and contract security within time required will constitute grounds for forfeiture of certified cheque or enforcement of bid bond.

.8 That if certified cheque is forfeited, Owner will retain difference in money between amount of Tender and amount for which Owner legally contracts with another party to perform the Work and will refund balance, if any, to Tenderer.

.9 That the Contract Documents include:

.1 Standard Specifications for Municipal Services latest edition.

.2 Project Documents

.1 Information to Tenderers

.2 Tender Form

.3 Form of Agreement

.4 Supplementary Specifications

Section 00 60 00 – Supplementary Specifications
Section 31 32 21 – Sludge Dredging and Dewatering
Section 40 05 50 – Aeration Equipment Installation

.5 Drawings:

Generally Entitled: Wallace WWTP De-Sludging
Dated: May 2021

0	Cover Sheet
1	C100 – Existing Conditions Site Plan and Cross Sections
2	C101 – New Site Plan and Details
3	C102 – Aeration Details

.6 Addenda as issued and as confirmed in subsection 2.4 of this section.

4. SCHEDULE OF QUANTITIES AND UNIT PRICES

SCHEDULE A
(TO BE COMPLETED BY ALL TENDERERS)

De-Sludging					
Item	**Description**	**Unit of Measurement**	**Estimated Quantity**	**Unit Price**	**Total Price**
1	Mobilization and Demobilization	L.S.	1		
2.	De- Sludging and De-watering	BDT (Bone Dry Tonne)	35		
3	Laydown area preparation	L.S.	1		
4	Aeration Equipment Installation	L.S.	1		
SUBTOTAL SCHEDULE A (Items 1 to 4)					

* The tenderer agrees that no part of Schedule A and/or Contingency Allowance items shall be expended without the written direction of the Owner, and any part not so expended shall be deducted in whole from the Total Tendered Price.

5. CONSTRUCTION EQUIPMENT

.1 Tenderer is to provide a complete list of equipment to be used during this project (provide a separate sheet if necessary to identify all equipment). The unit rates provided will be used in calculating the value of "cost plus" work without any additional mark-up. Rates are subject to review and will not be accepted unless they are consistent with industry standards for rental of similar equipment.

Equipment/Model	Hourly Rate Including Operator

6. PERSONNEL

.1 Tenderer is to provide a complete list of personnel to be used during this project (provide a separate sheet if necessary to identify all staff). The unit rates provided will be used in calculating the value of "cost plus" work without any additional mark-up. Rates are subject to review and will not be accepted unless they are consistent with industry standards for fees for similar labour.

Personnel	Hourly Rate

7. SUPPLIERS AND MANUFACTURERS

.1 Tenderer agrees to use the following Suppliers and Manufacturers for the following items of work:

Geotextile Dewatering Bags_____

and agrees that such suppliers and manufacturers will be adhered to unless otherwise directed or permitted, in writing, by the Engineer. **If this is <u>NOT</u> completed, the bid shall be a non-compliant bid.**

8. BONDS

.1 _____

_____

which is willing to become bound with the Tenderer, as Surety, in the amounts and under the conditions stipulated in the Contract Documents. A "Consent of Surety" is included with this Tender, executed under corporate seal by the above Surety and stating its intention to provide the required Performance, and Labour and Materials, Bonds.

11. SIGNATURE*

DATED THIS _____ DAY OF_____, 2021.

(Seal)

_____
Name of Firm Tendering

_____ _____
Witness Signature of Signing Office

_____
Name and Title (Printed)

_____ _____
Signature of Signing Officer Witness

_____
Name and Title (Printed)

_____
Company Address

_____
Telephone No.

_____
Fax No.

*NOTE: Tenders submitted by or on behalf of any Corporation must be signed and sealed in the name of such Corporation by a duly authorized officer or agent.

*****END OF SECTION 00 41 43****

SECTION 00 53 43

FORM OF AGREEMENT
(For Reference Only)

This Agreement made on the ___ day of _____ in the year 2021.

BY AND BETWEEN

MUNICIPALITY OF CUMBERLAND

hereinafter called the "Owner"

and

CONTRACTOR

hereinafter called the "Contractor"

The Owner and the Contractor agree as follows:

ARTICLE A1 - THE WORK

The Contractor shall:

.1 Perform the Work required by the Contract Documents for

Wallace WWTP De-Sludging and Aeration Equipment Installation

located in Wallace in Cumberland County for which the Agreement has been signed by the parties, and for which

Dillon Consulting Limited

is acting as and is hereafter called the “Engineer”, and

.2 do and fulfill everything indicated by this Agreement, and

.3 commence the work by the within two weeks of the award of the contract and attain Substantial Performance of the work as certified by the Engineer by the 29th day of October in the year 2021.

ARTICLE A2 - AGREEMENTS AND AMENDMENTS

The Contract supersedes all prior negotiations, representations or agreements, either written or oral, relating in any manner to the work, including the bidding documents that are not expressly listed in Article A3 of the Agreement.

ARTICLE A3 - CONTRACT DOCUMENTS

The following is an exact list of the Contract Documents referred to in Article A1.1 of this Agreement and as defined in subsection 6 of Section 00 71 00 DEFINITIONS. This list is subject to subsequent amendments in accordance with the provisions of the Contract Documents.

.1 Standard Specifications for Municipal Services

.2 Project Documents

.1 Information to Tenderers

.2 Tender Form

.3 Form of Agreement

.4 Supplementary Specifications:

Section 00 60 00 – Supplementary Specifications
Section 31 32 21 – Sludge Dredging and Dewatering
Section 40 05 50 – Fine Bubble Aeration System (Installation Only)

.5 Drawings:

Generally Entitled: Wallace WWTP De-Sludging and Aeration Equipment Installation

Dated: May 2021

Specifically Titled:

Sheet No.	Title	Latest Revision
	Cover Sheet	0
C100	Existing Conditions Site Plan and Cross Sections	0
C101	New Site Plan and Details	0
C102	Aeration Details	0

.6 Addenda _____ to _____.

ARTICLE A4 - CONTRACT PRICE

.1 The Estimated Contract Price is the sum of the products of the estimated quantities multiplied by the appropriate Unit Prices in the Form of Tender excluding the amount of Harmonized Sales Tax.

.2 The Estimated Contract Price is $_____.

.3 The amounts shall be subject to adjustment as provided in the Contract Documents.

.4 All amounts shall be in Canadian funds.

.5 The Contract Price is the sum of the products of the actual final quantities that are incorporated in, or made necessary by the Work, as confirmed by count and measurement, multiplied by the appropriate Unit Prices from the Tender together with any adjustments that are made in accordance with the provisions of the Contract Documents excluding the amount of Harmonized Sales Tax.

ARTICLE A5 - PAYMENT

.1 The Owner shall pay the Contractor in Canadian funds for the performance of the Contract.

.2 The Owner shall make monthly payments on account to the Contractor for the Work performed, as certified by the Engineer, subject to a 10% holdback.

.3 The amount of monthly payments shall be calculated as follows:

.1 The quantity for each pay item on which actual work has been performed shall be measured.

.2 For each Unit Price item this quantity shall be multiplied by the applicable Unit Price as provided in the Tender Form.

.3 For each lump sum item, multiply the percent complete by the value of the lump sum item.

.4 The total value of work completed for the payment period shall be calculated by adding the total of the products for all pay items from subsection 3.2 and 3.3 of this Article.

.5 The amount of the monthly payment shall be determined by deducting the 10% holdback and the total of all previous payments from the total value of such completed work as determined under subsection 3.4 of this Article.

.6 To the amount calculated above, the Harmonized Sales Tax will be added.

.4 The last day of the payment period shall be the last working day of the month.

.5 Upon Substantial Performance of the Work as certified by the Engineer the Owner shall pay to the Contractor the holdback monies then due in accordance with the provisions of

Section 00 72 45 - General Conditions, subsection GC5.8 - PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK.

.6 Upon the issuance of the final certificate for payment as certified by the Engineer, the Owner shall pay to the Contractor the balance of monies then due in accordance with the provision of Section 00 72 45 - General Conditions, subsection GC5.10 - FINAL PAYMENT.

.7 In the event of loss or damage occurring where payment becomes due under the property and boiler insurance policies, payment shall be made to the Contractor in accordance with the provisions of Section 00 72 45 - General Conditions, subsection GC 11.1 - INSURANCE.

.8 If the Owner fails to make payments to the Contractor as they become due under the terms of the Contract, interest shall be payable as follows:

.1 The annual interest rate applicable to the contract is three percent (3%) compounded semi-annually.

.2 Interest shall be calculated on the overdue balance from the due date.

ARTICLE A6 - RECEIPT OF AND ADDRESSES FOR NOTICES

.1 Notices in writing will be addressed to the recipient at the address set out below.

.2 The delivery of a Notice in Writing will be by hand, by courier, by prepaid first class mail, or by facsimile or other form of electronic communication during the transmission of which no indication of failure of receipt is communicated to the sender.

.3 A Notice in Writing delivered by one party in accordance with this Contract will be deemed to have been received by the other party on the date of delivery if delivered by hand or courier, or if sent by mail it shall be deemed to have been received five (5) working days after the date on which it was mailed.

.4 A Notice in Writing sent by facsimile or other form of electronic communication shall be deemed to have been received on the date of its transmission provided that if such day is not a Working Day or if it is received after the end of normal business hours on the date of its transmission at the place of receipt, then it shall be deemed to have been received at the opening of business at the place of receipt on the first Working Day next following the transmission thereof.

.5 An address for a party may be changed by Notice in Writing setting out the new address delivered to the other party in accordance with this Article.

.1 The Owner at Municipality of Cumberland, 1395 Blair Lake Road, Upper Nappan, NS, B4H 3Y4

.2 The Contractor at

.3 The Engineer at Dillon Consulting Limited, 137 Chain Lake Drive, Suite 100, Halifax, NS, B3S 1B3.

ARTICLE A7 - QUANTITIES AND MEASUREMENT

.1 The project is to be completed on a lump sum basis including all ancillary items necessary to complete the work.

.2 Measurement for progress payments shall be done on a percent complete basis for the items outlined in the Form of Tender.

ARTICLE A8 - SUCCESSION

The aforesaid Contract Documents are to be read into and form part of the Agreement and the whole shall constitute the Contract between the parties and subject to law and the provisions of the Contract Documents shall enure to the benefit of and be binding upon the parties hereto, their respective heirs, legal representatives, successors and assigns.

ARTICLE A9 - RIGHTS AND REMEDIES

No action or failure to act by the Owner, Engineer, or Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

ARTICLE A10 - TIME

Time shall be construed as being of the essence of the Contract.

SIGNATURES

IN WITNESS WHEREOF the parties hereto have executed this Agreement under their respective corporate seals and by the hands of their duly authorized representatives.

CONTRACTOR

SIGNED AND SEALED AND DELIVERED in the presence of:

[Seal]

Company Name

Witness

Signature of Signing Officer

Name and Title of Person Signing

Name and Title (printed)

Signature of Signing Officer

Name and Title (printed)

OWNER

[Seal]

Municipality of Cumberland
Company Name

Witness

Signature of Signing Officer

Name and Title of Person Signing

Name and Title (printed)

Signature of Signing Officer

Name and Title (printed)

(Where legal jurisdiction, local practice or Owner or Contractor requirements calls for (a) proof of authority to execute this document, attach such proof of authority in the form of a certified copy of a resolution naming the representative(s) authorized to sign the Agreement for and on behalf of the corporation or partnership; or (b) the affixing of a corporate seal, this Agreement should be properly sealed.

***** END OF SECTION 00 53 43 *****

SECTION 00 60 00

SUPPLEMENTARY SPECIFICATIONS

1. INTENT .1 The work of this contract is to be constructed in accordance with the Standard Specifications for Municipal Services as developed and published by the Nova Scotia Road Builders Association and Consulting Engineers of Nova Scotia Joint Committee on Contract Documents, except as modified herein.

.2 These Supplementary Specifications modify the specification sections to which they refer.

.3 The Supplementary Specifications take precedence over the specification to which they refer.

2. SECTION 00 53 43 – FORM OF AGREEMENT CCDC 2 2020 Stipulated Price Contract

GC 5.3 - PAYMENT

.1 Add clause 5.3.2

"5.3.2 A warranty holdback in the amount of two and one half (2.5) percent of the Total Estimated Contract Price will be retained by the Owner until the expiry of the twelve (12) month warranty period. In addition to the holdback amount required by applicable lien legislation."

GC 5.4 – SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT HOLDBACK

.1 Add Clause 5.4.7

"5.4.7 Holdback monies shall not be released until the Contractor has submitted the following documents, each in a form satisfactory to the Consultant dated after the expiration of sixty days from the date of Substantial Performance of the Work as specified in the Certificate of Substantial Performance issued by the Consultant.

.1 Statutory Declarations verifying that all liabilities incurred by the Contractor and his Sub-Contractors in carrying out the Work have been paid and there are no outstanding liens, garnishees, attachments or claims relating to the work except for amounts properly retained as a holdback or as an identified amount in dispute.

.2 A certificate of clearance from the Workers' Compensation Board of the Province in which the Work is being performed certifying the Contractor's compliance with the requirements, if any, of the Workers Compensation Act of the Province in which the Work is being performed, including any payment due thereunder.

.3 All warranties required under the provision of this contract, whether originating from the Contractor or Sub-Contractors or Suppliers.

.4 A copy of the Tenderer's current and valid Letter of Good Standing issued jointly by the Nova Scotia Construction Safety Association and the Province of Nova Scotia Department of Labour.

.5 A Certificate to the Owner by a solicitor qualified to practice law in the Province in which the Work is being performed to the effect that no lien associated with the Work exists against the Owner's property and the Work under the applicable lien legislation of the Province or Provinces in which the Work is being performed.

.6 A letter of release from the Surety Company.

.7 Submission of Final Record Drawings."

GC 5.5 – FINAL PAYMENT

.1 Add clause 5.5.5

"5.5.5 Sixty days after the contract is substantially performed the holdback amount may be reduced to two and one-half (2.5) percent of the value of the work, service and materials actually done, placed or finished and this balance of two and one-half percent shall be retained until all required work, including warranty work, is performed completely. The two and one-half (2.5) percent shall be in addition to the two and one half (2.5) percent Warranty Holdback noted below in Subsection 5.8.4."

.2 Add Clause 5.5.6

"5.5.6 A warranty holdback in the amount of two and one half (2.5) percent of the Total Estimated Contract Price will be retained by the Owner until the expiry of the twelve (12) month warranty period. In addition to the holdback amount required by applicable lien legislation."

GC 6.4 - CONCEALED OR UNKNOWN CONDITIONS

.1 Add Clause 6.4.5

"6.4.5 Utilities of various types as well as structures immediately adjacent to the line of the work have been shown on the Drawings. The locations of these utilities, buildings, and structures are shown using the best information available but no guarantee is given that the locations are absolutely accurate or that utilities or structures other than those shown are not present."

GC 6.5 - DELAYS

.1 Add Clause 6.5.6

"6.5.6 If, in the opinion of the Consultant, the critical path of the project schedule will be adversely affected by delays in completing the work, the Engineer may order the contractor to employ additional labour and equipment or work overtime at no cost to the owner (except when making up time due to delays of the kinds referred to in Clause 6.5.1, 6.5.2 and 6.5.3 hereof) to bring the work back on the contract work

schedule. Should the Contractor fail to comply with such orders, the owner shall have the right to employ the required labour and equipment and (except when making up time lost due to delays of the kinds referred to in Clauses 6.5.1, 6.5.2 and 6.5.3 hereof) deduct the cost of same from any payment then or thereafter due to the contractor."

GC 9.4 - CONSTRUCTION SAFETY

.1 Add Clause 9.4.6

"9.4.6 The Contractor shall develop and be responsible for the implementation of a comprehensive safety program covering all aspects of the Work. A copy of this program shall be delivered to the Consultant prior to any work being conducted on the project."

3. SECTION 01 10 00 - GENERAL REQUIREMENTS

SUBSECTION 2 - SUMMARY OF WORK

Add the following:

".2 The work to be completed under this contract is the dredging of sludge from the municipal wastewater treatment lagoons in Wallace, Nova Scotia and placement of the sludge into geotube dewatering bags, including addition of polymer as a dewatering agent. This includes preparation of a suitable laydown area to place the geotextile dewatering bags which is water tight and drains to the existing lagoons, supply and operation of polymer makedown and injection equipment, supply and placement of geotextile dewatering bags, temporary power if required, traffic control and site reinstatement.

The work also includes the installation of the owner supplied fine bubble aeration equipment in both lagoons following the dredging and dewatering of the sludge. This includes receiving, assembly and installation of the diffusers, downcomers, floating laterals, isolation valves and anchor system. The contractor shall provide end caps on the ends of the laterals for future connection by the Owner."

SUBSECTION 5 - EXISTING SITE CONDITIONS

.1 Add the following new Subsection:

".4 Locations of existing buried utilities as indicated on the drawings are approximate only. Contractor is responsible to confirm actual locations of utilities prior to construction. Contractor is to arrange for a locate company to provide underground locate services whether underground piping and electrical cable exists in the area."

SUBSECTION 7 - SUBMITTALS, 7.1 - Shop Drawings

.1 Add the following new Subsection:

".8 Submit, for review, shop drawings for:

.1 Polymer data sheet;
.2 Polymer injection equipment;
.3 Geotextile bag layout schematic;
.4 Geotextile bag laydown pad details;
.5 Geotextile dewatering bag data sheets
.6 All other items specified herein that typically require Shop Drawing Submittal."

SUBSECTION 11 - DELIVERY OF MATERIALS AND USE OF THE SITE

.1 Revise Subsection 11.1 to read:

".1 Confine equipment, products, and operations to within the boundaries of roads, specified right-of-way of the Owner, or site limits shown."

SUBSECTION 12 – TRAFFIC CONTROL

.1 Add the following new subsections:

".6 Contractor is to maintain at least single lane access on roads at all times. The Contractor shall comply with the temporary traffic control manual and all other specific requirements stipulated by Nova Scotia Department of Transportation and Infrastructure Renewal.

.7 The Contractor is responsible for notifying the public and local businesses of traffic interruptions and/or detours. Notices shall include newspaper and radio advisories as well as traffic control signage for the public and direct contact with affected business owners.

.8 The Contractor shall not interfere with the movement of waste delivery vehicles and waste delivery vehicles shall be given the right-of-way on all roads."

4. SECTION 01 22 00 - MEASUREMENT AND PAYMENT

1. Replace Section 01 22 00 with the following:

1.0 GENERAL

.1 Unit Prices and Lump Sum Prices are full compensation for the work necessary to complete each item in the Contract in combination with all other work necessary to the completion of the Work as a whole and not bid as a separate item.

.2 Include all of the following as required where individual quantities are not provided in the Form of Tender: environmental protection, clearing and grubbing, excavation (except rock), shoring, dewatering, bedding, backfilling, compaction, disposal of surplus common, marker stakes, reinstatement, traffic control, and all incidentals.

.3 All measurements shall be along a horizontal plane unless otherwise indicated.

.4 The numbers of the items described below correspond to the numbers of the items in Section 00 41 43 "FORM OF TENDER" "SCHEDULE A", "SCHEDULE B" and "SCHEDULE C".

.5 Additional instructions for measurement and/or payment for items of the Work may be contained in specific sections of the Technical Specifications Divisions 1 through 31 where appropriate. In the case of a conflict between the instructions for measurement and payment contained in this section and another section, the requirements of this section shall govern.

.6 The Contractor shall provide method of measuring dry solids extracted from the lagoons. Methods shall be able to be monitored by the Owner through confirmation of feed solids flow and concentration. All data collected shall be turned over to the Owner on a daily basis so that the progress can be tracked and adjustments made to the solids removal program as required.

2.0 SCHEDULE 'A' ITEMS

.1 Mobilization and Demobilization

Unit of Measurement: Lump Sum (L.S.)

Item Includes: Insurance, bonding, loading, transportation, contracting of all plant, material, equipment necessary to complete the work associated with the contract and after the work associated with the contract is completed.

.2 De-sludging and Dewatering

Unit of Measurement: Bone Dry Tonne (BDT)
Method of Measurement: Calculated by measuring the volume and the solids content of sludge.

Item Includes: All equipment, supply, transport and installation of materials, health and safety, testing, calibration, commissioning, labour and restoration for the complete removal of the existing lagoon aeration equipment and subsequent removal and dewatering of sludge from the lagoons including supply and placement of geotextile dewatering bags, quality control testing and all else required to complete the work in in space available at the site.

.3 Lay-down Area
Unit of Measurement: Lump Sum (L.S.)

Item Includes: All equipment, supply, transport and installation of materials, health and safety, testing, calibration, commissioning, labour and restoration associated with the construction of suitable water tight laydown areas which drain to the lagoons in accordance with the geotextile dewatering bag manufacturer's product requirements, wastage, storage, quality control testing and all else required to complete the work in in space available at the site.

.4 Aeration Equipment Installation
Unit of Measurement: Lump Sum (L.S.)

Item Includes: Receiving, and installation the owner supplied aeration equipment package into the lagoon cells after the de-sludging work has been completed. This system includes aeration diffusers, downcomers, floating laterals, control valves and anchor system.

5. SECTION 31 20 00 - EARTHWORK

.1 Add Clauses 3.9.13

Berms

.1 Do not place boulders and rock fragments with dimensions exceeding 150 mm within 300 mm of subgrade elevation.

.2 Use approved native site material and imported clay till for embankment construction.

.3 Material for berm/embankment construction to be completed to a minimum of 95 percent Standard Proctor Density with a maximum recommended moisture content of optimum ±2%. Fill is to be placed in a maximum uncompacted lift of 300 mm. Compaction is to be undertaken using heavy (18 tonne) sheep foot type rollers. Smooth drum vibrating rollers may be utilized provided the surface of each lift is scarified prior to placement of the subsequent lifts to ensure good bond between lifts.

.4 Fill is to be placed in continuous lifts, parallel to berm/embankment alignment. Care should be taken to ensure good bonding between successive lifts is obtained.

.5 Berm/embankment shall be brought up uniformly around the perimeter. Where openings are excavated through the embankment or it is necessary to join one embankment with another, the joint shall be stepped and completed as shown on the drawings.

6. ADDITIONAL SECTIONS OF SPECIFICATIONS

Section 31 32 21	–	Sludge Dredging and Dewatering
Section 40 05 50	–	Fine Bubble Aeration System Installation

***** END OF SECTION 00 60 00 *****

Part 1 General

1.1 SECTION INCLUDES

.1 The work covered by this section includes: (a) provision of all equipment, labour, and materials; (b) construction of a suitable of geotextile bag laydown area and (c) performance of all operations in connection with the construction of the geotextile tube structures on constructed laydown areas and dredging and dewatering of municipal biosolids material from Lagoons Cells 1 and 2.

1.2 RELATED SECTIONS

.1 Section 00 72 45 – General Conditions

.2 Section 00 60 00 – Supplementary Specifications

1.3 MEASUREMENT PROCEDURES

.1 As per the specifications all costs in connection with the mobilization and demobilization of the contractor's equipment shall be included in a lump sum price where indicated on the Tender Form. A separate unit cost should be included based on bone dry tonne to complete de sludging and de watering. No separate measurement will be made for geotextile tubes, placement of the underlying geotextile filter cloth and coating of the completed tubes. Payment shall be made at the contract lump sum price and shall constitute full compensation for providing all materials necessary for the complete and satisfactory delivery and installation of the geotextile tubes. No separate payment shall be made for any other incidental items associated with the proper installation of the geotextile tubes or compliance with required permits.

.2 The Contractor shall provide method of measuring dry solids extracted from the lagoons. Methods shall be able to be monitored by the Owner through confirmation of feed solids flow and concentration. All data collected shall be turned over to the Owner on a daily basis so that the progress can be tracked and adjustments made to the solids removal program as required.

1.4 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

- .1 ASTM D4491-99a, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
- .2 ASTM D4751-99a, Standard Test Method for Determining Apparent Opening Size of a Geotextile.

.2 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-4.2 No. 11.2-M89(April 1997), Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).
- .2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.
  - .1 No.2-M85, Methods of Testing Geosynthetics - Mass per Unit Area.

.2 No.3-M85, Methods of Testing Geosynthetics - Thickness of Geotextiles.

.3 No.6.1-93, Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.

.4 No.7.3-92, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.

.5 No. 10-94, Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size.

1.5 SUBMITTALS

.1 Submit a written certificate of compliance of geotextile tube manufacturer's catalog cuts, brochures, specifications, and product data for approval at least 4 weeks prior to start of work. The information provided shall attest that the geotextile tube meets the chemical, physical, and manufacturing requirements stated in these specifications.

.2 Submit a Plan of Construction describing the sequence of operations for the dredging and dewatering operation. The plan should conform to the general guidelines presented in these contract specifications, but should also include additional information. The plan shall address the approach and techniques required for: (a) fabrication of the geotextile tubes, laydown pad, (b) construction site preparation, (c) geotextile tube deployment and filling, and (d) monitoring and analysis of parameters such as characteristics of the material to be dredged, pipeline pressure, and hydraulic-fill characteristics. Equipment to be used for geotextile tube placement and filling shall be specified.

1.6 DELIVERY, STORAGE AND HANDLING

.1 During delivery and storage, protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.

.2 Geotextiles shall be labeled, shipped, stored, and handled in accordance with ASTM D 4873 and as specified herein. Each segment of geotextile tube shall be wrapped in an opaque and waterproof layer of plastic during shipment and storage. The plastic wrapping shall be placed around the geotextile in the manufacturing facility and shall not be removed until deployment. Each packaged segment of geotextile tube shall be labeled with the manufacturer's name, geotextile type, lot number, roll number, and roll dimensions (length, width, and gross weight). Appropriate handling equipment and techniques, as recommended by the manufacturer and as mentioned in the submittals and approved by the contracting officer, shall be used.

.3 Geotextile and/or plastic wrapping damaged as a result of delivery, storage, or handling shall be repaired or replaced, as directed by the contracting officer, at no additional cost to the Owner

.4 Geotextiles shall not be handled with hooks, tongs, or other sharp instruments. Geotextiles shall not be dragged along the ground. Any surface upon which the geotextile may rest or from which it may be deployed shall be leveled and prepared to a relatively smooth condition free of ruts, erosion rills, obstructions, depressions or debris (brush, burrs, or protrusions) greater than 150 mm in height (6 in.) that could snag and tear the fabric. A shallow "swale" or "cradle" may be constructed under low-water conditions on the tube center line to prevent geotextile tubes from rolling during filling operation.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Do not bury rubbish and waste materials on site.

.2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways.

.3 All waste material is to be disposed in accordance with applicable regulations. The Contractor is responsible to obtain all permits.

Part 2 Products

2.1 FABRIC REQUIREMENTS

.1 The geotextile for the tubes shall be a woven monofilament or multifilament pervious sheet of polymeric yarn. Fibers used in the manufacture of the geotextile fabric shall consist of long-chain synthetic polymers composed of at least 85 percent by weight polyolefins, polyesters, or polyamides. Stabilizers and/or inhibitors shall be added to the base polymer if necessary to make the filaments resistant to deterioration by ultraviolet light, oxidation, and heat exposure.

.2 Reclaimed or recycled fibers (post-consumer) or polymer shall not be added to the formulation.

.3 Geotextiles shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other (including the filaments or yarns at the edges of the fabric).

.4 The geotextile physical properties shall equal or exceed the minimum average roll test values (MARV) listed in Table 2, as determined by the standard test methods listed.

.5 Acceptance of geotextile shall be in accordance with ASTM D 4759.

.1 Strength values shown in Table 1 are for the weaker principal direction. Geotextile fabrics that are not in accordance with ASTM D 4759 shall be replaced as directed by the Engineer at no additional cost to the government.

.2 Standard of Acceptance: Miratech GT500 Sludge Dewatering Geotube or approved equivalent only.

Table 1: Geotextile, Type 1 (Geo-tube) Physical properties (woven)

Property	Test Method	Unit	Minimum Test Value
Apparent Opening Size	ASTM D 4751	US Sieve	#60
Puncture Strength	ASTM D 4833	lb	400
Wide Width Tensile (in any direction)	ASTM D 4595	lb/in	1000
Wide Width Tensile Elongation (in any direction)	ASTM D 4595	%	15
Trapezoidal Tear	ASTM D 4533	lb	550
Seam Strength	ASTM D 4884	lb/in	500

2.2 TEST, INSPECTIONS, AND VERIFICATIONS FOR GEOTEXTILES

.1 Geotextiles and factory seams shall meet the requirements specified in Table 1. Conformance testing shall be performed on random samples in accordance with quality control practices as prescribed by the manufacturer.

Part 3 Execution

3.1 SUBMITTALS

.1 The contractor is responsible to submit, a general plan of operations, a list of all equipment, chemicals, and the general specifications thereof, to the Consultant, 1 week before arriving on site on the designated date of project start up.

.2 Before arriving on site on the agreed upon date, the contractor will provide a letter of certification to the Engineer that all their equipment has been completely cleaned and disinfected, using NSF disinfectant solutions only.

.3 The contractor will be required to submit a work hazard assessment before commencing operations and supply a list of all personnel that will be on site.

.4 The contractor will be required to submit an environmental safety plan to be in keeping of the requirements of work conducted in an area designated as a protected water supply in the province of Nova Scotia

3.2 INSTALLATION

.1 The area of operation designated for equipment set up within the constraints of the site. The surface area of each lagoon is approximately 2,120 m². The contractor must be able to effectively maneuver the hydraulic dredge to be able to cover this area in its entirety to be able to remove all of the contents.

.2 The contractor is responsible to set up and take down all equipment for the entire project and arrange for outside contracting to position equipment as required, on the agreed upon date

.3 The contractor will provide a letter of certification that will verify any lubrication or hydraulic oil used on site for any equipment for any reason is food grade designated only.

.4 The contractor will provide onsite spill kits designed for chemicals and/or petrochemicals, and of large enough size (including generator fuel storage) to contain and secure any spills from all equipment.

.5 The contractor will be responsible for maintaining a clean operational area while on site, adhering strictly to environmentally appropriate best practices at all times.

.6 The sludge will be taken out of the lagoons by hydraulic vacuum dredging and delivered to the dewatering system.

.7 The contractor is responsible for providing any required source water supply on site.

.8 The Geo- Tube dewatering system will be a high volume, high solids type, with suitably sized conveyance equipment for dewatered sludge.

.9 The contractor will consult with the Municipality and must have prior approval of any chemical used on site to achieve dewatering, and subsequent solids percentage targets. All chemicals used will be NSF certified and the contractor will provide letters of certification for each one on site whether used or not. The chemicals chosen will be of the highest quality available to enhance and optimize performance of the dewatering operations.

.10 The contractor must consult with the Municipality to ensure the positioning of the Geo-Tubes will allow for proper collection of large amounts by a transport truck and continual operator of the facility.

.11 The Contractor will optimize the use of any chemical coagulants as percent solids of the alum sludge changes throughout the delivery process from the dredging, to ensure a high solids dewatered sludge (minimum 20%) after the dewatering process, while maintaining a clear filtrate back to the lagoon at all times.

.12 The contractor will ensure that any remaining amounts of chemical unused in the normal operations, even if partially full and activated, is secured and removed of in an environmentally appropriate manner from the work site, as reported to the Engineer during each, and then on the last day of dewatering operations.

.13 Within 30 days after notice to proceed, the contractor shall submit the Plan of Construction The plan shall incorporate the requirements of these specifications with respect to tube (and associated components) geometry, orientation, fabrics, fabrication, deployment and filling procedures per manufacturer's recommendations.

.14 Fabrication details or installation techniques that differ from those outlined in these specifications may be documented in the Plan of Construction and submitted for consideration by the Owner. However, rejection of alternative methods suggested by the Contractor shall not constitute a basis for claim against the Owner.

.15 Prior to installation, the contractor shall visually inspect the geotextile for damage and imperfections. Defective geotextiles shall be replaced no cost to the Owner.

.16 Check surface on which flexible liner is to be placed and remove projections that may puncture lining.

.17 Excavate anchor trenches at locations indicated.

.18 Place and secure liner in anchor trenches.

.19 Clean edges of panels to be spliced and join as outlined in manufacturer's recommendations.

.20 Complete anchoring of panels at base of slope.

.21 Cut liner sheets to fit accurately around inlets, outlets, sleeves, concrete structures and other projections through lining.

.22 Complete flashing and sealing of penetrations as indicated.

.23 Place cover blanket as indicated.

3.3 PUMP AND EQUIPMENT

.1 The pump and equipment used for the work required shall be determined by the contractor, identified in the Plan of Construction, and shall be approved by the Owner.

3.4 QUALITY CONTROL

.1 The contractor shall establish and maintain quality control procedure to be submitted to the Owner.

3.5 FINAL EXAMINATION AND ACCEPANCE

.1 The final condition of the work site, lagoons and sludge bed thickness will be reviewed at the completion of the dredging to ensure sufficient sludge has been removed from the Lagoon Cells.

3.6 CLEANING

.1 Remove construction debris from Project site and dispose of debris in an environmentally responsible and legal manner.

3.7 PROTECTION

.1 Vehicular traffic not permitted directly on geotextile.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 The selected Wastewater Treatment System Package consists of multiple processes as designed and supplied by Nexom Inc. or equivalent, and has been chosen by the Engineer to best meet the overall design requirements for this application.

.2 All equipment specified in the Wastewater Treatment System Package sections shall be supplied as a complete package by the Owner and received and installed by the Contractor.

.3 Elements of this specification have been included for reference. The Contractor shall be responsible for the receiving and installation of the Aeration System as outlined in Part 1 and Part 3 of the specification and on the Drawings. The equipment and shop drawing packages will be Owner supplied.

1.2 REFERENCED STANDARDS

.1 ASTM A240 – Chromium-Nickel Stainless Steel Plate

.2 ASTM A312 – Seamless, Welded, and Cold Worked Austenitic SS Pipe.

.3 ASTM A351 – Castings, Austenitic, for Pressure-Containing Parts

.4 ASTM A380 – Corrosion Protection, Acid Pickling

.5 ASTM A403 – Wrought Austenitic Stainless Steel Piping Fittings

.6 ASTM A480 – Stainless Steel Finish

.7 ASTM A530 – Specialized Carbon and Alloy Steel Pipe

.8 ASTM A554 – Welded Stainless Steel Mechanical Tubing

.9 ASTM A743 – Castings, Iron-Chromium, Iron-Chromium Nickel for General Applications.

.10 ASTM A744 – Castings, Iron-Chromium-Nickel for Severe Service.

.11 ASTM A774 – Stainless Steel Welded Fittings

.12 ASTM A778 – Stainless Steel Welded, Unannealed Austenitic Pipe

.13 ASTM D1171 – Elastomer Deterioration

.14 AISI 304 – 304 Stainless Steel Plate

.15 AISI 304L – 304L Stainless Steel Plate

.16 AISI 316 – 316 Stainless Steel Plate

.17 AISI 316L – 316L Stainless Steel Plate

.18 ANSI B-16.1 – Pipe Flanges

.19 ANSI B-16.5 – Pipe Flanges

.20 AWWA C606 – Grooved and Shouldered Joints

1.3 HANDLING AND STORAGE OF MATERIALS

.1 Assume complete responsibility for the safe delivery to the site of all equipment specified herein.

.2 Inspect all fabricated material for damage in transit before installation in the work.

.3 Exercise particular care to avoid damage to equipment.

.4 The Engineer reserves the right to reject equipment that is damaged or defective.

1.4 GUARANTEES

.1 The equipment shall be guaranteed to perform to the specified design operating conditions.

1.5 SUBMITTALS

.1 Provide Owner Shop Drawings showing fabrication, fixings, layout and installation of all equipment specified in this Section for approval prior to construction.

.2 All dimensions and other units are to be metric.

.3 Include with Shop Drawings the following:

- .1 Show grid layout, location dimensions and elevation of grid.
- .2 Provide engineering reports stating the clear water oxygen transfer efficiency, including a description of test facility procedures, methods of sampling and calculations. The test procedure shall be in accordance with "A Standard for Measurement of Oxygen Transfer in Clean Water" ASCE.
- .3 Provide headloss calculations for the aeration equipment. Calculations shall be derived at standard conditions and at design maximum air flow rate per diffuser including air supply piping from the blowers.
- .4 Provide calculations for determining the number of diffusers required to meet design requirements.
- .5 Details of:
  - .1 Diffusers, holders, retainers and gaskets
  - .2 Piping, including anchorage system, supports, and expansion and fixed joints
  - .3 Airline purge system where applicable
  - .4 Should there be any deviations or exceptions to these Specifications, submit a statement from the manufacturer listing such deviations/ exceptions. Include specification reference, proposed alternative and reason for changes

.4 Submit installation manual prior to shipment of equipment.

.5 Submit Operation and Maintenance Manuals.

1.6 BASIS OF DESIGN

.1 The design drawings, system layout, equipment selection, etc. have been obtained based on the OPTAER aeration system.

.2 The system shall be manufactured and supplied by:

- .1 Nexom Inc.

.3 Components specified herein shall be supplied by one supplier and shall be of the manufacturer's latest design.

.4 Under no circumstances will a system consisting of parts compiled and assembled by a manufacturer's representative or distributor be accepted.

.5 This specification shall be the standard by which any alternative system submittal will be reviewed. The decision of the Owner with respect to approval or rejection of any alternate equipment proposed is final (refer to Approval of Alternates section)

1.7 GENERAL LAYOUT/ARRANGEMENT

.1 The Lagoon aeration system shall generally consist of shallow buried main air supply headers with distribution laterals:

- .1 The main header connection with the air supply at the blower building as directed by Owner.
- .2 Lateral piping shall be connected to the main header with a flanged connection.
- .3 Each lateral pipe shall have a shutoff valve at the main header.
- .4 Main header connection with supply, per project drawings, shall be operational from both blowers as directed by Owner.
- .5 Lateral pipes shall be anchored to shore.
- .6 Floating Laterals: diffuser connection ports shall be thermally fused onto the lateral piping. A length of feeder hose (equal to the maximum water depth) shall be connected to the connection port with stainless steel clamps. The aeration diffuser shall be connected to the opposite end of the feeder hose.

.2 The aeration system including diffusers, lateral system, and feeder lines shall ensure that the lagoons do not have to be de-watered or drained for system installation or maintenance.

.3 Non-retrievable submerged aeration headers/laterals will not be accepted. PVC headers will also not be accepted.

1.8 INFLUENT/EFFLUENT DESIGN VALUES

.1 Design aeration system based on the following design values:

.1	Average Design Flow	71 m^3/day
.2	BOD (design):	250 mg/L
.3	TSS:	250 mg/L
.4	Total Ammonia-N:	25 mg/L

.2 Wastewater effluent parameters:

.1	$CBOD_5$ (design):	<25 mg/L
.2	TSS (design):	<25 mg/L

1.9 AERATION DESIGN CRITERIA

.1 Aeration system design is the sole responsibility of the Supplier and shall be stamped and signed by a Professional Engineer registered to practice in the Province of Nova Scotia.

.2 It is entirely the responsibility of the aeration equipment supplier to verify all design parameters. No allowance will be made for design errors or omissions that occur due to insufficient site investigation.

.3 Aeration Design Factors

.1 Alpha: 0.60

.2 Beta: 0.95

.3 Theta: 1.024

.4 Site Elevation: 3 m

.5 Maximum Water Temperature: 20 °C

.6 Minimum Water Temperature: 0.5 °C

.4 Aeration system shall be designed transfer sufficient oxygen to accommodate loads from:

.1 cBOD removal

.2 Internal sludge digestion

.5 The average dissolved oxygen content shall be not less than 2.0 mg/L in any part of the aerated lagoons.

.6 Diffusers shall have a minimum SOTE of 15.4% at a diffuser submergence depth of 3m, and at a maximum diffuser flux rate of 32.9 $m^3/hr/m^2$ (1.80 SCFM/sq.ft) of active surface area.

.7 Air distribution shall be designed to match the projected oxygen demand. Minimum requirements are as follows:

.1 Cell #1: 2 laterals, 4 HT25 diffuser assemblies

.2 Cell #2: 1 laterals, 2 HT25 diffuser assemblies

.8 Submit complete aeration design calculations and results of ASCE Standard Oxygen Transfer Efficiency (SOTE) tests conducted by an independent laboratory.

.9 Design blower system based on the following design values:

.1 Required Airflow: 91.7 m^3/hr (54 SCFM)

.2 Blower Site Elevation: 3 m

.3 Normal Operating air pressure: 40.7 kPa (5.9 psi)

.4 Relative Humidity: 50 %

.5 Min Air Intake Temp: -15 °C

.6 Maximum Air Intake Temp: 30 °C

.7 Blower motor shall be sized to accommodate a maximum (intermittent) air pressure of 49.6 kPa (7.2 psi)

Part 2 Products

2.1 AERATION PIPING

.1 High-Density Polyethylene (HDPE) Pipe: butt-fused joints.

.2 The polyethylene pipe shall be PE3408, or PE3608, or PE4710, and conform to the requirements of ASTM D3350

.3 Minimum DR requirements shall be the more stringent of the following:

.1 for buried piping: DR17 for heavy traffic areas; DR21 for light traffic areas; DR26 for non-traffic areas

.2 for other piping: DR17 for 100 mm piping, DR21 for 150 mm piping, DR26 for 200 mm and larger

.4 Minimum aeration header pipe size: 100 mm diameter

.5 Flange assemblies: Polyethylene stub end manufactured to match the pipe, with ductile iron slip-on flange (out of water and buried service), and SS slip-on flange (in-water).

.6 Provide saddles, tees, reducers, and other fittings required for the installation shown.

2.2 DIFFUSERS AND FEEDER TUBING

.1 HT25 fine bubble membrane diffuser assemblies consisting of PVC support tubes with EPDM diffuser membranes connected to an HDPE distribution manifold

.1 Maximum dry weight of individual diffuser and ballast assembly shall be 25 kg to allow for safe manual retrieval.

.2 EPDM diffuser membranes shall be fully supported over entire length

.3 EPDM diffuser membranes shall have a design life space of not less than 5 years before replacement is required.

.2 Aeration supplier shall provide precast concrete diffuser ballast weight assemblies including FRP support brackets with an HDPE cover around perimeter of weight. No on-site ballast fabrication will be accepted.

.3 Each aeration diffuser shall be individually accessible from the water surface by boat with no additional lifting equipment required. Aeration diffuser replacement shall require no more than a crew of two workers.

.4 Diffusers shall have a history of efficient operation, and freedom from clogging, excessive back pressures, or structural failure when applied to service conditions similar to those indicated for this project.

.5 Provide two (1) complete diffuser assembly and four (4) membrane assemblies as spare parts

.6 Feeder tubing used as the connection between the fine bubble diffuser and lateral piping shall be flexible PVC material reinforced with spiral polyester yarn; UV and weather resistant.

.1 Nominal inside diameter 25.4 mm.

.2 Service temperature range -15°F to 149°F

.3 Feeder tubing to be cut to length in factory.

2.3 LATERAL ANCHORING

.1 Each end of the floating laterals shall be held in place with a stainless steel cable attached to anchor posts

.2 A Self-Adjusting Tension assembly shall be located at the free end of the laterals and shall have the follow characteristics:

.1 Adjustment range: +/- 510 mm

.2 Tension assembly to provide a minimum constant tension force on lateral of 125 kg

.3 Equipped with winch for initial adjustments

.3 Anchor posts

.1 65 mm diameter, schedule 40 pipe - galvanized

.2 Minimum embedment of post in concrete pier: 610 mm

.3 Maximum Length – Fixed post: 1220 mm

.4 Minimum Length – Self-Adjusting Tension Assembly post: 1830 mm

.4 Concrete Pier

.1 460 mm diameter x 915 mm deep (minimum)

2.4 MISCELLANEOUS COMPONENTS

.1 Provide all other miscellaneous process equipment accessories including winches, stainless steel cable, concrete diffuser ballasts, rope, clamps, nuts/bolts, etc. as required for a complete system.

Part 3 Execution

3.1 DELIVERY TO SITE

.1 The manufacturer's equipment shall be packaged in containers constructed for normal shipping, handling and storage.

.2 The Owner will provide machinery and labour to unload and store the equipment in accordance to manufacturer's requirements.

3.2 GENERAL

.1 The installer of the aeration system shall supply all materials, tools, equipment, and services necessary to install the aeration system. This includes:

.1 Shallow buried aeration headers;

.2 Air supply;

.3 Connections to air supply; and

.4 Floating lateral assemblies:

.1 Aeration lateral piping;

.2 Feeder piping;

.3 Fittings and lateral valves;

.4 Diffuser assemblies, EPDM membranes, diffuser weights; and

.5 Self-tensioning lateral assemblies and anchor posts.

.2 Aeration Diffuser and Lateral Installation

.1 Join HDPE pipe and fittings using the butt-fusion method in accordance with the pipe manufacturer's instructions, and under the supervision of certified fusion technologists.

.2 Keep piping, during the progress of the work and on completion, free from obstructions and thoroughly clean. Remove foreign material from the pipe lines and ensure lines are free from leaks. Remove and replace any defective sections.

.3 Install HDPE lateral piping at flange connection locations as shown on the drawings.

.4 Install diffusers and feeder tubing in accordance with supplier's instructions at locations as shown on the drawings.

.5 Ensure adequate water levels in cell prior to any in-water equipment installation.

.3 The site shall be kept in a neat and orderly manner throughout the duration of the system installation.

3.3 MANUFACTURERS FIELD SERVICE

.1 Provide services of an experienced, and authorized representative of the Manufacturer (Supplier). A minimum of one (1) trip with one (1) day shall be allowed.

.1 Inspect equipment covered by these specifications

.2 Supervise any adjustments and installation checks

.3 Perform operation checks and tests as outlined below

.4 Perform start-up and commissioning of the system

.2 Perform air flow rate tests

.1 Testing shall be performed under full normal lagoon operational conditions

.2 RPM testing shall be performed on blower motor and block and correlated with factory generated blower performance curves to obtain airflows.

.3 Visually inspect aeration pattern

.1 Pattern shall be uniform at all diffuser locations

.4 If defects are revealed during testing, the Engineer may issue instructions for removal or correcting defective work and irregularities. If any material, in whole or in part, does not conform to the Specifications or is found to be defective then such material shall be rejected by the Engineer and replaced.

3.4 START-UP AND COMMISSIONING

.1 Supplier shall provide installation inspection, and start-up and commissioning for the system including on-site training of the Owner's operators. A minimum of one (1) trip with one (1) day onsite shall be allowed.

.2 The inspection shall consist of a visual inspection of the system with water filled to operating level to assess installation of laterals, anchors, stainless cabling, and to confirm even distribution of airflow through the diffuser units and across the entire system. The manufacture's inspection representative shall provide signed inspection documents confirming the date of the inspection and approval of the installation and operational performance.

.3 Check the installation of all components and provide a written commissioning report to the Engineer upon completion of installation and commissioning.

3.5 WARRANTY

.1 The entire equipment package shall be covered by 2-years warranty following successful commissioning. The supplier shall assume the responsibility for all transport and travel costs arising from warranty work. The warranty statement shall be signed by an Officer of the Company.

.2 System supplier shall maintain a minimum $2,000,000 Errors and Omissions insurance policy acceptable to the Owner.

.3 The aeration system Supplier shall provide written warranties for the aeration system.

.4 The Supplier shall repair or replace defective parts without charge to the Owner.

.5 Lateral Piping and Fittings Warranty

.1 Lateral piping and fittings shall be warranted to be free from defects in material and workmanship for a period of Twenty-four (24) months from the date of start-up.

.2 The cost for removal (disposal) and reinstallation of any defective parts during the warrantee period shall be the responsibility of the Owner

.6 Aeration Diffuser Warranty

.1 Aeration diffusers shall be warranted to be free from defects in material and workmanship for a period of twenty-four (24) months from the date of start-up.

.2 The cost for removal (disposal) and reinstallation of any defective parts during the warrantee period shall be the responsibility of the Owner

END OF SECTION



KEY PLAN

municipality of cumberland

DRAWING LIST

C100 EXISTING CONDITIONS SITE PLAN AND CROSS SECTIONS
C101 NEW SITE PLAN AND DETAILS
C102 AERATION DETAILS

WALLACE WWTP SLUDGE DE-WATERING AND AERATION EQUIPMENT INSTALLATION

MUNICIPALITY OF CUMBERLAND

WALLACE, NOVA SCOTIA

PROJECT NO. 20-3277

NOT FOR CONSTRUCTION

DILLON CONSULTING

MUNICIPALITY OF CUMBERLAND
WALLACE WWTP SLUDGE DE-WATERING AND AERATION EQUIPMENT INSTALLATION
AUGUST 2021
Project No. 20-3277

PLOT DATE: 2021-08-20 2:01:56 PM FILE NAME: U:\dms8182\5\203277-10-UV-CON.rvt



KEYPLAN

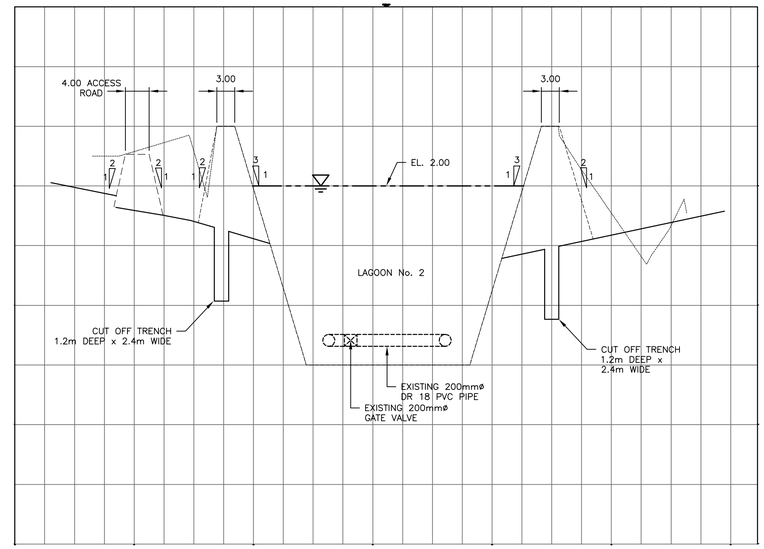
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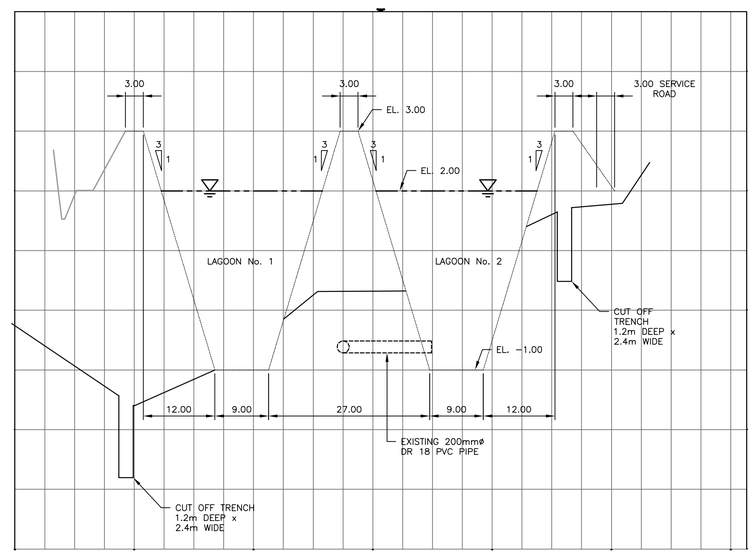
EXISTING SANITARY PIPING

EXISTING AIR PIPING

PLAN
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DRAWN: SMZ | CHECKED BY: KRM
DATE: AUGUST 2021
SCALE: 1:500 1:50

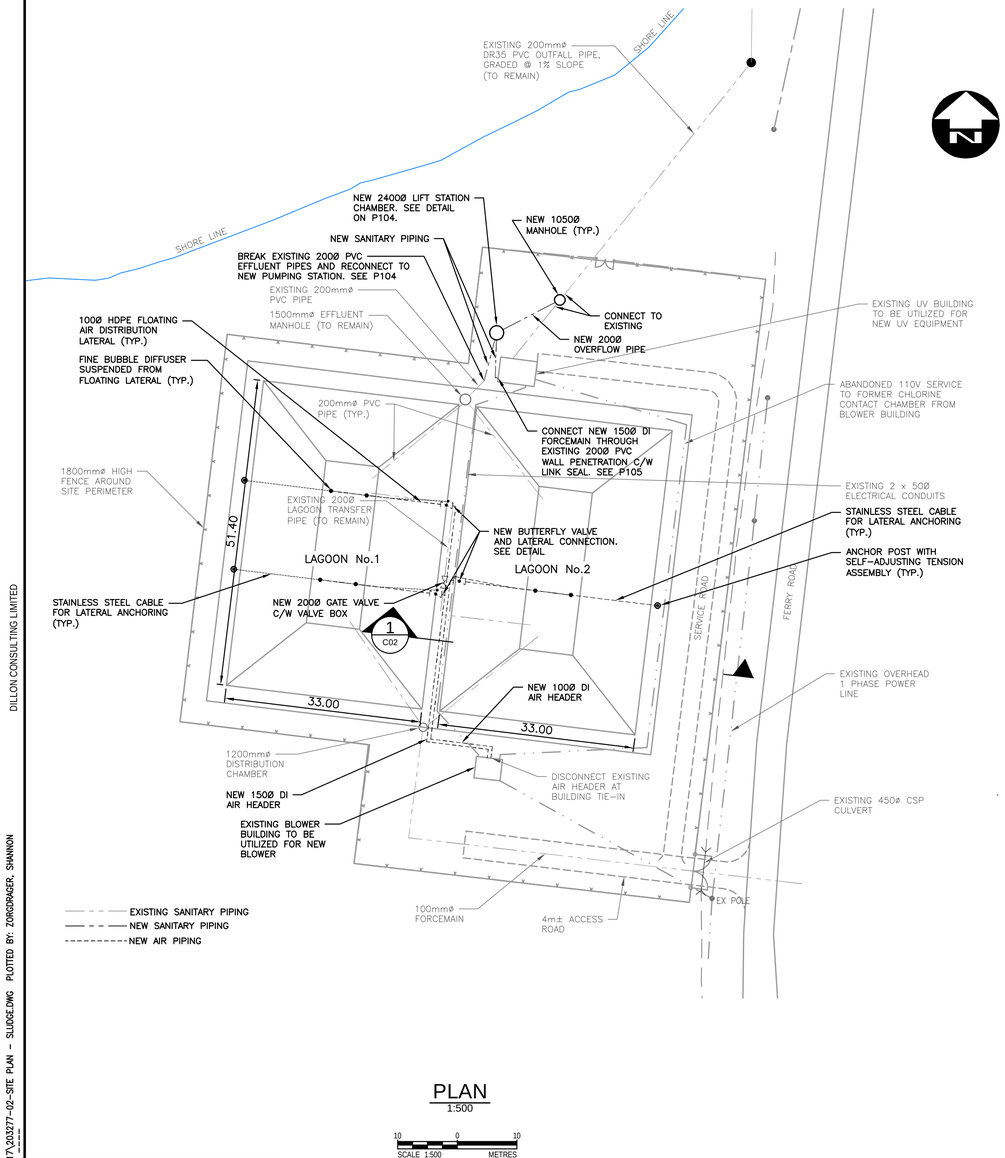
MUNICIPALITY OF CUMBERLAND
WALLACE WWTP SLUDGE DEWATERING AND AERATION INSTALLATION

EXISTING CONDITIONS
SITE PLAN AND CROSS SECTIONS

PROJECT NO. 20-3277

SHEET NO. C100

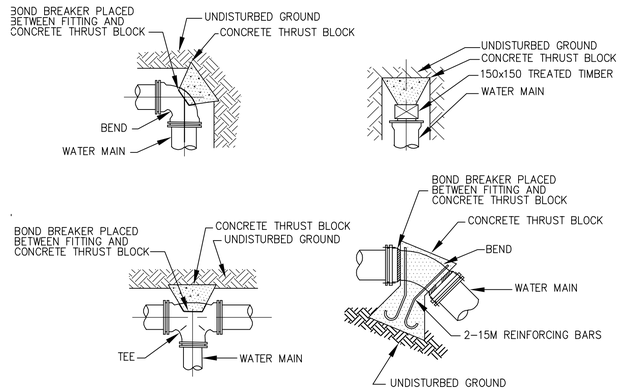
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PLOT DATE: 2021-08-20 @ 2:20:56 PM PLOT SCALE: 1:1 PLOT STYLE: ---
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PLAN
1:500

SCALE 1:500 — 10 0 10 METRES

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MINIMUM CONTACT AREAS FOR CONCRETE THRUST BLOCKS

PIPE DIA.	AREA (M^2) FOR SOIL SUPPORTING CAPACITY OF 100 kPa					
mm	CAP OR PLUG	TEE	90° BEND	45° BEND	22.5° BEND	11.25° BEND
150	0.48	0.48	0.64	0.40	0.24	0.16
200	0.80	0.80	1.12	0.64	0.32	0.16

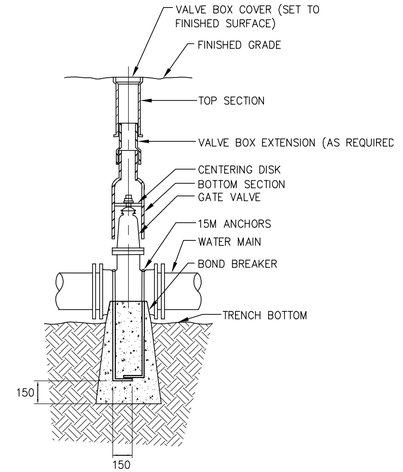
MINIMUM DISTANCE FROM FITTING TO UNDISTURBED GROUND

PIPE DIAMETER (mm)	mm
150	450
200	450

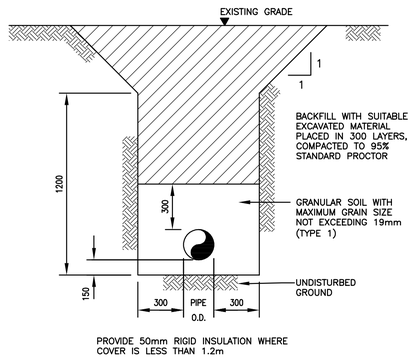
NOTE:

THESE TABLES ARE BASED ON SOIL SUPPORTING CAPACITIES OF 100kPa AND AN INTERNAL PRESSURE OF 10.35kPA. WHERE DIFFERENT SUPPORTING CAPACITIES OR INTERNAL PRESSURES ARE ENCOUNTERED, CONTACT AREAS SHOULD BE CALCULATED ACCORDINGLY. SAFE SUPPORTING CAPACITY SHOULD BE DETERMINED BY THE DESIGN ENGINEER, AND SHOULD INCLUDE AN APPROXIMATE FACTOR OF SAFETY.

THRUST BLOCK DETAILS
N.T.S.



VALVE DETAIL
N.T.S.



TYPICAL TRENCH DETAIL
N.T.S.

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DATE AUGUST 2021
SCALE 1:500

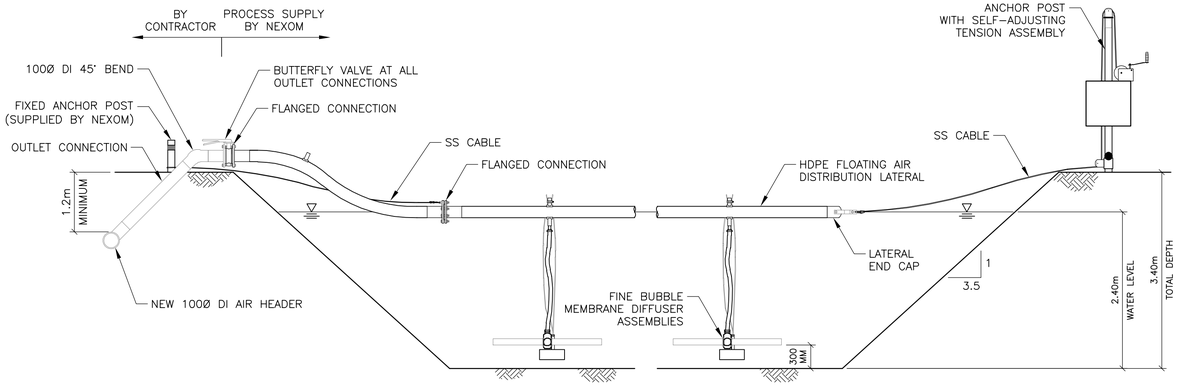
MUNICIPALITY OF CUMBERLAND
WALLACE WWTP SLUDGE DEWATERING AND AERATION INSTALLATION

PROJECT NO. 20-3277

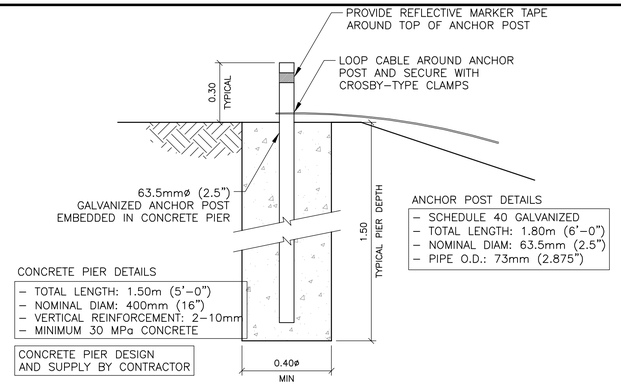
NEW SITE PLAN AND DETAILS

SHEET NO. C101

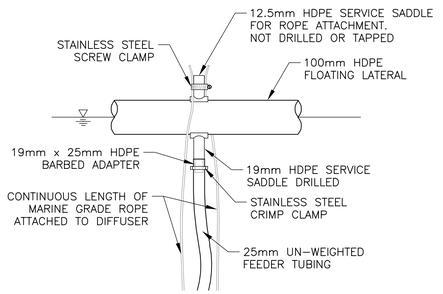
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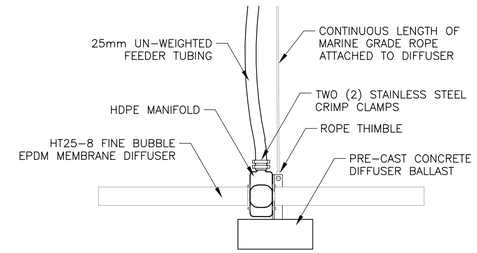
AERATED LAGOON SECTION
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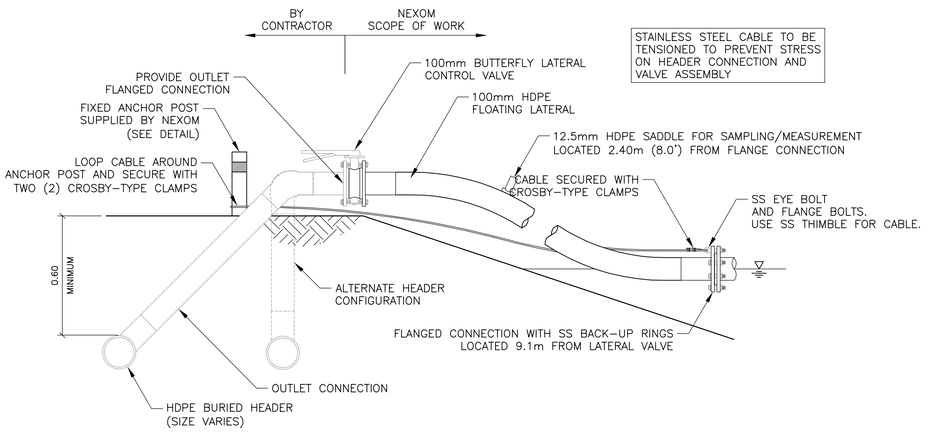
FIXED ANCHOR POST AT HEADER DETAIL
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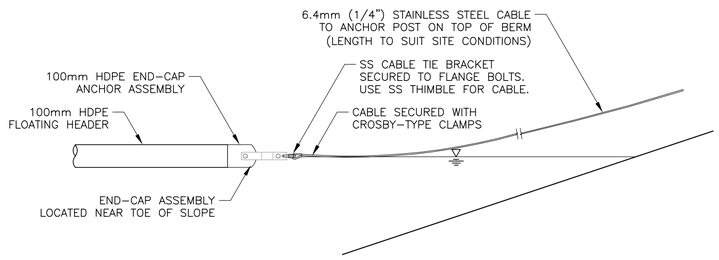
ROPE CONNECTION DETAIL
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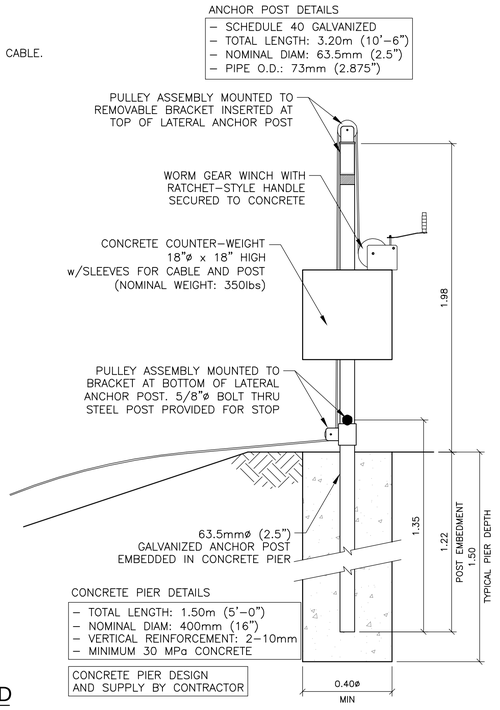
DIFFUSER CONNECTION DETAIL
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LATERAL DETAIL AT HEADER
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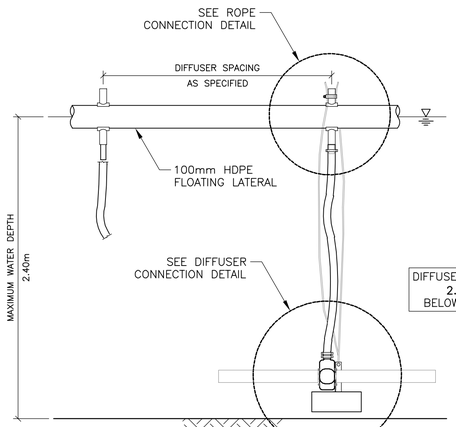


LATERAL DETAIL AT FREE END
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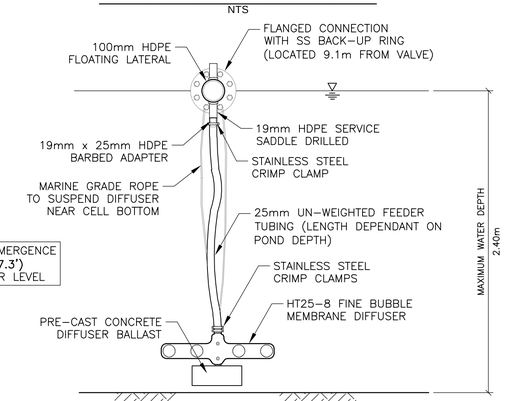




HT25-8 DIFFUSER - PLAN
NTS



LATERAL DETAIL - ELEVATION
NTS



LATERAL DETAIL - SECTION
NTS

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MUNICIPALITY OF CUMBERLAND
WALLACE WWTP SLUDGE DEWATERING AND AERATION INSTALLATION

AERATION DETAILS

PROJECT NO. 20-3277

SHEET NO. C102