WATER QUALITY IMPROVEMENT PROJECT

BIORETENTION BASIN AND RELATED IMPROVEMENTS AT MANOR PLACE

SRF PROJECT NO. 5121-06-00
GIGP NO. 702
JANUARY 2017

Prepared for:

VILLAGE OF GREENPORT
SUFFOLK COUNTY, NEW YORK

Mayor George W. Hubbard, Jr.
Deputy Mayor/Trustee Jack Martilotta
Trustee Mary Bess Phillips
Trustee Douglas W. Roberts
Trustee Julia Robins

Prepared by:

D&B ENGINEERS AND ARCHITECTS, P.C.
WHITE PLAINS, NEW YORK

NO TEXT ON THIS PAGE

CONTRACT DOCUMENTS, SPECIFICATIONS,
PLANS AND BID DOCUMENTS FOR
WATER QUALITY IMPROVEMENT PROJECT
BIORETENTION BASIN AND RELATED IMPROVEMENTS AT
MANOR PLACE
VILLAGE OF GREENPORT

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NOTICE TO BIDDERS

SEALED BIDS ONLY will be received by the Board of Trustees of the Village of Greenport at the Greenport Village Hall, 236 Third Street, Greenport, New York, 11944, during the regular Village business hours from 8:30 a.m. through 4:30 p.m. from April 6, 2017 through and until 3:00 p.m. April 27, 2017, at which time all properly received sealed bids will be publicly opened and read. The Contracts will be awarded as soon thereafter as practical and as the Mayor and Board of Trustees so determine, for;

VILLAGE OF GREENPORT
BIORETENTION BASIN AND RELATED IMPROVEMENTS
AT MANOR PLACE 2017

Bid and Contract Documents, including Plans and Specifications, may be obtained and examined at Office of the Village Clerk at the Village of Greenport Village Hall during regular Village hours beginning April 6, 2017 or by electronic mail. Each interested party requesting a printed set of Contract Documents will be required to pay a non-refundable fee of FIFTY DOLLARS ($50.00) payable to the Village of Greenport.

Each Bid submitted with respect to this Contract must be accompanied by a non-collusion statement to the submitted Bid pursuant to Section 103 of the General Municipal Law.

No Bid shall be considered by the Board of Trustees of the Village of Greenport that is submitted by any contractor, person or entity that is in arrears to the Village of Greenport, or that is in default as surety or otherwise upon any obligation to the Village, and no Bid will be considered that is submitted by any contractor, person or entity whose performance of any previous contract with the Village has been unsatisfactory in the opinion of the Board of Trustees. Such a contractor, person or entity whose performance has been unsatisfactory shall not be deemed to be a responsible Bidder.

The Village of Greenport reserves the right to reject any and all Bids received, to waive informalities and to increase, decrease, or omit any portions of the Contract Specifications. Subject to the foregoing, the Village of Greenport will award the Contract to the Bidder which in the opinion of the Board of Trustees is the lowest responsible Bidder qualified by past experience to satisfactorily perform the work required by the Contract and furnishing the required security.

The successful Bidder must maintain Worker Compensation Insurance within the statutory limits, Automobile Liability Insurance, and General Liability Insurance Policy with limits of $1,000,000 each occurrence and Property Damage limits of not less than $1,000,000 each occurrence, with $2,000,000 aggregate for the benefit of the successful Bidder and naming the Village of Greenport as an insured party. Originals of the required policies shall be provided to the Village of Greenport with the copies of the Contracts that have been executed by the successful Bidder as required.

All Bids must be submitted on the prescribed forms as bound herein and returned to the Village of Greenport intact with the complete book of Contract Documents. All blank spaces for Bid prices or information required to be provided must be filled in or completed, both in words and figures as indicated. Any Bid, submission or proposal that contains any omissions, erasures, alterations, additions or items not called for in the itemized proposal, or that contains irregularities of any kind, may be deemed by the Board of Trustees to be nonconforming or nonresponsive and to constitute sufficient cause for rejection of that Bid.

In the event of any discrepancy in the price or amount of the Bid for any item in the proposal, the price as expressed in words shall govern. Any request by a Bidder or Bidder's representative to the Village or any other person or party for information, clarification, or interpretation must be submitted to the Village of Greenport Village Clerk, in writing only, not less than five (5) days prior to closing date for the submission of Bids. Bidders are cautioned not to submit proposals until after having inspected the site of the proposed work and having made themselves familiar with the Village's local conditions. ANY AND ALL COMMUNICATION WITH THE VILLAGE OF GREENPORT, ITS OFFICERS OR EMPLOYEES REGARDING THIS BID AND PROJECT FROM 12:01 A.M. April 6, 2017 THROUGH AND INCLUDING 3:00 P.M. April 27, 2017 SHALL BE WITH THE VILLAGE CLERK ONLY, AND NO OTHER PERSON WITHOUT THE EXPRESS PERMISSION OF THE VILLAGE CLERK UNDER PENALTY OF DISQUALIFICATION.

The Contract and project is a public works contract covered by Article 8 of the Labor Law or a building service contract covered by Article 9 thereof, and neither Contractor's employees nor the employees of its subcontractors may be required or permitted to work more than the number of hours or days stated in said statutes, except as otherwise provided in the Labor Law and as set forth in prevailing wage and supplement schedules issued by the State Labor Department. Furthermore, Contractor and its subcontractors must pay at least the prevailing wage rate and pay or provide the prevailing supplements, including the premium rates for overtime pay, as determined by the State Labor Department in accordance with the Labor Law. This project has been registered with the New York State Department of Labor as a pubic works project and a schedule of prevailing wages for Suffolk County is available from the New York State Department of Labor and will be provided to the Contractor with the Contract herein.

The Village of Greenport is an equal opportunity employer and does not discriminate on the basis of race, color, creed, ancestry, disability or handicap, marital/financial status, military status, religion, sex, sexual orientation, age or national origin with respect to employment or any employment related matter and the Village of Greenport requires that all contractors participating in contracts for public work in the Village of Greenport and all subcontractors of those contractors comply with those same requirements. The Village of Greenprot encourages bids for public contracts and public contracts with the Village of Greenport and subcontracts of those contracts by minority and women owned contractors and entities and the Village of Greenport may solicit bids and contracts from such entities with respect to the public work noticed herein.

Sylvia Lazzari Pirillo
Village Clerk
Village of Greenport

END OF SECTION
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INSTRUCTIONS TO BIDDERS

1. USE OF BID FORMS

The Village of Greenport has prepared a set of Bid and Contract Documents that includes a complete set of Bid and Contract forms which are to be completely filled out, executed, and returned attached to the bid form and technical specifications.

2. INTERPRETATION OF ADDENDA

No oral interpretation will be made to any Bidder as to the meaning of the Contract Documents or any part thereof. Requests for such an interpretation shall be made in writing to the Village Clerk, Village of Greenport. Any inquiry received five (5) or more working days prior to the date fixed for opening of Bids will be given consideration. Every interpretation made to a Bidder will be in the form of an Addendum to the Contract Documents and all such Addenda shall become part of the Contract and all Bidders shall be bound by such Addenda.

3. INSPECTION OF SITE

Bidders should visit the area of the proposed work and fully acquaint themselves with the existing conditions and should fully inform themselves as to the facilities and the difficulties and restrictions attending the performance of the Contract. Bidders should thoroughly examine and familiarize themselves with the Bid and Contract Documents. The Bidder to whom the contract is awarded, shall in no way be relieved of any obligation under it due to his failure to receive or examine any form or legal instrument or to visit the site to acquaint himself with the conditions there existing, and the Village will be justified in rejecting any claim by the Bidder based on facts regarding which he should have been on notice as a result thereof.

4. ALTERNATIVE BID

No Alternative Bids will be considered.

5. BIDS

a) All Bids must be submitted on forms supplied by the Village of Greenport and shall be subject to all requirements of the Contract Documents. All Bids must be regular in every respect and no interlineations, excisions or special conditions shall be made in the Bid Form by the Bidder.

b) Bid documents including the Bid Form, the Non-Collusion Affidavit and the Certificate of Bidder's Qualifications shall be enclosed in envelopes (outer & inner), both of which shall be sealed and clearly labeled wth the name of the contract on which the bidder is bidding as follows:

BIORETENTION BASIN AND RELATED IMPROVEMENTS AT MANOR PLACE CONTRACT, 2017_____ _

Village Clerk
236 Third Street
Greenport, New York 11944

The name of the Bidder shall also appear as well as the date and time of Bid opening, in order to guard against premature opening of the Bid.

c) The Village may consider as irregular any Bid on which there is an alteration of or departure from the Bid Form attached hereto and, at its option, may reject same.

d) If the Contract is awarded, it will be awarded by the Village of Greenport to a responsible Bidder on the basis of the lowest Bid received. The Contract will require the completion of the work according to the Contract Documents.

6. CONTRACTOR'S EQUIPMENT AND EXPERIENCE STATEMENT

Bidders shall submit with his Bid a fully completed "Contractor's Equipment and Experience Statement" if requested by the Village after the bid opening. The required information is to indicate the Bidder's experience record in providing municipalities or other public entities servivices related to those under the Contract. It is understood that the Bidder shall furnish the Village all such information and data for this purpose as the Village may request. The Village reserves the right to reject any Bid if an investigation of available information does not satisfy the Village that the Bidder is qualified to properly carry out the terms of the Contract. All questions in the Contractor's Equipment and Experience Statement shall be completed by the Bidder.

7. DISCLOSURE CERTIFICATE

The Disclosure Certificate..

8. CONFLICT OF INTEREST CERTIFICATE

Bidders must certify on the appropriate form that no Village officer or employee has an interest in this Contract.

9. CERTIFICATION OF NO INDICTMENT, CONVICTION, SUSPENSION, DEBARMENT, OR TERMINATION

By bidding on a Contract, each Bidder and each person signing on behalf of the Bidder certifies, and in the case of a joint Bid each party thereto certifies as to its own organization, that the Bidder and each parent and/or affiliate of the Bidder has not;(a) been indicted or convicted in any jurisdiction; (b) been suspended, debarred, found not responsible or otherwise disqualified from entering into contracts with any governmental agency or been denied a government contract or agreement for failure to meet prequalification standards; (c) had a contract or agreement terminated by any governmental agency for breach of contract or for any cause related directly or indirectly to an indictment or convictions; (d) changed its name and/or Employer Identification Number (taxpayer identification number) following his having been indicted, convicted, suspended, debarred or otherwise disqualified, or had a contract or agreement terminated as more fully provided in (a), (b), and (c) above; (e) ever used a name, trade name or abbreviated name, or an Employer Identification Number different from those inserted in this Proposal; (f) been denied a contract or agreement by any

governmental agency for failure to provide the required security, including bid, payment or performance bonds, or any alternative security deemed acceptable by the agency letting the contract or agreement; (g) failed to file any required tax returns or failed to pay any applicable federal, state, or local taxes; (h) had a lien imposed upon its property based on taxes owed and fines and penalties assessed by any agency of the federal, state or local government; (i) been, and is not currently, the subject of a criminal investigation by any federal, state or local prosecuting or investigative agency and/or a civil-antitrust investigation by any federal, state or local prosecuting or investigative agency; (j) had any sanctions imposed as a result of a judicial or administrative proceeding with respect to any professional license held or with respect to any violation of a federal, state or local environmental law, rule or regulation; and (k) shared space, staff, or equipment with any business entity.

10. BIDDER ELIGIBILITY FOR AWARD OF CONTRACTS

Bidder must be an authorized representative of a major shingle manuracturer. Bidders are advised that the Village of Greenport, in awarding its contracts, will honor any determination by an agency of the State of New York that a Bidder is not eligible to bid on or be awarded public contracts because the Bidder has been determined to have engaged in illegal or dishonest conduct. This policy permits a Bidder whose ineligibility has been so determined by an agency of the State of New York to submit a bid on this contract and then to establish that it is eligible to be awarded the contract on which it has bid because (i) the state agency determination relied upon does not apply to the Bidder , or (ii) the state agency determination relied upon was made without affording the Bidder the notice and hearing to which the Bidder was entitled by the requirements of due process of law, or (iii) the state agency determination was clearly erroneous or (iv) the state agency determination relied upon was not based on a finding of conduct demonstrating a lack of integrity.

11. SALES OR COMPENSATING USE TAXES

Sales to the Village as a governmental instrumentality of the State of New York are exempt from taxation, either state or municipal, and also from federal taxation, including excise taxes.

12. NON-COLLUSION AFFIDAVIT

Each Bidder submitting a Bid to the Village of Greenport for the work contemplated by these documents must execute the Non-Collusion Affidavit in the appropriate attached form certifying that the Bidder has not entered into a collusive agreement with any other person, firm or corporation in regard to any Bid submitted.

13. CORRECTIONS

Erasures or other changes in the Bids must be explained or noted over the signature of the Bidder.

14. TIME FOR RECEIVING BIDS

Every effort will be made to properly receive any unopened Bid received prior to the Bid receipt date and time. However, the Village assumes no liability for Bids lost or misplaced that could result in a Bid not being opened at the appropriate time by the Village. The Village officer whose duty it is to open Bids will decide when the specified time has arrived, and no bid received thereafter will be considered.

15. OPENING OF BIDS

At the time and place fixed for the opening of Bids, the Village will cause every Bid received within the time set for receiving Bids to be opened and publicly read aloud, irrespective of any irregularities therein.

16. AWARD OF CONTRACT AND/OR REJECTION OF BID

The Contract, if awarded, will be awarded within sixty (60) days of the date of receiving Bids to the Bidder that submits the lowest responsible Bid complying with all conditions of the bid documents. The Village of Greenport reserves the right to reject any and all Bids submitted if it is determined to be in the best interests of the Village of Greenport to do so.

17. EXECUTION OF CONTRACT.

The successful Bidder shall execute and deliver to the Village three copies of the Contract Documents that have been executed by the Bidder within five days of the receipt by the Bidder of the Notice of Award sent from the Village.

18. EQUAL EMPLOYMENT OPPORTUNITY

The Village of Greenport is an equal opportunity employer and does not discriminate on the basis of race, color, creed, ancestry, disability or handicap, marital/financial status, military status, religion, sex, sexual orientation, age or national origin with respect to employment or any employment related matter and the Village of Greenport requires that all contractors participating in contracts for public work in the Village of Greenport and all subcontractors of those contractors comply with those same requirements. The Village of Greenport encourages bids for public contracts and public contracts with the Village of Greenport and subcontracts of those contracts by minority and women owned contractors and entities and the Village of Greenport will solicit bids and contracts from such entities with respect to the public work noticed herein.

19. PERMITS

The Bidder shall secure and pay all fees in connection with any and all permits and licenses required for the work and shall have such permits and licenses in effect on or before the date the bids are received by the Village.

20. LETTER OF TRANSMITTAL

The required Letter of Transmittal shall contain the name, address and telephone number of the Bidder and shall contain wording to the effect that attached is a completed Bid proposal for Bio Retention Basin and Related Improvements at Manor Place, Contract 2017 including those items required to be completed in the Bid Specifications and all related Addenda.

21. SPECIFICATIONS OF VEHICLES – NOT USED

22. BASIC INFORMATION

The basic information is presented in the attached specifications.

23. PREVAILING WAGE REQUIREMENTS

This Contract is a public works contract and subject to Articles 8 and 9 of the New York State Labor Law and the Contractor is required to pay prevailing wages and to provide a certification of payment of prevailing wage with a certified payroll upon any request for payment by the Contractor or upon any request for same by the Village.

23. ITEMS REQUIRED AT THE BID OPENING

Letter of Transmittal.
Proposal Form.
Disclosure Certificate.
Conflict of Interest Certificate.
Certificate of Criminal Non-Involvement.
Non-Collusion Affidavit.
Certificates of Insurance

END OF THIS SECTION
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BID FORM

Bid of _____ hereinafter called "Bidder", a _____ doing business as _____, to the Village of Greenport Bioretention Basin and Related Improvements at Manor Place Contract 2017, 236 Third Street, Greenport, New York 11944, hereinafter. called "Village".

Ladies and Gentlemen:

The Bidder, in compliance with your invitation to Bids with respect to a Contract for VILLAGE OF GREENPORT BIORETENTION BASIN AND RELATED IMPROVEMENTS AT MANOR PLACE CONTRACT 2017 having examined the Bidding Documents, and, the following Addenda (receipt of which is hereby acknowledged):

Date , 2017

and the site of the proposed work and being familiar with the conditions underlying the construction of the proposed work including but not limited to the availability of materials and labor, hereby proposes to furnish all labor materials and supplies, and to undertake the work in accordance with the Bidding Documents. These prices are to cover all expenses incurred in performing the Work required under be Bidding Documents, of which this Proposal becomes a part thereof.

VILLAGE OF GREENPORT
BIORETENTION BASINSAND RELATED IMPROVEMENTS
AT MANOR PLACE 2016

BID FORM AND SCHEDULE OF BID PRICES

Total Project Bid Price:

Price in Dollars: _____

Price in Words: _____

Notes

1. The work to be performed under this Contract shall be guaranteed all labor and materials for a period of one (1) year from the date of final acceptance by the Village. All equipment furnished and installed under this Contract is hereby guaranteed in the same manner. The Successful Bidder must be prepared to commence work immediately and not later than five (5) days after delivery by the Village of written notice to proceed and the Bidder shall submit a list of all materials and equipment, which he proposes to install, within five (5) days of the Notice of Award, including a copy of the manufacturer's specifications for each item. All items shall be subject to acceptance by the Village.

2. This Bid may be withdrawn at any time prior to the scheduled time for the opening of Bids or any authorized postponement thereof, provided that the Bidder submits a written request to withdraw that is actually received by the Village prior to the scheduled time for opening the Bids.

3. The undersigned hereby declares that the only persons interested in this proposal or the Contract are either the Bidder or the principals of the Bidder as stated; that this proposal is in all respects made without collusion or fraud; that the undersigned will, within five (5) days after the delivery of Notice of Award of the Bid, execute and deliver to the Village, an executed version of the Contract shown in these contract documents together with all required security and evidence of insurance.

NAME OF BIDDER _____

ADDRESS OF BIDDER _____

FAX NUMBER _____

SIGNED BY _____

TITLE _____

DATE _____

NOTE: Whenever a price written in figures differs from the unit price for the same item as stated in words, the prices written in words will be considered to be the Contract.

Item No	Description	Quantity	Unit	Unit Cost	Total Cost	Total Cost (in words)
1-1	(Manor Place) Complete installation and demolition of all systems described in these Contract Documents include but not limited to furnishing, testing, installing all components of pervious pavers, landscaping, porous pavement, outlet structure, capping two existing catch basins, and educational sign as required to constitute a fully furnished system.	1	LS	$_____	$_____	
1-2	Complete installation of bench and guide rail system described in Contract Documents include but not limited to furnishing, testing and installing components.	1	LS	$_____	$_____	

END OF SECTION
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BIDDER CERTIFICATIONS

Bidder Note: All Certificates in this Section must be completed by the Bidder and included with the Bid.

CERTIFICATE OF BIDDER QUALIFICATIONS

STATE OF.....)

COUNTY OF.....)

_____, being duly sworn, deposes and says that:

(1) He is (owner, partner, officer, representative, or agent) _____ of _____, the Bidder that has submitted the attached Bid; and

(2) That the Bidder owns, leases or controls the necessary equipment required to perform the work described in the Plans, Specifications and Contract to be executed by the Bidder and the Village of Greenport, New York; and

(3) That the Bidder is financially capable of accomplishing the work to be performed as described in the Plans, Specifications and Contract to be executed between the Bidder and the Village of Greenport, New York; and

(4) That the Bidder is fully qualified to perform all phases of the work as described in the Plans, Specifications and Contract to be executed between the Bidder and the Village of Greenport, New York.

IN WITNESS WHEREOF, the undersigned has caused this Certificate to be executed this _____ day of _____, 20_____.

_____
President
(or authorized agent of corporation)

Sworn and subscribed
to before me this _____ day of _____, 2017_____.

_____
Secretary

DISCLOSURE CERTIFICATE

STATE OF.....)

COUNTY OF.....)

_____, being duly sworn, deposes and says that:

(1) He is (owner, partner, officer, representative, or agent) _____ of _____, the Bidder that has submitted the attached Bid; and

(2) That the following is a complete listing of all Bidder's stockholders or partners who own ten percent (10%) or more of its stock of any class, or a listing of all partners in the partnership who own a ten percent (10%) or greater interest in the partnership, as the case may be.

NAME	ADDRESS	PERCENT OWNERSHIP

NOTE: Continue on separate sheet until all stockholders/partners exceeding the 10% ownership criteria are listed.

IN WITNESS WHEREOF, the undersigned has caused this Certificate to be executed this _____ day of _____, 20_____.

_____
President
(or authorized agent of corporation)

Sworn and subscribed
to before me this _____ day of _____, 20_____.

_____
Secretary

CONFLICT OF INTEREST CERTIFICATE

STATE OF.....)

COUNTY OF.....)

_____, being duly sworn, deposes and says that:

(1) He is (owner, partner, officer, representative, or agent) _____ of _____, the Bidder that has submitted the attached Bid; and

(2) That no officer or employee of the Village of Greenport, New York has prior knowledge of the amount of Bidder's Bid; and

(3) That no officer or employee of the Village of Greenport, New York has any ownership or other interest in the Bidder's business or operations; and

(4) That no officer or employee of the Village of Greenport, New York will participate in any profits, receive any compensation, commission, gift or other reward for his services as a result of the Bidder obtaining this Contract.

IN WITNESS WHEREOF, the undersigned has caused this Certificate to be executed this _____ day of _____, 20_____.

_____
President
(or authorized agent of corporation)

Sworn and subscribed
to before me this _____ day of _____, 20_____.

_____
Secretary

BIDDER'S CERTIFICATE OF CRIMINAL NON-INVOLVEMENT

STATE OF.....)

COUNTY OF.....)

_____, being duly sworn, deposes and says that:

(1) He is (owner, partner, officer, representative, or agent) _____ of _____, the Bidder that has submitted the attached Bid; and

(2) That no person(s) involved directly, indirectly or beneficially in the Bidder's business (regardless of type of business), proprietorship, partnership, corporation, association or any other form of business entity, have ever been convicted of any felony.

IN WITNESS WHEREOF, the undersigned has caused this Certificate to be executed this _____ day of _____, 20_____.

_____
President
(or authorized agent of corporation)

Sworn and subscribed
to before me this _____ day of _____, 20_____.

_____
Secretary

NOTE: If the above cannot be certified to, attach to this Certification a separate page stating the details in full. Give names of persons convicted for each offense, their respective position and title, nature of the offense, date thereof, court in which matter was entered and sentence imposed, if any.

NON-COLLUSION AFFIDAVIT OF BIDDER

STATE OF.....)

COUNTY OF.....)

_____, being duly sworn, deposes and says that:

He is (owner, partner, officer, representative, or agent) _____ of _____, the Bidder that has submitted the attached Bid; and

That he is fully informed respecting the preparation and contents of the attached Bid, and of all pertinent circumstances respecting such Bid; and

That such Bid is genuine and is not a collusive or sham Bid; and

That neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted; or agreed to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement, or collusion, or communication, or conference with any other Bidder to fix the prices in the attached Bid or of any other Bidder, or to fix any overhead, profit or cost element of the Bid price or that of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the Village of Greenport, Suffolk County, New York or any other person or firm interested in the proposed Contract; and

That the prices quoted in the attached Bid are fair and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder, or any of its officers, agents, representatives, owners, employees, or parties in interest, including this affiant.

IN WITNESS WHEREOF, the undersigned has caused this Certificate to be executed this _____ day of _____, 20_____.

_____
President
(or authorized agent of corporation)

Sworn and subscribed
to before me this _____ day of _____, 20_____.

_____
Secretary

END OF THIS SECTION
BC – 5

BIDDER'S QUALIFICATIONS

BIDDER WILL BE REQUIRED TO PROVIDE COMPLETED BIDDER QUALIFICATION SECTION ON REQUEST BY VILLAGE AFTER BID OPENING ONLY.

ADDITIONAL BIDDER REQUIREMENTS:

END OF THIS SECTION
BQ – 1

GENERAL CONDITIONS

1. PROJECT AREA

Bioretention Basin and Related Improvements at Manor Place,
Village of Greenport, New York,

2. TERM OF CONTRACT AND PRICE ADJUSTMENTS

Bids must be submitted for a contract term that will commence on the execution of the Contract by the Village and end on the termination of the Contract as defined therein.

3. COMMENCEMENT DATE

The work contemplated by these documents must commence on the later of _____, or on the delivery of a signed copy of the Contract to the Contractor by the Village Any delay in the commencement of the work must be approved in writing by the Village.

4. FEDERAL, STATE AND VILLAGE REGULATIONS

All operations conducted by the Bidder in performance of the work under the Contract must meet all Federal, State, County and Village of Greenport Safety, Environmental, Emission and Road Restriction requirements in effect on the date of commencement and throughout the life of the Contract. The Bidder covenants and agrees at all times during the effective term of the Contract to observe all applicable Federal, State, County and Village laws, ordinances and regulations.

5. SUBCONTRACTING

The Bidder cannot subcontract, transfer or in any way give to others any portion(s) of the work considered under the Contract, except with the prior written approval of the Village.

6. SAVE HARMLESS

The Bidder agrees to indemnify, save harmless and exempt the Village, its officers, agents, servants and employees from and against any and all suits, actions, legal proceedings, claims, demands, damages, costs, expenses and attorney's fees incidental to any work done in the performance of the Contract arising out of a willful or negligent act or omission of the Bidder, its officers, agents, servants and employees; provided, however, that the Bidder shall not be liable for any suits, actions, legal proceedings, claims, demands, damages, costs, expenses and/or attorney's fees arising out of a willful or negligent act or omission of the Village, its officers, agents, servants and employees, or third parties.

7.. INSURANCE

Bidder shall purchase and maintain at all times during the term of the Contract such insurance as will protect Bidder and the Village of Greenoprt from claims which may arise out of or result from the Bidder's operation under the Contract, whether such operations be by the Bidder or by any subcontractor, or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable. The Village of Greenport will be named as an additional insured on all insurance policies.

Minimum acceptable insurance coverages for the Contract are:

INSURANCE DESCRIPTION	LIMITS OF LIABILITY
Workers' Compensation	Statutory
Commercial General Liability, including Property Damage Liability and Commercial Automobile Liability	$1,000,000 per accident single limit $2,000,000 total annual

Insurance Certificates shall contain the following obligation:

"This is to certify that the policies of insurance described herein have been issued to the insured for whom this certificate is issued, and the stated coverages are in force at this time. In the event of cancellation or material change in a policy that affect the certificate holder, thirty (30) days prior written notice will be given the certificate holder."

Proof of Insurance (Insurance Certificate) must accompany bid.

8. INDEMNIFICATION

The Contractor shall save, keep harmless and defend the Village against any and all liability for claims or costs of whatsoever kind and nature for injury to or death of any person or persons and for loss or damage to any property, whether owned by the Village or otherwise, occurring in connection with or in any way incident to or arising out of the, services, operations, or performance of work in connection with this Contract, resulting in whole or in part from the negligent or intentional acts or omissions of Contractor, its officers, employees, agents, subcontractors or representatives of Contractor

9. NO DISCRIMINATION

Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex, national origin, age, disability or marital status. Furthermore, if this is a Contract for the construction, alteration or repair of any public building or public work or for the manufacture, sale or distribution of materials, equipment or supplies, and to the extent that this Contract shall be performed within the State of New York, Contractor agrees that neither it nor its subcontractors shall, by reason of race, age, creed, color, disability, sex or national origin (a) discriminate in hiring against any New York State citizen who is qualified and available to perform the work; or (b) intimidate any employee hired for the performance or work under this Contract.

10. NEW YORK STATE LABOR LAW COMPLIANCE

This project is a public works contract covered by Article 8 of the Labor Law or a building service contract covered by Article 9 thereof, and neither Contractor’s employees nor the employees of its subcontractors may be required or permitted to work more than the number of hours or days stated in said statutes, except as otherwise provided in the Labor Law and as set forth in prevailing wage and supplement schedules issued by the State Labor Department. Furthermore, Contractor and its subcontractors must pay at least the prevailing wage rate and pay or provide the prevailing supplements, including the premium rates for overtime pay, as

determined by the State Labor Department in accordance with the Labor Law. This project has been registered with the New York State Department of Labor as a public works project and a schedule of prevailing wages for Suffolk County is available from the New York State Department of Labor and will be provided to the Contractor with the Contract herein.

11. NEW YORK STATE ENVIRONMENTAL FACILITIES FUNDING REQUIREMENTS

This project is partial funded through the New York State Environmental Facilities Corporation, and must meet various New York State and federal requirements. These requirements include compliance with New York State's minority and women's business enterprise (MWBE) laws and regulations. Failure to meet all the requirements of MWBE regulations, as they apply to this project, in a timely manner may result in freezing of disbursements of SRF funds. This may affect the Contractor's payments. Refer to the attached "NY State Revolving Fund MWBE/EEO/DBRA Bid Packet for Construction Contracts". Note: This project is not subject to Davis Bacon Related Acts (DBRA) requirements. Additional details can be found at www.nysefc.org or by calling (518) 402-7396 or (800) 882-9721.

At the Time of Bid:

The completed forms listed below shall be part of the official bid submission by each competing contractor:

- **EPA Form 6100-3** "DBE Subcontractor Performance Form" – Each potential bidder shall complete this form and submit it to the MBO for each MWBE firm contacted during the bid or proposal preparation process, and make reasonable efforts to obtain signatures from the MBEs and WBEs contacted.

- **EPA Form 6100-4** "DBE Subcontractor Utilization Form" – This form shall be completed by each potential bidder and submitted to the MBO as part of the bid submission. On this form, each bidder offers their estimated plan for MBE and WBE utilization for their contract.

NOTE: The EEO Policy Statement should be completed and submitted at this time. See EEO section

Prior to Award of the Contract:

- EPA Form 6100-2 **"DBE Subcontractor Participation Form" -** Distribute the form to MWBE Subcontractors who are listed on the 6100-4 form. Submit documented proof (e.g. email, letter, certified mail receipt) to the MBO that the 6100-2 form was sent to the MWBE Subcontractors. (See Required Forms) NOTE: The EPA forms are not required for projects valued at $250,000 or less in a year.

After Award of the Contract:

Each prime contractor is obligated to seek MWBE participation and document their good faith efforts to meet MWBE goals.

12. CERTIFICATES

The Bidder must complete all Certificates throughout the Bid Documents as a part of the Bid.

13. RIGHT OF VILLAGE TO TERMINATE CONTRACT

The Village may terminate the Contract if the work to be done is abandoned by the Bidder; or if the Contract is assigned without the Prior written consent of the Village; or if the Bidder is adjudged bankrupt; or if a general assignment of the Bidder's assets is made for the benefit of creditors; or if a receiver is appointed for the Bidder or any of his property; or if at any time the Village determines that the work performance under the Contract is being unnecessarily delayed, or the Bidder is violating any of the material conditions of the Contract, or that the Bidder is executing the same in bad faith or otherwise not in accordance with the terms of said Contract; then, in the event any of the foregoing occurs, the Village may serve written notice upon the Bidder and his Surety of the Village's intention to terminate the Contract. Unless within thirty (30) days after the serving of such notice a satisfactory arrangement is made for continuance, the Bidder shall be deemed in default and the Contract shall be automatically terminated, the Village may take over and prosecute the work to completion, by contract or otherwise. The Bidder and his Surety shall be liable to the Village for all damages, as well as excess costs sustained by the Village by reasons of such prosecution and completion by the Village, inclusive of any optional extensions of the contract. In the event the Bidder shall be adjudged bankrupt and a receiver appointed or a general assignment for the benefit of creditors is made, or the Bidder is proven insolvent or fails in business, the Contract shall not be an asset of the Bidder. In the event of termination, irrespective of the reason, the Village retains the right but not the obligation to purchase the Bidder's equipment at fair market value.

14. PAYMENTS

Bidder shall be paid by the Village within thirty (30) days after completion and proper submittal of required invoices consistent with the terms and conditions of the Contract. Bidder must submit certified payrolls confirming compliance with the New York State Labor Law prevailing wage requirements.

15. WARRANTIES

All manufacturer warranties must be in place and must be provided by the Bidder on the completion of the Contract Work.

Bidder must provide a ten year labor warranty in writing upon completion of the Contract Work.

END OF THIS SECTION

CONTRACT

THIS CONTRACT, made this day of Two Thousand and Seventeen by and between the Village of Greenport, (the "Village") and _____ (the "Contractor") as follows:

WITNESSETH:

That for and in consideration of the promises and agreements herein, and the payments herein promised to be made, the parties hereto agree as follows:

FIRST: The Contractor shall perform and provide in a workmanlike manner all of the labor, and furnish and provide all of the materials, equipment, tools, and implements and will otherwise faithfully perform and complete the entire Contract Work as provided hereunder in connection with the

VILLAGE OF GREENPORT
BIORETENTION BASIN AND RELATED IMPROVEMENTS
AT MANOR PLACE CONTRACT 2017

as described in the Contract Documents made and prepared by the Village of Greenport, as set forth in the Contractor's Bid dated_____and in strict conformity with the Bidding Documents and Contract Documents and more specifically the Notice to Bidders, the Instructions for Bidders, the Bid, and this Contract, General Terms and Conditions, and Techinical Specifications, annexed and made a part hereof, which hereinafter will be collectively referred to as the "Contract Documents". Contract Duration will be 180 calendar days from Notice to Proceed and Completion shall be not later than December 31, 2017.

SECOND: In consideration of the Contractor performing this Contract in the manner herein stated and as provided in the Contract Documents, the Village of Greenport agrees to pay to the Contractor the sums of money mentioned in said Contract Documents in the manner and under the conditions therein provided.

THIRD: The Contractor agrees that the provisions of the Contract or Contract Documents to the contrary notwithstanding, and regardless of any contingency or condition, unforeseen or otherwise, in the present or in the future, the Contractor shall not be entitled to receive any money or other consideration from the Village or any other party to this Agreement or involved in this project other than the amounts stated in the Contract Documents. The failure of the Village of Greenport to insist upon the strict performance of any of the terms, covenants, agreements, or conditions of the Contract Documents, or of any one or more of those terms or conditions or the temporary or other failure of the Village to object to the Contractor's failure to perform its obligations under this Contract and the Contract Documents, shall not be deemed to be and will not be a waiver by the Village of Greenport of any of the terms, covenants, agreements, provisions and conditions of this Contract, or the Contract Documents and the Contract and Contract Documents shall be and

shall remain in full force and effect with full power and authority on the part of the Village of Greenport to enforce the provisions of the Contract and Contract Documents or cause those provisions to be enforced at any time, without prejudice to any other rights which the Village of Greenport may have against the Contractor under this Contract and the Contract Documents.

FOURTH: The Terms that are stated or used in the Contract Documents and this Contract which are defined in the General Conditions of the Contract Documents shall have the meanings that are indicated in the General Conditions of the Contract Documents.

FIFTH: Neither the Village of Greenport nor the Contractor shall, without the prior written consent of the other, assign or sublet in whole or in part its interests under the Contract or any of the Contract Documents; and, specifically, the Contractor shall not assign any monies due or to become due without the prior written approval and consent of the Village of Greenport

SIXTH: The Village of Greenport and the Contractor each binds itself, its partners, successors, assigns and legal representatives of the other party hereto in respect to all covenants, agreements and obligations contained in the Contract and the Contract Documents (the term Contract Documents by definition and agreement of the parties includes but is not limited to this Contract).

SEVENTH: The Contract together with the Contract Documents constitute the entire agreement between the Village of Greenport and the Contractor and the Contract and the Contract Documents and any part thereof may only be altered, amended or repealed by a duly executed written instrument signed by both parties.

EIGHTH: All manufacturer warranties must be in place and in favor of the Village as owner and must be provided by the Bidder to on the completion of the Contract Work. Bidder must provide a ten year labor warranty in writing upon completion of the Contract Work.

IN WITNESS WHEREOF, the parties hereto have executed this Contract the day and year first above written.

Village of Greenport

By:_____

(VILLAGE SEAL)

Contractor:

By:_____

(SEAL) Name/Title

State of New York)
) ss.:
County of Suffolk)

On the day of in the year
before me, the undersigned, personally appeared

personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies) and that by his/her/their signature(s) on the instrument the individual(s) or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
(signature and office of individual taking acknowledgement)

State of New York)
) ss.:
County of Suffolk)

On the day of in the year
before me, the undersigned, personally appeared

personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies) and that by his/her/their signature(s) on the instrument the individual(s) or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
(signature and office of individual taking acknowledgement)

END OF THIS SECTION

NO TEXT ON THIS PAGE

NEW YORK STATE OF OPPORTUNITY. Environmental Facilities Corporation

ANDREW M. CUOMO
Governor

SABRINA M. TY
President and CEO

Program Requirements and Bid Packet for Construction Contracts

(For Non-Treatment Works projects
funded with NYS Clean Water State Revolving Fund)

Effective October 1, 2016

New York State Environmental Facilities Corporation
625 Broadway, Albany, NY 12207-2997
P: (518) 402-6924 F: (518) 402-7456
www.efc.ny.gov

Table of Contents

ATTACHMENTS (REQUIRED FORMS)

Attachment 1 - EEO Policy Statement
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Attachment 6 - EPA Form 6100-2 - DBE Subcontractor Participation Form
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Attachment 9 - Lobbying Certification

PART 1:

HOW TO USE THIS DOCUMENT

The New York State Environmental Facilities Corporation ("EFC") implements the New York State Revolving Fund ("SRF") for Clean Water projects.

This Program Requirements and Bid Packet for Construction Contracts document contains (1) a brief description of New York State and federal program requirements for Contracts and Subcontracts for Non-Treatment Works projects funded in whole or part by the New York State Clean Water SRF, (2) required language for such Contracts and Subcontracts to satisfy the SRF program requirements, including required forms, and (3) guidance materials to assist entities in complying with these requirements.

PROGRAM REQUIREMENTS

The following requirements apply to Non-Treatment Works projects funded with the NYS Clean Water State Revolving Fund:

- Participation of Minority- and Women-Owned Business Enterprises ("MWBE") and Equal Employment Opportunities ("EEO") pursuant to New York State Executive Law, Article 15-A and New York Code of Rules and Regulations, Title 5 (5 NYCRR) Parts 140-145 (Regulations of the Commissioner of Economic Development);

- Participation by Disadvantaged Business Enterprises ("DBE") in United States Environmental Protection Agency ("EPA") Programs pursuant to 40 Code of Federal Regulations (CFR) Part 33;

- Equal Employment Opportunities pursuant to Titles VI and VII of the Civil Rights Act of 1964, 40 CFR Part 7, and 41 CFR Part 60-1 Subpart A;

- Affirmative Action requirements pursuant to 41 CFR Part 60-4;

- Applicable State and/or local prevailing wage requirements;

- Requirements regarding suspension and debarment pursuant to 2 CFR Part 180, 2 CFR Part 1532, 29 CFR § 5.12, State Labor Law § 220-b, and State Executive Law § 316; and,

- Restrictions on Lobbying pursuant to 40 CFR Part 34.

EFC or its authorized representatives, and other governmental entities as applicable, reserve the right to conduct occasional site inspections to monitor compliance with SRF program requirements.

This document is not intended to be inclusive of all applicable legal requirements and there may be other legal requirements that need to be included in a particular Contract or Subcontract that are not set forth here. Accordingly, EFC recommends that Recipients, Contractors, Subcontractors, and any other involved entities consult their legal counsel for advice on compliance will all applicable laws, including but not limited to local laws. This document is not intended to be legal advice.

Refer to the EFC website at www.efc.ny.gov/MWBE for the latest version of the bid packet to ensure that the most recent forms and contract language are being used.

REQUIRED CONTRACT LANGUAGE

Part 2 of this document is the Required Contract Language. All of the language in Part 2 must be inserted in to all Contracts and Subcontracts funded in whole or in part with SRF funds, in order for SRF Recipients, Contractors, and Subcontractors to comply with the above-listed SRF program requirements.

GUIDANCE MATERIALS

Part 3 of this document sets forth Guidance Materials intended to assist SRF Recipients, Contractors, and Subcontractors in complying with the foregoing SRF program requirements, as applicable.

The Guidance Materials are for informational purposes only and are not intended to be used as contractual language. Please do not incorporate the Guidance Materials into any Contracts or Subcontracts.

COMMONLY USED TERMS

The following commonly used terms are defined herein as follows:

"Contract" means an agreement between a Recipient and a Contractor.

"Contractor" means all bidders, prime contractors, Service Providers, and consultants as hereinafter defined, unless specifically referred to otherwise.

"Service Provider" means any individual or business enterprise that provides one or more of the following: legal, engineering, financial advisory, technical, or other professional services, supplies, commodities, equipment, materials, or travel.

"Subcontract" means an agreement between a Contractor and a Subcontractor.

"Subcontractor" means any individual or business enterprise that has an agreement, purchase order, or any other contractual arrangement with a Contractor.

"Recipient" means the party, other than EFC, to a grant agreement or a project finance agreement with EFC through which funds for the payment of amounts due thereunder are being paid in whole or in part.

"State" means the State of New York.

"Treatment Works" is defined in Clean Water Act (CWA) Section 212.

"Nonpoint Source Projects" and **"Green Infrastructure Projects"** are defined in CWA Section 319.

"Estuary Management Program Project" is defined in CWA Section 320.

PART 2:

REQUIRED CONTRACT LANGUAGE

SECTION 1 REQUIREMENTS AND PROCEDURES FOR BUSINESS PARTICIPATION OPPORTUNITIES FOR FEDERAL DISADVANTAGED BUSINESS ENTERPRISES AND NEW YORK STATE CERTIFIED MINORITY- AND WOMEN-OWNED BUSINESS ENTERPRISES AND EQUAL EMPLOYMENT OPPORTUNITIES FOR MINORITY GROUP MEMBERS AND WOMEN

The Equal Employment Opportunities requirements of this section apply to Contracts and Subcontracts greater than $10,000.

The Minority- and Women- Owned Business Enterprises ("MWBE") and Disadvantaged Business Enterprises ("DBE") requirements of this section apply to Contractors and Subcontractors working pursuant to: (1) construction Contracts greater than $100,000; (2) Contracts that are initially under this threshold but subsequent change orders or contract amendments increase the Contract value to above $100,000; and, (3) change orders greater than $25,000.

Disregard this section if it does not apply to this Contract or Subcontract.

I. General Provisions

A. Contractors and Subcontractors are required to comply with the following provisions:

1. New York State Executive Law Article 15-A and 5 NYCRR Parts 140-145 ("MWBE Regulations") for all State contracts as defined therein, with a value (1) in excess of $25,000 for labor, services (including, but not limited to, legal, legal, financial, and other professional services), supplies, equipment, materials, or any combination of the foregoing, or (2) in excess of $100,000 for the acquisition, construction, demolition, replacement, major repair or renovation or real property and improvements thereon.
2. 40 CFR Part 33 ("Federal DBE Regulations") for contracts under EPA financial assistance agreements, as those terms are defined therein.
3. Title VI of the Civil Rights Act of 1964 and 40 CFR Part 7 ("Title VI") for any program or activity receiving federal financial assistance, as those terms are defined therein.
4. Title VII of the Civil Rights Act of 1964 and 41 CFR Part 60-1 Subpart A ("Title VII") for construction contracts related to any government programs providing federal financial assistance, as those terms are defined therein.
5. 41 CFR Part 60-4 ("Federal Affirmative Action Regulations") for federal or federally assisted construction contracts in excess of $10,000, as those terms are defined therein.

B. The Contractor and Subcontractor shall not discriminate on the basis of race, color, national origin or sex in the performance of this Contract. The Contractor and Subcontractor shall carry out applicable requirements of 40 CFR Part 33 in the award and administration of contracts awarded under EPA financial assistance agreements. Failure by the Contractor and Subcontractor to carry out these requirements is a material breach of this Contract which may result in the termination of this Contract or other legally available remedies.

C. Contractors and Subcontractors shall have instituted grievance procedures to assure the prompt and fair resolution of complaints when a violation of Title VI of the Civil Rights Act of 1964 or Title 40 CFR Part 7 is alleged.

D. Failure to comply with all of the requirements herein may result in a finding by the Recipient that the Contractor is non-responsive, non-responsible, and/or has breached the Contract, leading to the withholding of funds or such other actions, liquidated damages pursuant to subsection III(F) of this section, or enforcement proceedings as allowed by the Contract.

E. If any terms or provisions herein conflict with Executive Law Article 15-A, the MWBE Regulations, Federal DBE Regulations, Title VI, Title VII, or Federal Affirmative Action Regulations, such law and regulations shall supersede these requirements.

F. Upon request from the Recipient's Minority Business Officer ("MBO") and/or EFC, Contractor will provide complete responses to inquiries and all MWBE and EEO records available within a reasonable time. For purposes of this section, MBO means the duly authorized representative of the SRF Recipient for MWBE and EEO purposes.

II. Equal Employment Opportunities (EEO)

A. Each Contractor and Subcontractor performing work on the Contract shall undertake or continue existing EEO programs to ensure that minority group members and women are afforded equal employment opportunities without discrimination because of race, creed, color, national origin, sex, age, disability or marital status. For these purposes, EEO shall apply in the areas of recruitment, employment, job assignment, promotion, upgrading, demotion, transfer, layoff, or termination and rates of pay or other forms of compensation.

B. Contractor represents that it has submitted an EEO policy statement to Recipient prior to the execution of this Contract.

C. Contractor represents that it's EEO policy statement includes the following language:

1. The contractor will not discriminate on the basis of race, creed, color, national origin, sex, age, disability, or marital status against any employee or applicant for employment, will undertake or continue existing programs of affirmative action to ensure that minority group members and women are afforded equal employment opportunities without discrimination and will make and document its conscientious and active efforts to employ and utilize minority group members and women in its work force on Contracts relating to SRF projects.
2. The Contractor shall state in all solicitations or advertisements for employees that, in the performance of the Contract relating to this SRF project, all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color, national origin, sex, age, disability or marital status.
3. The Contractor shall request each employment agency, labor union, or authorized representative of workers with which it has a collective bargaining or other agreement or understanding, to furnish a written statement that such employment agency, labor union, or representative will not discriminate on the basis of race, creed, color, national origin, sex, age, disability or marital status, and that such union or representative will affirmatively cooperate in the implementation of the Contractor's obligations herein.

D. The Contractor will include the provisions of Subdivisions II(A), II(C), and II(E) in every Subcontract in such a manner that the requirements of these subdivisions will be binding upon each Subcontractor as to work in connection with the Contract.

E. The Contractor shall comply with the provisions of the Human Rights Law (Executive Law Article 15), Title VI, Title VII, the Federal Affirmative Action Regulations, and all other State and Federal statutory and constitutional non-discrimination provisions. The Contractor and Subcontractors shall not discriminate against any employee or applicant for employment because of race, creed (religion), color, sex, national origin, sexual orientation, military status, age, disability, predisposing genetic characteristic, marital status or domestic violence victim status, and shall also follow the requirements of the Human Rights Law with regard to non-discrimination on the basis of prior criminal conviction and prior arrest.

F. The Contractor shall display the EEO poster at the project site in a visible location. The EEO poster can be found at https://www.dol.gov/ofccp/regs/compliance/posters/pdf/eeopost.pdf.

G. Required EEO Form

1. EEO Workforce Employment Utilization Report ("Workforce Report")

a. The Contractor shall submit a Workforce Report, and shall require each of its Subcontractors to submit a Workforce Report to the Recipient, in such format as shall be required by EFC on a monthly basis during the term of the Contract.
b. Separate forms shall be completed by Contractor and any Subcontractor.
c. In limited instances, the Contractor may not be able to separate out the workforce utilized in the performance of the Contract from the Contractor's and/or Subcontractor's total workforce. When a separation can be made, the Contractor shall submit the Workforce Report and indicate that the information provided related to the actual workforce utilized on the Contract. When the workforce to be utilized on the Contract cannot be separated out from the Contractor's and/or Subcontractor's total workforce, the Contractor shall submit the Workforce Report and indicate that the information provided is the Contractor's total workforce during the subject time frame, not limited to work specifically under the Contract.

III. Business Participation Opportunities for MWBEs

A. Contract Goals

1. For purposes of this Contract, EFC establishes the following goals for New York State certified MWBE participation ("MWBE Combined Goals") based on the current availability of qualified MBEs and WBEs.

Program	MWBE Combined Goal*
CWSRF, DWSRF, & Green Innovation Grant Program	20%
NYS Water Grants (also receiving EFC loan)	Clean Water project 23% Drinking Water project 26%
NYS Water Grants (grant only)	30%
Engineering Planning Grant	Consolidated Funding Application Round 2012-2014 20% Consolidated Funding Application Round 2015-2017 30%

*May be any combination of MBE and/or WBE participation

2. For purposes of providing meaningful participation by MWBEs on the Contract and achieving the MWBE Contract Goals established in Section III-A hereof, the Contractor should reference the directory of New York State Certified MBWEs found at the following internet address: https://ny.newnycontracts.com.
3. Where MWBE Contract Goals have been established herein, pursuant to 5 NYCRR § 142.8, the Contractor must document "good faith efforts" to provide meaningful participation by MWBEs as Subcontractors or suppliers in the performance of the Contract. In accordance with Section 316-a of Article 15-A and 5 NYCRR § 142.13, the Contractor acknowledges that if it is found to have willfully and intentionally failed to comply with the MWBE participation goals set forth in the Contract, such a finding constitutes a breach of Contract and the Contractor shall be liable to the Recipient for liquidated or other appropriate damages, as set forth herein.

B. MWBE Utilization Plan

1. The Contractor represents and warrants that Contractor has submitted an MWBE Utilization Plan to the Recipient prior to the execution of this Contract.

2. The Contractor agrees to use such MWBE Utilization Plan for the performance of MWBEs on the Contract pursuant to the prescribed MWBE goals set forth in Section III-A of this section.
3. The Contractor further agrees that a failure to submit and/or use such MWBE Utilization Plan shall constitute a material breach of the terms of the Contract. Upon the occurrence of such a material breach, the Recipient shall be entitled to any remedy provided herein, including but not limited to, a finding that the Contractor is not responsive.
4. Contractor must report any changes to the Utilization Plan after Contract award and during the term of the Contract to the Recipient's MBO. Contractor shall indicate the changes to the MBO in the next Monthly MWBE Contractor Compliance Report after the changes occurred. At EFC's discretion, an updated MWBE Utilization Plan form and good faith effort documentation may be required to be submitted. When a Utilization Plan is revised due to execution of a change order, the change order should be submitted to the MBO with the revised Utilization Plan.
5. The Contractor shall submit copies of all fully executed subcontracts, agreements, and purchase orders that are referred to in the MWBE Utilization Plan to the MBO within 30 days of their execution.

C. Requests for Waiver

1. If the Contractor, after making good faith efforts, is unable to comply with MWBE goals, the Contractor may submit a Request for Waiver to the Recipient documenting good faith efforts by the Contractor to meet such goals. If the documentation included with the waiver request is complete, the Recipient shall forward the request to EFC for evaluation, and EFC will issue a written notice of acceptance or denial within twenty (20) days of receipt.
2. If the Recipient, upon review of the MWBE Utilization Plan and updated Quarterly MWBE Contractor Compliance Reports determines that the Contractor is failing or refusing to comply with the MWBE Contract Goals and no waiver has been issued in regards to such non-compliance, the Recipient may issue a notice of deficiency to the Contractor. The Contractor must respond to the notice of deficiency within seven (7) business days of receipt. Such response may include a request for partial or total waiver of MWBE Contract Goals.

D. Monthly MWBE Contractor Compliance Report ("Monthly MWBE Report")

The Contractor agrees to submit a report to the Recipient by the third business day following the end of each month over the term of this Contract documenting the payments made and the progress towards achievement of the MWBE goals of the Contract. The Monthly MWBE Report must be supplemented with proof of payment by the Contractor to its Subcontractors (e.g., copies of both sides of a cancelled check) and proof that Subcontractors have been paid within 30 days of receipt of payment from the Recipient. The final Monthly MWBE Report must reflect all Utilization Plan revisions and change orders.

E. Required Federal DBE Forms

1. EPA Form 6100-3 - DBE Subcontractor Performance Form
   Contractor represents that it has submitted the Form 6100-3 to all of its Subcontractors, all of its Subcontractors have completed the form, and that Contractor submitted such completed forms to Recipient with its bid submission.
2. EPA Form 6100-4 - DBE Subcontractor Utilization Form
   Contractor represents that it has completed the Form 6100-4 and submitted such completed form to Recipient with its bid submission.
3. EPA Form 6100-2 - DBE Subcontractor Participation Form
   Contractor represents that it has distributed a Form 6100-2 to its MWBE Subcontractors for completion prior to execution of this Contract.

F. Liquidated Damages - MWBE Participation

In accordance with Section 316-a of Article 15-A and 5 NYCRR §142.13, if it has been determined by the Recipient or EFC that the Contractor has willfully and intentionally failed to comply with the MWBE participation goals, the Contractor shall be obligated to pay to Recipient liquidated damages or other appropriate damages, as specified herein and as determined by the Recipient or EFC.

Liquidated damages shall be calculated as an amount not to exceed the difference between:

1. All sums identified for payment to MWBEs had the Contractor achieved the approved MWBE participation goals; and,
2. All sums actually paid to MWBEs for work performed or materials supplied under this Contract.

The Recipient and EFC reserve the right to impose a lesser amount of liquidated damages than the amount calculated above based on the circumstances surrounding the Contractor's non-compliance.

In the event a determination has been made by the Recipient or EFC which requires the payment of damages identified herein and such identified sums have not been withheld, Contractor shall pay such damages to the Recipient within sixty (60) days after they are assessed unless prior to the expiration of such sixtieth day, the Contractor has filed a complaint with the Empire State Development Corporation – Division of Minority and Women's Business Development ("ESD") pursuant to Subdivision 8 of Section 313 of the Executive Law in which event the damages shall be payable if the Director of ESD renders a decision in favor of the Recipient.

SECTION 2 REQUIREMENTS REGARDING SUSPENSION AND DEBARMENT

The requirements of this section apply to all Contracts and Subcontracts.

Contractor and any Subcontractors shall comply with, Subpart C of 2 CFR Part 180 as implemented and supplemented by 2 CFR Part 1532. The Contractor is not a debarred or suspended party under 2 CFR Part 180 or 2 CFR Part 1532, or 29 CFR § 5.12. Neither the Contractor nor any of its Subcontractors have contracted with, or will contract with, any debarred or suspended party under the foregoing regulations.

The Contractor and any Subcontractors have not been deemed ineligible to submit a bid on or be awarded a public contract or subcontract pursuant to Article 8 of the State Labor Law, specifically Labor Law § 220-b. In addition, neither the Contractor nor any Subcontractors have contracted with, or will contract with, any party that has been deemed ineligible to submit a bid on or be awarded a public contract or subcontract under Labor Law § 220-b.

In addition, the Contractor and any Subcontractors have not been deemed ineligible to submit a bid and have not contracted with and will not contract with any party that has been deemed ineligible to submit a bid under Executive Law § 316.

SECTION 3 RESTRICTIONS ON LOBBYING

The requirements of this section apply to all Contracts and Subcontracts greater than $100,000. Disregard this section if it does not apply to this Contract or Subcontract.

The Contractor and any Subcontractor executing a Contract or Subcontract in excess of $100,000 agree to provide to the Recipient an executed Certification Regarding Lobbying pursuant to 40 CFR Part 34 ("Lobbying Certification") in the form attached hereto as Attachment 9, consistent with the prescribed form provided in Appendix A to 40 CFR Part 34.

PART 3:

GUIDANCE MATERIALS

APPLICABILITY OF PROGRAM REQUIREMENTS

This chart contains a listing of the SRF program requirements contained within this document, as well as the following details regarding each requirement: (1) its applicability, i.e., what types of contracts/subcontracts, particular monetary thresholds if applicable; (2) a section reference to the Required Contract Language that applies from Part 2; and (3) a section reference to the Guidance that applies from this Part.

Requirement	Applicability	Section of Required Contract Language from Part 2	Section of Appropriate Guidance from Part 3
Minority- and Women- Owned Business Enterprises (MWBE) and Disadvantaged Business Enterprises (DBE)	Contractors and Subcontractors working pursuant to: (1) Construction Contracts greater than $100,000 (2) Contracts that are initially under this threshold but subsequent change orders or Contract amendments increase the Contract value above $100,000 (3) Change orders greater than $25,000	1	1
Equal Employment Opportunities (EEO)	Contracts and Subcontracts greater than $10,000	1	1
Applicable Labor Standards	All Contracts and Subcontracts for public works are subject to State Labor Law requirements. Review local labor requirements to determine applicability of any additional requirements to your Contract or Subcontract.	-	2
Suspension and Debarment	All Contracts and Subcontracts	2	3
Restrictions on Lobbying	All Contracts and Subcontracts greater than $100,000	3	4

SECTION 1 GUIDANCE FOR THE REQUIREMENTS AND PROCEDURES FOR BUSINESS PARTICIPATION OPPORTUNITIES FOR FEDERAL DISADVANTAGED BUSINESS ENTERPRISES AND NEW YORK STATE CERTIFIED MINORITY- AND WOMEN-OWNED BUSINESS ENTERPRISES AND EQUAL EMPLOYMENT OPPORTUNITIES FOR MINORITY GROUP MEMBERS AND WOMEN

I. Summary of EEO, MWBE, and DBE Forms

A. Forms to be Submitted Prior to Contract Execution

1. **EEO Policy Statement**
   To be submitted by the Contractor to the Recipient's Minority Business Officer ("MBO") prior to Contract execution. The "MBO" refers to the duly authorized representative of the SRF Recipient for MWBE and EEO purposes. This form is attached hereto as Attachment 1. See Required Contract Language, Section 1(II).

2. **EPA Form 6100-3 – DBE Subcontractor Performance Form**
   To be submitted by the Contractor to the MBO with its bid submission. This form is attached hereto as Attachment 7. See Required Contract Language, Section 1(III)(E).

3. **EPA Form 6100-4 – DBE Subcontractor Utilization Form**
   To be submitted by the Contractor to the MBO with its bid submission. This form is attached hereto as Attachment 8. See Required Contract Language, Section 1(III)(E).

4. **EPA Form 6100-2 – DBE Subcontractor Participation Form**
   To be submitted by the Subcontractors to the MBO prior to Contract execution. The Contractor must provide the form to the Subcontractors for completion. The Contractor should also submit documentation (e.g., email, letter, certified mail receipt) to the MBO that the 6100-2 form was made available to the MWBE Subcontractors. This form is attached hereto as Attachment 6. See Required Contract Language, Section 1(III)(E).

5. **MWBE Utilization Plan**
   To be submitted by the Contractor to the MBO after the bid opening, but in no case more than ten (10) business days after the Contractor receives notice from the Recipient that the Contractor has submitted a low bid. This form is attached hereto as Attachment 4. See Required Contract Language, Section 1(III)(B).

B. Forms to be Submitted During the Term of the Contract

1. **EEO Workforce Employment Utilization Report ("Workforce Report")**
   To be submitted by the Contractor to the MBO on a monthly basis during the term of the Contract. This form is attached hereto as Attachment 2. See Required Contract Language, Section 1(II)(G).

2. **Request for Partial or Total Waiver**
   If applicable, to be submitted by the Contractor to the MBO at any time during the term of the Contract, but not later than prior to the submission of a request for final payment on the Contract. This form is attached hereto as Attachment 5. See Required Contract Language, Section 1(III)(C).

3. **Monthly MWBE Contractor Compliance Report ("Monthly MWBE Report")**
   To be submitted by the Contractor to the MBO by the third business day following the end of each month over the term of the Contract. This form is attached hereto as Attachment 3. See Required Contract Language, Section 1(III)(D).

II. Equal Employment Opportunities (EEO)

Pursuant to 41 CFR Part 60-4, the United States Department of Labor has established EEO goals for the employment of minorities and women. For federal and federally assisted construction Contractors, goals for minorities and females are established as a percentage participation rate. These goals are applicable to all of a Contractor's construction work sites (whether or not these sites are also the result of a federal Contract or are federally assisted). The goals are applicable to each nonexempt Contractor's total onsite construction workforce, regardless of whether or not part of that workforce is performing work on a federal, federally assisted or non-federally related project Contract or Subcontract. Contractors should apply to each work site the goal for the geographical area that each particular work site is located in. These goals, and further information, are available at:
https://www.dol.gov/ofccp/TAguides/TAC_FedContractors_JRF_QA_508c.pdf.

III. Business Participation Opportunities for MWBEs

A. Contract Goals

The goals provided herein (Required Contract Language, Section 1(III)(A)) are effective as of October 1, 2016. MWBE participation goals for a contract will be based on the goals in place at the time of the execution date of each respective contract, unless otherwise specified. In certain instances, the goals may vary, such as with projects co-funded by EFC and other state/federal agencies. With some co-funded projects, EFC may defer to the MBE and WBE participation goals and program established by those agencies.

Please contact EFC if you have any questions about the applicable MWBE participation goals for your contract.

B. Good Faith Efforts

The Contractor must make good faith efforts to develop an adequate MWBE Utilization Plan and must continue such good faith efforts in order to meet applicable MWBE participation goals. The Contractor shall maintain documentation of good faith efforts to solicit participation of MWBE firms for SRF-funded projects. If a Contractor is unable to meet contract MWBE participation goals, and submits a Request for Waiver, documentation of such good faith efforts must accompany the request. See Required Contract Language, Section 1(III)(C).

Contractor should also continue good faith efforts to seek opportunities for MWBE participation during the life of the contract even if proposed goals have been achieved.

Examples of documentation of good faith efforts are set forth below:

- Information on the scope of work related to the contract, such as a copy of the schedule of values from the bid submission, and specific steps taken to reasonably structure the scope of work to break out tasks or equipment needs for the purpose of providing opportunities for subcontracting with, or obtaining supplies or services from, MBEs or WBEs.

- Printed screenshots of the directory of Certified Minority- and Women- Owned Business Enterprises (“MWBE directory”) on ESD’s website on a Statewide basis, if appropriate, for both MBEs and WBEs that provide the services or equipment necessary for the contract. Contact the MBO for assistance in performing a proper search including identifying a sufficient number of solicitations to show that good faith effort was made.

- Copies of timely solicitations and documentation (e.g., faxes and emails) that the Contractor offered relevant plans, specifications, or other related materials to MBE and WBE firms on ESD’s MWBE directory to participate in the work, with the responses.

- A log prepared by the Contractor in a sortable spreadsheet documenting the Contractor's solicitation of MBEs and WBEs for participation as Subcontractors or suppliers pursuant to a contract. The log should consist of the list of MBE and WBE firms solicited, their contact information, the type of work they were solicited to perform (or equipment to provide), how the solicitation was made (fax, phone, email) and the contact information, the contacts name and the outcome. If a bid was received, the bid price should also be included in the log. See a sample log format below:

Date	M/WBE Type	Company	Scope of work	Contact Name	Phone/ Email	Solicitation Format	MWBE Response	Negotiation Required?	Selected? If not, Explain

If no response was received to an initial solicitation, at least one follow-up solicitation should be made in a different format than the first, e.g. fax followed by phone call. Any bids received from non-MWBE firms for the same areas MWBEs were solicited should also be tracked on the log.

- Copies of the EPA 6100-3 and 6100-4 forms that are required with the bid submission. A properly completed EPA 6100-3 form is good indication of a contact to an MWBE and their response to the contact. If solicitations do not result in obtaining sufficient participation of MWBE firms due to non-responsiveness, please contact the MBO or EFC MWBE representative for support.

- Copies of any advertisements of sufficient duration to effectively seek participation of certified MBE and WBEs timely published in appropriate general circulation, trade and MWBE oriented publications, together with listing and dates of publication of such advertisements. EFC recommends the use of the NYS Contract Reporter that is free to all Contractors - https://www.nyscr.ny.gov/. A log should be kept of the responses to the ads, similar to the log for MWBE firm solicitation and should include the non-MWBE firms that responded and the bid prices. Any negotiations should be documented in the log.

- Documents demonstrating that insufficient MBEs or WBEs are reasonably available to perform the work.

- A written demonstration that the Contractor offered to make up any inability to meet the project MWBE participation goals in other contracts and/or agreements performed by the Contractor on another SRF funded project.

- The date of pre-bid, pre-award, or other meetings scheduled by the Recipient, if any, and the contact information of any MBEs and WBEs who attended and are capable of performing work on the project.

- Any other information or documentation that demonstrates the Contractor conducted good faith efforts to provide opportunities for MWBE participation in their work. For instance, Prime Contractors and MBOs should develop a list of MWBE firms that have expressed interest in working on SRF-funded projects

- The use of certified DBE and small businesses certified through the US Small Business Administration (SBA) may be considered as a demonstration of Good Faith Efforts.

C. MWBE Utilization Plan

1. The MWBE Utilization Plan must be submitted to the Recipient's MBO after the bid opening, but in no case more than ten (10) business days after the Contractor receives notice from the Recipient that the Contractor has submitted a low bid.
2. The MBO will evaluate a completed MWBE Utilization Plan. If the MBO finds the Utilization Plan sufficient, it will be forwarded to EFC for review. If the MBO finds the Utilization Plan insufficient, the MBO will work with the Contractor to address deficiencies before submitting to EFC for review. A written notice of acceptance or deficiency will be issued by EFC within 20 business days of receipt of the Utilization Plan. Upon receipt of a notice of deficiency from either the MBO or EFC, the Contractor shall respond with a written remedy to such notice within seven (7) business days of receipt.
3. In coordination with the MBO, EFC will accept an MWBE Utilization Plan upon consideration of many factors, including the following:

    a. The MWBE Utilization Plan indicates that the proposed goals for the project will be achieved;
    b. A Contractor, who is a certified MBE or WBE, will be credited for up to 100% of the category of their certification. However, good faith efforts to seek participation in the other category are also required; and,
    c. Adequate documentation to demonstrate good faith efforts and/or support a specialty equipment/services waiver as described below in Section III(E).

4. EFC reserves the right to request additional information and/or documentation to support the adequacy of the MWBE Utilization Plan.
5. Within 10 days of EFC's acceptance of a MWBE Utilization Plan, EFC will post the approved Utilization Plan on the EFC website.
6. In coordination with the MBO, EFC may issue conditional acceptance of Utilization Plans pending submission of additional documentation that demonstrates there will be an increase in MWBE participation.

D. Eligibility for MWBE Participation Credit

1. To receive MWBE participation credit, Contractors or Subcontractors performing work that have been identified in an approved MWBE Utilization Plan must be certified as an MBE or WBE by ESD.
2. Prime Contractors may also include second or lower tier Subcontractors (Subcontractors hired by Subcontractors) on their MWBE Utilization Plan.
3. Credit for MWBE participation shall be granted only for MWBE firms performing a commercially useful business function according to custom and practice in the industry.
    a. Factors to be used in assessing whether an MWBE is performing a commercially useful function include:
        i. The amount of work subcontracted;
        ii. Industry practices;
        iii. Whether the amount the MWBE is to be paid under the contract is commensurate with the work it is to perform;
        iv. The credit claimed towards MWBE utilization goals for the performance of the work by the MWBE; and,
        v. Any other relevant factors.

    b. "Commercially useful functions" normally include:
        i. Providing technical assistance to a purchaser prior to a purchase, during installation, and after the supplies or equipment are placed in service;
        ii. Manufacturing or being the first tier below the manufacturer of supplies or equipment;
        iii. Providing functions other than merely accepting and referring requests for supplies or equipment to another party for direct shipment to a Contractor; or,
        iv. Being responsible for ordering, negotiating price, and determining quality and quantity of materials and supplies.

4. No credit will be granted for MWBEs that do not perform a commercially useful function. An MWBE does not perform a commercially useful function if its role adds no substantive value and is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to obtain the appearance of participation.

E. Requests for Waiver

1. If the Contractor's application of good faith efforts does not result in the utilization of MWBE firms to achieve the aforementioned goals or a specialty equipment/service waiver is requested, the Contractor may request a full or partial waiver of MWBE participation goals by completing a Request for Waiver form, attaching appropriate documentation of good faith efforts, and submitting same to the MBO. See also Required Contract Language, Section 1(III)(C). Even if an MWBE waiver is granted, EEO information must still be submitted.
2. The MBO and EFC will review each waiver request based on the good faith effort criteria presented above and the documentation submitted with the waiver request. EFC will not issue any automatic waivers from MWBE responsibilities.
3. In cases where EFC accepts a full or partial waiver of MWBE participation goals, the waiver request will be posted to EFC's website.
4. Specialty Equipment/Service Waiver: A specialty equipment/service waiver may be granted in cases where:

    a. equipment is made by only one non-MWBE manufacturer,
    b. the technical specifications call for equipment that is not available through an MWBE supplier;
    c. the equipment is constructed on site by specially trained non-MWBE labor;
    d. the service is not available through an MWBE (such as work done by National Grid);
    e. the service is proprietary in nature (such as use of certain computer software necessary for control systems); or,
    f. the service cannot be subcontracted (such as litigation services).

    If the contract includes specialty equipment or services, and documentation is submitted demonstrating that there are no MWBE firms capable of completing this portion of the contract, the specialty amount of the contract may be deducted from the total contract amount to determine the MWBE Eligible Amount and the goals will be applied to the MWBE Eligible Amount. This determination is made at the discretion of the MBO and EFC.

    Example:
    $200,000 - $50,000 = $150,000
    (Contract) (Specialty equipment/service) (MWBE Eligible Amount)
    The MWBE goal is applied to the MWBE Eligible Amount.

    A request for this specialty equipment/service deduction can be completed by filling out a Request for Waiver form and submitting it to the MBO. The request must include a copy of the page from the contract where the equipment/ service is described and the cost of each item. For construction contracts, the schedule of values or bid tabulation sheet should also be submitted. Additional documentation may be requested by the MBO or EFC.

IV. Subcontractor's Responsibilities

Subcontractors should:

1. Maintain their MWBE certifications, and notify the Contractor and MBO of any change in their certification status.
2. Notify the Contractor of any MWBE Subcontractors they hire so they may be included on the Contractor's Utilization Plan.

3. Respond promptly to solicitation requests by completing and submitting bid information in a timely manner.
4. Maintain business records that should include, but not be limited to, contracts/agreements, records of receipts, correspondence, purchase orders, and canceled checks.
5. Complete and submit the EPA Form 6100-3 - DBE Subcontractor Performance Form to the Contractor prior to submission of the Contractor's bid to the Recipient.
6. Complete and return EPA Form 6100-2 - DBE Subcontractor Participation Form to the Recipient prior to Contractor's execution of the contract.
7. Ensure that a required EEO Policy Statement and applicable MWBE requirements are included in each subcontract.
8. Notify the MBO and EFC when contract problems arise, such as non-payment for services or when the Subcontractor is not employed as described in the MWBE Utilization Plan.

V. Protests/Complaints

Contractors or Subcontractors who have any concerns, issues, or complaints regarding the implementation of the SRF MWBE & EEO Program, or wish to protest should do so in writing to the MBO and EFC. The MBO, in consultation with EFC, will review the circumstances described in the submission, investigate to develop additional information, if warranted, and determine whether action is required. If the Contractor or Subcontractor believes the issue has not been resolved to their satisfaction, they may appeal in writing to EFC for consideration.

VI. Waste, Fraud and Abuse

Subcontractors, Contractors, or Recipients who know of or suspect any instances of waste, fraud, or abuse within the MWBE & EEO Program should notify the project MBO and EFC immediately. Additionally, suspected fraud activity should be reported to the USEPA – Office of Inspector General Hotline at (888) 546-8740, the New York State Office of Inspector General at (800) 367-4448, or the ESD Compliance Office at (212) 803-3266.

SECTION 2 GUIDANCE FOR APPLICABLE LABOR STANDARDS

Contractors and Subcontractors working under a public works contract are subject to labor standards under State Labor Law, including but not limited to prevailing wage requirements, and may be subject to additional labor requirements under applicable local laws. When preparing the bid for an SRF project, the Contractor, and any Subcontractors, must use the higher of the applicable prevailing State or local wage rates paid to each trade.

SECTION 3 GUIDANCE FOR REQUIREMENTS REGARDING SUSPENSION AND DEBARMENT

A list of debarred and suspended contractors, pursuant to 2 CFR Parts 180 and 1532 and 29 CFR § 5.12, is available on the US Department of Labor's website at https://www.sam.gov/portal/public/SAM/.

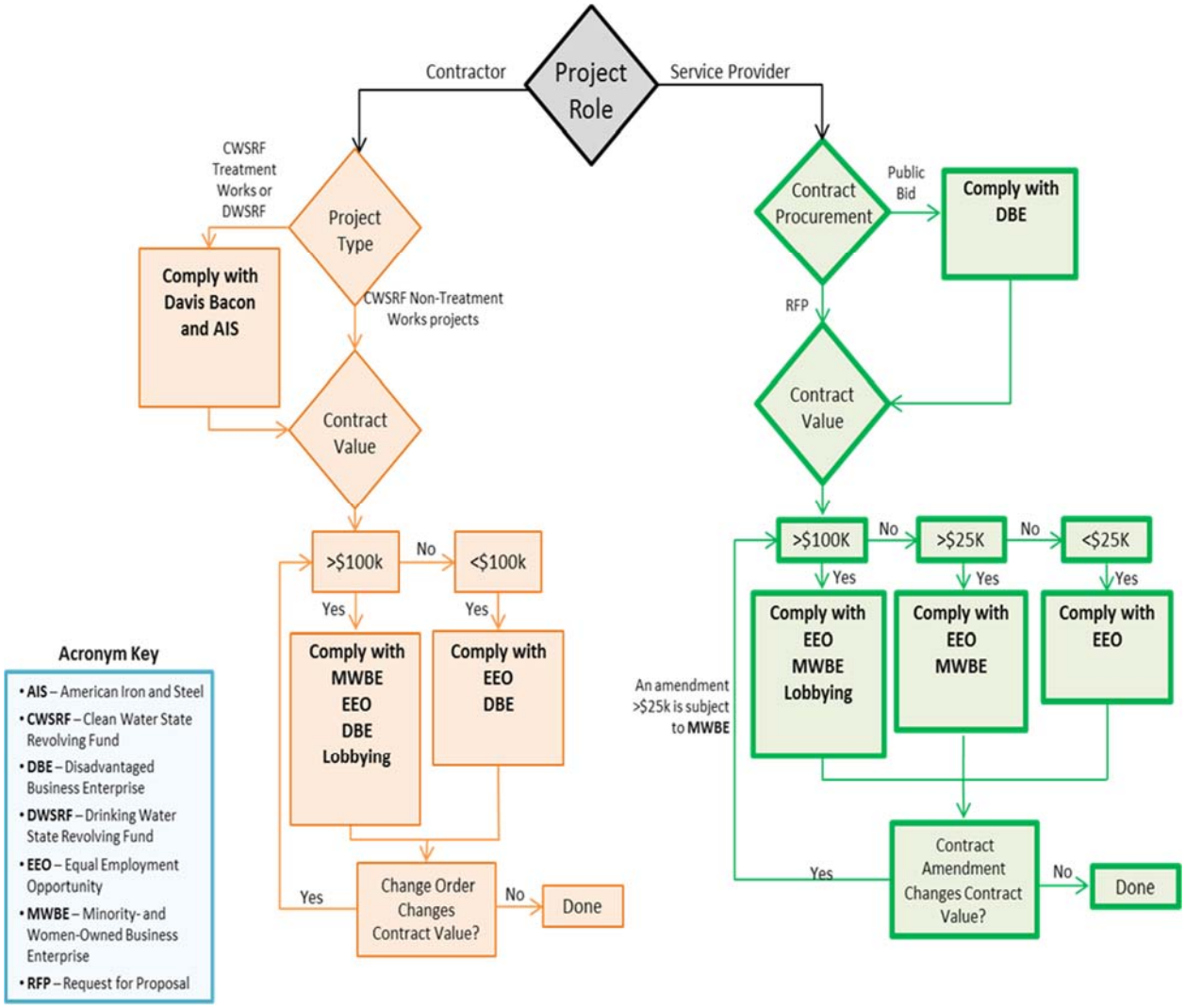
A list of contractors and subcontractors deemed ineligible to submit a bid on or be awarded a public contract or subcontract, pursuant to Article 8 of the State Labor Law, is available on the New York State Department of Labor's website at http://labor.ny.gov/workerprotection/publicwork/PDFs/debarred.pdf

A list of contractors deemed ineligible to submit a bid is maintained by Empire State Development's Division of Minority and Women's Business Development.

SECTION 4 GUIDANCE FOR RESTRICTIONS ON LOBBYING

Each Contractor and any Subcontractor that has a Contract or Subcontract exceeding $100,000 shall provide to the Recipient a completed Certification Regarding Lobbying pursuant to 40 CFR Part 34 ("Lobbying Certification") in the form attached hereto as Attachment 9 consistent with the prescribed form provided in Appendix A to 40 CFR Part 34. The form provides a certification that the Contractor or Subcontractor will not expend appropriated federal funds to pay any person for influencing or attempting to influence an officer or employee of any agency, Member of Congress, officer or employee of Congress or any employee of any Member of Congress in accordance with the provisions of 40 CFR Part 34, and to maintain such certification for their own records. It is noted that disbursement of funds may be withheld until the Lobbying Certification form has been received by the Recipient.

SECTION 5 PROGRAM CONTRACT REQUIREMENT DECISION TREE



SECTION 6 SUMMARY OF CONTRACTOR REQUIREMENTS FOR SRF-FUNDED PROJECTS

Forms can be found as attachments to this document or online at www.efc.ny.gov/MWBE

Forms should be submitted electronically via email or through EFC's dropbox

	Refer to Part 3 Guidance Section
To be submitted with this bid:	
☐ EEO Policy Statement	Section 1
☐ Documented Proof that EPA Form 6100-2 - DBE Subcontractor Participation Form was given to MWBE Subcontractors	Section 1
☐ EPA Form 6100-3 - DBE Subcontractor Performance Form	Section 1
☐ EPA Form 6100-4 - DBE Subcontractor Utilization Form	Section 1
☐ Lobbying Certification	Section 4
To be submitted prior to or upon Contract award:	
☐ Executed Contracts, Subcontracts, agreements, and purchase orders	
☐ MWBE Utilization Plan and/or Waiver Request	Section 1
Tasks for construction start:	
☐ Ensure that all Subcontracts contain Part 2: Required Contract Language	
☐ Post EEO Poster	Section 1
☐ Pay the higher of applicable prevailing state or local wages including benefits	Section 2
Ongoing documentation & tasks:	
☐ EEO Workforce Utilization Report	Section 1
☐ Submit Monthly MWBE Reports to MBO	Section 1
☐ Maintain proof of payments for MWBE Subcontractors	Section 1

Attachment 1
New York State Environmental Facilities Corporation
EQUAL EMPLOYMENT OPPORTUNITY POLICY STATEMENT
NEW YORK STATE REVOLVING FUND (SRF)

I, _____, am the authorized representative of _____.
Name of Representative Name of Contractor/Service Provider
I hereby certify that _____ will abide by the equal employment
Name of Contractor/Service Provider
opportunity (EEO) policy statement provisions outlined below.

(i) The Contractor will not discriminate on the basis of race, creed, color, national origin, sex, age, disability, or marital status against any employee or applicant for employment, will undertake or continue existing programs of affirmative action to ensure that minority group members and women are afforded equal employment opportunities without discrimination and will make and document its conscientious and active efforts to employ and utilize minority group members and women in its work force on Contracts relating to SRF projects.

(ii) The Contractor shall state in all solicitations or advertisements for employees that, in the performance of the Contract relating to this SRF project, all qualified applicants will be afforded equal employment opportunities without discrimination because of race, creed, color, national origin, sex, age, disability or marital status.

(iii) The Contractor shall request each employment agency, labor union, or authorized representative of workers with which it has a collective bargaining or other agreement or understanding, to furnish a written statement that such employment agency, labor union, or representative will not discriminate on the basis of race, creed, color, national origin, sex, age, disability or marital status, and that such union or representative will affirmatively cooperate in the implementation of the Contractor's obligations herein.

(iv) The Contractor shall comply with the provisions of the Human Rights Law (Article 15 of the Executive Law), including those relating to non-discrimination on the basis of prior criminal conviction and prior arrest, and with all other State and federal statutory and constitutional non-discrimination provisions, including Titles VI and VII of the Civil Rights Act of 1964, 40 CFR Part 7, 41 CFR Part 60-1 Subpart A, and 41 CFR Part 60-4. The Contractor and Subcontractors shall not discriminate against any employee or applicant for employment because of race, creed (religion), color, sex, national origin, sexual orientation, military status, age, disability, predisposing genetic characteristic, marital status or domestic violence victim status.

(v) The Contractor will include the provisions of subdivisions (i) through (iv) in every Subcontract in such a manner that the requirements of these subdivisions will be binding upon each Subcontractor as to work in connection with the Contract.

X _____

Contractor/Service Provider Representative

Attachment 2
NYS Environmental Facilities Corporation
Equal Employment Opportunity (EEO) Workforce Employment Utilization Report

Municipality:	County:	SRF Project No.:	Contract ID:
Contractor/Service Provider:		Date:	

Report Includes – Please select one from the options below:

☐ Construction Contracts - Report the hours of contractor's and ALL subcontractor's employees who worked on contract activities during the month

☐ Service Provider Contracts - Report the Actual Contractor/subcontractor's workforce (# of personnel) utilized on this contract.

Job Categories	Hispanic/ Latino		Non-Hispanic / Latino											
			Male						Female					
	Male	Female	White	Black/ African American	Native Hawaiian/ Other Pacific Islander	Asian	Native American/ Alaska Native	Two or More Races	White	Black/ African American	Native Hawaiian/ Other Pacific Islander	Asian	Native American/ Alaska Native	Two or More Races
Senior Level Officials/Managers														
Mid-Level Officals/Managers														
Professionals														
Technicians														
Sales Workers														
Administrative Support Workers														
Skilled Craftsmen														
Operatives Semi-Skilled														
Laborers & Helpers														
Service Workers														
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Journeypersons														
Apprentices														
Trainees														

Service Provider Contracts Only: ☐ There are no changes to the workforce utilized on this contract since the last EEO Workforce Utilization Report

Electronic Signature of Contractor: ☐ I certify that the information submitted herein is true, accurate and complete to the best of my knowledge. **Date:**

Name (Please Type)**:**

Attachment 2
NYS Environmental Facilities Corporation
Equal Employment Opportunity (EEO) Workforce Employment Utilization Report

INSTRUCTIONS

All Contractors and each Subcontractor identified in the approved MWBE Utilization Plan must complete an EEO Workforce Utilization Report and submit it to the MBO on a monthly basis for construction contracts and on a quarterly basis for service provider contracts. Separate forms shall be completed by the Contractor and any Subcontractor. Where the work force to be utilized in the performance of the contract can be separated out from the contractor's or subcontractors' total workforce, the contractors shall *complete this form only for the actual work force utilized on the contract*. Where the workforce utilized in the performance of the contract cannot be separated out from the contractor's or subcontractors' total workforce, the contractors shall *complete this form for the contractor's or subcontractors' total workforce*.

Construction Contracts: Report the hours of contractor's and ALL subcontractors' employees who worked on contract activities for each month.

RACE/ETHNIC IDENTIFICATION: Definitions of race and ethnicity for purposes of completion of this form are as follows:

- **Hispanic or Latino -** A person having origins in Cuba, Mexico**,** Puerto Rico, South or Central America.
- **White -** A person having origins of Europe, the Middle East, or North Africa.
- **Black or African-American -** A person having origins in any of the black racial groups of Africa.
- **Native Hawaiian or Other Pacific Islander-** A person having origins in any of the peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
- **Asian -** A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian Subcontinent
- **American Indian or Alaska Native -** Origins in any of the original peoples of North, Central, and South America and who maintain tribal affiliation or community attachment
- **Two or More Races -** All persons who identify with more than one of the above five races.

DESCRIPTION OF JOB CATEGORIES: The major job categories used in EEO Workforce Utilization Report are as follows:

- **Senior Level Officials and Managers -** Individuals residing in the highest levels of organizations who plan, direct and formulate policies, set strategy and provide the overall direction of enterprises/organizations for the development and delivery of products or services.
- **Mid-Level Officials and Managers -** Individuals who receive directions from the Senior Level management and serve as managers, other than those who serve as Senior Level Officials and Managers, including those who oversee and direct the delivery of products, services or functions at group, regional or divisional levels of organizations.
- **Professionals -** Most jobs in this category require bachelor and graduate degrees, and/or professional certification. In some instances, comparable experience may establish a person's qualifications.
- **Technicians -** Jobs in this category include activities that require applied scientific skills, usually obtained by post-secondary education of varying lengths, depending on the particular occupation, recognizing that in some instances additional training, certification, or comparable experience is required.
- **Sales Workers -** These jobs include non-managerial activities that wholly and primarily involve direct sales.
- **Administrative Support Workers -** These jobs involve non-managerial tasks providing administrative and support assistance, primarily in office settings.
- **Skilled Craftsmen –** Includes higher skilled occupations in construction (building trades craft workers and their formal apprentices) and natural resource extraction workers. Examples of these types of positions include: boilermakers; brick and stone masons; carpenters; electricians; painters.
- **Operatives Semi-Skilled -** Most jobs in this category include intermediate skilled occupations and include workers who operate machines or factory-related processing equipment. Most of these occupations do not usually require more than several months of training. Examples include: textile machine workers.
- **Laborers & Helpers -** Jobs in this category include workers with more limited skills who require only brief training to perform tasks that require little or no independent judgment.
- **Service Workers -** Jobs in this category include food service, cleaning service, personal service, and protective service activities.

Attachment 3

New York State Environmental Facilities Corporation

Monthly Minority- & Women- Owned Business Enterprise (MWBE) Contractor Compliance Report

("Monthly MWBE Report")

Instructions:

- Contractors are to complete the report in Word version and email to the SRF Recipient's Minority Business Officer ("MBO") on a monthly basis.
- If you require additional pages, you may find them on EFC's MWBE web page at www.efc.ny.gov/mwbe.
- **All** MWBE Subcontractors for this contract **MUST** be listed on the form regardless of whether they were paid this month.
- Please save Report as "*MReport – (Project No). – (Municipality) – (Firm Name) – (Date)*" and send the Word version of this document.
- Proofs of payment in the amounts shown below must be transmitted to the MBO with the report.

Municipality:	County:	Contract ID:	Month:	Year:
SRF Project No.:	GIGP/EPG No:	Registration No. (NYC only):		

Prime Contractor/Service Provider:	Award Date:	Start Date:	**Date all MWBE subs paid in full:**

Signature of Contractor: ☐ I certify that the information submitted herein is true, accurate and complete to the best of my knowledge and belief. Date:

Last Month's Contract **Amt:** $ Revised Contract Amt: $	**MWBE Eligible Amt**: $ (Goals are applied to this amount and includes eligible change orders, amendments & waivers)	**EFC MWBE Goals** MBE: % MBE Amt: $ WBE: % WBE Amt: $ Total: % Total Amt: $	**Total Paid to Prime** Total Paid this Month: $ Total Paid to Date: $

NYS Certified M/WBE Contractor & Subcontractor	Please Specify Any Revisions this Month.	Subcontractor Total Amount		Payments this Month	Previous Payments	Total Payments Made to Date
		Original	Revised			
Name: Fed. Employer ID#: Select Only One: ☐ MBE ☐ WBE ☐ Other:	☐ Subcontractor is REMOVED ☐ NEW Subcontractor ☐ Subcontract Amt. INCREASED ☐ Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: Select Only One: ☐ MBE ☐ WBE Supplier ☐ Other:	☐ Subcontractor is REMOVED ☐ NEW Subcontractor ☐ Subcontract Amt. INCREASED ☐ Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: Select Only One: ☐ MBE ☐ WBE ☐ Other:	☐ Subcontractor is REMOVED ☐ NEW Subcontractor ☐ Subcontract Amt. INCREASED ☐ Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: Select Only One: ☐ MBE ☐ WBE ☐ Other:	☐ Subcontractor is REMOVED ☐ NEW Subcontractor ☐ Subcontract Amt. INCREASED ☐ Subcontract Amt. DECREASED					

Attachment 3
New York State Environmental Facilities Corporation
Monthly Minority- & Women- Owned Business Enterprise (MWBE) Contractor Compliance Report
("Monthly MWBE Report")

NYS Certified M/WBE Contractor & Subcontractor	Please Specify Any Revisions this Month.	Subcontractor Contract Amount		Payments this Month	Previous Payments	Total Payments Made to Date
		Original	Revised			
Name: Fed. Employer ID#: Select Only One: ☐ MBE ☐ WBE ☐ Other:	☐ Subcontractor is REMOVED ☐ NEW Subcontractor ☐ Subcontract Amt. INCREASED ☐ Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: Select Only One: ☐ MBE ☐ WBE ☐ Other:	☐ Subcontractor is REMOVED ☐ NEW Subcontractor ☐ Subcontract Amt. INCREASED ☐ Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: Select Only One: ☐ MBE ☐ WBE ☐ Other:	☐ Subcontractor is REMOVED ☐ NEW Subcontractor ☐ Subcontract Amt. INCREASED ☐ Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: Select Only One: ☐ MBE ☐ WBE ☐ Other:	☐ Subcontractor is REMOVED ☐ NEW Subcontractor ☐ Subcontract Amt. INCREASED ☐ Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: Select Only One: ☐ MBE ☐ WBE ☐ Other:	☐ Subcontractor is REMOVED ☐ NEW Subcontractor ☐ Subcontract Amt. INCREASED ☐ Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: Select Only One: ☐ MBE ☐ WBE ☐ Other:	☐ Subcontractor is REMOVED ☐ NEW Subcontractor ☐ Subcontract Amt. INCREASED ☐ Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: Select Only One: ☐ MBE ☐ WBE ☐ Other:	☐ Subcontractor is REMOVED ☐ NEW Subcontractor ☐ Subcontract Amt. INCREASED ☐ Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: Select Only One: ☐ MBE ☐ WBE ☐ Other:	☐ Subcontractor is REMOVED ☐ NEW Subcontractor ☐ Subcontract Amt. INCREASED ☐ Subcontract Amt. DECREASED					

Attachment 3
New York State Environmental Facilities Corporation
Monthly Minority- & Women- Owned Business Enterprise (MWBE) Contractor Compliance Report
(“Monthly MWBE Report”)

NYS Certified M/WBE Contractor & Subcontractor	Please Specify Any Revisions this Month.	Subcontractor Total Amount		Payments this Month	Previous Payments	Total Payments Made to Date
		Original	Revised			
Name: Fed. Employer ID#: Select Only One: ☐ MBE ☐ WBE ☐ Other:	☐ Subcontractor is REMOVED ☐ NEW Subcontractor ☐ Subcontract Amt. INCREASED ☐ Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: Select Only One: ☐ MBE ☐ WBE ☐ Other:	☐ Subcontractor is REMOVED ☐ NEW Subcontractor ☐ Subcontract Amt. INCREASED ☐ Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: Select Only One: ☐ MBE ☐ WBE ☐ Other:	☐ Subcontractor is REMOVED ☐ NEW Subcontractor ☐ Subcontract Amt. INCREASED ☐ Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: Select Only One: ☐ MBE ☐ WBE ☐ Other:	☐ Subcontractor is REMOVED ☐ NEW Subcontractor ☐ Subcontract Amt. INCREASED ☐ Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: Select Only One: ☐ MBE ☐ WBE ☐ Other:	☐ Subcontractor is REMOVED ☐ NEW Subcontractor ☐ Subcontract Amt. INCREASED ☐ Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: Select Only One: ☐ MBE ☐ WBE ☐ Other:	☐ Subcontractor is REMOVED ☐ NEW Subcontractor ☐ Subcontract Amt. INCREASED ☐ Subcontract Amt. DECREASED					
Name: Fed. Employer ID#: Select Only One: ☐ MBE ☐ WBE ☐ Other:	☐ Subcontractor is REMOVED ☐ NEW Subcontractor ☐ Subcontract Amt. INCREASED ☐ Subcontract Amt. DECREASED					
Additional Pages can be found at www.efc.ny.gov TOTAL						

PLEASE EXPLAIN ANY REVISIONS (Change orders over $25K may require that good faith efforts be made to obtain additional MWBE participation) :

Attachment 4
New York State Environmental Facilities Corporation
Minority- & Women- Owned Business Enterprise (MWBE) Utilization Plan

Instructions for Contractors & Service Providers:

Contractors and Service Providers must complete Sections 2 and 3. **Submit the completed, signed (electronic signature box checked and dated) form in Microsoft Word format to the SRF Recipient's designated Minority Business Officer (MBO) no later than the date of contract execution.** Incomplete forms will be found deficient. If more than 10 subcontractors are used, additional pages for Section 3 can be found in the form Additional Utilization Plan Section 3.

If the prime contract is being performed by the parties to a Joint Venture, Teaming Agreement, or Mentor-Protégé Agreement that includes a certified MWBE, please contact EFC for assistance.

MWBE firms must be certified by the NYS Empire State Development Corporation (ESD) in order to be counted towards satisfaction of MWBE participation goals. The utilization of certified MWBEs for non-commercially useful functions may not be counted towards utilization of certified MWBEs in the Utilization Plan.

See the Bid Packet at www.efc.ny.gov/mwbe or consult your designated MBO for further guidance.

Instructions for Minority Business Officers (MBO):

The MBO must complete Section 1. The MBO may designate an Authorized Representative to complete and submit quarterly payment reports on its behalf, and, if so designated, the MBO's Authorized Representative must also complete Section 1. The Authorized Representative may only submit quarterly payment reports on behalf of the MBO and may not submit any other required forms or reports for the MBO. The MBO must complete Section 1 even if designating an Authorized Representative. **Submit the completed, signed (electronic signature box checked and dated) form in Microsoft Word format via e-mail to your EFC MWBE Representative.**

The subject heading of the e-mail to the EFC MWBE Representative should follow the format "UP, SRF Number, Contractor." EFC will review the Utilization Plan and notify the MBO via e-mail of its acceptance or denial.

Within 10 days of EFC's acceptance of a Utilization Plan, EFC will post the approved Utilization Plan on the EFC website.

Attachment 4
New York State Environmental Facilities Corporation
Minority- & Women- Owned Business Enterprise (MWBE) Utilization Plan

SECTION 1: MUNICIPAL INFORMATION			
Recipient/Municipality:		**County:**	
SRF Project No.:	**GIGP/EPG No.:**	**Contract ID:**	**Registration No. (NYC only):**
Minority Business Officer:		**Email:**	**Phone #:**
Address of MBO:			
Electronic Signature of MBO: ☐ I certify that the information submitted herein is true, accurate and complete to the best of my knowledge and belief.			**Date:**
Complete if applicable:			
Authorized Representative:		**Title:**	
Authorized Rep. Company:		**Email:**	**Phone #:**
Electronic Signature of Authorized Rep.: ☐ I certify that the information submitted herein is true, accurate and complete to the best of my knowledge and belief.			**Date:**

SECTION 2: PRIME CONTRACTOR / SERVICE PROVIDER INFORMATION					
Firm Name:			**Contract Type:** ☐ Construction ☐ Other Services		
Prime Firm is Certified as: ☐ MBE ☐ WBE ☐ N/A ☐ Other: Please repeat information in the Utilization Plan below (Section 3). If dual certified, you must select either MBE or WBE.					
Address:		**Phone #:**	**Fed. Employer ID #:**		
Description of Work:					
Award Date:	**Start Date:**	**Completion Date:**	**MWBE GOAL Total**		**PROPOSED MWBE Participation**
Total Contract Amount: $ **MWBE Eligible Contract Amount:** $ (MWBE Goals are applied to this amount and includes all change orders, amendments, & waivers)			**MBE:** % $		**MBE:** % $
			WBE: % $		**WBE:** % $
			Total: % $		**Total:** % $

Attachment 4
New York State Environmental Facilities Corporation
Minority- & Women- Owned Business Enterprise (MWBE) Utilization Plan

SECTION 3: M/WBE SUBCONTRACTOR INFORMATION				
This Submittal is:	☐ The First/Original Utilization Plan ☐ Revised Utilization Plan #:			
NYS Certified M/WBE Subcontractor Info		**Contract Amount:**		**For EFC Use:**
		MBE ($)	**WBE ($)**	
Name:	**Fed. Employer ID#:**			
Address:	**Phone #:**			
Scope of Work:	**Email:**			
Select Only One: ☐ **MBE** ☐ **WBE** ☐ Other:	**Start Date:**			
Full Contract Amount: $	**Completion Date:**			
Name:	**Fed. Employer ID#:**			
Address:	**Phone #:**			
Scope of Work:	**Email:**			
Select Only One: ☐ **MBE** ☐ **WBE** ☐ Other:	**Start Date:**			
Full Contract Amount: $	**Completion Date:**			
Name:	**Fed. Employer ID#:**			
Address:	**Phone #:**			
Scope of Work:	**Email:**			
Select Only One: ☐ **MBE** ☐ **WBE** ☐ Other:	**Start Date:**			
Full Contract Amount: $	**Completion Date:**			
Name:	**Fed. Employer ID#:**			
Address:	**Phone #:**			
Scope of Work:	**Email:**			
Select Only One: ☐ **MBE** ☐ **WBE** ☐ Other:	**Start Date:**			
Full Contract Amount: $	**Completion Date:**			

Attachment 4
New York State Environmental Facilities Corporation
Minority- & Women- Owned Business Enterprise (MWBE) Utilization Plan

SECTION 3: M/WBE SUBCONTRACTOR INFORMATION continued				
Name:	**Fed. Employer ID#:**			
Address:	**Phone #:**			
Scope of Work:	**Email:**			
Select Only One: ☐ **MBE** ☐ **WBE** ☐ Other:	**Start Date:**			
Full Contract Amount: $	**Completion Date:**			
Name:	**Fed. Employer ID#:**			
Address:	**Phone #:**			
Scope of Work:	**Email:**			
Select Only One: ☐ **MBE** ☐ **WBE** ☐ Other:	**Start Date:**			
Full Contract Amount: $	**Completion Date:**			
Name:	**Fed. Employer ID#:**			
Address:	**Phone #:**			
Scope of Work:	**Email:**			
Select Only One: ☐ **MBE** ☐ **WBE** ☐ Other:	**Start Date:**			
Full Contract Amount: $	**Completion Date:**			
Name:	**Fed. Employer ID#:**			
Address:	**Phone #:**			
Scope of Work:	**Email:**			
Select Only One: ☐ **MBE** ☐ **WBE** ☐ Other:	**Start Date:**			
Full Contract Amount: $	**Completion Date:**			

SIGNATURE	
Electronic Signature of Contractor: ☐ I certify that the information submitted herein is true, accurate and complete to the best of my knowledge and that all MWBE subcontractors will perform a commercially useful function. **Name** (Please Type)**:**	**Date:**

Attachment 5
New York State Environmental Facilities Corporation
Minority & Women Owned Business Enterprise (MWBE) Waiver Request Form

Instructions for Contractors & Service Providers:
Contractors and Service Providers must complete Sections 2, 3, and 4. **Submit the completed, signed (electronic signature box checked and dated) form in Microsoft Word format to the SRF Recipient's designated Minority Business Officer (MBO).** Incomplete forms will be found deficient.

See the Bid Packet at www.efc.ny.gov/mwbe or consult your designated MBO for further guidance.

Instructions for Minority Business Officers (MBO):
The MBO must complete Section 1. **Submit the completed, signed (electronic signature box checked and dated) form in Microsoft Word format via e-mail to your EFC MWBE Representative.** The subject heading of the e-mail to the EFC MWBE Representative should follow the format "Waiver Request, SRF Number, Contractor." EFC will review and notify the MBO via e-mail of its acceptance or denial.

If a partial MWBE waiver is requested, an MWBE Utilization Plan must also be submitted for the amount of proposed MWBE participation.

SECTION 1: MUNICIPAL INFORMATION				
Recipient/Municipality:			**County:**	
SRF Project No.:	**GIGP/EPG No.:**	**Contract ID:**	**Registration No. (NYC only):**	
Minority Business Officer (MBO):		**Email:**	**Phone #:**	
Address of MBO:				
Signature of MBO: ☐ I certify that the information submitted herein is true, accurate and complete to the best of my knowledge and belief.				**Date:**

SECTION 2: PRIME CONTRACTOR / SERVICE PROVIDER INFORMATION			
Firm Name:			**Contract Type:** ☐ Construction ☐ Other Services
Prime Firm is Certified as: ☐ MBE ☐ WBE ☐ N/A ☐ Other:			
Address:		**Phone #:**	**Fed. Employer ID #:**
Contact Information of Firm Representative Authorized to Discuss Waiver Request: **Name:** **Title:** **Phone #:** **E-mail:**			
Description of Work:			**EFC MWBE GOAL Total**
Award Date:	**Start Date:**	**Completion Date:**	**MBE:** % $
Total Contract Amount: $ **MWBE Eligible Contract Amount:** $ (MWBE Goals are applied to this amount and includes all change orders, amendments, & waivers)			**WBE:** % $ **Total:** % $

Attachment 5
New York State Environmental Facilities Corporation
Minority & Women Owned Business Enterprise (MWBE) Waiver Request Form

SECTION 3: TYPE OF MWBE WAIVER REQUESTED

1. ☐ **Full Waiver** (No MWBE participation)

2. ☐ **Partial Waiver** (Less than the MWBE goals; indicate below the proposed MWBE participation)

   PROPOSED MWBE Participation

   MBE: % $

   WBE: % $

   Total: % $

3. ☐ **Specialty Equipment/Services Waiver** (Must be of SIGNIFICANT cost - list of equipment and cost must be attached in addition to the supporting documentation outlined below)

SECTION 4: SUPPORTING DOCUMENTATION

To be considered, the Request for Waiver Form must be accompanied by the documentation requested in items 1 – 9, as listed below. If a Specialty Equipment Waiver is requested, it must be accompanied by the documentation requested in items 1 - 13. If a Specialty Services Waiver is requested, it must be accompanied by the items requested in items 1 – 9 and item 14. Copies of the following information and all relevant supporting documentation must be submitted along with the request. Please contact EFC for assistance, including sample documentation.

1. A letter of explanation setting forth your basis for requesting a partial or total waiver and detailing the good faith efforts that were made.

2. Copies of advertisements in any general circulation, trade association, and minority- and women-oriented publications in which you solicited MWBEs for the purposes of complying with your participation goals, with the dates of publication.

3. Screenshots of search results (by business description or commodity code) from Empire State Development Corporation's (ESD) MWBE Directory of all certified MWBEs that were solicited for purposes of complying with your MWBE participation goals.

4. Copies of faxes, letters, or e-mails sent to MWBE firms to solicit participation and their responses.

5. A log of solicitation results, consisting of the list of MWBE firms solicited for the contract and the outcome of the solicitations. The log should be broken out into separate areas for each task that is solicited (e.g., trucking, materials, electricians) and clearly provide a rationale for firms included on the completed Utilization Plan as well as for those not chosen. The log should show: that each MWBE firm was contacted twice by two different methods (e.g., fax and phone); who was spoken to; what was said; and the final outcome of the solicitation.

6. A description of any contract documents, plans, or specifications made available to MWBEs for purposes of soliciting their bids and the date and manner in which these documents were made available. Specifically, include information on the scope of work in the contract and a breakout of tasks or equipment, such as

a schedule of values for a construction contract or a proposal or excerpt from a professional services agreement.

7. Documentation of any negotiations between you, the Contractor, and the MWBEs undertaken for purposes of complying with your MWBE participation goals.

8. Any other information you deem relevant which may help us in evaluating your request for a waiver. Examples may include sign-in sheets from any pre-bid meetings where MWBE firms were invited, attendance at MWBE forums, etc.

9. EFC and the MBO reserve the right to request additional information and/or documentation.

Additional Documentation for Requests for Specialty Equipment Waivers:

10. Copies of the appropriate pages of the technical specification related to the equipment showing the choices for manufacturers or other information that limits the choice of vendor.

11. Letter, e-mail or screenshot of website from the manufacturer listing their distributors in NYS and the locations.

12. Screenshots of ESD's MWBE Directory searches for the manufacturer and distributor showing that they are not found in the Directory.

13. An invoice or purchase order showing the value of the equipment.

Additional Documentation for Requests for Specialty Service Waivers:

14. A letter of explanation containing information about the scope of work and why no MWBE firms could be subcontracted to provide that service.

Note: Unless a Total Waiver has been granted, Firms will be required to submit all reports and documents pursuant to the provisions set forth in the procurement and/or contract, as deemed appropriate by EFC, to determine MWBE compliance. In cases where EFC accepts a full or partial waiver of MWBE participation goals, the waiver request will be posted to EFC's website.

SIGNATURE	
Electronic Signature of Contractor: ☐ I certify that the information submitted herein is true, accurate and complete to the best of my knowledge. **Name:** (Please Type)**:**	**Date:**

Attachment 6
United States Environmental Protection Agency
Form 6100-2
DBE Subcontractor Participation Form

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Participation Form

An EPA Financial Assistance Agreement Recipient must require its prime contractors to provide this form to its DBE subcontractors. This form gives a DBE[1] subcontractor[2] the opportunity to describe work received and/or report any concerns regarding the EPA-funded project (e.g., in areas such as termination by prime contractor, late payments, etc.). The DBE subcontractor can, as an option, complete and submit this form to the EPA DBE Coordinator at any time during the project period of performance.

Subcontractor Name	Project Name	
Bid/ Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact
Address		
Telephone No.	Email Address	
Prime Contractor Name	Issuing/Funding Entity:	

Contract Item Number	Description of Work Received from the Prime Contractor Involving Construction, Services , Equipment or Supplies	Amount Received by Prime Contractor

[1] A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

[2] Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Participation Form

Please use the space below to report any concerns regarding the above EPA-funded project:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Subcontractor Signature	Print Name
Title	**Date**

Attachment 7
United States Environmental Protection Agency
Form 6100-3
DBE Subcontractor Performance Form

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Performance Form

This form is intended to capture the DBE[1] subcontractor's[2] description of work to be performed and the price of the work submitted to the prime contractor. An EPA Financial Assistance Agreement Recipient must require its prime contractor to have its DBE subcontractors complete this form and include all completed forms in the prime contractors bid or proposal package.

Subcontractor Name	Project Name	
Bid/ Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact
Address		
Telephone No.	Email Address	
Prime Contractor Name	Issuing/Funding Entity:	

Contract Item Number	Description of Work Submitted to the Prime Contractor Involving Construction, Services , Equipment or Supplies	Price of Work Submitted to the Prime Contractor

DBE Certified By: ___ DOT ___ SBA ___ Other: _____	Meets/ exceeds EPA certification standards? ___ YES ___ NO ___ Unknown

[1] A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

[2] Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Performance Form

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware of that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

Prime Contractor Signature	Print Name
Title	**Date**

Subcontractor Signature	Print Name
Title	**Date**

Attachment 8
United States Environmental Protection Agency
Form 6100-4
DBE Subcontractor Utilization Form

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Utilization Form

This form is intended to capture the prime contractor's actual and/or anticipated use of identified certified DBE[1] subcontractors[2] and the estimated dollar amount of each subcontract. An EPA Financial Assistance Agreement Recipient must require its prime contractors to complete this form and include it in the bid or proposal package. Prime contractors should also maintain a copy of this form on file.

Prime Contractor Name		Project Name
Bid/ Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact
Address		
Telephone No.		Email Address
Issuing/Funding Entity:		

I have identified potential DBE certified subcontractors	○ YES	◉ NO
If yes, please complete the table below. If no, please explain:		

Subcontractor Name/ Company Name	**Company Address/ Phone/ Email**	**Est. Dollar Amt**	**Currently DBE Certified?**

Continue on back if needed

[1] A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

[2] Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Utilization Form

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware of that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

Prime Contractor Signature	Print Name
Title	**Date**

Attachment 9
New York State Environmental Facilities Corporation
CERTIFICATION REGARDING LOBBYING
FOR
CONTRACTS, GRANTS, LOANS, AND
COOPERATIVE AGREEMENTS
40 CFR Part 34

SRF Project No.: _____

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

By: _____
Name: _____
Title: _____
Date: _____
Contract ID: _____

TECHNICAL SPECIFICATIONS

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.1 Scope of Work

A. The Work to be performed under this Contract and in accordance with these Specifications consists of, but is not limited to, furnishing of all equipment, superintendents, labor, skill, material and all other items necessary as for the Bioretention Basin and Related Improvements at the Manor Place Project located in Greenport, New York. The Contractor shall perform all Work required for such construction in accordance with the Contract Documents and subject to the terms and conditions of the Contract, complete and ready for use.

B. The Contractor shall furnish all labor, materials, equipment and appurtenant work necessary to construct all work as shown, specified and required for the Water Quality Improvements and Related work at the Manor Place Project.

The general project requirements (in no particular order):

1. Locate existing utilities; retain an independent contractor to assist in locating all on site utilities.
2. Installation of pervious pavers.
3. Installation of porous pavement.
4. Installation of outlet structure.
5. Installation of park bench.
6. Installation of water tight frame and grates.

1.2 Contract Documents

A. The Work to be done is shown on the set of Contract Drawings entitled Bioretention Basin and Related Improvements at the Manor Place Project, Village of Greenport, New York and described in the Contract Specifications.

1.3 General Arrangement

A. Any incidental removals, temporary relocations, protection of exiting shrubbery and roots, protection of existing structures, walkways, buildings, temporary furnishings, compliance with all safety regulations are part of this Contract and shall be included herein as needed to conduct this work and meet the requirements of the Contract.

1.4 Time of Work

A. Overtime work shall be considered as normal procedure under this Contract, and the Contractor shall make no claims for extra compensation as a result thereof.

B. Unless otherwise specifically permitted, all work that would be subject to damage shall be stopped during inclement, stormy or freezing weather. Only such work as will not suffer injury to workmanship or materials will be permitted. The Contractor shall carefully protect his Work against damage or injury from the weather, and when work is permitted during freezing weather shall provide and maintain approved facilities for heating the materials and for protecting the finished Work.

1.5 Site Inspections

A. The proposed bidder and contractor for this work shall thoroughly examine the site conditions including the interior and exterior of all systems, manholes, structures, locations, etc. subject to the work. In no circumstances shall a claim be considered for any existing condition that is part of this construction.

B. Manholes, chambers, etc. are confined spaces as defined by the Federal and state regulations governing confined space entry and safety procedures in such areas. The Contractor shall be solely responsible for compliance with OSHA, NIOSH and all other pertinent regulations in performing this work. The contractor shall prepare a complete confined space entry plan to be used for this project. The Contractor shall be solely responsible for ensuring that only personnel who have received proper training perform any work requiring confined space entry. The contractor is responsbile for supplying the necessary confined space equipment and is responsible to fulfill the rescue requirements mandated by OSHA for confined space entry.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 01050

FIELD ENGINEERING

PART 1 – GENERAL

1.1 General

A. The Contractor will establish bench marks for use by the Contractor and his subcontractors, all other layout work shall be in accordance with the Contract Documents. The Engineer shall provide the Contractor with an AUTOCAD disk of the design drawings for his use.

B. Contractor shall:

1. Provide civil, structural or other professional engineering services specified, or required to execute Contractor's construction methods.

2. Develop and make all detail surveys and measurements needed for construction.

3. Provide a transit and leveling instrument, stakes and accessories on the site at all times and a skilled instrument man employed or obtained whenever necessary for layout of the Work.

4. Provide all material required for bench marks, control points, batter boards, grade stakes, and other items.

5. Be solely responsible for all locations, dimensions and levels. No data other than written order of the Owner shall justify departure from the dimensions and levels required by the Drawings.

1.2 Datum Plane

A. All elevations shown on the Contract Plans or specified refer to the Project Datum, Contractor to establish bench mark.

1.3 Contractor's Field Engineer

A. The Contractor shall employ and retain at the Site of the Work a field engineer and/or superintendent capable of performing all engineering tasks required of the Contractor. Tasks shall include as a minimum:

1. A projection of work to be completed the following day must be submitted to the Engineer by 4:00 p.m. of the preceding work day. This projection must include:

a. Location of all areas in which construction will be done.

b. Number of workers required each day

b. Major construction equipment utilized.

c. Equipment and materials to be installed.

2. Furnish all required lines and grades for construction operations. Check all formwork, reinforcing, subgrade, asphalt, other materials and equipment.

3. Maintain field office files and drawings, and Record Drawings. Prepare Layout and Coordination Drawings for construction operations.

4. Check and coordinate Work for conflicts and interferences and immediately advise the Engineer of all discrepancies noted.

5. Cooperate with Engineer in field inspections as required.

6. Follow without delay all instructions of the Engineer or assistants in the prosecution and completion of the work in conformity with this Contract. The Contractor's representative shall have full authority to supply labor and materials immediately.

7. The Contractor shall also have a competent representative available to receive telephone messages and provide a reasonable reply as soon as possible, but not later than 24 hours.

1.4 Qualifications of Field Superintendent

A. Qualified superintendent acceptable to the Engineer and Owner.

1.5 Locating Underground Utilities

A. The locations of all utilities shown on the contact drawings are based on available in-house information furnished by the owner and utility companies and public agencies with lines and property in the vicinity of the proposed work areas and are not guaranteed to be complete or accurate. The Contractor shall obtain utility mark outs on all public and private properties in accordance with all local and state requirements where work under this contract is to be performed. Prior to any excavation or construction the Contractor shall notify the owner, all utility companies and applicable agencies and request a mark out of their lines and properties in the field in the area of the proposed work. In addition, on the project site (outside of public right of way), the Contractor shall provide the services of an independent utility mark out service subcontractor qualified to locate and mark out all utilities in the vicinity of the work using the appropriate equipment and methods available prior

to construction. The subcontractor shall survey (location/ elevation) and prepare a utilities location as-built drawing for the use by the contractor in performance of the work under this contract.

1.6 As-built Survey

A. The Contractor is to provide an as-built survey using a licensed professional surveyor after construction is complete. Contractor is to provide as-built survey electronically on a CD with its raw data and information in AutoCAD 2013 or newer along with a PDF set. Three sets of drawings are required prior to project close out. Each and every sheet provided in the design set and more sheets, if needed, are to be included in the as-built set.

1.7 Contractor Cost for Engineers Services

A. In the event that the Engineer is required to provide additional engineering services as a result of substitution of materials or equipment which are not "or equal" by the Contractor, or changes by the Contractor in dimension, weight, power requirements, etc. of the equipment and accessories furnished, or as a result of the Contractor's errors, omissions or failure to conform to the requirements of the Contract Documents or if the Engineer is required to examine and evaluate any changes proposed by the Contractor solely for the convenience of the Contractor, then the Engineer's charges in connection with such additional services shall be charged to the Contractor by the Owner.

B. For all Shop Drawings related to this Contract:

1. The Contractor shall respond to required submittals with complete information and accuracy to achieve required approvals within two submissions. All costs to the Consulting Engineer involved with subsequent submission of the Shop Drawings, Samples or other items requiring approval, will be back charged to the Contractor at a rate of $350 per shop drawing submittal or the actual cost based upon the number of hours to review the submittal times the Engineers' normal billing rate, whichever is greater. These costs shall be deducted from payments due for Work completed by the Contractor. In the event an approved item is requested by the Contractor to be changed or substituted for, all involved costs in the reviewing and approval process will likewise be back charged to the Contractor unless judged by the Engineer that the need for such deviation from previously approved data is beyond the control of the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 -EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 01150

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 Description

A. The items listed below constitute all of the pay items for the completion of the Work. No direct or separate payment will be made for providing miscellaneous temporary or accessory works, plant services, layout surveys, job signs, sanitary requirements, testing, reparation of damages produced by Contractor, safety devices, approval and Record Drawings, water supplies, power, maintaining traffic, removal of waste, watchmen, Bonds, insurance, and all other requirements of the Contract, General and Supplementary Conditions. Compensation for all such services, things and materials shall be included in the price stipulated for the lump sum listed herein.

1.2 Estimate of Quantities

A. The estimated quantities for the lump sum and select unit bid prices, as listed in the Bid Sheets, are approximate only and are included solely for the purpose of comparison of Bids. The Owner does not expressly or by implication agree that the nature of the materials encountered below the surface of the ground or the actual quantities of material encountered or required will correspond therewith and reserves the right to increase or decrease any quantity or to eliminate any quantity as the Owner may deem necessary. Contractor will not be entitled to any adjustment in a lump sum and select unit bid price as a result of any change in an estimated quantity and agrees to accept the aforesaid lump sum and select unit bid prices as complete and total compensation for any additions or deductions caused by a variation in quantities as a result of more accurate measurement, or by any changes or alterations in the Work approved by the Owner, and for use in the computation of the value of the Work performed for Partial Payments.

1.3 General Construction

A. For providing all mobilization, temporary systems, surveying, demobilization, permitting, traffic control, dewatering, shoring, bracing, restoration, etc. and all labor, material and equipment necessary to complete all work as shown on the Contract Drawings and in accordance with the project Manual and Specifications.

1.4 Unit Cost Items

A. In the event unit price items are added to the Contract, for any unit price item, the Contractor will be paid at the unit price bid for any quantity up to one hundred twenty five (125%) percent of the estimated quantity for that item set forth in the bid

sheets. If during the progress of the Work, the actual quantity of any unit price item required to complete the Work approaches the estimated quantity for that item, and for any reason it appears that the actual quantity of any unit price item necessary to complete the Work will exceed the estimated quantity for that item by twenty five (25%) percent, the Contractor shall immediately notify the Owner of such anticipated overrun. The Contractor shall not be compensated for any quantity of a unit price item provided which is in excess of one hundred twenty five (125%) percent of the estimated quantity for that item set forth in the bid sheets without written authorization from the Owner.

B. If the actual quantity of any unit price item necessary to complete the Work will exceed one hundred twenty (125%) percent of the estimated quantity for that item set forth in the bid sheets, the Owner reserves the right and the Contractor agrees to negotiate a new unit price for such item in accordance with the change order provisions of this Contract. In no event shall such negotiated new price exceed the unit bid price. If the Owner and the Contractor cannot agree on a new price, then the Contractor shall provide additional quantities of the item on a time and materials basis at the direction of the Owner for the actual and reasonable cost, but in no event at a unit price exceeding the unit price bid.

1.5 Damages by Contractor

A. No payments shall be made for reparation of damages caused by Contractor.

1.6 Contractor Pay Requisitions

A. The Contractors shall submit monthly payment requisitions, prepared as directed by the Engineer. A maximum of one payment requisition shall be submitted each month.

B. The Contractor may, at the approval of the Engineer, submit payment for unit cost items based upon agreed upon estimated amounts each month prior to completion of as built surveys.

C. Final red line only as-built surveys must be submitted and accepted by the engineer prior to final payment.

1.7 Measurement and Payment Conditions

A. The contract for this work is broken down among 2 project element designated as 1-1 and 1-2.

B. Where an item is referenced to “furnish and install” this shall refer to the planning, procurement, demolition, testing, installation, clean-up, etc. necessary to constitute a fully functional system.

1.8 Bid Items

1-1	(Manor Place) Complete installation and demolition of all systems described in these Contract Documents include but not limited to furnishing, testing, installing all components of pervious pavers, landscaping, porous pavement, outlet structure capping two existing catch basins, and educational sign as required to constitute a fully furnished system.
1-2	Complete installation of bench and guide rail system described in Contract Documents include but not limited to furnishing, testing and installing all components.

+ + END OF SECTION + +

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SECTION 01300

SUBMITTALS

PART 1 – GENERAL

1.1 Related Documents

A. Drawings and general provisions of Contract apply to this Section.

1.2 Summary

A. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including;

1. Contractor's construction schedule.
2. Submittal schedule.
3. Construction reports.
4. Construction photographs.
5. Shop Drawings.
6. Product Data.
7. Samples.

B. Administrative Submittals: Such submittals include, but are not limited to:

1. Permits.
2. Schedule of values.
3. Applications for payment.
4. Performance and payment bonds.
5. Insurance certificates.
6. List of Subcontractors.

1.3 Submittal Procedures

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.

Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.

The Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

B. Processing: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals.

Allow two weeks for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Architect will promptly advise the Contractor when a submittal being processed must be delayed for coordination.

If an intermediate submittal is necessary, process the same as the initial submittal.

Allow two weeks for reprocessing each submittal.

No extension of Contract Time will be authorized because of failure to transmit submittals to the Engineer sufficiently in advance of the Work to permit processing.

C. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.

Provide a space approximately 4" x 5" on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.

Include the following information on the label for processing and recording action taken.

1. Project name.

2. Date.

3. Name and address of Engineer.

4. Name and address of Contractor.

5. Name and address of subcontractor, if applicable.

6. Name and address of supplier, if applicable.

7. Name of manufacturer.

8. Number and title of appropriate Specification Section.

9. Drawing number and detail references, as appropriate.

D. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Engineer using a transmittal form. Submittals received from sources other than the Contractor will be returned without action.

On the transmittal Record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.

1.4 Contractor's Construction Schedule

A. Construction Schedule: Prepare a fully developed, horizontal bar-chart type Contractor's construction schedule. Submit within 30 days of the date established for "Commencement of the Work".

1.5 Submittal Schedule

A. After development and acceptance of the Contractor's construction schedule, prepare a complete schedule of submittals. Submit the schedule within 10 days of the date required for establishment of the Contractor's construction schedule. Coordinate submittal schedule with the list of subcontracts, schedule of values and the list of products as well as the Contractor's construction schedule.

B. Construction Photographs: Furnish 2 sets of project photographs (minimum of 25 photos per month) at monthly intervals in CO format. Comply with Engineer's direction concerning desired vantage points for shots. Project photographs to be submitted monthly to Engineer with Contractor's application for payment.

1.6 Shop Drawings

A. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.

Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:

1. Dimensions.

2. Identification of products and materials included.

3. Compliance with specified standards.

4. Notation of coordination requirements.

5. Notation of dimensions established by field measurement.

Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2" x 11" but no larger than 36" x 48".

Initial Submittal: Submit one (1) draft print for the Engineer's review.

Final Submittal: Submit five (5) sets, 2 prints will be returned.

One of the prints returned shall be marked-up and maintained as a "Record Document". Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.

1.7 Engineer's Action

A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Engineer will review each submittal, mark to indicate action taken, and return promptly.

Compliance with specified characteristics is the Contractor's responsibility

B. Action Stamp: The Engineer will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:

I. Approved: Where submittals are marked "No Exception Taken," that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.

II. Marked "Approved as Noted": When submittals are marked "Make Correction Noted," that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.

III. Revise and Resubmit: When submittal is marked "Revise and Resubmit," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.

IV. Disapproved: When submittal is marked “disapproved,” do not proceed with the part of the work covered by the submittal. Prepare a new submittals in accordance with the contract documents; resubmit without delay.

Do not permit submittals marked "Disapproved" to be used at the Project site, or elsewhere where Work is in progress.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

NO TEXT ON THIS APGE

SECTION 01700

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of Contract, apply to this Section.

1.2 Summary

A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:

1. Inspection procedures.

2. Project record document submittal.

3. Operating and maintenance manual submittal.

4. Submittal of warranties.

5. Final cleaning.

B. Closeout requirements for specific construction activities are included in the appropriate Sections in Division 2 through Division 18.

1.3 Substantial Completion

A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.

In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.

1. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.

Advise Owner of pending insurance change-over requirements.

Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.

Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities; include occupancy permits, operating certificates and similar releases.

Submit record drawings, maintenance manuals, final project photographs, damage or settlement survey, property survey, and similar final record information.

Deliver tools, spare parts, extra stock, and similar items.

Make final change-over of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of change-over in security provisions.

Complete testing of systems. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.

Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.

B. Inspection Procedures: On receipt of a request for inspection, the Engineer will either proceed with inspection or advise the Contractor of unfilled requirements. The Engineer will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1. The Engineer will repeat inspection when requested and assured that the Work has been substantially completed.

2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.4 Final Acceptance

A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.

3. Submit a certified copy of the Engineer's final inspection list of items to be completed or corrected, stating that each item has been completed or

otherwise resolved for acceptance, and the list has been endorsed and dated by the Engineer.

4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion, or when the Owner took possession of and responsibility for corresponding elements of the Work.

5. Submit consent of surety to final payment.

6. Submit a final liquidated damages settlement statement.

7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Reinspection Procedure: The Engineer will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Engineer.

1. Upon completion of reinspection, the Engineer will prepare a certificate of final acceptance, or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

2. If necessary, reinspection will be repeated.

1.5 Record Document Submittals

A. General: Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Engineer's reference during normal working hours.

B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

1. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.

2. Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings.

3. Note related Change Order numbers where applicable.

4. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.

C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawing information and Product Data.

1. Upon completion of the Work, submit record Specifications to the Engineer for the Owner's records.

D. Record Product Data: Maintain one copy of each Product Data submittal. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendations. Give particular attention to concealed products and portions of the Work which cannot otherwise be readily discerned later by direct observation. Note related Change Orders and mark-up of record drawings and Specifications.

Upon completion of mark-up, submit complete set of record Product Data to the Architect for the Owner's records.

E. Record Sample Submitted: Immediately prior to the date or dates of Substantial Completion, the Contractor will meet at the site with the Architect and the Owner's personnel to determine which of the submitted Samples that have been maintained during progress of the Work are to be transmitted to the Owner for record purposes. Comply with delivery to the Owner's Sample storage area.

F. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record-keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Engineer for the Owner's records.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

+ + END OF SECTION + +

SECTION 02140

DEWATERING

PART 1 - GENERAL

1.1 Work Included

A. The Contractor shall furnish all labor, materials, and equipment, and perform all work necessary to lower and control the groundwater levels and hydrostatic pressures to permit the installation of the work.

B. The work shall include the installation, testing, operation, maintenance, supervision, dewatering, rewatering, and final dismantling and removal from the site of the dewatering system as described herein. It shall also include the cost of any replacement or rehabilitation of the subgrade or structures damaged due to dewatering system failures or Contractor negligence. The Contractor shall be responsible for compliance with all regulations relating to this work in accordance with the requirements of the General Conditions.

C. Dewatering shall include the diversion, collection, and removal of all ice, snow and surface runoff from the work areas; and removal of groundwater from new excavations to permit construction in the dry.

D. The Contractor shall select the specific type, size and arrangement of the dewatering system to perform correctly and as described herein.

1.2 Related Work

A. Earthwork shall be in accordance with Section 02200.

1.3 General Information

A. Prior to any excavation, the dewatering system shall be placed in operation to lower the water level, as required. Thereafter, the system shall be operated continuously 24 hours per day, 7 days per week until all work has been satisfactorily completed, including placement of fill materials, and dewatering is no longer required as noted in Paragraph 3.12; all as determined by the Village. An adequate weight of fill material shall be in place to prevent buoyancy prior to discontinuing operation of the dewatering system.

B. The Contractor shall provide power for the dewatering, including all costs for installation, energy and fuel. Standby power shall be supplied by diesel powered engine generators.

1.4 Examination of the Site

A. The Contractor shall take all the steps considered necessary to familiarize himself with the surface and subsurface site conditions, and shall obtain the data that is required to analyze the water and soil environment at the site and to assure that the materials used for the dewatering systems will not erode, deteriorate, or clog to the extent that the dewatering systems will not perform properly during the period of the dewatering.

B. Prior to starting dewatering operations the Contractor and the Village shall make a joint inspection of the condition of all existing structures on the site to establish their present condition. Photographs shall be taken to record any conditions that may become the subject of possible damage claims against the Contractor. Photographs shall be taken in accordance with the requirements of the General Conditions.

1.5 Submittals

A. The Contractor shall prepare and submit a notification letter to the Village with

1. The proposed starting date of the dewatering operation.

2. The details of the dewatering system to be installed.

3. The pump capacity, pumping rate, and expected volume of water to be withdrawn.

4. The location of water discharge.

5. The expected duration of the operation.

B. Shop Drawings

Each submittal shall be complete in all respects incorporating all information and data listed herein and all additional information required for evaluation of the proposed Dewatering System's compliance with the Contract Documents.

Partial, incomplete or illegible submissions will be returned to the Contractor without review for resubmittal.

Shop drawings shall include, but not be limited to:

1. Plans showing the methods and location of dewatering and discharge. The drawings shall include a sufficient number of detailed sections to clearly illustrate the scope of work. The relationship of the dewatering system, discharge line to existing buildings, other structures, utilities, streets and

new construction shall be clearly indicated. Utility locations shall be shown.

2. Lists of materials and equipment to be used including details of installation.

The Village's review of shop drawings and related submittals shall be made to verify that the general scope of work is adequate, and that the Contractor is qualified to perform the work as shown on the drawings. Acceptance of the Contractor's plans and methods of construction by the Village shall not be construed to relieve the Contractor in any way from his responsibility for the successful performance of the dewatering work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 Dewatering System Requirements

A. General

The dewatering system shall be installed from the existing ground surface or from the bottom of an excavation which is located above the groundwater level. The system design shall be based on the groundwater level and shall be capable of relieving all hydrostatic pressure against the height of the excavation walls and lowering the hydrostatic level below the bottom of the subgrade a minimum of 3 feet in the work areas both prior to excavation, and during excavation and construction.

B. Responsibility

The Contractor shall be solely responsible for the design, construction, arrangement, location, and depths of the dewatering system necessary to accomplish the work described herein. The dewatering shall be accomplished in a manner that: will prevent the loss of fines, seepage, boils, quick conditions or softening of the foundation strata; will maintain stability of the sides and bottom of the excavation; and will result in all construction operations being performed in the dry.

C. Dewatering Criteria

Only after the entire dewatering system has been installed, the system tested to the Village's satisfaction, and all temporary earth support systems within the affected

drawdown area have been installed to their full depth will dewatering of the excavation be allowed.

3.2 Coordination

The scheduling and progress of the dewatering work shall be coordinated with all other related work such as excavation, sheeting, pouring of concrete walls and slabs, force main installation, backfill and compaction, or any other operation that might be affected by this work.

3.3 Surface Water

The Contractor shall provide, operate and maintain all ditches, berms, site grading, sumps and pumping facilities to divert, collect and remove all surface water from work areas. All collected water shall be discharged, as indicated on the Drawings and/or as approved by NYSDEC.

3.4 Disposal of Dewatering System Discharge

The discharge from the dewatering system shall be carried in pipes out of the area of the work and discharged as shown on the Drawings and/or as approved by the Village.

3.5 Performance

A. Ground water shall not be discharged directly into creeks, ponds, lakes or waterways without written permission from the proper authorities.

B. All catch basins or recharge basins adversely affected by the accumulation of silt resulting from dewatering operations, shall be restored by the Contractor to their original condition. This work shall be done at no additional cost the Village.

C. Noise levels for dewatering pumps measured at a distance of 25 feet from the pumps shall not exceed 60 db.

+ + END OF SECTION + +

SECTION 02200

EARTHWORK

PART 1 - GENERAL

1.1 Summary

A. Scope:

1. Contractor shall perform all excavating, backfilling, compacting and disposing of earth materials as shown, specified, and required for the purpose of constructing pipelines, concrete work, grading, and other facilities.

2. All necessary preparation of subgrade shall be included.

3. For the purpose of disposal and relocation, excavated materials shall be classified as follows:

   a. Organic materials, shall be disposed off-site at Department of Environmental Conservation approved disposal sites.

4. Compaction and testing. Compaction and compaction testing shall be performed on this project. An independent compaction testing monitoring firm routinely engaged in this work shall be employed by the contractor to test and report on compaction.

B. Sources of Materials:

1. Non-frost susceptible fill material shall be obtained from on-site sources, as necessary.

2. Crushed stone materials shall be obtained from off-site sources.

3. Topsoil, except for topsoil stripped from the work areas, shall be obtained from off-site sources.

1.2 Submittals

A. Submit the following in accordance with Section 01300, “Submittals”:

1. Shop Drawings: Submit plans of open cut excavations showing side slopes and limits of the excavation at grade where not shown on the Contract Drawings.

2. Independent Testing Laboratory: Prior to conducting the required tests, the Contractor shall submit, to the Engineer, for approval, the name of the independent test laboratory which will facilitate the required testing.

3. Samples and Test Results:

   a. At least 2 weeks prior to the date of anticipated use, the Contractor shall submit, to the Engineer, for approval, a representative sample of all off-site material required. The Contractor shall notify the Engineer in writing of the source of each sample.

   b. The Contractor shall provide, along with the above samples, the required test results, excluding the field density test.

4. Disposal Sites: List of disposal sites for unsuitable materials and all required permits for use of the sites.

5. Manufacturer's Data: Submit for approval manufacturer's specifications, performance characteristics and operating instructions for the compaction equipment.

1.3 Quality Assurance

A. Permits and Regulations: Contractor shall perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

B. Reference Standards: Comply with applicable provisions and recommendations of the following except as otherwise shown or specified.

1. ASTM D 422, Particle-Size Analysis of Soils.

2. ASTM D 2922, Nuclear Density Gauge of Soils.

3. ASTM D 1557, Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, using 10-pound (4.54 kg) Rammer and 18-inch (457 mm) Drop.

C. Tests:

1. An independent testing laboratory shall be employed by the Contractor to perform the required tests.

2. Required tests for all existing soils to be re-used as top soil or fill (select, organic or granular) and for all imported borrow fill or top soil:

   a. Gradation, ASTM D 422.

   b. Moisture Density Relationship (Modified Proctor), ASTM D 1557.

c. Optimum Moisture: Maximum density curve for each soil used for backfill.

d. Field Density Tests on each lift of backfilled material: ASTM D1556, ASTM D2167 or ASTM D2922.

e. Minimum of five (5) tests consisting of items a – d above to be approved by the Engineer.

1.4 Job Conditions

A. Existing Structures:

1. Shown on the Drawings are certain utilities and surface and underground structures located on or adjacent to the Work. This information has been obtained from existing records. It is not guaranteed to be correct or complete and is shown for the convenience of the Contractor. Contractor shall explore ahead of the required excavation to determine the exact location of all structures and utilities. They shall be supported and protected from injury by the Contractor. If they are broken or injured, they shall be restored immediately by the Contractor at no additional cost to the Owner.

2. Prior to execution of the Work, the Contractor shall check and verify governing dimensions and elevations. The Contractor and Engineer shall jointly survey the condition of adjoining structures. Photographs and records shall be made of any prior settlement or cracking of structures, pavements, and the like, that may become the subject of possible damage claims.

B. Existing Utilities:

1. Locate existing underground utilities in the areas of Work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.

2. Should uncharted or incorrectly charted piping or utilities be encountered during excavation, consult the Owner in keeping respective services and facilities in operation. Repair damaged utilities to the satisfaction of the Engineer.

3. Do not interrupt existing utilities serving facilities occupied and used by the Owner or others, except when permitted in writing by Engineer.

4. Demolish and completely remove existing underground utilities indicated to be removed.

C. Protection of Persons and Property:

1. Barricade open excavations occurring as part of this Work and post with warning lights. Operate warning lights during hours from dusk to dawn each day and as otherwise required.

2. Protect structures, utilities, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by Contractor's operations.

3. Consult Engineer and obtain his approval before removing or disturbing pipes, structures, or other facilities that are encountered on the line of the excavation.

4. Structures, utilities, sidewalks, pavements and other facilities removed or disturbed shall be replaced to their original condition, unless otherwise shown, specified or directed.

D. Odor Control: As an odor abatement measure, cover, at the end of each work day, all areas of organic or odorous material which were exposed during excavation with a minimum 6-in and a maximum 24-inch deep of clean fill. Excavated organic or odorous material shall be immediately removed off-site and shall not be stockpiled on-site.

E. Roadways and Walks: Unless otherwise approved by Engineer, excavated material and materials of construction shall be so deposited, and the Work shall be so conducted, as to leave open and free for vehicular traffic a roadway not less than 10 feet in width. All hydrants, valves, and other facilities which may require access during construction shall be kept accessible for use. During the progress of the Work, Contractor shall maintain such roadways in satisfactory condition and the Work shall at all times be so conducted as to cause a minimum of inconvenience to the Owner and Pedestrians.

PART 2 - PRODUCTS

2.1 General Requirements for Fill

A. All fill material shall be free of refuse and organic matter, frozen material and other objectionable material.

B. Excavated materials meeting these requirements and the requirements stipulated below for the appropriate type of fill material shall be used when approved by the Engineer as general fill, not as fill for the rain garden bends. Otherwise the Contractor shall excavate, haul and place material from approved off-site sources.

C. All materials shall be subject to inspection by the Engineer. Material not meeting the above specifications shall not be accepted. All costs associated with reprocessing of rejected material shall be borne by the Contractor.

2.2 Soil Materials

A. Crushed aggregate: Shall consist of crushed stone or crushed gravel conforming to the following gradation:

Sieve Size	Percent Retained on Sieve
3/4-inch	85-100 (throughout)

B. Unsuitable Material: All soils not meeting the requirements of Paragraphs A, B, C, D, E and F, and all organic materials.

C. Geotextile Materials:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include, but are not limited to, the following:

   a. Amoco Fabrics and Fibers Co.

   b. Hoechst Celanese Corp.

   c. Nicolon Mirafi Group.

2. Warning Tape: Acid and alkali-resistant polyethylene film warning tape manufactured for marking and identifying, underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility. Provide tape colors to utilities as follows:

   a. Red: Electric

   b. Orange: Telephone and Communications

   c. Blue: Water

PART 3 - EXECUTION

3.1 Inspection

A. Contractor shall provide Engineer with sufficient time and means to examine the areas and conditions under which excavating, filling, and grading are to be performed. Work shall not proceed until all unsatisfactory conditions have been corrected in a manner acceptable to Engineer.

3.2 Erosion Control

See Section 02270, Sedimentation and Erosion Control

3.3 Excavation

A. General:

1. Contractor shall perform all excavation required to complete the Work as shown and specified. All material excavated shall be nonclassified. It shall include all materials such as earth, sand, clay, gravel, hardpan, boulders, organic materials, rock, rubbish and all other materials within the excavation limits.

2. Excavations shall be open type, shored and braced where necessary to prevent injury to workmen and to new and existing structures or pipelines.

3. All excavations shall be made in the dry.

4. Dispose of excavated material and waste materials as specified herein.

B. Pipeline Excavation:

1. Pipe trenches shall be excavated below the pipe bottom to allow for pipe bedding material.

2. Trench width shall be minimized to greatest extent practical but shall conform to the following:

a. Sufficient to provide room for installing, jointing and inspecting piping, but in no case wider at top of pipe than pipe barrel outside diameter plus 2 feet.

b. Enlargements at pipe joints may be made if required and approved by Engineer.

c. Sufficient for sheeting, bracing and sloping.

d. Sufficient to allow thorough compacting of sand adjacent to bottom half of pipe.

e. Do not use excavating equipment which requires the trench to be excavated to excessive width.

C. Structure Excavation:

1. Excavation shall be made to the grades shown on the Contract Drawings and to such widths as will give suitable room for construction of the structures, for bracing and supporting, pumping and draining. The bottom of the excavations shall be rendered firm and dry and in all respects acceptable to the Engineer.

2. Excavation shall be accomplished by methods which preserve the undisturbed state of subgrade soils. For structures having multiple bearing levels or adjacent structures at different levels, excavation and foundation construction shall first be accomplished at the lowest levels to prevent undermining foundations and disturbing adjacent bearing soils at higher levels.

3. Excavation equipment shall be satisfactory for carrying out the work in accordance with the Specifications. Earth shall not be plowed, scraped, or dug with machines so near to the finished subgrade as to result in excavation of, or disturbance of material below grade.

4. When excavation for foundations has reached final depths, the Engineer shall be notified and will inspect conditions. If materials and conditions are not satisfactory to the Engineer, the Engineer will issue instructions as to the procedures for correction of the unsatisfactory condition.

5. During final excavation to subgrade level, take precautions required to prevent disturbance of material. Hand excavate the final 6 inches as necessary to obtain a satisfactory undisturbed bottom.

D. Unsuitable Excavation:

1. If any over excavation occurs through error of the Contractor or for the Contractor’s convenience, it shall be refilled at the Contractor’s expense with concrete, select fill or other material satisfactory to the Engineer.

2. If Contractor fails to properly dewater the excavation or trench, or disturbs the subgrade or otherwise fails or neglects to conduct the excavation work in a manner that provides surface of subgrade in proper condition for construction, the Contractor shall remove all disturbed material and replace it with concrete, select fill, or other approved material at his own expense. The condition of the subgrade shall meet with the approval of the Engineer before any work is placed thereon.

3. If, in the opinion of the Engineer, the material, in its undisturbed natural condition, at or below the grade of the excavation indicated on the Drawings is unsuitable for foundations, or if organic or silty soil extends

below excavation depth, it shall be removed and be replaced with select fill or other suitable material. Suitable material excavated from the site shall be used before select fill from an outside source is permitted.

3.4 Sheeting, Shoring and Bracing

A. General:

1. Sheeting, shoring and bracing shall be used where necessary to prevent injury to workmen, structures, or pipe lines. Jetting for sheeting installation is prohibited.

2. All municipal, county, state and federal ordinances, codes, regulations and laws shall be observed. All trenches shall be shored with the minimal protection of sheeting listed in OSHA Regulations, 29 CFR, Part 1926, Subpart P - Excavations, Trenching and Shoring.

3. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.

4. Use of vibratory methods or hammers for installation is strictly prohibited.

5. Unless otherwise shown. specified, or ordered, all materials used for temporary sheeting shall be removed when work is completed. Such removal shall be made in a manner not injurious to the structure or its appearance or to adjacent Work.

6. If any bulkhead tie backs, support structures or other systems are uncovered during excavation, the Contractor shall immediately notify the Engineer. Tie-backs or other support structures shall be protected, restored to their original use and burial depth as required. At the completion of the project he Contractor shall retain the services of a professional geotechnical or structure engineer to certify in writing the systems have been inspected and are functional and suitable for continued use. Photographs or other evidence shall be provided in the report.

7. Relocated hospital informational signs shall be installed with new concrete footings as shown on plans. Contractor shall relocate, extend, reconnect, test and electrical connections to sign in accordance with NYS building code and NEC requirements.

8. The clearances and types of the temporary sheeting, insofar as they affect the character of the finished Work, will be subject to the approval of the Engineer but the Contractor shall be responsible for the adequacy of all sheeting, shoring, bracing and other related Work.

9. Safe and satisfactory installation of the sheeting shall be the entire responsibility of the Contractor.

10. The contractor shall submit a geotechnical and sheeting and shoring plan, signed and sealed by a New York State Professional Engineer for any sheeting and shoring over 4 feet below grade proposed on this project. The plan shall include crack and vibration monitoring on nearby structures to ensure no impact. In the event the existing nearby structures are impacted, the contractor shall repair or rehabilitate the strctures at no cost to the owner.

B. Removal of Sheeting and Bracing:

1. Remove sheeting and bracing from excavation unless otherwise ordered in writing by the Engineer. Removal shall be done so as to not cause injury to the Work. Removal shall be equal on both sides of excavation to ensure no unequal loads on pipe or structure.

2. Use of vibratory extractors is strictly prohibited.

3. Sacrificial sheeting can be left in place as approved by the Engineer. Defer removal of sheeting and bracing, where removal may cause soil to come into contact with concrete, until wall and floor framing up to and including grade level floors are in place and concrete has attained sufficient strength to withstand the soil and superimposed loads.

3.5 Backfill and Compaction

A. Fill excavations as promptly as Work permits, but not until completion of the following:

1. Acceptance by Engineer of all Work within the excavation.

2. Inspection, testing approval, and recording of locations of underground utilities, connections, branches, structures and other facilities.

3. Removal of temporary shoring and bracing, and backfilling of voids with satisfactory materials.

4. Removal of trash and debris.

B. Excavation shall be kept dry during backfilling operations. Backfills around piping and structures shall be brought up evenly on all sides.

C. All backfill shall be placed in layers not exceeding 6 inches in thickness, and each layer shall be compacted as specified below.

D. Backfill above and adjacent to pipe, and adjacent to buildings and walls shall be compacted by light weight equipment, such as "walk behind" vibratory plate compactors. Heavy self propelled compactors shall not be used until the following criteria are met:

1. A minimum of 18 inches of compacted backfill has been placed above the top of the pipe.

2. Area to be compacted is a minimum distance of 3 pipe diameters away from the adjacent pipe.

3. Area to be compacted is a minimum of 10 feet from building walls.

E. "Jumping jack" hammers shall not be used above pipes until a minimum of 3 feet of backfill has been placed and compacted.

F. Compaction Density Requirements:

1. Unless otherwise noted, the degree of compaction required for all types of fills shall be 95 percent in accordance with ASTM D 1557 (Modified Proctor Test). Material shall be moistened or aerated as necessary to provide the moisture content that will facilitate obtaining the specified compaction.

2. The Contractor shall notify the Engineer a minimum of 24 hours prior to starting any compaction operation.

3. Field density tests shall be made by an independent testing laboratory employed by the Contractor to determine the actual density attained in each layer of fill. No fill shall be placed over a layer which has not been tested and approved. Should these tests indicate that the density of any layer of fill or portion thereof is below the required density, the particular layer or portion thereof shall be reworked until the required density has been obtained. Field density test procedures shall conform with ASTM D2167, ASTM D1556, or ASTM D2922. All final test results shall be submitted to the Engineer for review. At least one test per lift or one test per 250 yards placed shall be performed, whichever is greater.

4. The moisture content of the fill material shall be at or slightly below the optimum moisture content for the soils being utilized during the entire time when the compactor is working on the fill. If, in the opinion of the Engineer, the fill is too dry for proper compaction, the Contractor shall spray the fill with a sufficient quantity of clean water to bring the fill layer to the proper moisture content. No compactive effort shall be made if the

fill is significantly above the optimum moisture content, unless specifically approved by the Engineer.

5. No fill material shall be placed, spread or compacted while the ground or fill is frozen or thawing or during unfavorable weather conditions. When work is interrupted, fill operations shall not be resumed unless the moisture content and density of the fill are as previously specified. The fill surface must be made smooth and free from ruts or indentations at the end of any working day when any significant precipitation is forecast and/or at the completion of the compaction operations in that areas, in order to prevent saturation of the fill material.

G. Contractor shall repair, at no additional cost to Owner, after settlement that occurs. He shall make all repairs and replacements necessary within 30 days after notice from the Engineer.

3.6 Grading

A. Uniformly grade areas within limits of the Work, including adjacent transition areas. Smooth subgrade surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

B. Turfed Areas: Finish areas to receive topsoil to within not more than 1-inch above or below the required subgrade elevations.

C. Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/4-inch when tested with a 10-foot straightedge.

D. Compaction: After grading, compact subgrade surfaces to the depth and percentage of maximum density required.

3.7 Disposal of Excavated Materials

A. No excavated materials suitable for common or select fill shall be removed from the site or disposed of by the Contractor except as directed by the Engineer. Materials shall be neatly piled at designated locations on-site.

B. Organic material and material which does not conform to the requirements for backfill shall be disposed of in compliance with these specifications.

C. Contractor shall not dump soil onto those areas designated as wetlands or waterways. Contractor shall not stockpile or store spoil, materials, tools or equipment on or near wetlands and waterways.

+ + END OF SECTION + +

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SECTION 02270

SEDIMENTATION AND EROSION CONTROL

PART 1 - GENERAL

1.1 Scope of Work

A. Erosion control shall include all work, materials and measures necessary to comply with NYSDEC guidelines to control soil erosion and sediment control resulting from construction operations, prevent flow of sediment from the construction site, and contain construction materials (including excavation and backfill) within protected working areas.

B. Any and all disturbed soil area shall be treated with re-seeding and an erosion control blanket as specified here in.

1.2 Quality Assurance

A. The contractor shall comply with the requirements of the NYSDEC as they relate to erosion control.

B. For the purposes of erosion stabilization and control either erosion control blankets as specified or hydro seeding using a flexible growth medium would be acceptable. This specification covers both alternatives.

PART 2 - PRODUCTS

2.1 Erosion Control Blanket

A. The Erosion Control Blanket shall be a temporary erosion control covering to protect the prepared seed bed from wind, precipitation and erosion, and allow for proper establishment of the vegetation. The Erosion Control Blanket shall be a machine produced mat of 70% agricultural straw and 30% coconut fiber.

B. The Erosion Control Blanket shall have a consistent thickness with the straw and coconut mixture evenly distributed over the entire area of the mat. The top surface of the mat shall be covered with UV stabilized, black polypropylene netting having approximately a 5/8-inch by 5/8-inch mesh size. The bottom surface of the mat shall be a light weight, photodegradable netting with approximately 1/2-inch x 1/2-inch mesh size. The blanket shall be sewn together on 2 inch centers (maximum) using biodegradable thread. The sewing shall secure the netting on each side of the mat to maintain the nets relative to the straw/coconut fiber core.

C. The Erosion Control Blanket shall have the following physical characteristics:

Core Material	70% agricultural straw evenly distributed at 0.35 lbs/sq. yard., 30% coconut fiber evenly distributed at 0.15 lbs./sq. yard.
Bottom Netting	Photodegradable netting with approximately 1/2-inch by 1/2-inch mesh size. Approximate weight 1.6 lb/1,000 sq. ft.
Top Netting	UV stabilized polypropylene netting with approximately 5/8-inch by 5/8-inch mesh size. Approximate weight 3.0 lbs/ 1,000 sq. ft.
Stitch	Biodegradable, with a stitch spacing no grater than 2.0 inches on center.
Roll Width	6.5 feet minimum.
Roll Length	No less than 80 feet.

D. The Erosion Control Blanket shall be SC150 as manufactured by North American Green, CS-2 as manufactured by Bon Terra America, or approved equal.

E. The Erosion Control Blanket shall be secured in place using heavy duty metal staples. The metal staples shall be U-shaped of the lengths shown on the Drawings, 1 inch wide and shall be fabricated from 11-gauge or greater diameter metal wire. The metal staples shall be furnished by the manufacturer of the Erosion Control Blanket and shall be suitable for the installed product and consistent with the manufacturer's recommendations.

2.2 Flexible Growth Medium

A. Flexible Growth Medium (FGM) shall be composed of long strand, thermally refined wood fibers, crimped, interlocking man-made fibers and performance enhancing additives. The FGM requires no curing period and upon application forms an intimate bond with the soil surface to create a continuous, porous, absorbent and flexible erosion resistant blanket that allows for rapid germination and accelerated plant growth.

B. The Flexible Growth Medium shall be Flexterra® FGM as manufactured by PROFILE Products LLC, 750 Lake Cook Road – Suite 440, Buffalo Grove, IL 60089, Phone - 800-366-1180, Fax - 847-215-0577, website – www.profileproducts.com or equal.

C. All components of the FGM shall be pre-packaged by the Manufacturer to assure material performance and in compliance with the following values:

1. Thermally Processed Wood Fibers 74.5% + 3.5%
2. Proprietary Crosslinked Hydro-Colloid Tackifiers and Activators 10% + 1%

3. Proprietary Crimped, Man-Made Interlocking Fibers 5% +1%
4. Moisture Content 10.5% + 1.5%

Under no circumstances will field mixing of additives or components be accepted.

D. Physical Characteristics

	TEST METHOD[1]	ENGLISH	SI
Physical			
Mass Per Unit Area	ASTM D6566	11.5 oz/yd^2	390 g/m^2
Thickness	ASTM D6525	0.19 in	4.8 mm
% Ground Cover	ASTM D6567	99%	99%
Water Holding Capacity	ASTM D7367	1500%	1500%
Color (fugitive dye)	Observed	Green	Green
Endurance			
Functional Longevity	Observed	$\leq$ 18 months	$\leq$ 18 months
Performance			
Cover Factor[2] (3"/hr)	TTI[4]	0.003	0.003
% Effectiveness[3]	TTI[4]	99.7%	99.7%
Cover Factor	ASTM D 6459[5]	0.001	0.001
% Effectiveness[3]	ASTM D 6459[5]	99.9%	99.9%
Shear Stress	ASTM D7207	1 lb/ft^2	48 Pa
Vegetation Establishment	ASTM D7322	800%	800%

1. ASTM test methods developed for Rolled and Hydraulic Erosion Control Products.
2. Cover Factor is calculated as soil loss ratio of treated surface versus an untreated control surface.
3. % Effectiveness = One minus Cover Factor multiplied by 100%.
4. TTI (Texas Transportation Institute) - large scale indoor rainfall simulator/2H:1V slopes, three - ½ hr. events on sandy soils. Clay soil values: Cover Factor – 0.001, Percent Effectiveness – 99.9%
5. Large scale rainfall simulator/test beds in conformance with "Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Performance in Protecting Hillslopes from Rainfall Erosion"

2.3 Product Delivery, Storage and Handling

A. Each roll of erosion control material delivered to the site shall be labeled by the manufacturer identifying the manufacturer's name, product identification, roll dimensions and direction for unrolling. Each roll of erosion control material shall be supplied wrapped in a watertight and opaque protective cover.

B. All erosion control material shall be properly stored to protect the materials from ultraviolet degradation, precipitation or other inundation, mud, dirt, dust, puncture, cutting, extreme heat caused by direct sunlight or any other damaging or deleterious conditions.

C. Materials which are damaged during shipment, storage, handling or installation shall be rejected, removed from the job site and replaced at no additional cost to

the Owner. The Contractor shall take special care to ensure that the integrity of the protective wrapping on each roll is maintained until the time of installation.

PART 3 - EXECUTION

3.1 General

A. Settling basins, plastic filter fabrics, hay bales or other erosion and sediment control measures approved by NYSDEC and as specified and shown on the Contract Plans shall be used where necessary to protect vegetation, wetlands and wetland buffer zones and to prevent sediment from either surface runoff or the dewatering operations from entering catch basins, surface waters, etc.

B. All soil erosion and sediment control practices are to be installed prior to any major soil disturbance and maintained until permanent protection is established.

C. Upon completion of construction activities, the area used for the tracking pad shall be returned to elevations and conditions which existed prior to start of construction.

D. The contractor shall take necessary measures to maintain dust control. Dirt haul roads shall be sprinkled with water or given a surface of crushed stone or wood chips as required. Vehicles shall be cleaned, as necessary, prior to using public streets. Paved roads shall be sprinkled with water.

E. All soil erosion and sediment control devices shall be located in the field as shown on the drawing or at the direction of the Engineer. The contract drawings are not intended to show the location and details for all such devices but are to be used as a reasonable guide.

F. Any changes to the approved soil erosion and sediment control plans will require the submission of soil erosion and sediment control plans to the Engineer. The revised plans must meet all current state soil erosion and sediment control practices. No extension of the contract time will be given to the Contractor should resubmission be required.

G. Contractor shall obtain all required permits.

H. Upon completion of construction work after final grading and when permanent stabilization has been established, the bales and silt fences shall be removed by the Contractor. However, no soil erosion devices shall be removed without written permission of the Engineer.

I. All excess material, except for topsoil, shall be removed from the site by the Contractor in accordance with the Contract Documents or as ordered by the Engineer.

J. Conduit outlets and catch basin inlets must be protected prior to start of construction.

K. All soil erosion and sediment control practices shall be left in place and maintained, including silt and sediment removal, until construction is completed, area is stabilized and the Engineer so directs.

L. The Contractor shall restrict his operations to the areas of construction as shown on the Contract Drawings. Any encroachment outside the areas of construction shall be the Contractor's responsibility and he shall assume all costs for repairing any damaged caused by his operations.

3.2 Erosion Control Materials

A. The erosion control materials shall be installed over the prepared seedbed which has been constructed in accordance with the requirements of these Specifications, as shown on the Drawings and as directed by the Owner.

B. Prior to the placement of the erosion control materials in an area, the Contractor and the Engineer shall examine the prepared seedbed to ensure that it is smooth, stable, firm, evenly graded, free of protrusions, sharp stones, vehicle imprints or other damaging objects, properly and evenly seeded and free of erosion. The Contractor shall immediately repair any damage or defect in the prepared seedbed, including reseeding if necessary, prior to the installation of the erosion control materials.

C. The Contractor shall handle and install the erosion control materials in such a manner to ensure that the material is not damaged in any way and does not damage the seed bed.

D. The protective wrapping on each roll shall not be removed sooner than one hour prior to unrolling. Unused portions of rolls which are not used in the same day that they are unwrapped shall be rewrapped and properly stored. Unused portions of rolls which are shorter than 33% of the manufactured roll length shall be discarded unless specifically approved by the Engineer for a particular application.

E. In the presence of wind, the erosion control material shall be weighted with sandbags or the equivalent. Such sandbags shall be installed during placement and shall remain in place until the installation of the erosion control material is completed. The sandbags shall not be left in place, incorporated into the Work or their contents deposited in the area of Work.

F. The erosion control materials shall be cut using approved cutting instruments as recommended by the manufacturer. The method of cutting shall result in a neat, clean, controlled cut which does not cause pulling or unraveling of the material components.

G. The erosion control materials shall be installed on the prepared seedbed within 36 hours of the placement of the seed and landscaping materials.

H. The Contractor shall exercise extreme care during the placement and installation of the erosion control materials so as to minimize the disturbance to the prepared seedbed. The Contractor shall repair and reseed any damage to the prepared seeded at the expense of the Contractor at the direction of the Owner.

3.3 Erosion Control Blanket

A. The Erosion Control Blanket shall be installed in the areas shown on the Drawings in accordance with the manufacturer's recommendations, as specified and as directed by the Engineer.

B. The Erosion Control Blanket shall be installed vertically downslope in the direction of water flow.

C. The Erosion Control Blanket shall be anchored at the top of the slope in a 6-inch by 6-inch anchor trench and the blanket shall be stapled in the anchor trench on 3-foot centers. The trench areas shall be backfilled, compacted and hand reseeded.

D. The blanket and fabric edges shall be overlapped at least 3 inches and secured with staples at least 3 feet on centers.

E. The Erosion Control Blanket shall not be pulled taut during installation. The erosion control blanket shall be in intimate contact with the underlying soil surface. If trampolining is experienced, additional staples shall be installed to secure the fabric to the soil.

F. The Erosion Control Blanket shall be stapled to the underlying soil using a uniform stapling pattern which will provide a staple (field) density of at least two staples per square yard.

G. Check slots shall be installed every 50 feet by placing a fold at least 8 inches vertically into the soil. The Erosion Control Blanket shall be stapled in the check slot on 3 feet centers and at each edge. The check slots shall be backfilled, compacted and hand seeded.

H. Successive lengths of Erosion Control Blanket shall be overlapped at least 1-foot shingle style, with upslope layer on top. The overlapped area shall be stapled on 1-foot centers.

I. The downslope end of the Erosion Control Blanket shall be anchored in an anchor slot at least 8 inches deep. The anchor slot shall be backfilled, compacted and hand seeded.

3.4 Flexible Growth Medium

A. Examine substrates and conditions where materials will be applied. Apply product to geotechnically stable slopes that have been designed and constructed to divert runoff away from the face of the slope. Do not proceed with installation until satisfactory conditions are established.

B. Strictly comply with manufacturer's installation instructions and recommendations. For optimum pumping and application performance use approved mechanically agitated, hydraulic seeding/mulching machines with a fan-type nozzle (50-degree tip). Apply FGM from opposing directions and to achieve best soil coverage.

C. Erosion Control and Revegetation: For maximum performance, apply FGM in a two-step process:

1. Mix and apply seed and soil amendments with small amount of FGM for visual metering.

2. Mix and apply FGM at a rate of 50 lb per 125 gallons (23 kg/475 liters) of water over freshly seeded surfaces. Confirm loading rates with equipment manufacturer. Do not leave seeded surfaces unprotected, especially if precipitation is imminent.

Depending upon site conditions FGM may be applied in a one-step process where all components may be mixed together in single tank loads. Consult with manufacturer for further details.

D. Mixing: A mechanically agitated hydraulic-application machine is recommended:

1. Fill tank to middle of agitator shaft or tank about 1/3 full of water. Turn on pump to wet or purge lines. Begin agitating. Keep adding water slowly while adding the FGM at a steady rate.

2. Consult application and loading charts to determine number of bags to be added. Mix at a rate of 50 lbs. of FGM per 125 gallons (23kg/475 liters). Contact equipment manufacturer to confirm optimum FGM mixing rates.

3. All FGM should be loaded when the tank is approximately 3/4 full.

4. Fertilizer should be added once the tank is nearly full.

5. Before applying, mix the slurry for at least 10 minutes after adding the last amount of FGM. This is very important to fully activate the bonding additives and to attain proper viscosity.

6. Turn off recirculation valve and reduce agitator speed to minimize potential for air entrainment within the slurry.

E. Application: Use a fan-type nozzle (50-degree tip) whenever possible for best soil surface coverage. Apply FGM from opposing directions to soil surface, reducing the "shadow effect" and assuring a minimum of 95% of soil surface coverage. Slope interruption devices or water diversion techniques are recommended when slope lengths exceed 100 ft (30m) and/or slopes > 3H;1V. Install materials at the following minimum application rates:

Slope Gradient/Condition	English	SI
<3H to 1V	3000 lb/ac	3400 kg/ha
>3H to 1V and <2H to 1V	3500 lb/ac	3900 kg/ha
>2H to 1V and <1H to 1V	4000 lb/ac	4500 kg/ha
>1H to 1V	4500 lb/ac	5100 kg/ha
As infill for TRM	3500 lb/ac	3900 kg/ha

1. Increase application rates on highly erosive soils or chiseled, disked, furrowed or tracked slopes. Contact Manufacturer for additional details.

2. Material should not be applied in channels, swales or other areas where concentrated flows are anticipated, unless installed in conjunction with a temporary erosion control blanket or non-degradable turf reinforcement mat.

3. After application, thoroughly flush the tank, pumps and hoses to remove all FGM material. Wash all material from the exterior of the machine and remove any slurry spills. FGM will be more difficult to remove once it dries.

F. Cleaning and Protection: Clean spills promptly. Advise Owner of methods for protection of treated areas. Do not allow treated areas to be trafficked or subjected to grazing.

+ + END OF SECTION + +

SECTION 03350

GRASSCRETE

PART 1 – GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.2 Summary

A. Work specified in this section includes all labor, materials, equipment and services necessary to complete the Grasscrete Molded Pulp Grass Filled Void System, or equal, including single use formers, reinforcement, sub-base materials, grass fill and curing compound.

B. Related sections include the following:

1. Section 03000, Cast-in-Place Concrete

1.3 Definitions

A. Grasscrete: Cellular reinforced concrete system with voids created by void formers. Grasscrete is an internationally copyrighted brand owned by Grass Concrete Limited.

B. Former: A temporary form designed to create the cell or void unique to Grasscrete concrete slabs.

C. Grass Filled Void System: A Grasscrete installation that has the voids created by the formers filled with soil and subsequently planted with grass or other vegetation allowing water to percolate through the concrete.

1.4 Submittals

A. Product Requirements:

1. Provide submittal information in accordance with Section 01300, Submittals.

B. Product Data:

1. Submit specifications, test data and other data required for each type of manufactured material and product indicated.

2. Submit Technical Bulletins listing manufacturer's name, product name, descriptive data, curing time and application requirements.

3. Submit Material Safety Data Sheet (MSDS) and other safety requirements.

C. Field Quality-Control Test and Inspection Reports:

1. Documentation by the Contractor of the sub-grade compaction results prior to concrete placement.

2. Documentation by the Contractor of the project specific concrete mix air content as provided by the ready mix concrete producer prior to concrete placement.

3. Documentation by the Contractor of the project specific concrete mix compressive strength as provided by the ready mix concrete producer prior to concrete placement.

4. Documentation by the Contractor of the project specific concrete mix slump as provided by the ready mix concrete producer prior to concrete placement.

1.5 Quality Assurance

A. Installer Qualifications: The Contractor for this work shall be a Bomanite Grasscrete Licensed Contractor and Certified Applicator approved by The Bomanite Company (303) 369-1115, or approved equal.

1. Provide letter of certification from The Bomanite Company stating that installer is a certified applicator of special concrete finishes and is familiar with proper procedures/installation requirements required by the manufacturer.

2. Use an authorized Bomanite Grasscrete Licensed Contractor and adequate number of skilled workmen who are thoroughly trained and experienced in the necessary craft.

3. Applicator shall be familiar with the specified requirements and the methods needed for proper performance of work of this section.

4. Applicator shall be familiar with the previously approved mock-ups that demonstrated standard of workmanship.

5. Authorized Bomanite Grasscrete Systems installers limited to the following:

a. www.bomanite.com/grasscrete

B. Manufacturer Qualifications: A firm experienced in the support and training of a national installer network and manufacturing products required/listed to complete the work.

1. The Bomanite Company (303) 369-1115.

2. Or equal.

C. Source Limitations:

1. Obtain each type or class of cementitious material of the same brand from same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

D. Mock-ups:

1. Apply finish to mock-ups constructed by Licensed Installer, using each type of finish to demonstrate finished appearance and standard of workmanship.

a. Mock-up shall include entire system, including sub-base, and reinforcement with voids opened and filled with soil.

b. Notify Engineer seven days in advance of dates and time when mock-ups will be constructed.

c. Obtain from Engineer approval of mock-ups before starting construction.

d. If the Engineer determines that the mock-ups do not meet requirements, General Contractor will demolish and remove them from the site and arrange to assemble more until approved.

e. Maintain mock-ups during construction in an undisturbed condition as a standard for judging the completed work.

1.6 Delivery, Storage and Handling

A. Deliver materials in original packages and containers, with seals unbroken, bearing labels indicating brand name and directions for storage, mixing with other components and application.

B. Store materials to comply with manufacturers written instructions to prevent deterioration from moisture or other detrimental effects.

C. Dispense special concrete finish material from factory numbered and sealed containers. Maintain record of container numbers.

1.7 Project Conditions

A. Environmental Limitations:

1. Comply with manufacturer's written instructions for ambient temperature and other conditions affecting installation performance.

2. Concrete must be cured a minimum of 14 days or as directed by the manufacturer before trafficking can begin.

1.8 Performance Requirements

A. The product is required to bear daily vehicular traffic traveling at speeds greater than 20 miles per hour.

B. The product is required to be continuously reinforced with rebar.

C. The product is required to be manufactured from cast-in-place concrete with a minimum thickness of 5 1/2".

PART 2 - PRODUCTS

2.1 Manufacturers

A. The Bomanite Company (303) 369-1115.

B. Or equal.

2.2 Materials

A. Molded Pulp Formers: Vacuum formed bio-degradable tools.

1. Sizing: Molded Pulp 5 ½" sized formers.

B. Cure and seal: Water-based acrylic polymer curing compound designed to bond to fresh concrete and holds in the mix water to achieve improved concrete properties and complies with ASTM C309.

C. Reinforcement: Steel reinforcement to be minimum Grade 60 meeting ASTM a615/a615m.

1. Use No. 2 bar 8 inches on center.

D. Concrete: Portland cement shall conform to ASTM C 150, Type I, II or V. Aggregates shall conform to ASTM C 33 and be 1/2" minus. Mixing water shall be fresh, clean and potable. In freeze-thaw areas, air entrainment shall be provided as required. Water reducing admixtures and/or super-plasticizers are permitted and shall conform to ASTM C 494.

1. 5,000 psi.

E. Concrete Reinforcing Fibers: BASF Masterfiber MAC Matrix Fibers monofilament stick type fibers 2" in length or equal.

1. 1.5.

F. Void In-Fill: Material used to fill the voids in the Grasscrete System.

1. Topsoil.

G. No substitutions or alternates to the above unless indicated will be accepted.

PART 3 – EXECUTION

3.1 Examination

A. Sub-grade for vehicle traffic shall be in accordance with local concrete street specifications. For most applications, except for very heavy loads, native soil having a minimum "R" Value of 30 and a compaction of 95% will provide a suitable sub-grade. Consult General Contractor, Structural Engineer, Architect and Concrete Contractor prior to installation of concrete slab to ensure complete understanding of substrate preparation, reinforcement, penetrations, mix design, placing and finishing requirements, water capacity, elevations, etc.

B. The Grasscrete slab shall have a minimum thickness of 5 1/2". All perimeters of the Grasscrete slab should be restrained by a 12" minimum concrete border poured monolithically.

C. The Grasscrete shall be reinforced steel bar in both directions seated on the integral former chair.

3.2 Preparation

A. Examine sub-grade, with installer present, for conditions affecting performance of finish. Rectify conditions detrimental to timely and proper work. Do not proceed until unsatisfactory conditions are corrected.

B. Verify that elevations and compaction meet Project Conditions above.

C. Prior to concrete pour, verify that formers are free of construction damage and contaminants.

3.3 Installation

A. Construction Process:

1. Sub-grade shall be leveled to a uniform plane 6 1/2" below the final grade of the Grasscrete slab. 1" of washed concrete sand compliant with ASTM C-33 is then placed over the sub-base bringing the sub-base 5 ½" from final elevation.

2. Grasscrete formers shall be placed on the sand sub-base. In sloped situations the use of steel spikes or rebar lengths hammered through the formers into the sub-base may be necessary to hold the formers in place during the concrete placement process.

3. The reinforcement is placed in an alternating, stacking pattern. 16" on center north-south, 16" on center east-west followed by 16" on center north-south and finally 16" on center east-west if 8" on center steel has been specified. This stacking of the steel will place it at the most desirable height with minimal exposure to former material.

4. Concrete reinforcing fibers are added to the ready mix truck in conjunction with the high range water reducers (if required to meet mix design specifications).

5. Concrete shall be placed and leveled to the top of the Grasscrete formers. The concrete surface shall have a coarse broom swept finish.

6. Grasscrete formers shall have the void tops removed after the concrete has hardened sufficiently with residual paper pulp left in the voids acceptable.

7. The open voids will be filled with soil to within a minimum of ½" of the concrete surface.

3.4 Protection

A. General: Protect finished work from traffic until fully cured in accordance with manufacturer's recommendations.

3.5 Attached: Material cut-sheet

+ +END OF SECTION + +

NO TEXT ON THIS PAGE

SECTION 02429

DRAINAGE STRUCTURES

PART 1 - GENERAL

1.1 Summary

A. Work included: Contractor shall furnish all labor, materials, equipment and incidentals necessary to provide, install and test all precast concrete drainage structures, catch basins, trench drains, manholes, associated piping, and similar structures as shown, specified, and otherwise required to complete the Work.

B. General: Structures shall conform in shape, size, dimensions, materials, and other respects to the details shown on the Drawings.

C. Related Work Specified Elsewhere:

1. Section 02200, Earthwork.

1.2 Submittals

A. Submit the following in accordance with Section 01300, “Submittals”:

1. Submit for approval detailed drawings and data on pipe joints and specials.

2. Submit for approval Shop Drawings showing design and construction of all precast concrete and products including, but not limited to, the following:

a. Size and spacing of steel reinforcement.

b. Wall and slab thicknesses.

c. Concrete cover over steel reinforcement.

d. Concrete mix design including design compressive strength.

e. Manhole frame dimensions.

f. Height of frame and leveling course.

g. Grade elevation at each catch basin.

h. Certificates of compliance with the referenced specifications.

i. Pipe inverts, locations, sizes.

j. Structural load Calculations.

1.3 Quality Assurance

A. General:

1. Comply with ANSI, OSHA, ASTM and all applicable Federal, State and local codes, including revisions to date of Contract.

2. Qualifications of manufacturer: Products used in the work of this Section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the Engineer.

3. The Contractor shall give the Engineer 24 hours written notice plus travel time prior to the commencement of any manufacturing process or testing procedures for precast concrete products.

4. At the point of manufacture and after delivery to the site, the Engineer reserves the right to inspect and test all precast concrete products.

5. In addition, at the place of manufacture of precast concrete products, the Engineer reserves the right at all times:

   a. To inspect the materials, the processes of manufacture, and the records of analysis and tests.

   b. To select test specimens.

6. All precast concrete products delivered to the site shall be clearly marked at the factory with the date of manufacture and the manufacturer's identification. Omission of this information may be cause for rejection of the catch basin.

B. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. ASTM C 32, Sewer and Manhole Brick (made from clay or shale).

2. ASTM C 139, Concrete Masonry Units for Construction of Catch Basins and Manholes.

3. ASTM C 140, Sampling and Testing Concrete Masonry Units.

4. ASTM C 207, Hydrated Lime for Masonry Purposes.

5. ASTM C 478, Precast Reinforced Concrete Manhole Sections.

PART 2 - PRODUCTS

2.1 Precast Products

A. Where shown or otherwise approved by the Engineer, precast concrete shall be used for items such as catch basins. Layout and details shall be as shown and specified. Design shall be adequate to withstand all loads imposed including earth pressure, vehicle loads and construction loading.

B. Manholes and other structures shall be of sufficient strength to safely support an AASHTO H-20 loading. All steel reinforcement shall meet the requirements of ASTM A 615, ASTM A 82 and ASTM A 185.

C. Manholes shall conform to ASTM C478.

D. Manhole steps as specified or shown on the plans shall be included for all manholes.

E. All manholes shall be free of visible leakage.

F. Reinforcing steel shall be deformed billet steel bars conforming with ASTM A615 Grade 60 and shall be in conformance with ACI 315. Submit mill certificates with all submittals.

G. Test on reinforced concrete manhole components shall be in conformance with the physical requirements of ASTM C 478.

H. Compression tests cylinders shall be collected and the results submitted in conformance with section 3300 cast in place concrete for all pre-cast concrete structures and a certificate of compliance with the results shall be submitted for approval.

I. Manholes and other structures shall be provided with openings at the proper locations and elevations for all pipe connections. The space around each pipe connection shall be sealed with mortar or as shown on the Plans.

2.2 Miscellaneous Metals

A. Metal frames, covers, grates, troughs, steps and similar required items shall be provided as shown and in accordance with Section 05540, Castings.

2.3 Drainage Piping

A. HDPE drainage pipe shall be N-12 pipe Type S as manufactured by Advanced Drainage Systems (ADS), or approved equal.

B. Fittings shall be manufactured by ADS or approved equal.

2.4 Pipe Connectors

A. Pipe connectors shall be used in gravity-flow sewer and drainage applications to connect to reinforced concrete pipe.

B. Connectors shall consist of a PVC hub, rubber sleeve and stainless steel band.

C. Connection shall be a compression fit into the cored wall of a mainline pipe.

D. Hub shall be made from heavy-duty PVC material. Stainless steel clamping assembly shall be made from minimum 301 grade steel.

E. Rubber sleeve and gasket, when applicable, shall meet the requirements of ASTM F477. Gaskets shall be installed by the manufacturer. The water-based solution provided by the manufactures shall be used during assembly. Pipe lube shall not be used.

F. Water tight bell connection shall be included that meets the requirements of ASTM D3212.

G. Approved Manufactures

1. InsertaTee Co. ph: 503.357.2110 fax: 503.359.5417 insertatee.com

2. Or approved equal.

PART 3 - EXECUTION

3.1 Preparation

A. All excavation, shoring and dewatering required for the construction of drainage structures shall be performed in accordance with Section 02200, Earthwork.

B. Excavation shall be to the required depth. Over-excavated areas shall be backfilled with select fill material properly compacted as specified in Section 02200, Earthwork.

3.2 Installation of Precast Products

A. General: Install the work of this section in strict accordance with the approved Shop Drawings and manufacturer guidelines.

B. Set drainage structures at the proper elevation with proper bearing on a suitable foundation. Catch basins shall be level and oriented to receive all incoming and outgoing pipes.

C. Brick stacks shall be used for all precast structures where required. They shall be a maximum of 12 inches in height, constructed on the top surface on which the frame will be placed. The brick stack shall bring the frame to the proper grade.

D. Brick shall be satisfactorily wet when being laid and each brick shall be laid in mortar so as to form full bed, end and side joints in one operation. The joints shall not be wider than 3/8-inch, except when the bricks are laid radially, in which case the narrowest part of the joint shall not exceed 1/4-inch.

E. An approved watertight joint shall be provided for each pipe entering and exiting each catch basin.

3.3 Installation of Pipe Connectors

A. Installation shall be in accordance with manufacture's recommended installation guidelines.

B. Backfill around the connector shall be of the same material type and compaction level as specified for the pipe installation.

+ + END OF SECTION + +

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SECTION 02529

CONCRETE CURBS, GUTTERS, AND SIDEWALKS

PART 1 - GENERAL

1.1 Description

A. Scope of Work:

1. Contractor shall furnish all labor, materials, equipment and incidentals required to provide concrete sidewalks, curbs, and guttesr as shown on the Contract Drawings and specified herein.

2. The thickness and extent of curbs are shown on the Drawings.

B. Related Work Specified Elsewhere:

1. Section 02200, Earthwork.

2. Section 03600, Grout.

1.2 Quality Assurance

A. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. ASTM D 1190, Concrete Joint Sealer, Hot Poured Elastic Type.

1.3 Submittal

A. Samples: Submit for approval samples, manufacturer's product data, test reports and material certifications as required in referenced Sections for concrete work.

B. Certificates: Manufacturer's certification that expansion joint sealer meets Specification requirements.

C. Shop Drawings: In accordance with the procedures and requirements set forth in the General Conditions and Division 1, the Contractor shall submit the following to the Engineer for approval:

1. Submit for approval copies of dimensioned layout of the Work, showing pattern, expansion joints and reinforcing.

PART 2 - PRODUCTS

2.1 Materials

A. Welded Wire Fabric: Smooth wire fabric shall comply with requirements of Section 03200, Reinforcing Steel. Furnish wire fabric in flat sheets, not rolls.

B. Bar reinforcement shall comply with the requirements of Section 03200, Reinforcing Steel.

C. Concrete Materials: Comply with requirements of Section 03000, Concrete:

D. Construction Joints: Comply with requirements of Section 03251, Construction Joints.

E. Polypropylene Fiber: Fiber length of 0.75 inches minimum and mixed at a rate of 1.5 pounds per cubic yard of concrete. The Contractor will submit documentation to Engineer and obtain approval of fiber material prior to use on the job.

PART 3 - EXECUTION

3.1 Subgrade Preparation

A. Preparation of the subgrade including compaction shall be completed for the full width of the Work:

1. Where the subgrade is construction by excavation of existing grade, the top 6-inches of the subgrade shall be compacted to at least 95 percent of maximum dry density at optimum moisture content.

2. Where the subgrade is constructed on fill:

    a. The existing grade shall be made smooth and compacted per Section 3.1.A.

    b. The subgrade shall be brought to the final lines and grades utilizing select fill as specified in Section 02200, Earthwork.

3. Base: Base shall be provided as shown on the Contract Drawings. The material shall be select fill as specified in Section 02200, Earthwork, and compacted as specified.

3.2 Form Construction

A. Set forms to line and grade. Install forms over full length of concrete. Forms shall be either of metal or of acceptable planed and matched lumber, and shall be of such construction as to allow for inspection for grade and alignment and that will produce a smooth surface on the finished curb.

3.3 Reinforcement

A. Locate, place, and support reinforcement as specified in Section 03200, unless otherwise shown. Size of reinforcement shall be as shown.

3.4 Concrete Placement

A. General: Comply with the requirements of Section 03000 for mixing and placing concrete, and as specified.

B. Place concrete in one course, monolithic construction, for the full width and depth of the pour.

3.5 Joints

A. General: Construct expansion, contraction, and construction joints with faces perpendicular to surface of the sidewalk or curb. Construct transverse joints at right angles to the Work centerline and as shown.

B. Contraction Joints: Provide these joints at 5 feet on centers for sidewalks.

C. Construction Joints: Place joints at locations where placement operations are stopped for a period of more than 1/2-hour, except where such pours terminate at expansion joints.

D. Expansion Joints: Provide 1/2-inch expansion joint filler where Work abuts structures; at returns; and at 20 foot spacing for straight runs. If sidewalk and curb is not poured monolithically, provide expansion joints where each abuts the other.

1. Place top of expansion joint material not less than 1/2 inch or more than 1 inch below concrete surface. Apply joint sealer on top of expansion joint material flush with concrete surface, and in accordance with manufacturer's instructions. Expansion joint shall be Asphalt Expansion Joint Filler by W.R. Meadows, or equal.

3.6 Concrete Finishing

A. Smooth the exposed surface by screening and floating.

B. Work edges of sidewalks and transverse joints; and round to 1/4-inch radius.

C. Complete surface finishing by drawing a fine-hair broom across surface, perpendicular to line of traffic.

3.7 Curing

A. Protect and cure finished concrete sidewalks and curbs, complying with applicable requirements of Section 03000.

3.8 Repair and Cleaning

A. Repair or replace broken or defective sidewalks and curbs as directed by the Engineer.

B. Sweep work and wash free of stains, discolorations, dirt or other foreign material.

3.9 Measurement and Payment

A. No separate payment for the item, "Concrete Curbs, Sidewalk, and Gutters," will be made for the installation of concrete curbs and sidewalk on the plant site. The cost of same shall be included in the Lump Sum Base Bid.

+ + END OF SECTION + +

SECTION 02580

FLEXIBLE PAVEMENT (FLEXI-PAVE)

PART 1 – GENERAL

1.1 Description

A. Scope of Work: Contractor shall furnish all labor, materials, equipment and incidentals required to provide Flexible Pavement as shown on the Contract Drawings and specified herein.

B. See Contract Drawings for details. Two types of applications are required for this project.

C. Related Work Specified Elsewhere

1. Section 02200 Earthwork

1.2 Submittals

A. Samples: Submit for approval color samples, manufacturer's products data, test reports, and material certifications as required.

B. KBI Certification Number (certified installer)

C. MSDS Sheets

1.3 Weather Limitations

A. Installation and overnight product curing to take place in temperatures between 45°F and 95°F.

PART 2 – PRODUCTS

2.1 Materials

A. Consist of three components: recycled automobile passenger tires, aggregate rock and a urethane-based bounding agent.

B. Be porous, non-cracking, insulating, and flexible.

C. Have the capacity to bond with: wood; steel; concrete; aluminum; compacted aggregate; enamel tile, or; fiberglass.

D. Be resistant to: chlorine; ozone; bromine; muriatic acid; salt water; oil; transmission oil, and; hydraulic oil.

E. Be tested in accordance with the Federal Hazardous Substance Act (16 CFR 1500.44).

F. Have a pervious infiltration rate of at least 4,000 inches per hour.

G. Exceed ADA requirements for slippage and fall hazards.

2.2 Product and Manufacturers

A. KBI Flexi®-Pave Model Number HD2000

B. Or Approved Equal.

PART 3 – EXECUTION

3.1 Subgrade Preparation

A. Preparation of the subgrade including compaction shall be completed for the full width of the Work.

1. Where the subgrade is construction by excavation of existing grade, the top 6-inches of the subgrade shall be compacted to at least 95 percent of maximum dry density at optimum moisture content.

2. Where the subgrade is constructed on fill:

a. The existing grade shall be made smooth and compacted per Section 3.1.A.1.

b. The subgrade shall be brought to the final lines and grades utilizing select fill as specified in Section 02200, Earthwork.

3.2 Installation of Root Barrier

A. A Bio-Barrier Root Barrier or approved equal is to be installed in accordance with manufacturer recommendations.

3.3 Installation of Filter Fabric

A. Landscape fabric is to be installed above the subbase and must have permeability greater than the soil below.

3.4 Installation of Subbase

A. See drawings.

3.5 Installation of Flexible Pavement

A. Flexible Pavement is to be installed in accordance with manufacturer specifications.

3.6 Operation and Maintenance

A. Flexible pavement is to be vacuumed on an annual basis to prevent clogging.

3.7 Attached: material cut-sheet.

+ + END OF SECTION + +

NO TEXT ON THIS PAGE

KBI

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FLEXI-PAVE™ HD2000 PAVING

THE INNOVATIVE FORCE BEHIND TIRE RECYCLING

RECYCLED TIRE CONSUMPTION BY PRODUCT

PRODUCT CODE	TIRE CONTENT	3/8" TIRE GRANULE PER SQ.FT.	# TIRES PER 1 MILE x 4ft. WIDE	MARKET APPLICATIONS
FLEXI-PAVE HD2000 Heavy Duty	50%	5 lbs	10,560	Trails, Jogging Paths, Side Walks, Parking Lots, Driveways, Golf Cart Paths, Surfacing On Quaysides, Ballasting In Marine Vessels etc.
FLEXI-PAVE HD1000 Heavy Duty	25%	2.5 lbs	5,280	Pool Decks, Onto Board Walks, Disabled Ramps, Balconies, Boat Ramps & Other General Re-surfacing Over Cracked Engineered surfaces.
FLEXI-PAVE P2000	67%	6.5 lbs	15,840	Children's Safety Play Surfaces, Trails, & Jogging Paths.
FLEXI-PAVE P1000	38%	3.25 lbs	7,920	Pool Decks, Onto Board Walks, Disabled Ramps, Balconies, Roof Access, Ergonomic Floors, Marine Deck Applications & Other General Re-surfacing Over Cracked Engineered Surfaces.

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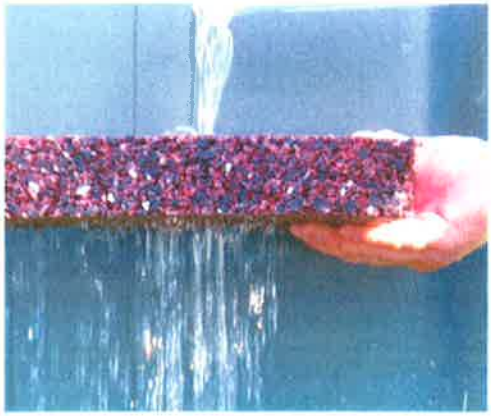

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CREATE SLIP RESISTANT SAFETY	RECYCLED PRODUCT USE	CONTROL EROSION
MINIMIZE MAINTENANCE	CONSERVE WATER	FOREVER FORGET POTHOLES

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Cover That Cracked Concrete Patio Or Slab Without Removing The Old Broken Concrete To Save Time And Money. Resurface that Splintering Wooden Deck or Dock and Create a Maintenance Free Surface while Adding Beauty, Comfort and Style. Create Slip Resistant Ramps To Help With ADA Compliance.

5. Use Flexi-Pave™ for Decks, Docks and Handicap Ramps

Convert Membrane Roofs Into Patios Using Flexi-Pave™ To Distribute Loads, Extend Roof Life And Provide Tested Protection From Hail. Flexi-Pave™ Is An Amazing Sound Control Tool And Creates Slip Resistant Stairways With No Sharp Edges. Convert Sand Or Mulch Playgrounds Into Safe And Clean Play Zones. Surround A Pool For Safety!

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NAICS codes 234110, 324121, 324122 and 326299

Placement Of Flexi-Pave™ On the GSA Schedule Is Currently In progress. Once Complete, KB Industries Flexi-Pave™ Can Initially Be Found Under ***New Products*** *In The Federal Supply Service Multiple Awards Schedule 03 Facilities Maintenance And Management Section.*

Once On The GSA Schedule the Link Below Should Provide Access to Flexi-Pave™

http://www.gsaelibrary.gsa.gov/ElibMain/SinDetails?executeQuery=YES&scheduleNumber=03FAC&flag=&filter=&specialItemNumber=541+099

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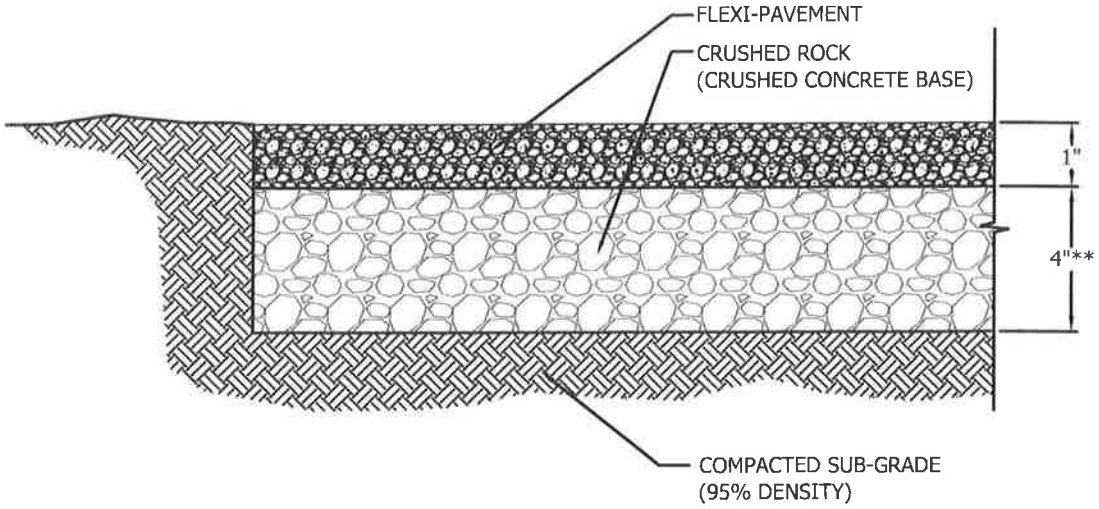
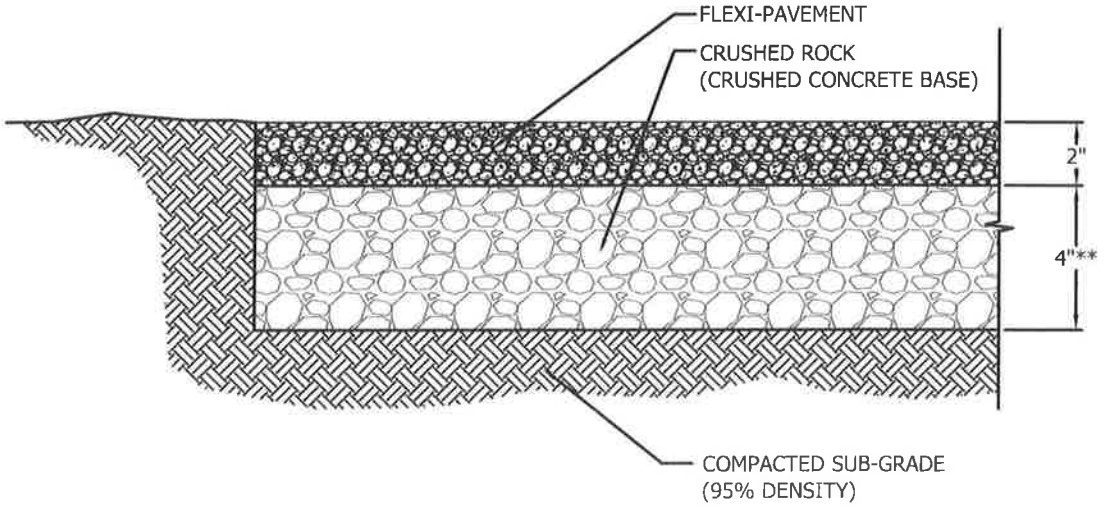


** BASE DEPTH VARIES DEPENDING ON APPLICATION

HD 1000



** BASE DEPTH VARIES DEPENDING ON APPLICATION

HD 2000

KBI
THE INNOVATIVE FORCE BEHIND TIRE RECYCLING

1915 62nd St. North
Tampa, Fl. 33619

February 6, 2003

Memorandum: Pervious Pavement and Underground Vault Surface Water "rules of thumb" that can be applied to Flexi-Pave™ HD2000, and Flex-Path™ P2000 products manufactured by K.B.Industries, Inc and installed by K.B.Industries, Inc. "Exclusive Licensed Contractors".

Subject: The product classes mentioned above are highly pervious systems that only need modification when site drainage conditions fall below the "Rational C" coefficient set by SWIFTMUD regulatory body.

Site Drainage Conditions:

1) Deep Seasonal High Ground Water Table (SHGWT) - A general "rule of thumb" is the SHGWT should be greater than two (2) feet below the bottom of the pervious pavement system.

2) Deep confining unit (clay layer) - A general "rule of thumb" is the confining unit should be greater than five (5) feet below the bottom of the pervious pavement system.

3) High saturated vertical (Kv) and horizontal (Kh) permeability - A general "rule of thumb" is for saturated Kv to be greater than six (6) inches per hour, and Kh to be greater than nine (9 inches per hour.)

Typically, the above three items are only present in soils that are classified as Hydrologic Soil Group (HSG) "A".

The aforementioned referenced systems will work with less than ideal soil conditions (i.e. Hydrologic Soil Group (HSG) "B, C, D". if measures like using fill dirt (top soil) in the pre-preparation stage are done to meet the minimum standard that is specified by the regulatory authority. Typically in areas that have the lower Soil Group classifications, sometimes referred to as "pine bark flat" (HSG BD), commercial projects require the pre-preparation of back filling the affected area to meet district rule criteria.

Thus K. B. Industries. Inc. products Flexi Pave HD2000 ™ and Flex Path P2000 ™ need no further preparation than what is specified in the aforementioned product specifications.

ASPHALT TECHNOLOGIES, INC.

TEST & EVALUATION REPORT

December 23, 2003

Report For: K. B. Industries, Inc.
1915 62nd Street North
Tampa, Florida 33610

SAMPLE INFORMATION:

Material	Sample Size		
	Length (inches)	Width (inches)	Height (inches)
Flexi-Pave Mat (Sample Date Unknown)	23.0	23.0	6.0

DATA/RESULTS:

PROPERTY	TEST METHOD	RESULTS		
		1	2	3
Coefficient of Permeability, cm/sec	FDOT FM 5-565	17657×10^{-5}	17872×10^{-5}	17659×10^{-5}
Average Coefficient of Permeability, cm/sec	---	17729×10^{-5}		

DISCUSSION: The Average Coefficient of Permeability for a 3.37-inch thick section of Flexi-Pave is 17729×10^{-5} cm/sec. For reference purposes, the value required by the Florida Department of Transportation for a regular impermeable pavement section is less than, or equal to, 125×10^{-5} cm/sec.

Tested by: _____ Dated: December 23, 2003
Duc Nguyen, Bituminous Pavement EIT

Reviewed by: _____ Dated: December 23, 2003
Holly Collins-Garcia, E.I., Laboratory Director

PRI Asphalt Technologies, Inc. 6408 Badger Drive Tampa, FL 33610 Tel: 813-621-5777 Fax: 813-621-5840 e-mail: mail@priasphalt.com Website: http://www.priasphalt.com

ASPHALT TECHNOLOGIES, INC.

CONFIDENTIAL Email & FAX TRANSMISSION

COVER PAGE PLUS: -0-

TO: David May, PE / DMA Engineering — **Email:** dmay@dmaeng.com; **FAX:** 863-619-5629

FROM: Ken Grzybowski — **DATE:** 19 May 2005

SUBJECT: **Interim Test & Evaluation Status Report: Flexxi-Pave**

Re: your tel request this date

The table below provides the current status of selected evaluations for the Flexxi-Pave samples submitted.

DATA/RESULTS: Interim

PROPERTY	TEST METHOD	PARAMETERS	RESULTS		COMMENT
Scuff / Power Steering Resistance	ISSA TB 100, Wet Track Abrasion	@ 25 °C	1 Hr = 4.6 g/ft²	6 Day = 8.6 g/ft²	Good- Excellent [1]
	ISSA TB 139, Cohesion Measurement		15 kg-cm (solid spin) [2]		Excellent
Permeability	FL DOT FM 5-565	3.14" dia x 6.53" t sample - replicates @ 25°C	1.8 x 10⁻¹ cm/sec		Permeable
Flexibility	PRI - TM 025	4"w x 2"t x 36" samples, @ 25°C, replicates	22.17" max deflection at center of beam - no cracks after 16 days		highly flexible [3]
Hamburg Loaded Wheel Tester	TX DOT 242-F	@ 60 °C, to 8,000 cycles or 0.5" rut depth which ever occurs first; use 2 3/8"t x 9.25"w x 13"l samples, replicates	2.3 mm rut depth at 8,000 cycles (test terminated)		Excellent
Permeability	FL DOT FM 5-565	Cut 6" dia sample from 1 black field sample supplied	In Progress, due 6/30		--
Static Loading	TX DOT 231-F	@ 60 °C, replicates			--
Resilient Modulus	ASTM D 4123	@ 25 °C, replicates; 4" dia x 2.5"t samples			--
Slip Resistance	ASTM D 2047	18" x 18" x 2"t samples, @ 25 °C - dry	0.65		Non-Slip Hazard [4]
Scuff / Power Steering Resistance on Laboratory After Accelerated Aging	Xenon Arc, ASTM D 4798 - 500 hrs ISSA TB 100, Wet Track Abrasion	Accelerated Aging - 500 hours/cycle, xenon arc + water spray: 51/9 cycle Wet Track Abrasion @ 25 °C	4 Hr. = 16.5 g/ft²	6 Day = to be tested 6/30/05	Excellent 1 Hr.

[1] simulated performance test correlated to field applied slurry seals; values ≥ 75 g/ft² indicate acceptable wear properties. The 6 day value (6 days of conditioning in water) indicates acceptable water resistant properties.

[2] Solid Spin; no cracks, no aggregate dislodged, no tearing, equivalent to a cohesive value of 26 kg-cm.

[3] beam samples exhibited excellent flexibility and resistance to cracking and maintaining integrity, beams recovered to original shape without exhibiting permanent deformation

[4] ASTM D 2047 states ...laboratory testing of floor polishes with a coefficient of friction of not less than 0.5 traditionally have been recognized as providing nonhazardous walkway surfaces. A wet surface was not evaluated since material is permeable

DISCUSSION: results at this point indicate Flexxi-Pave exhibits excellent cohesive integrity, high resistant to abrasion, wear and surface scarring/deformation, superior rut (permanent deformation) resistance, is highly flexible and resilient and a good resistance to field aging as assessed by accelerated aging (xenon arc/sunlight and water)

FLEXI-PAVE BASE SPECIFICATION Prepared by David May, P.E. January 17, 2005

SECTION 100
GRADED AGGREGATE BASE

100-1 Description

Construct a base course composed of graded aggregate of 1) 2 inches for pedestrian and bicycle use, 2) 4 inches for automobile vehicle use, 3) 6 inches for truck use or 4) construct as directed by Licensee.

100-2 Materials

Use graded aggregate material, produced from approved sources, which yields a satisfactory mixture meeting all the requirements of these Specifications after it has been crushed and processed as a part of the mining operations. Use graded aggregate base materials of uniform quality throughout, substantially free from vegetable matter, shale, lumps and clay balls, and having a Lime rock Bearing Ratio value of not less than 100. Use materials retained on No. 10 sieve composed of aggregate meeting the following requirements:
Soundness Loss, Sodium, Sulfate: AASHTO T 104.....15% Percent Wear: AASHTO T 96 (Grading A).....65% Percent this group of aggregates is composed of granite, gneiss, or quartzite. Use graded base material meeting the following graduation:

SIEVE SIZE	PERCENT BY WEIGHT PASSING
¾ inch	90 to 100
3/8 inch	20 to 55
No. 4	0 to 10
No. 8 0 to 5	0 to 5
No.16	-
No. 50	-

Ensure that the materials passing the No. 10 sieve has a sand equivalent (AASHTO T 176) value of not less than 28. Graded aggregate may be referred to hereinafter as "aggregate".

K.B. Industries, Inc., 28100 US HWY 19 North, Suite 410,
Clearwater, Florida. 33761. USA. Tel: 727-726-2700 Fax: 727-726-2800

Continued on PAGE 2

100-3 Equipment.

Use mechanical rock spreaders, equipped with a device that strikes off the rock uniformly to laying thickness, capable of producing even distribution. Where the use of a mechanical spreader is not practicable; the Contractor may spread the rock using bulldozers or blade graders or other means that result in an even distribution.

100-4 Spreading Aggregate.

Spread the aggregate uniformly removing all segregated areas of fine or coarse rock and replace them with properly graded rock.

100-5 Compacting and Finishing Base.

100-5.1 Moisture Content. When the material does not have the proper moisture content to ensure the required density, wet or dry it as required. When adding water, uniformly mix it in by disking to the full depth of the course that is being compacted. During wetting or drying operations, manipulate, as a unit, the entire width and depth of the course that is being compacted.

100-5.2 Density Requirements. After attaining the proper moisture conditions, uniformly compact the material to a density of not less than 95% of the maximum density as determined by AASHTO T-180, Method D. Ensure that the minimum density that will be acceptable at any location outside the traveled roadway (such as intersections, crossovers, turnouts, etc.) is 95% of the maximum density.

100-5.3 Density Tests. One density test is required per 500 lineal feet of finished base unless otherwise indicated by the engineer.

100 5.4 Dust Abatement. Minimize the dispersion of dust from the base material during construction and maintenance operations by applying small amounts of water or other dust control materials.

100-6 Testing Surface. Check the finished surface of the base course with a template cut to the required crown as designed in the plans or by the engineer. Correct all irregularities greater than ¼ inch to the satisfaction of the Engineer by scarifying and removing or adding rock as required and re-compact the entire area as specified herein before.

For any questions regarding the above specification, please contact David May, P.E. (863) 629-6586

K.B. Industries, Inc., 28100 US HWY 19 North, Suite 410,
Clearwater, Florida. 33761. USA. Tel: 727-726-2700 Fax: 727-726-2800

THE INNOVATIVE FORCE BEHIND TIRE RECYCLING

FLEXI-PAVE™ HD2000, HD1000

Product Description: A heavy duty, flexible, porous surfacing designed to be used as paving material in low-speed applications. Made from recycled rubber tires and aggregate. It is 1" thick when installed over existing engineered surfaces and minimum 2" thick when installed over compacted sub-grade.

Features	Benefits
Porous	Reduces the need for separate retention areas Increases usable square footage on your site Increases potential building size and parking area Reduces puddles in low-lying areas
Impact-absorbing surface	Reduce injuries
Slip-resistant	Reduce slip and fall accidents
Resistant to freeze / thaw conditions	Reduces maintenance costs.
Resistant to separation and cracking caused by root intrusion	Reduces liability claims from "trip & fall"
Customized colors available	Many design possibilities

Standard Colors: Black, Brown, Tan, Green, Granite, and Redwood (custom colors available)

Recommended Uses: Parking lots, driveways, sidewalks, boat ramps, decks, handicap ramps, cart paths, jogging trails, and for marine use

Pricing & Ordering: Pricing for Flexi-Pave™ is based on the square footage being covered, any substrate required, the particulars of the site, and the particulars of the job including forming, special equipment, and disposal. Each installation will be quoted separately.

Installation: This is a seamless poured-in-place product that is installed by certified technicians at the job site

Recommended substrate: HD 2000 (2" thick) should be installed over a minimum of 4" of crushed concrete or crushed asphalt with a minimum compaction rate of 95%. It can also be installed over existing engineered surfaces such as concrete or asphalt parking areas, sidewalks, paths, etc, at 1" thick (HD 1000)

Surface Preparation: Substrate must be clean, dry and primed before application

Required temperature for installation: Minimum ambient temperature of 50° F

Drying Time: 24 hours

Specifications: HD 2000 and HD1000 are made from 3/8" recycled rubber granule and ½" nominal dry aggregate which is bonded together with a single-component moisture-cured urethane.

Safety Information: MSDS are available upon request.

KB Industries, Inc 28100, Us Hwy. 19 North, Suite 410, Clearwater, FL. 33761
Tel: 727-726-2700 Fax: 727-726-7800 www.kbius.com

MATERIAL SAFETY DATA SHEET

DATE: AUGUST 2005

K.B.INDUSTRIES, INC.
28100 US HWY. 19 NORTH, SUITE 410,
CLEARWATER, FLORIDA. 33761 USA.
TEL: (001) 727- 726- 2700
FAX: (001) 727- 726- 2800

I. PRODUCT IDENTIFICATION

PRODUCT NAME: **FP35**
PRODUCT CODE: **FP35**

CHEMICAL FAMILY: **POLYURETHANE CEMENT**

OSHA HAZARD COMMUNICATION STATUS: THIS PRODUCT IS NOT HAZARDOUS UNDER THE CRITERIA OF THE FEDERAL OSHA HAZARD COMMUNICATION STANDARD 29 CFR 1910.1200

FIRE: THIS PRODUCT IS CLASSIFIED AS NON FLAMMABLE

II. HAZARDOUS INGREDIENTS

INGREDIENT NAME	CAS NO	CONTENTS	HEALTH CLASS	RISK
DIPHENYL METHANE-4, 4'-DI-ISOCYANATE WITH CATALYST (LESS THAN 0.1%)	101-68-8	10-30%	Xn	20, 26/37/38, 42/43

III. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Liquid
CHANGE IN PHYSICAL STATE:
Setting Point: -18°C
Initial boiling point 260°C
DENSITY: approx. 1.1 g/cm^3 at 20°C
VAPOR PRESSURE: <0.0003mmHg @ 25C
VISCOSITY: approx. 1800-2600 mPas at 25°C
SOLUBILITY IN WATER: insoluble, reacts
pH VALUE: not applicable
FLASH POINT: >200°C
FREE NCO CONTENT: approx. 10%
EXPLOSIVE LIMITS: N/A
THERMAL DECOMPOSITION: N/A
HAZARDOUS DECOMPOSITION PRODUCTS: No hazardous decomposition products if stored and handled correctly
HAZARDOUS REACTIONS: Exothermic reaction with amines and alcohols; reacts with water forming CO_2
FIRE & EXPLOSION HAZARDS: Not classed as flammable. If involved in a fire, it may emit noxious and toxic fumes. Due to reaction with water producing CO_2 gas, a hazardous build-up of pressure could result if contaminated containers are re-sealed.

FP35

IV. LABELLING FOR USER PURPOSES AND TRANSPORT

EEC Classification:	Harmful	
Hazard Symbol:	X_n	
Risk Phrases:	R20	Harmful by inhalation
	R42	May cause sensitization by inhalation
Safety Phrases:	S23	Do not breathe gas / fumes / vapor / spray
	S24/25	Avoid contact with skin and eyes
	S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
	S37	Wear suitable gloves
	S38	In case of insufficient ventilation, wear suitable respiratory equipment
	S45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
	P4	Contains isocyanates

V. STORAGE AND HANDLING

USAGE PRECAUTIONS: Avoid spilling, skin and eye contact. Ventilate well, avoid breathing vapors. Use approved respirator if air contamination is above accepted level.

STORAGE PRECAUTIONS: Keep in cool, dry ventilated storage and closed containers. Keep in original container. Store below 25C.

HAZARDOUS REACTIONS: Reaction with water (moisture) produces CO_2 gas. Exothermic reaction with materials containing active hydrogen groups.

VI. EXPOSURE AND PERSONAL PROTECTION

INGREDIENT NAME:	CAS No	STD	LT EXP	ST EXP
Diphenyl Methane-4, 4'-Di-isocyanate	101-68-8	MEL	(8 hrs) 0.02MG/M3 (Sen)	(15 min) 0.07mg/m3 (Sen)

PERSONAL PROTECTION

Gloves:	At all times.
Eye Protection:	At all times.
Respirators:	Suitable respiratory equipment with positive air supply should be used in cases of insufficient ventilation or where operational procedures demand it.
Hygienic Routine:	DO NOT SMOKE IN WORK AREA. No eating or drinking while working with this material.

FIRE AND EXPLOSION HAZARDS:

Not classed as flammable. If involved in a fire, it may emit noxious and toxic fumes. Due to reaction with water producing CO_2 gas, a hazardous build-up of pressure could result if contaminated containers are re-sealed.

DISPOSAL:

Disposal should be in accordance with local, state or national legislation.

Small quantities and empty drums: pre-treat to neutralize prior to disposal
Large quantities: incinerate under approved controlled conditions, using incinerators suitable for the disposal of noxious chemical waste

FP35

VII. EMERGENCY MEASURES

ACCIDENTAL RELEASE:

Wear necessary protective equipment. Ventilate well. Avoid contact with skin or inhalation of spillage, dust or vapor. Collect with absorbent, non-combustible material into suitable containers. Containers with collected spillage must be properly labeled with correct contents and hazard symbol. Avoid water on spilled material or leaking containers. Do not contaminate water sources or sewer.

FIRE FIGHTING EQUIPMENT.

Extinguishing media: Use powder, CO2 or foam. DO NOT use water if avoidable.

Special fire fighting procedures: Do not get water inside container. NOTE: Use air supplied respirators to protect against gases / fumes. Use special clothing. PVC boots should be worn.

FIRST AID:

Skin contact:	Wash immediately with water followed by soap and water. If symptoms persist, Obtain medical attention. Contaminated clothing should be laundered before Re-use.
Eye contact:	Irrigate immediately with plenty of clean water or an eyewash solution for at least 15 minutes. Obtain medical attention.
Inhalation:	The affected person should be moved to fresh air and made to rest. Obtain medical attention. Treatment is symptomatic for primary irritation or bronchospasm.
Ingestion:	Give water or milk to drink. Do not induce vomiting. Obtain medical attention as a precaution. Treat symptomatically. Get medical attention.

VIII. TOXICOLOGICAL INFORMATION

HEALTH WARINGS:	INHALATION. Preparation contains small amounts of isocyanate that may cause allergic reaction and irritation of respiratory system. Prolonged inhalation of high concentrations may damage respiratory system. SKIN CONTACT. Irritating to skin. May cause sensitization by skin contact. EYE CONTACT. Irritating to eyes INGESTION. May cause discomfort
TARGET ORGANS.	Skin. Eyes. Respiratory system, Lungs.

Summary: This product is a respiratory irritant and potential respiratory sensitizer. Repeated inhalation of the vapor at levels above the OEL could cause respiratory sensitization. It may cause mild eye irritation and slight skin irritation (P.I. Index = 1). It may cause skin sensitization. This product is of low acute toxicity by ingestion (LD50 > 5g/kg) and of no more than slight toxicity by skin absorption.

The information and recommendations in this publication are to the best of our knowledge, information and belief to be accurate at the date of publication. Nothing herein is to be construed as a warranty, express or implied. In all cases, it is the responsibility of users to determine the applicability of such information or the suitability of any products for their own particular purpose.

MATERIAL SAFETY DATA SHEET

DATE: AUGUST 2005

K.B.INDUSTRIES, INC.
28100 US HWY. 19 NORTH, SUITE 410,
CLEARWATER, FLORIDA. 33761. USA.
TEL: (001) 727- 726- 2700
FAX: (001) 727- 726- 2800

I. PRODUCT IDENTIFICATION

PRODUCT NAME: **FP45**

PRODUCT CODE: **FP45**

CHEMICAL FAMILY: **POLYURETHANE CEMENT**

OSHA HAZARD COMMUNICATION STATUS: THIS PRODUCT IS NOT HAZARDOUS UNDER THE CRITERIA OF THE FEDERAL OSHA HAZARD COMMUNICATION STANDARD 29 CFR 1910.1200

FIRE: THIS PRODUCT IS CLASSIFIED AS NON FLAMMABLE

II. HAZARDOUS INGREDIENTS

INGREDIENT NAME	CAS NO	CONTENTS	HEALTH CLASS	RISK
DIPHENYL METHANE-4, 4'-DI-ISOCYANATE WITH CATALYST (LESS THAN 0.1%)	101-68-8	10-30%	Xn	20, 26/37/38, 42/43

III. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE	Liquid
CHANGE IN PHYSICAL STATE:	
	Setting Point: -18°C
	Initial boiling point: 260°C
DENSITY:	approx. 1.07 g/cm^3 at 20°C
VAPOR PRESSURE:	<0.0003mmHg @ 25C
VISCOSITY:	approx. 1800-2600 mPas at 25°C
SOLUBILITY IN WATER:	insoluble, reacts
pH VALUE:	not applicable
FLASH POINT:	>240°C
FREE NCO CONTENT:	approx. 10%
EXPLOSIVE LIMITS:	N/A
THERMAL DECOMPOSITION:	N/A
HAZARDOUS DECOMPOSITION PRODUCTS:	No hazardous decomposition products if stored and handled correctly.
HAZARDOUS REACTIONS:	Exothermic reaction with amines and alcohols. reacts with water forming CO_2
FIRE & EXPLOSION HAZARDS:	Not classed as flammable. If involved in a fire, it may emit noxious and toxic fumes. Due to reaction with water producing CO_2 gas, a hazardous build-up of pressure could result if contaminated containers are re-sealed

FP45

IV. LABELLING FOR USER PURPOSES AND TRANSPORT

EEC Classification:	Harmful	
Hazard Symbol:	X_n	
Risk Phrases:	R20	Harmful by inhalation
	R42	May cause sensitization by inhalation
Safety Phrases:	S23	Do not breathe gas / fumes / vapor / spray
	S24/25	Avoid contact with skin and eyes
	S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
	S37	Wear suitable gloves
	S38	In case of insufficient ventilation, wear suitable respiratory equipment
	S45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)
	P4	Contains isocyanates

V. STORAGE AND HANDLING

USAGE PRECAUTIONS: Avoid spilling, skin and eye contact. Ventilate well, avoid breathing vapors. Use approved respirator if air contamination is above accepted level.

STORAGE PRECAUTIONS: Keep in cool, dry ventilated storage and closed containers. Keep in original container. Store below 25C.

HAZARDOUS REACTIONS: Reaction with water (moisture) produces CO_2 gas. Exothermic reaction with materials containing active hydrogen groups.

VI. EXPOSURE AND PERSONAL PROTECTION

INGREDIENT NAME:	CAS No.	STD	LT EXP	ST EXP
Diphenyl Methane-4, 4'-Di-isocyanate	101-68-8	MEL	(8 hrs) 0.02MG/M3 (Sen)	(15 min) 0.07mg/m3 (Sen)

PERSONAL PROTECTION

Gloves:	At all times.
Eye Protection:	At all times.
Respirators:	Suitable respiratory equipment with positive air supply should be used in cases of insufficient ventilation or where operational procedures demand it.
Hygienic Routine:	DO NOT SMOKE IN WORK AREA. No eating or drinking while working with this material.

FIRE AND EXPLOSION HAZARDS.

Not classed as flammable. If involved in a fire, it may emit noxious and toxic fumes. Due to reaction with water producing CO_2 gas, a hazardous build-up of pressure could result if contaminated containers are re-sealed.

DISPOSAL.

Disposal should be in accordance with local, state or national legislation.

Small quantities and empty drums: pre-treat to neutralize prior to disposal.
Large quantities: incinerate under approved controlled conditions, using incinerators suitable for the disposal of noxious chemical waste.

FP45

VII. EMERGENCY MEASURES

ACCIDENTAL RELEASE:

Wear necessary protective equipment. Ventilate well. Avoid contact with skin or inhalation of spillage, dust or vapor. Collect with absorbent, non-combustible material into suitable containers. Containers with collected spillage must be properly labeled with correct contents and hazard symbol. Avoid water on spilled material or leaking containers. Do not contaminate water sources or sewer.

FIRE FIGHTING EQUIPMENT.

Extinguishing media. Use powder, CO2 or foam. DO NOT use water if avoidable.

Special fire fighting procedures: Do not get water inside container. NOTE: Use air supplied respirators to protect against gases / fumes. Use special clothing. PVC boots should be worn.

FIRST AID:

Skin contact:	Wash immediately with water followed by soap and water. If symptoms persist, Obtain medical attention. Contaminated clothing should be laundered before Re-use.
Eye contact:	Irrigate immediately with plenty of clean water or an eyewash solution for at least 15 minutes. Obtain medical attention.
Inhalation:	The affected person should be moved to fresh air and made to rest. Obtain medical attention. Treatment is symptomatic for primary irritation or bronchospasm.
Ingestion:	Give water or milk to drink. Do not induce vomiting. Obtain medical attention as a precaution. Treat symptomatically. Get medical attention.

VIII. TOXICOLOGICAL INFORMATION

HEALTH WARINGS:	INHALATION. Preparation contains small amounts of isocyanate that may cause allergic reaction and irritation of respiratory system. Prolonged inhalation of high concentrations may damage respiratory system. SKIN CONTACT. Irritating to skin. May cause sensitization by skin contact. EYE CONTACT. Irritating to eyes INGESTION. May cause discomfort
TARGET ORGANS.	Skin. Eyes. Respiratory system, Lungs.

Summary. This product is a respiratory irritant and potential respiratory sensitizer. Repeated inhalation of the vapor at levels above the OEL could cause respiratory sensitization. It may cause mild eye irritation and slight skin irritation (P.I. Index = 1). It may cause skin sensitization. This product is of low acute toxicity by ingestion (LD50 > 5g/kg) and of no more than slight toxicity by skin absorption.

The information and recommendations in this publication are to the best of our knowledge, information and belief to be accurate at the date of publication. Nothing herein is to be construed as a warranty, express or implied. In all cases, it is the responsibility of users to determine the applicability of such information or the suitability of any products for their own particular purpose.

NO TEXT ON THIS PAGE

SECTION 03000

CONCRETE (CAST-IN-PLACE)

PART 1 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 Summary

A. This Section specifies cast-in-place concrete, including framework, reinforcing, mix design, placement procedures, and finishes.

B. Cast-in-place concrete includes the following:

1. Foundations and footings.

2. Slabs-on-grade.

3. Foundation walls.

1.3 Submittals

A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.

B. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others if requested by Engineer.

C. Shop drawings for reinforcement detailing fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures.

D. Shop drawings for formwork indicating fabrication and erection of forms for specific finished concrete surfaces. Show form construction including jointing, special form joints or reveals, location and pattern of form tie placement, and other items that affect exposed concrete visually.

1. Engineer's review is for general applications and features only. Designing formwork for structural stability and efficiency is Contractor's responsibility.

E. Laboratory test reports for concrete materials and mix design test.

F. Material certificates in lieu of material laboratory test reports when permitted by Engineer. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

G. Minutes of pre-installation conference.

1.4 Quality Assurance

A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:

1. American Concrete Institute (ACI) 301, "Specifications for Structural Concrete for Buildings."

2. ACI 318, "Building Code Requirements for Reinforced Concrete."

3. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice."

B. Concrete Testing Service: Engage a testing agency acceptable to Engineer to perform material evaluation tests and to design concrete mixes.

C. Materials and installed work may require testing and retesting at any time during progress of Work. Tests, including retesting of rejected materials for installed Work, shall be done at Contractor's expense.

1.5 Form Materials

A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.

1. Use overlaid plywood complying with U.S. Product Standard PS-1 "A-C or B-B High Density Overlaid Concrete Form," Class I.

2. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood," Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.

B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Form Release Agent: Provide commercial formulation form release agent with a maximum of 350 mg/l volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

D. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal. Provide units that will leave no metal closer than 1-1/2 inches to the plane of the exposed concrete surface.

1. Provide ties that, when removed, will leave holes not larger than 1 inch in diameter in the concrete surface.

1.6 Reinforcing Materials

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Galvanized Reinforcing Bars: ASTM A 767, Class II (2.0 oz. zinc psf), hot-dip galvanized after fabrication and bending.

C. Epoxy-Coated Reinforcing Bars: ASTM A 775.

D. Steel Wire: ASTM A 82, plain, cold-drawn steel.

E. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.

F. Deformed-Steel Welded Wire Fabric: ASTM A 497.

G. Epoxy-Coated Welded Wire Fabric: ASTM A 884, Class A.

H. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications.

1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

2. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).

1.7 Concrete Materials

A. Portland Cement: ASTM C 150, Type I.

Use one brand of cement throughout Project unless otherwise acceptable to Engineer.

B. Fly Ash: ASTM C 618, Type F.

C. Normal-Weight Aggregates: ASTM C 33 and as specified. Provide aggregates from a single source for exposed concrete.

1. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling.

2. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Engineer.

D. Lightweight Aggregates: ASTM C 330.

E. Water: Potable.

F. Fiber Reinforcement: Polypropylene fibers engineered and designed for secondary reinforcement of concrete slabs, complying with ASTM C 1116, Type III.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

2. Products: Subject to compliance with requirements, provide one of the following:

a. Gilco Fibers, Cormix Construction Chemicals.

b. Durafiber, Durafiber Corp.

c. Fiberstrand 100, Euclid Chemical Co.

c. Fibermesh, Fibermesh Co., Div. Synthetic Industries, Inc.

d. Forta CR, Forta Corp.

e. Grace Fibers, W.R. Grace & Co.

f. Polystrand, Metalcrete Industries

G. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.

H. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

2. Products: Subject to compliance with requirements, provide one of the following:

a. Air-Tite, Cormix Construction Chemicals.

b. Air-Mix or Perma-Air, Euclid Chemical Co.

c. Darex AEA or Daravair, W.R. Grace & Co.

d. MB-VR or Micro-Air, Master Builders, Inc.

e. Sealtight AEA, W.R. Meadows, Inc.

f. Sika AER, Sika Corp.

I. Water-Reducing Admixture: ASTM C 494, Type A.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

2. Products: Subject to compliance with requirements, provide one of the following:

a. Chemtard, ChemMasters Corp.

b. PSI N, Cormix Construction Chemicals.

c. Eucon WR-75, Euclid Chemical Co.

d. WRDA, W.R. Grace & Co.

e. Pozzolith Normal or Polyheed, Master Builders, Inc.

f. Metco W.R., Metalcrete Industries.

g. Prokrete-N, Prokrete Industries.

h. Plastocrete 161, Sika Corp.

J. High-Range Water-Reducing Admixture: ASTMC494, Type F or Type G.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

2. Products: Subject to compliance with requirements, provide one of the following:

a. Super P, Anti-Hydro Co., Inc.

b. Cormix 200, Cormix Construction Chemicals.

c. Eucon 37, Euclid Chemical Co.

d. WRDA 19 or Daracem, W.R. Grace & Co.

e. Rheobuild or Polyheed, Master Builders, Inc.

f. Superslump, Metalcrete Industries.

g. PSPL, Prokrete Industries.

h. Sikament 300, Sika Corp.

K. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

2. Products: Subject to compliance with requirements, provide one of the following:

a. Q-Set, Conspec Marketing & Manufacturing Co.

b. Lubricon NCA, Cormix Construction Chemicals.

c. Accelguard 80, Euclid Chemical Co.

d. Daraset, W.R. Grace & Co.

e. Pozzutec 20, Master Builders, Inc.

f. Accel-Set, Metalcrete Industries.

L. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

2. Products: Subject to compliance with requirements, provide one of the following:

a. PSI-R Plus, Cormix Construction Chemicals.

b. Eucon Retarder 75, Euclid Chemical Co.

c. Daratard-17, W.R. Grace & Co.

d. Pozzolith R, Master Builders, Inc.

e. Protard, Prokrete Industries.

f. Plastiment, Sika Corporation.

1.8 Related Materials

A. Reglets: Where sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 0.0217-inch-thick (26-gage) galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.

B. Waterstops: Provide flat, dumbbell-type or centerbulb-type waterstops at construction joints and other joints as indicated. Size to suit joints.

C. Rubber Waterstops: Corps of Engineers CRD-C 513.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

2. Manufacturers: Subject to compliance with requirements, provide products of one of the following:

a. The Burke Co.

b. Progress Unlimited.

c. Williams Products, Inc.

D. Polyvinyl Chloride Waterstops: Corps of Engineers CRD-C 572.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

2. Manufacturers: Subject to compliance with requirements, provide products of one of the following:

a. The Burke Co.

b. Greenstreak Plastic Products Co.

c. W.R. Meadows, Inc.

d. Progress Unlimited.

e. Schlegel Corp.

f. Vinylex Corp.

E. Sand Cushion: Clean, manufactured or natural sand.

F. Vapor Retarder: Provide vapor retarder that is resistant to deterioration when tested according to ASTM E 154, as follows:

G. Polyethylene sheet not less than 6 mils thick.

H. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

1. Waterproof paper.

2. Polyethylene film.

3. Polyethylene-coated burlap.

I. Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.55 kg/sq. meter when applied at 200 sq. ft./gal.

1. Provide material that has a maximum volatile organic compound (VOC) rating of 350 mg per liter.

2. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

3. Products: Subject to compliance with requirements, provide one of the following:

a. A-H 3 Way Sealer, Anti-Hydro Co., Inc.

b. Spartan-Cote, The Burke Co.

c. Conspec #1, Conspec Marketing & Mfg. Co.

d. Sealco 309, Cormix Construction Chemicals.

e. Day-Chem Cure and Seal, Dayton Superior Corp.

f. Eucocure, Euclid Chemical Co.

g. Horn Clear Seal, A.C. Horn, Inc.

h. L&M Cure R, L&M Construction Chemicals, Inc.

i. Masterkure, Master Builders, Inc.

j. CS-309, W.R. Meadows, Inc.

k. Seal N Kure, Metalcrete Industries.

l. Kure-N-Seal, Sonneborn-Chemrex.

m. Stontop CS2, Stonhard, Inc.

J. Water-Based Acrylic Membrane Curing Compound: ASTM C 309, Type I, Class B.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

2. Products: Subject to compliance with requirements, provide one of the following:

a. Highseal, Conspec Marketing and Mfg. Co.

b. Sealco - VOC, Cormix Construction Chemicals.

c. Safe Cure and Seal, Dayton Superior Corp.

d. Aqua-Cure, Euclid Chemical Co.

e. Dress & Seal WB, L&M Construction Chemicals, Inc.

f. Masterkure 100W, Master Builders, Inc.

g. Vocomp-20, W.R. Meadows, Inc.

h. Metcure, Metalcrete Industries.

i. Stontop CS1, Stonhard, Inc.

K. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

2. Products: Subject to compliance with requirements, provide one of the following:

a. Aquafilm, Conspec Marketing and Mfg. Co.

b. Eucobar, Euclid Chemical Co.

c. E-Con, L&M Construction Chemicals, Inc.

d. Confilm, Master Builders, Inc.

e. Waterhold, Metalcrete Industries.

L. Underlayment Compound: Free-flowing, self-leveling, pumpable, cement-based compound for applications from 1 inch thick to feathered edges.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

2. Products: Subject to compliance with requirements, provide one of the following:

a. K-15, Ardex, Inc.

b. Self-Leveling Wear Topping, W.R. Bonsal Co.

c. Conflow, Conspec Marketing and Mfg. Co.

d. Corlevel, Cormix Construction Chemicals.

e. LevelLayer II, Dayton Superior Corp.

f. Flo-Top, Euclid Chemical Co.

g. Gyp-Crete, Gyp-Crete Corp.

h. Levelex, L&M Construction Chemicals, Inc.

i. Underlayment 110, Master Builders, Inc.

j. Stoncrete UL1, Stonhard, Inc.

k. Concrete Top, Symons Corp.

l. Thoro Underlayment Self-Leveling, Thoro System Products.

M. Bonding Agent: Polyvinyl acetate or acrylic base.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

2. Products: Subject to compliance with requirements, provide one of the following:

a. Polyvinyl Acetate (Interior Only):

1) Superior Concrete Bonder, Dayton Superior Corp.

2) Euco Weld, Euclid Chemical Co.

3) Weld-Crete, Larsen Products Corp.

4) Everweld, L&M Construction Chemicals, Inc.

5) Herculox, Metalcrete Industries.

6) Ready Bond, Symons Corp.

b. Acrylic or Styrene Butadiene:

1) Acrylic Bondcrete, The Burke Co.

2) Strongbond, Conspec Marketing and Mfg. Co.

3) Day-Chem Ad Bond, Dayton Superior Corp.

4) SBR Latex, Euclid Chemical Co.

5) Daraweld C, W.R. Grace & Co.

6) Hornweld, A.C. Horn, Inc.

7) Everbond, L&M Construction Chemicals, Inc.

8) Acryl-Set, Master Builders Inc.

9) Intralok, W.R. Meadows, Inc.

10) Acrylpave, Metalcrete Industries.

11) Sonocrete, Sonneborn-Chemrex.

12) Stonlock LB2, Stonhard, Inc.

13) Strong Bond, Symons Corp.

N. Epoxy Adhesive: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit Project requirements.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

2. Products: Subject to compliance with requirements, provide one of the following:

a. Burke Epoxy M.V., The Burke Co.

b. Spec-Bond 100, Conspec Marketing and Mfg. Co.

c. Resi-Bond (J-58), Dayton Superior.

d. Euco Epoxy System #452 or #620, Euclid Chemical Co.

e. Epoxtite Binder 2390, A.C. Horn, Inc.

f. Epabond, L&M Construction Chemicals, Inc.

g. Concresive Standard Liquid, Master Builders, Inc.

h. Rezi-Weld 1000, W.R. Meadows, Inc.

i. Metco Hi-Mod Epoxy, Metalcrete Industries.

j. Sikadur 32 Hi-Mod, Sika Corp.

k. Stonset LV5, Stonhard, Inc.

l. R-600 Series, Symons Corp.

1.9 Proportioning And Designing Mixes

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to Engineer for preparing and reporting proposed mix designs.

Do not use the same testing agency for field quality control testing.

Limit use of fly ash to not exceed 25 percent of cement content by weight.

B. Submit written reports to Engineer of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Engineer.

C. Design mixes to provide normal weight concrete with the following properties as indicated on drawings and schedules:

2500-psi, 28-day compressive strength; water-cement ratio, 0.67 maximum (non-air-entrained), 0.54 maximum (air-entrained).

D. Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C) ratios as follows:

Subjected to freezing and thawing: W/C 0.45.

Subjected to deicers/watertight: W/C 0.40.

Subjected to brackish water, salt spray, or deicers: W/C 0.40.

E. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:

Ramps, slabs, and sloping surfaces: Not more than 3 inches.

Reinforced foundation systems: Not less than 1 inch and not more than 3 inches.

Concrete containing high-range water-reducing admixture (superplasticizer): Not more than 8 inches after adding admixture to site-verified 2-to-3-inch slump concrete.

Other concrete: Not more than 4 inches.

F. Lightweight Structural Concrete: Lightweight aggregate and concrete shall conform to ASTM C 330. Proportion mix to produce concrete with a minimum compressive strength of 3000 psi at 28 days and a calculated equilibrium unit

weight of 110 pcf plus or minus 3 pcf as determined by ASTM C 567. Concrete slump at the point of placement shall be the minimum necessary for efficient mixing, placing, and finishing. Maximum slump shall be 6 inches for pumped concrete and 5 inches elsewhere. Air entrain concrete exposed to weather according to ACI 301 requirements.

G. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Engineer before using in Work.

H. Fiber Reinforcement: Add to mix at rate of 1.5 lb per cu. yd. unless otherwise recommended by manufacturer.

PART 2 - PRODUCTS

2.1 Admixtures

A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.

B. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F (10 deg C).

C. Use high-range water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs, concrete, parking structure slabs, concrete required to be watertight, and concrete with water-cement ratios below 0.50.

D. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within the following limits:

1. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure:

2. 4.5 percent (moderate exposure); 5.5 percent (severe exposure) for 1-1/2-inch maximum aggregate.

3. 4.5 percent (moderate exposure); 6.0 percent (severe exposure) for 1-inch maximum aggregate.

4. 5.0 percent (moderate exposure); 6.0 percent (severe exposure) for 3/4-inch maximum aggregate.

5. 5.5 percent (moderate exposure); 7.0 percent (severe exposure) for 1/2-inch maximum aggregate.

6. Other concrete not exposed to freezing, thawing, or hydraulic pressure, or to receive a surface hardener: 2 to 4 percent air.

E. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

2.2 Concrete Mixing

A. Job-Site Mixing: Mix concrete materials in appropriate drum-type batch machine mixer. For mixers of 1 cu. yd. or smaller capacity, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released. For mixers of capacity larger than 1 cu. yd., increase minimum 1-1/2 minutes of mixing time by 15 seconds for each additional cu. yd.

Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.

B. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified.

When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

2.3 Execution

A. Coordinate the installation of joint materials, vapor retarder/barrier, and other related materials with placement of forms and reinforcing steel.

2.4 Forms

A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:

Provide Class A tolerances for concrete surfaces exposed to view.

Provide Class C tolerances for other concrete surfaces.

B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.

C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal.

D. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.

E. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

F. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

2.5 Vapor Retardant/Barrier Installation

A. General: Place vapor retarder/barrier sheeting in position with longest dimension parallel with direction of pour.

B. Lap joints 6 inches and seal with manufacturer's recommended mastic or pressure-sensitive tape.

C. Cover vapor retarder/barrier with sand cushion and compact to depth indicated.

2.6 Placing Reinforcement

A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.

1. Avoiding cutting or puncturing vapor retarder/barrier during reinforcement placement and concreting operations. Repair damages before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Engineer.

D. Place reinforcement to maintain minimum coverages as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

2.7 Joints

A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Engineer.

B. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.

C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements.

D. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.

E. Waterstops: Provide waterstops in construction joints as indicated. Install waterstops to form continuous diaphragm in each joint. Support and protect exposed waterstops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's printed instructions.

F. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

G. Joint fillers and sealants are specified in Section 07920 "Caulking and Sealants."

H. Contraction (Control) Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as shown. Use saw cuts 1/8 inch wide by one-fourth of slab depth or inserts 1/4 inch wide by one-fourth of slab depth, unless otherwise indicated.

1. Form contraction joints by inserting pre-molded plastic, hardboard, or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.

2. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.

3. If joint pattern is not shown, provide joints not exceeding 15 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).

2.8 Installing Embedded Items

A. General: Set and build into formwork anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.

B. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.

C. Install dovetail anchor slots in concrete structures as indicated on drawings.

D. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

2.9 Preparing Form Surfaces

A. General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.

1. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.

    a. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.

2.10 Concrete Placement

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.

Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.

C. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.

2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.

D. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.

1. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.

2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

3. Maintain reinforcing in proper position on chairs during concrete placement.

E. Cold-Weather Placement: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.

Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.

F. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.

1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F (32 deg C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.

Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.

3. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Engineer.

PART 3 - EXECUTION

3.1 Finishing Formed Surfaces

A. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.

B. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.

C. Smooth-Rubbed Finish: Provide smooth-rubbed finish on scheduled concrete surfaces that have received smooth-formed finish treatment not later than 1 day after form removal.

Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

D. Grout-Cleaned Finish: Provide grout-cleaned finish on scheduled concrete surfaces that have received smooth-formed finish treatment.

Combine one part Portland cement to one and one-half parts fine sand by volume, and a 50:50 mixture of acrylic or styrene butadiene-based bonding admixture and water to form the consistency of thick paint. Blend standard Portland cement and white Portland cement in amounts determined by trial patches so that final color of dry grout will match adjacent surfaces.

Thoroughly wet concrete surfaces, apply grout to coat surfaces, and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.

E. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.2 Monolithic Slab Finishes

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, Portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated.

After placing slabs, finish surface to tolerances of F(F) 15 (floor flatness) and F(L) 13 (floor levelness) measured according to ASTM E 1155. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.

B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and where indicated.

After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Finish surfaces to tolerances of F(F) 18 (floor flatness) and F(L) 15 (floor levelness) measured according to ASTM E 1155. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

C. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.

After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances of F(F) 20 (floor flatness) and F(L) 17 (floor levelness) measured according to ASTM E 1155. Grind smooth any surface defects that would telegraph through applied floor covering system.

D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.

3.3 Miscellaneous Concrete Items

A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other

trades is in place. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

3.4 Concrete Curing And Protection

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.

Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

B. Curing Methods: Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified.

C. Provide moisture curing by the following methods:

1. Keep concrete surface continuously wet by covering with water.

2. Use continuous water-fog spray.

3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.

D. Provide moisture-retaining cover curing as follows:

1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

E. Apply curing compound on exposed interior slabs and on exterior slabs, walks, and curbs as follows:

1. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

2. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

F. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

G. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.

1. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.

3.5 Shores and Supports

A. General: Comply with ACI 347 for shoring and reshoring in multistory construction, and as specified.

B. Extend shoring from ground to roof for structures four stories or less, unless otherwise permitted.

C. Extend shoring at least three floors under floor or roof being placed for structures over four stories. Shore floor directly under floor or roof being placed, so that loads from construction above will transfer directly to these shores. Space shoring in stories below this level in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members where no reinforcing steel is provided. Extend shores beyond minimums to ensure proper distribution of loads throughout structure.

D. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to support work without excessive stress or deflection.

E. Keep reshores in place a minimum of 15 days after placing upper tier, or longer, if required, until concrete has attained its required 28-day strength and heavy loads due to construction operations have been removed.

3.6 Removing Forms

A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.

B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days or until concrete has attained at least 75 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.

C. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

3.7 Reusing Forms

A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable to Engineer.

3.8 Concrete Surface Repairs

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Engineer.

B. Mix dry-pack mortar, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.

C. Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.

D. For surfaces exposed to view, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

E. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Engineer. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.

F. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.

G. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.

H. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.

I. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.

J. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Engineer.

K. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

L. Repair isolated random cracks and single holes 1 inch or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

M. Perform structural repairs with prior approval of Engineer for method and procedure, using specified epoxy adhesive and mortar.

N. Repair methods not specified above may be used, subject to acceptance of Engineer.

3.9 Quality Control Testing During Construction

A. General: The Contractor will employ a testing agency to perform tests and to submit test reports.

B. Sampling and testing for quality control during concrete placement may include the following, as directed by Engineer.

C. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

D. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.

E. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.

F. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.

G. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.

H. Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. yd. more than the first 25 cu. yd. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

I. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.

When total quantity of a given class of concrete is less than 50 cu. yd., Engineer may waive strength testing if adequate evidence of satisfactory strength is provided.

When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.

Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.

J. Test results will be reported in writing to Village, Structural Engineer, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.

K. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

L. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Engineer. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

+ + END OF SECTION + +

SECTION 03100

CONCRETE FORMWORK

PART 1 - GENERAL

1.1 Description

A. Work included: Under this section, the Contractor shall provide all labor, equipment and material necessary to furnish all formwork for cast-in-place concrete complete in place, and as shown on the drawings, specified herein and approved by the Engineer.

In general, work to be included under this section shall include, but not be limited to, the following:

1. Provide formwork in accordance with the provisions of this Section for all cast-in-place concrete shown on the Drawings or required by other Sections of these Specifications.

2. Provide formed openings for other trades.

3. Coordinate installation of items furnished by other trades.

B. Related Work Described Elsewhere

1. Section 03200, Concrete Reinforcement.

2. Section 03300, Concrete.

1.2 Quality Assurance

A. Design of formwork is the Contractor's responsibility.

B. Standards:

1. ACI 301: Specifications for Structural Concrete for Buildings.

2. ACI 302: Recommended Practice for Concrete Floor and Slab Construction.

3. ACI 318: Building Code Requirements for Reinforced Concrete.

4. ACI 347: Recommended Practice for Concrete Formwork.

C. Allowable tolerances: Conform to ACI 301, Section 4.3.

1.3 Submittals

A. General: Submit shop drawings in accordance with Section 01300, Submittals.

B. Shop drawings: Submit details of form types, methods of form construction and erection, design computations, and location of form joints, form ties and embedded items.

C. Certificates: Submit certificates from manufacturers stating that materials meet specified requirements.

D. Concrete test reports: Submit certified laboratory test reports if concrete tests are required for form removal.

E. Calculations: Submit early form removal calculations if required in advance of form removal.

PART 2 - PRODUCTS

2.1 Form Aerials

A. General: Conform to ACI 301 and ACI 302 unless otherwise shown or specified.

B. Forms:

1. Construct formwork for exposed (painted or unpainted) concrete surfaces with smooth faced undamaged plywood or other panel type materials acceptable to the Engineer to provide continuous, straight, smooth as-cast surfaces. Furnish in largest practical sizes to minimize number of joints.

2. Provide form material with sufficient thickness to withstand pressure of newly placed concrete without excessive and objectionable bow or deflection.

3. Wood forms:

a. Framing lumber: Stress-graded.

b. Lumber in direct contact with concrete: Dressed on at least the contact side, with dressed or tongue-and-groove edges.

c. Other lumber: Dressed or rough.

4. Plywood forms:

   a. Grade marked.

   b. B-B Plyform, Exterior Class 1 and 2 and HDO High Density Concrete form Plywood, Class 1 and 2 conforming to Product Standard PS 1, minimum thickness 3/4-inch.

5. Hardwood forms: Tempered smooth-one-side (515), not less than 3/16-inch thick, conforming to product standard PS 58.

6. Fiber-glass-reinforced-plastic forms: Sizes and cross sections as required, with thicknesses, reinforcement, and surface finish to form concrete surfaces that are smooth and free of irregularity.

7. Steel forms: Sizes and cross sections as shown or required, with metal gauges, reinforcement, stiffeners, and surface finish to form concrete surfaces that are smooth, free of irregularity and concrete stains.

C. Form coatings: Inner faces of all forms shall be thoroughly cleaned prior to concreting. Forms for concrete surfaces that will not be subsequently waterproofed shall be coated with a chemical type release agent and shall be applied lightly by spray to avoid retardation. Contractor shall submit release agent manufacturer to Engineer for approval. Forms for concrete surfaces to be waterproofed shall be wetted prior to concreting.

2.2 Design of Formwork

A. General: Conform to ACI 301 and ACI 302 unless otherwise shown or specified.

1. Design, erect, support, brace, and maintain formwork so that it will safely support vertical and lateral loads that might be applied, until such loads can be supported by the concrete structure.

2. Carry vertical and lateral loads to ground by formwork system and in-place construction that has attained adequate strength for that purpose.

3. Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation, and position.

4. Design forms and falsework to include assumed values of live load, dead load, weight of moving equipment operated on formwork, concrete mix, height of concrete drop, vibrator frequency, ambient temperature, foundation pressures, stresses, lateral stability, and other factors pertinent to safety of structure during construction.

5. Provide shores and struts with positive means of adjustment capable of taking up formwork settlement during concrete placing operations, using wedges or jacks or a combination thereof.

6. provide trussed supports when adequate foundations for shores and struts cannot be secured.

7. Support form facing materials by structural members spaced sufficiently close to prevent objectionable deflection.

8. Fit forms placed in successive units for continuous surfaces to accurate alignment, free from irregularities, and within allowable tolerances.

9. Provide camber in formwork as required for anticipated deflections due to weight and pressures of fresh concrete and construct ion loads.

10. Provide formwork sufficiently tight to prevent leakage of cement paste during concrete placement. Solidly butt joints and provide backup material at joints as required to prevent leakage and fins.

11. Ties for forms shall be waterproof type.

PART 3 - EXECUTION

3.1 General

A. Unless otherwise shown or specified, install and remove formwork in accordance with ACI 301, Chapters 4, 10, 11, 13 and IS; and ACI 302, Chapter 3.

3.2 Surface Conditions

A. Examine the substrate and conditions under which work of this Section is to be performed, and correct unsatisfactory conditions which would prevent proper and timely completion of the Work. Do not proceed until satisfactory conditions have been corrected.

3.3 Form Construction

A. General:

1. Construct forms complying with ACI 347, to the exact sizes, shapes, lines and dimensions shown, and as required to obtain accurate alignment, location, grades, level and plumb work in finish structures.

2. Provide for openings, offsets, sinkages, keyways, recesses, moldings, reglets, chamfers, blocking, screeds, bulkheads, anchorages, inserts, and other features required. Use selected materials to obtain required finishes.

3. Forms for openings, and construction which accommodates installation by other trades whose materials and products must be fabricated before the opportunity exists to verify the measurements of adjacent construction which affects such installations, shall be accurately sized and located as dimensioned on the Drawings. In the event that deviation from the Drawing dimensions results in problems in the field, the contractor shall be responsible for resolution of the conditions as approved by the Engineer, without additional expense to the Owner.

B. Fabrication:

1. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where the slope is too steep to place concrete with bottom forms only. Keep "groove, notch" wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and assure ease of removal.

2. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Brace temporary closures and set tightly to temporary openings on forms in as inconspicuous locations as possible, consistent with design requirements. Form intersecting planes to provide true, clean cut corners.

C. Falsework:

1. Erect falsework and support, brace and maintain it to safely support vertical, lateral, and asymmetrical loads applied until such loads can be supported by in-place construction. construct falsework so that adjustments can be made for take-up and settlement.

2. Provide wedges, jacks, or camber strips to facilitate vertical adjustments. Carefully inspect falsework and formwork during and after concrete placement operations to determine abnormal deflection or signs of failure; make necessary adjustments to produce Work of required dimensions.

D. Forms for exposed concrete:

1. Drill forms to suit ties used to prevent leakage of concrete mortar around the tie holes. Do not splinter forms by driving ties through improperly prepared holes.

2. Provide sharp, clean corners at intersecting planes, without visible edges or offsets. Back joints with extra studs or girts to maintain true, square intersections.

3. Use extra studs, walers, and bracing to prevent objectionable bowing forms between studs and to avoid bowed appearance in concrete. Do not use narrow strips of form material which will produce bow.

4. Assemble forms so that they may be readily removed without damage to exposed concrete surfaces.

E. Corner treatment: Unless shown otherwise, form chamfers with strips on external corners of columns, walls, girders, beams, foundation walls projecting beyond overlying masonry, and other external corners that will be exposed. Extend terminal edges to required limit and miter chamfer strips at changes in direction.

F. Provision for other trades: Provide openings in concrete formwork to accommodate work of other trades. Verify size and location of openings, recesses and chases with the trade requiring such items. Accurately place and securely support items to be built into forms.

G. Cleaning and tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before concrete is placed. Retighten forms immediately after concrete placement as required to eliminate mortar leaks.

3.4 Form Coatings

A. Coat form contact surfaces with form-coating compound before reinforcement is placed. Do not allow excess form-coating material to accumulate in the forms or to come into contact with surfaces which will be bonded to fresh concrete. Apply in compliance with manufacturer's instructions.

3.5 Installation of Embedded Items

A. General: Set and build into the work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of the items to be attached thereto.

B. Edge forms and screed strips for slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in the finished slab surface. Provide and secure units to support types of screeds required.

C. Those trades whose work is related to the concrete or must be supported by it shall be given ample notice and opportunity to install embedded items before the concrete is placed.

D. Electrical conduits, junction boxes, pipes, sleeves, inserts and similar items shall be placed in the concrete in accordance with all of the requirements of the Building Code. Such items shall be protected to the extent that they are not displaced or damaged during the placing of concrete.

E. Openings in slabs shall be provided for pipes, conduits and the like required for the work of other trades. When such work is completed, the excess part of the respective openings shall be completely closed up to the pipe sleeve with waterstops or inserts, matching the adjoining work.

F. Sleeves for miscellaneous metal work, such as castings, pipes and anchors shall be set as indicated, true and to proper alignment.

G. Waterstops shall be installed so as to form a continuous watertight diaphragm. Adequate provision shall be made to support and completely protect the waterstops during the progress of the work. Splices shall be made in conformance with the recommendations of the waterstop manufacturer.

3.6 Anchorage Items

A. Anchorage items shall be of sufficient number, size and location to ensure sufficient anchorage for the purpose intended.

B. Adequate slots or inserts shall be provided for anchoring members at openings. Slots and dowels shall be provided for anchoring ends and tops of masonry partitions abutting concrete.

C. Inserts for suspended ceilings shall be spaced at 4 feet on centers.

3.7 Joints

A. Provide isolation, control, contraction, expansion and construction joints in accordance with Section 3.7.6 and also as shown on the drawings. The Contractor shall prepare drawings showing all joints for the Engineer's approval before pouring the concrete.

B. Continue reinforcing steel and wire fabric across construction joints where not indicated as being free to move.

C. Install premoulded joint filler at locations shown. Extend fill from bottom of concrete up flush to finish concrete surface or hold down below finish surface as detailed.

D. Make splices in premoulded filler in manner to preclude penetration of concrete between joint faces.

E. For structural slabs and walls, locate the joints in a manner to divide the slab and walls into areas not in excess of 600 sq.ft., with one dimension being not greater than 120 percent of the other dimension.

F. Provide keyways at least 1-1/2 inches deep in all construction joints in walls, slabs, and between footings and walls. Keyway width or height shall be one-third the wall or slab thickness unless otherwise noted on the plans or directed by the Engineer.

G. Isolation joints in slab on grade: Provide isolation joints in slabs on grade at points of contact between slabs on grade and vertical surfaces where indicated. Caulk in accordance with Section 07951.

H. Sealant slots: Where premoulded joint filler is held down below finish concrete face, install in the form a water-soaked wood strip of dimensions shown to form, after removal, a proper size slot to receive sealant.

I. Control joints in slab on grade:

1. Provide control joints in slabs on grade to form panels or patterns as shown.

2. Form control joints by inserting prefabricated strip into the fresh concrete until the top surface of strip is flush with the slab surface.

3. After the concrete has cured for at least seven days, remove inserts and clean loose debris from the grooves.

4. Caulk in accordance with Section 07920.

3.8 Removal of Forms

A. Forms shall not be disturbed until the concrete has adequately hardened. Shoring shall not be removed until the supported member has acquired sufficient strength to support its weight and the load upon it. Members subject to additional loads during construction shall be adequately shored to sustain all resulting stresses. Removal of forms shall be accomplished in such a manner and sequence as will prevent injury to the concrete.

Provisions of ACI 301, Sections 4.5, 4.6 and 4.7 apply. Subject to the Village's requirements and upon approval, forms may be removed at the following

minimum times unless high-early strength is specified. Shoring may be required at the option of the Engineer beyond these periods.

B. Removal of Forms and Supports:

Temperature	Over 95°F	70°F - 95°F	60°F - 70°F	50°F - 60°F	Below 50°F
Walls	5 days	1 day	2 days	3 days	Do not remove forms until site-cured test cylinders develop 50% of 28 day strength (typical)
Columns	7 days	2 days	3 days	4 days	
Slabs					
5" Thick or Less	10 days	5 days	6 days	7 days	
Over 5" Thick		12 days	6 days	8 days	

When high-early strength concrete is specified, a schedule for removal of forms will be developed in the field from the age/strength relationships established for the materials and proportions used by tests in accordance with ACI-301, Section 3.8.

The removable portion of form ties shall be withdrawn from the concrete immediately after taking down the forms. The holes left by such ties shall be filled with a polymer modified grout, and the surface shall be finished with a steel spatula or rubbed with sack cloth.

Care shall be taken in removing forms, wales, shorings, supports, and form ties to avoid spalling or marring the concrete. The required rubbed finish and such patching as may be necessary shall be started immediately after removal of the forms.

3.10 Reuse of Forms

A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable. Apply new form coating compound material to concrete contact surfaces as specified for new formwork. When forms are reused for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close all joints. Align and secure joints to avoid offsets.

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SECTION 03200

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 Description

A. Work included: Under this section, the Contractor shall provide all labor, equipment and material necessary to furnish and install all steel required for reinforcement of cast-in-place concrete completed in place, and as shown on the drawings, specified herein and approved by the Engineer.

The Contractor shall provide all required additional concrete reinforcement for all wall penetrations. Reinforcement for wall penetrations shall conform to the requirements herein and as shown on the drawings.

B. Related Work

1. Section 03000 –Concrete

1.2 Quality Assurance

A. Standards

1. ACI 301: Specifications for Structural Concrete for Buildings.

2. ACI 302: Recommended Practice for Concrete Floor and Slab Construction.

3. ACI 315: Details and Detailing of Concrete Reinforcement.

4. ACI 315R: Manual of Engineering and Placing Drawings for Reinforced Concrete Structures.

5. ACI 318: Building Code Requirements Concrete.

6. AWS D1.4: Structural Welding Code - Reinforcing Steel.

7. CRSI: Manual of Standard Practice.

8. New York State Uniform Fire Prevention and Building Code.

B. Allowable tolerances: Conform to ACI 301, Section 5.4.

1.3 Submittals

A. General: Submit shop drawings in accordance with Section 01300, Submittals.

B. Shop Drawings: The Contractor shall submit complete Shop Drawings of all material proposed to be furnished and installed under this Section.

1. Show detail layouts of jointing and reinforcement, including dimensions, openings and spacings, embedded items; bending details; bar schedules; welds; and similar items required for the proper construction of the work.

2. Detail the reinforcement in accordance with ACI 315, ACI 315R and CRSI Manual.

3. Include the bar schedules, the individual weight of each bar, the total weight of each bar size, and the total weight of bars on each schedule list. Base the calculated weights on the theoretical unit weights shown in Table 1, ASTM A615.

4. Include the minimum concrete cover for reinforcement (see ACI 318).

C. Samples: Accompanying the above submittal, submit samples of exposed-to-view bolsters and supports.

D. Mill certificates: Accompanying the Shop Drawings, submit steel producer's certificates of mill analysis, tensile, and bend tests for reinforcing steel.

1.4 Product Handling

A. Delivery: Deliver reinforcement to the job site bundled, tagged, and marked. Use metal tags indicating bar size, lengths, and other information corresponding to markings shown on placement diagrams.

B. Storage: Store reinforcement at the job site in a manner to prevent damage and accumulation of dirt and excessive rust.

PART 2- PRODUCTS

2.1 General

A. Conform to ACI 301, ACI 315, and ACI 315R unless otherwise shown or specified.

2.2 Materials

A. Reinforcing bars: ASTM A 615, Grade 60, deformed.

B. Steel wire: ASTM A 82.

C. Welded wire fabric: ASTM A 185.

D. Supports for reinforcement: Bolster, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcement in place:

1. Use wire bar type supports complying with CRSI recommendations, unless otherwise indicated. Do not use wood, brick, and other unacceptable materials.

2. For slabs on grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

3. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with either plastic protected legs or stainless steel legs.

E. Fiber Reinforcement: Polypropylene fibers engineered and designed for secondary reinforcement of concrete slabs, complying with ASTM C 1116, Type III.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

2. Products: Subject to compliance with requirements, provide one of the following:

a. Gilco Fibers, Cormix Construction Chemicals.

b. Durafiber, Durafiber Corp.

c. Fiberstrand 100, Euclid Chemical Co.

c. Fibermesh, Fibermesh Co., Div. Synthetic Industries, Inc.

d. Forta CR, Forta Corp.

e. Grace Fibers, W.R. Grace & Co.

f. Polystrand, Metalcrete Industries

2.3 Fabrication

A. General: Fabricate reinforcing bars to conform to required shapes and dimensions, with fabrication tolerances complying with CRSI Manual. In case of fabricating errors, do not rebend or straighten reinforcement in a manner that will injure or weaken the material.

B. Unacceptable materials: Reinforcement with any of the following defects will not be permitted in the Work:

1. Bar lengths, depths, and bends exceeding specified fabrication tolerances.

2. Bend or kinks not indicated on Drawings or final Shop Drawings.

3. Bars with reduced cross-section due to excessive rusting or other cause.

PART 3 - EXECUTION

3.1 Inspection

A. Examine the substrata, formwork, and the conditions under which concrete reinforcement is to be placed, and correct conditions which would prevent proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected.

3.2 Installation

A. General

1. Comply with the specified standards for details and methods of reinforcement placement and supports, and as herein specified.

2. Clean reinforcement to remove loose rust and mill scale, earth, and other materials which reduce or destroy bond with concrete.

3. Position, support, and secure reinforcement against displacement of formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.

4. Place reinforcement to obtain the minimum coverages for concrete protection. Arrange, space and securely tie bars and bar supports together with 16 gauge wire to hold reinforcement accurately in position during

concrete placement operations. Set wire ties so that twisted ends are directed away from exposed concrete surfaces.

5. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh.

6. Provide sufficient numbers of supports and of strength to carry reinforcement. Do not place reinforcing bars more than 2 inches beyond the last - leg of any continuous bar support. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.

7. Fiber length of 0.75 minimum and mixed at a rate of 1.5 pounds per cubic yard of concrete.

B. Splices: Provide standard reinforcement splices by lapping ends, placing bars in contact, and tightly wire tying. Where welded splices are approved, conform to AWS D1.4.

+ + END OF SECTION + +

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SECTION 03350

GRASSCRETE

PART 1 – GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.2 Summary

A. Work specified in this section includes all labor, materials, equipment and services necessary to complete the Grasscrete Molded Pulp Grass Filled Void System, or equal, including single use formers, reinforcement, sub-base materials, grass fill and curing compound.

B. Related sections include the following:

1. Section 03000, Cast-in-Place Concrete

1.3 Definitions

A. Grasscrete: Cellular reinforced concrete system with voids created by void formers. Grasscrete is an internationally copyrighted brand owned by Grass Concrete Limited.

B. Former: A temporary form designed to create the cell or void unique to Grasscrete concrete slabs.

C. Grass Filled Void System: A Grasscrete installation that has the voids created by the formers filled with soil and subsequently planted with grass or other vegetation allowing water to percolate through the concrete.

1.4 Submittals

A. Product Requirements:

1. Provide submittal information in accordance with Section 01300, Submittals.

B. Product Data:

1. Submit specifications, test data and other data required for each type of manufactured material and product indicated.

2. Submit Technical Bulletins listing manufacturer's name, product name, descriptive data, curing time and application requirements.

3. Submit Material Safety Data Sheet (MSDS) and other safety requirements.

C. Field Quality-Control Test and Inspection Reports:

1. Documentation by the Contractor of the sub-grade compaction results prior to concrete placement.

2. Documentation by the Contractor of the project specific concrete mix air content as provided by the ready mix concrete producer prior to concrete placement.

3. Documentation by the Contractor of the project specific concrete mix compressive strength as provided by the ready mix concrete producer prior to concrete placement.

4. Documentation by the Contractor of the project specific concrete mix slump as provided by the ready mix concrete producer prior to concrete placement.

1.5 Quality Assurance

A. Installer Qualifications: The Contractor for this work shall be a Bomanite Grasscrete Licensed Contractor and Certified Applicator approved by The Bomanite Company (303) 369-1115, or approved equal.

1. Provide letter of certification from The Bomanite Company stating that installer is a certified applicator of special concrete finishes and is familiar with proper procedures/installation requirements required by the manufacturer.

2. Use an authorized Bomanite Grasscrete Licensed Contractor and adequate number of skilled workmen who are thoroughly trained and experienced in the necessary craft.

3. Applicator shall be familiar with the specified requirements and the methods needed for proper performance of work of this section.

4. Applicator shall be familiar with the previously approved mock-ups that demonstrated standard of workmanship.

5. Authorized Bomanite Grasscrete Systems installers limited to the following:

a. www.bomanite.com/grasscrete

B. Manufacturer Qualifications: A firm experienced in the support and training of a national installer network and manufacturing products required/listed to complete the work.

1. The Bomanite Company (303) 369-1115.

2. Or equal.

C. Source Limitations:

1. Obtain each type or class of cementitious material of the same brand from same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

D. Mock-ups:

1. Apply finish to mock-ups constructed by Licensed Installer, using each type of finish to demonstrate finished appearance and standard of workmanship.

a. Mock-up shall include entire system, including sub-base, and reinforcement with voids opened and filled with soil.

b. Notify Engineer seven days in advance of dates and time when mock-ups will be constructed.

c. Obtain from Engineer approval of mock-ups before starting construction.

d. If the Engineer determines that the mock-ups do not meet requirements, General Contractor will demolish and remove them from the site and arrange to assemble more until approved.

e. Maintain mock-ups during construction in an undisturbed condition as a standard for judging the completed work.

1.6 Delivery, Storage and Handling

A. Deliver materials in original packages and containers, with seals unbroken, bearing labels indicating brand name and directions for storage, mixing with other components and application.

B. Store materials to comply with manufacturers written instructions to prevent deterioration from moisture or other detrimental effects.

C. Dispense special concrete finish material from factory numbered and sealed containers. Maintain record of container numbers.

1.7 Project Conditions

A. Environmental Limitations:

1. Comply with manufacturer's written instructions for ambient temperature and other conditions affecting installation performance.

2. Concrete must be cured a minimum of 14 days or as directed by the manufacturer before trafficking can begin.

1.8 Performance Requirements

A. The product is required to bear daily vehicular traffic traveling at speeds greater than 20 miles per hour.

B. The product is required to be continuously reinforced with rebar.

C. The product is required to be manufactured from cast-in-place concrete with a minimum thickness of 5 1/2".

PART 2 - PRODUCTS

2.1 Manufacturers

A. The Bomanite Company (303) 369-1115.

B. Or equal.

2.2 Materials

A. Molded Pulp Formers: Vacuum formed bio-degradable tools.

1. Sizing: Molded Pulp 5 ½" sized formers.

B. Cure and seal: Water-based acrylic polymer curing compound designed to bond to fresh concrete and holds in the mix water to achieve improved concrete properties and complies with ASTM C309.

C. Reinforcement: Steel reinforcement to be minimum Grade 60 meeting ASTM a615/a615m.

1. Use No. 2 bar 8 inches on center.

D. Concrete: Portland cement shall conform to ASTM C 150, Type I, II or V. Aggregates shall conform to ASTM C 33 and be 1/2" minus. Mixing water shall be fresh, clean and potable. In freeze-thaw areas, air entrainment shall be provided as required. Water reducing admixtures and/or super-plasticizers are permitted and shall conform to ASTM C 494.

1. 5,000 psi.

E. Concrete Reinforcing Fibers: BASF Masterfiber MAC Matrix Fibers monofilament stick type fibers 2" in length or equal.

1. 1.5.

F. Void In-Fill: Material used to fill the voids in the Grasscrete System.

1. Topsoil.

G. No substitutions or alternates to the above unless indicated will be accepted.

PART 3 – EXECUTION

3.1 Examination

A. Sub-grade for vehicle traffic shall be in accordance with local concrete street specifications. For most applications, except for very heavy loads, native soil having a minimum "R" Value of 30 and a compaction of 95% will provide a suitable sub-grade. Consult General Contractor, Structural Engineer, Architect and Concrete Contractor prior to installation of concrete slab to ensure complete understanding of substrate preparation, reinforcement, penetrations, mix design, placing and finishing requirements, water capacity, elevations, etc.

B. The Grasscrete slab shall have a minimum thickness of 5 1/2". All perimeters of the Grasscrete slab should be restrained by a 12" minimum concrete border poured monolithically.

C. The Grasscrete shall be reinforced steel bar in both directions seated on the integral former chair.

3.2 Preparation

A. Examine sub-grade, with installer present, for conditions affecting performance of finish. Rectify conditions detrimental to timely and proper work. Do not proceed until unsatisfactory conditions are corrected.

B. Verify that elevations and compaction meet Project Conditions above.

C. Prior to concrete pour, verify that formers are free of construction damage and contaminants.

3.3 Installation

A. Construction Process:

1. Sub-grade shall be leveled to a uniform plane 6 1/2" below the final grade of the Grasscrete slab. 1" of washed concrete sand compliant with ASTM C-33 is then placed over the sub-base bringing the sub-base 5 ½" from final elevation.

2. Grasscrete formers shall be placed on the sand sub-base. In sloped situations the use of steel spikes or rebar lengths hammered through the formers into the sub-base may be necessary to hold the formers in place during the concrete placement process.

3. The reinforcement is placed in an alternating, stacking pattern. 16" on center north-south, 16" on center east-west followed by 16" on center north-south and finally 16" on center east-west if 8" on center steel has been specified. This stacking of the steel will place it at the most desirable height with minimal exposure to former material.

4. Concrete reinforcing fibers are added to the ready mix truck in conjunction with the high range water reducers (if required to meet mix design specifications).

5. Concrete shall be placed and leveled to the top of the Grasscrete formers. The concrete surface shall have a coarse broom swept finish.

6. Grasscrete formers shall have the void tops removed after the concrete has hardened sufficiently with residual paper pulp left in the voids acceptable.

7. The open voids will be filled with soil to within a minimum of ½" of the concrete surface.

3.4 Protection

A. General: Protect finished work from traffic until fully cured in accordance with manufacturer's recommendations.

3.5 Attached: Material cut-sheet

+ +END OF SECTION + +

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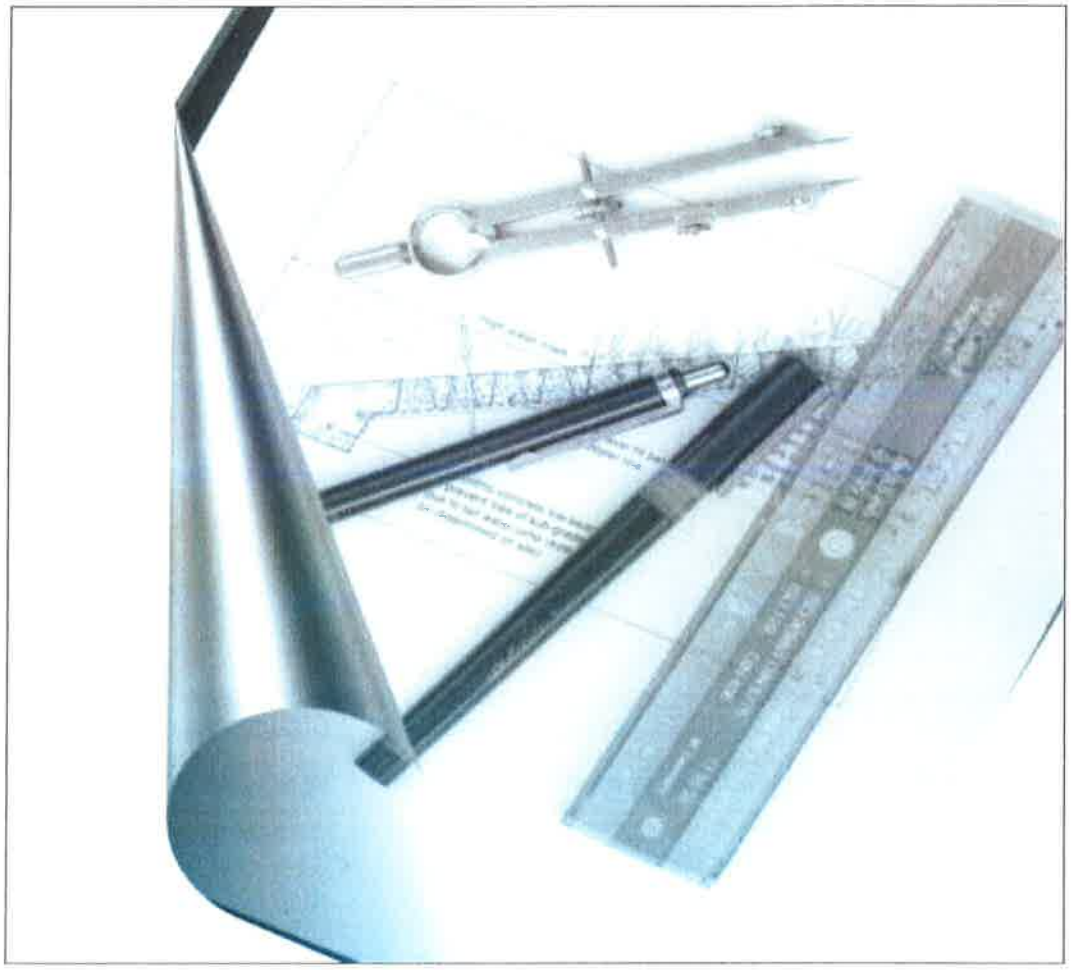
GRASSCRETE®

CAST INSITU PAVING SYSTEM

DESIGN AND SPECIFICATION GUIDE



GRASS CONCRETE LIMITED

PART OF THE GC GROUP OF COMPANIES

INTRODUCTION

So versatile is the GRASSCRETE system that it can often be claimed as a tailored solution to a range of construction problems from heavy traffic applications to high water flow erosion control.

Across the years, GRASSCRETE has become a generic reference to the process of grass and concrete paving. Occasionally however, the unique cast on site system is confused with precast variants.

We hope, with this publication, to provide a definitive guide for GRASSCRETE in all of its major applications which should enable safe specification without confusion.

CONTENTS

CHAPTER ONE – DESIGN PRINCIPLES

PART ONE ~ THEORY

GRASSCRETE is essentially a cellular reinforced concrete slab, the cells being created by casting around plastic void formers.

The plastic former, manufactured from recycled materials is the culmination of many years of study which has perfected the shape of the pocket and the form and draw of the vacuum forming process. It provides crucially, the strength to accept live concrete loads, yet is thin enough to enable the tops to be easily melted to reveal the voids.

Structural analysis of the finished concrete section is based upon the bending moment of the mesh reinforcement contained within the slab, relatively to slab depth, contact area with base and an assumed allowable ground bearing of 45kN/m^2 for its base. By using combinations of depth and different mesh types, the system can be tailored to provide the most economical solution.

PART TWO ~ CONSTRUCTION

The 600x600mm plastic formers are laid edge to edge over a sand blinded formation to form a continuous layer broken only by a 100mm margin to the edge of each bay and at the point of each expansion joint.

Once the formers are in position the mesh reinforcement is laid over the former upstands, the individual 200x200mm upstands of each corresponding to the grid module of the reinforcement. As the mesh drops over the upstand, it is located in position by a spacer, this integrally moulded feature fixes the position of the mesh.

Expansion joints are located at maximum 10x10m centres and can be specified in the 3 following types:-

Type A - Ambient climates (fig.1)
Pre-soaked 25mm wide softwood filler to full depth of system with no sealant.

Type B - Extreme climates (fig.1)
Closed cell 25mm wide polyethylene (PE) foam or bitumen impregnated fibreboard. (It is advisable to seal the latter type to prevent subsequent chafing).

Type C - Heavy load transference (fig.2)
As Type B but incorporating 300mm long x 20mm diameter dowels at 600mm centres with cap and de-bond to one end with joint sealed irrespective of filler type (we recommend this type of joint for use only in the 150mm thick systems and only for regular load transference.

To Type A & B joints we recommend a 100mm wide trowelled margin to expansion joints. For Type C dowelled joints this should be increased to 150mm.

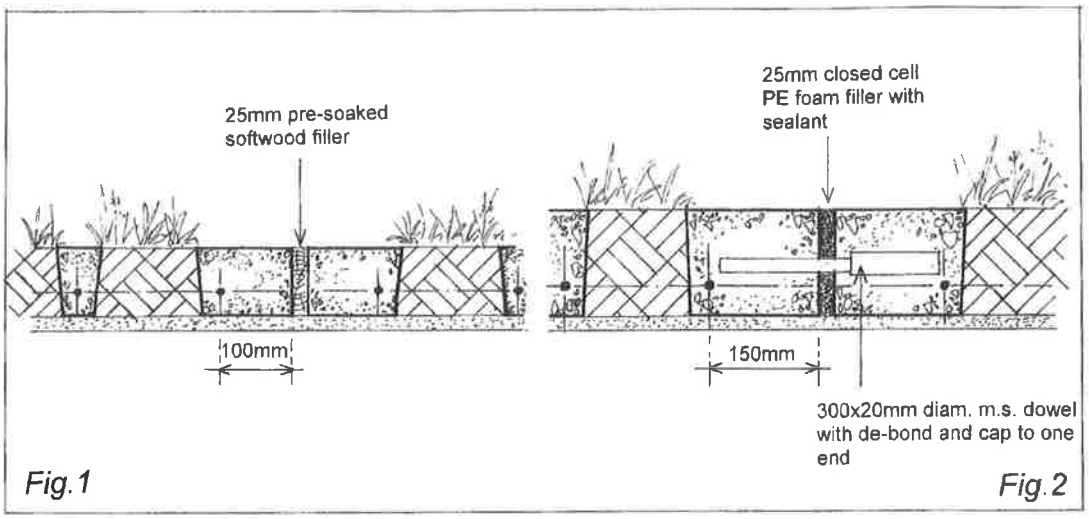


Fig.1 *Fig.2*

The concrete mix is of a readily available readymix type and can be identified by the following design mix description –

Cement type	:	Ordinary Portland (sulphate resisting may be used for extreme exposure)
Minimum cement content	:	350kgs/m^3
Maximum water/cement ratio	:	0.55
Maximum size aggregate	:	10mm
Ratio sand/total aggregate	:	0.45
Control/ batch slump	:	100mm general applications 50mm steep slopes
Site added admixtures	:	Superplasticiser to manufacturer's recommended dosage levels.
Final slump	:	Flowing:- general applications 75-100mm:- steep slopes
Air content	:	3% +/- 1½% (higher values can be considered for compliance with highway related specifications)

The type of superplasticiser used can vary and may slightly increase or decrease the air content depending upon the formulation.

The concrete mix is designed to self compact around the plastic formers. Only when laying to the very steepest slopes where the slump is markedly reduced should any form of compaction be considered.

During pouring the concrete is drawn level to the tops of the formers by use of rubber bladed squeegees. This should be the only finish applied. Tamping or brushing is not required.
The system is designed to be capable of following most profiles either in the plan shape or vertical level. The former is simply cut to allow the incorporation of curves etc without stepping to the edges.

In respect of tolerances, the depth of the concrete is limited by the depth of the plastic former. The level at the surface will therefore generally reflect that of the prepared sub-base.

After the concrete has set and hardened (generally after 48 hours), the former tops are removed. This is carried out by use of LPG or paraffin (Kerosene) flame guns. Waving the burner across the top of the mould removes the top allowing the side walls to melt down to harmless residue deposited in the base of the void.

Please note that the melting out process does not emit any CFC's and there is only a small quantity of CO_2 evident, the operation being similar in it's emission levels to wood burning.

Following the melting operation the voids are infilled with topsoil and then seeded. Consideration should be given to the potential settlement of the topsoil which should be allowed to naturally take place. The seed can therefore be incorporated within a fine topsoil overlayer if the surface is not to be used immediately.

Alternatively, where immediate use is required the soil levels can be topped up at a later stage after initially striking flush to the upper concrete level.

For types of seed mix please see the appropriate chapters elsewhere in this publication.

Where gravel infill is used in lieu of topsoil/seed, we recommend the use of a 20-5mm grading which will be less susceptible to displacement than smaller graded 'pea gravel' types.

First trafficking of the surface should be linked to the curing period of the concrete. Under ambient conditions and a normal curing process we would recommend the following guidelines.

After 24 hours	-	foot traffic
After 7 days	-	40% of design load*
After 14 days	-	75% of design load*
After 28 days	-	100% of design load*

* Where regular early use is required we would recommend the incorporation of fibre reinforcement in the concrete mix to harden to the pocket walls.

CHAPTER TWO – TRAFFIC APPLICATIONS

PART ONE ~ EARTHWORKS & SUB-BASE DESIGN

As stated in Chapter One the surfacing has a structural requirement of a 45kN/m² allowable ground bearing. Where the existing ground naturally provides this, a sub-base depth of 150mm is normally adequate. For infrequently used parking, this can possibly be reduced.

In any event, consideration should be given to the access requirement for plant and deliveries during the construction process. This temporary works loading may therefore dictate the actual depth adopted.

To limit the possibility of "sub-grade pumping" through the sub-base under load, we recommend the utilisation of an underlying geotextile layer where the sub-base is to be heavily trafficked.

The sub-base specification for UK applications should relate to a Specification for Highways and Bridges Clause 803 Type 1 granular sub-base. For applications elsewhere in the world this relates to a free draining granular material of low plasticity and non frost susceptibility.

The cellular nature of the surface allows the release of frost heave pressure and this can be witnessed by the soil levels rising an falling under a freeze/thaw cycle. This feature enables the often stipulated guidelines of a frost free 450mm of construction to be relaxed enabling the surface to be laid over chalk sub-strata without additional sub-base depth.

PART TWO ~ DRAINAGE

On level ground GRASSCRETE can drain at 90% the rate of ordinary grassland. In the early stages of grass germination this figure may be slightly reduced until the root matrix is established. There may also be a natural raising of water table levels where significant site development has recently taken place.

The shape of the GRASSCRETE pocket will enable the retention of surface water during periods where the sub-grade is slow to drain (see fig.3).

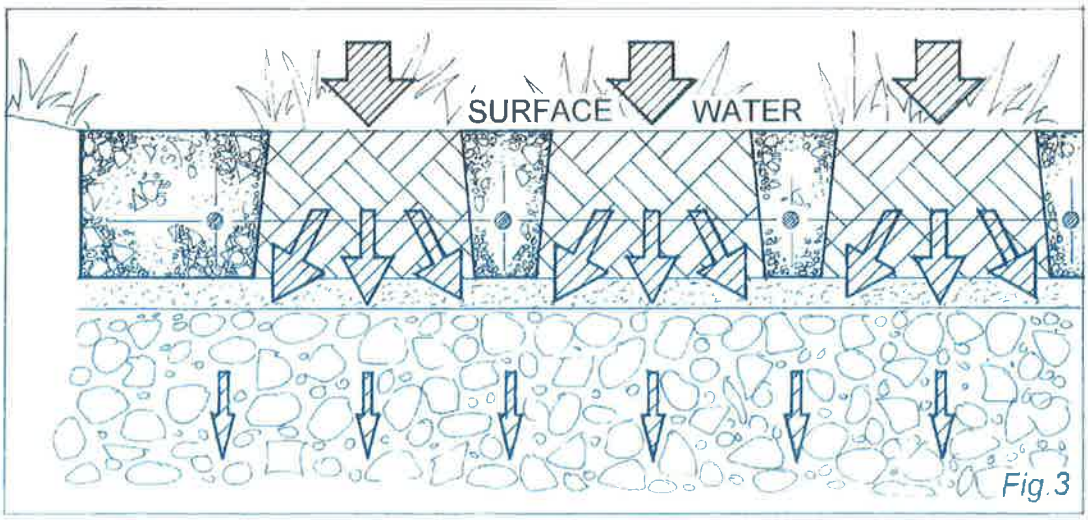


Fig.3

Where a slow draining sub-grade such as a cohesive clay is encountered, consideration can be given to the utilisation of an underlying drainage blanket as part of the overall sub-base design. This enables a reservoir head to be formed without weakening the ground bearing capability (see fig.4).

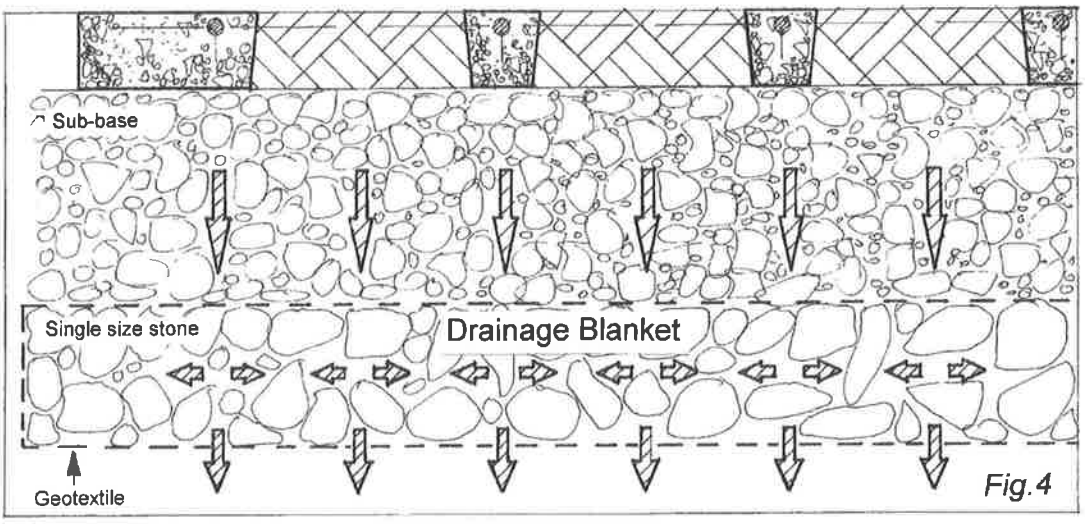


Fig.4

Please see our separate publication "GRASSCRETE STORM WATER MANAGEMENT- THE CASE FOR A POROUS PAVING SYSTEM" which details the advantages of a sustainable self-draining paving system on new developments.

PART THREE ~ CAR PARKS

A common feature of precast systems is their susceptibility to "elephant track" under regular loading often rendering them unsuitable for all but the infrequently used car parks. GRASSCRETE however, places no reliance upon grass for stability - a drawback with precast. It can therefore be specified in a wide range of applications.

Another factor in the specification of a grassed car park is the tyre rumble under use, a factor associated with precast units, which on large areas in particular, can be uncomfortable and cause displacement of units due to the resulting vibration. With its reinforced structure GRASSCRETE does not suffer from such problems.

A typical car park module is 4.8 x 2.4 metres with a 6.0 metre wide access aisle for two way traffic flow. Long strip casting enables bays of 4.8/5.0 metres and 6.0 metres wide can be constructed utilising the 100mm wide solid concrete edge as a subtle bay delineation (see fig.5).

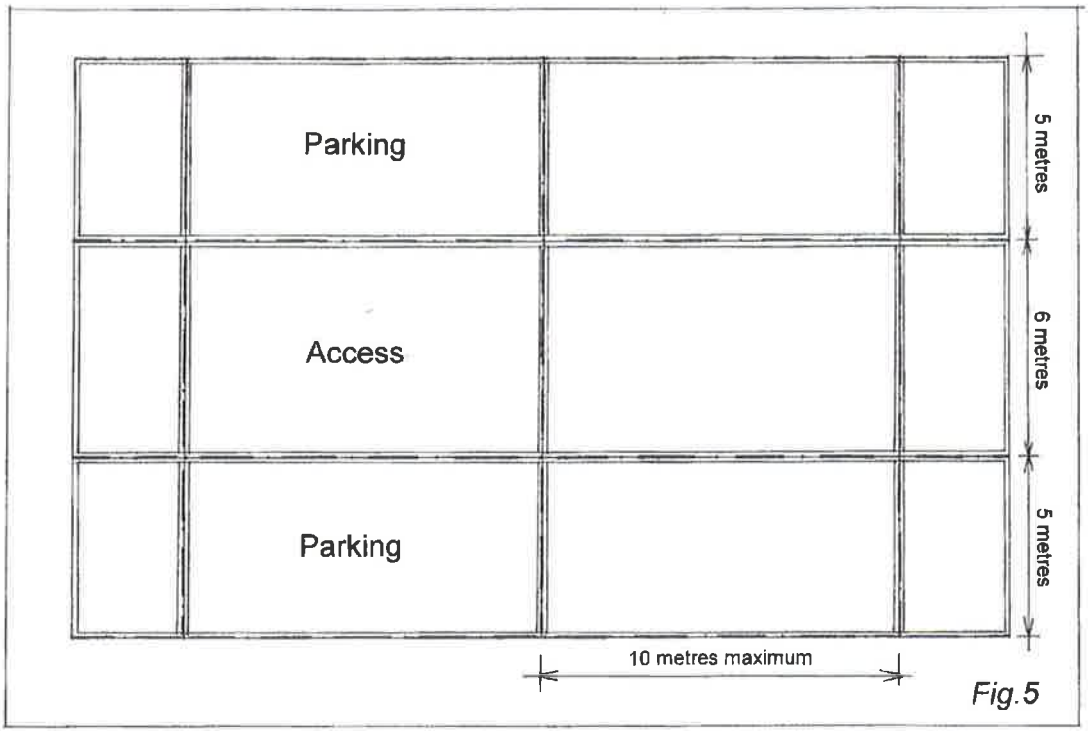


Fig.5

In addition to the general parking provided under fig.5, further delineation can be provided by transverse strips of concrete formed by the omission of a 200mm part segment of a former. This can be either to the full width of a bay or in a truncated 'tee' format (see fig.6).

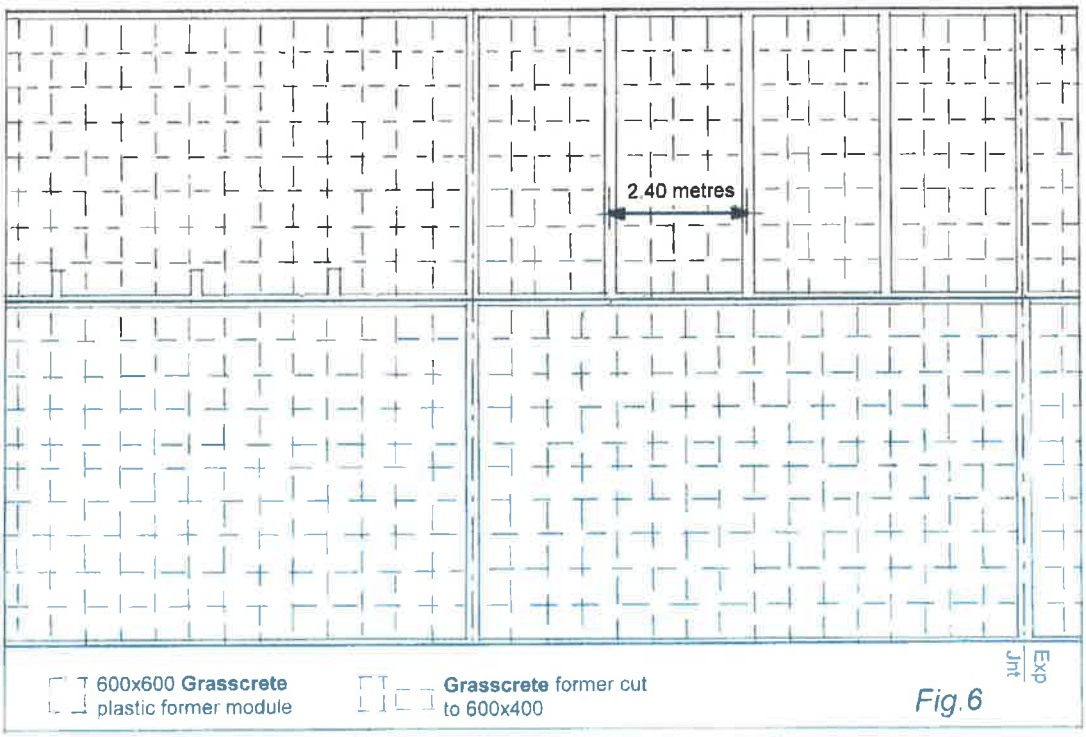


Fig.6

With a natural grassed appearance for the car park, it is also possible to eliminate elements of an otherwise hard landscape. With no requirement for kerb edges the surface can blend into the natural landscape. With no need for surface water drainage falls, the surface level can follow contours which may be contrary to normal requirements. Taking the natural appearance a step further, shrubs and trees form a softer natural marker than bollards and can be easily incorporated into most paving layouts. With its self-draining nature GRASSCRETE can be cast to within 600mm of mature trees. Further advice on root training is available on request.

As an alternative finish, GRASSCRETE can be specified with a 20-5mm gravel infill to the pockets without affecting the structural performance of the system, as the pocket fill does not influence its load bearing capability.

With no requirement for underlying drainage and no need for perimeter kerbs, existing GRASSCRETE car parks can be extended without worrying about drainage falls. This factor enables car parks to be constructed on profiles which would be otherwise unsuitable for a sealed paving system.

PART FOUR ~ ACCESS ROADS

i) General Access

GRASSCRETE is often specified for access routes required to have low ecological or visual intrusion. Its self-draining nature limits surface water run off and enables roads to be constructed with minimal infrastructure work.

Its low visual intrusion is a virtue which sees it regularly specified on defence projects where satellite or aerial identification is often to be avoided.

Another virtue lies in its 'continuous slab' structure which defies vandalism, thereby making it ideal for use in prison establishments where an alternative precast type could be lifted for inappropriate use.

A particular advantage over precast concrete and plastic systems is the lack of differential settlement or surface shear under load. This eliminates the need for kerb edge restraint and enables slimmer sub-bases to be considered.

The plan profile of access roads can be varied without stepping to the outer edge, this being achieved by simply cutting the plastic formers tangental to the edge alignment (see fig.7).

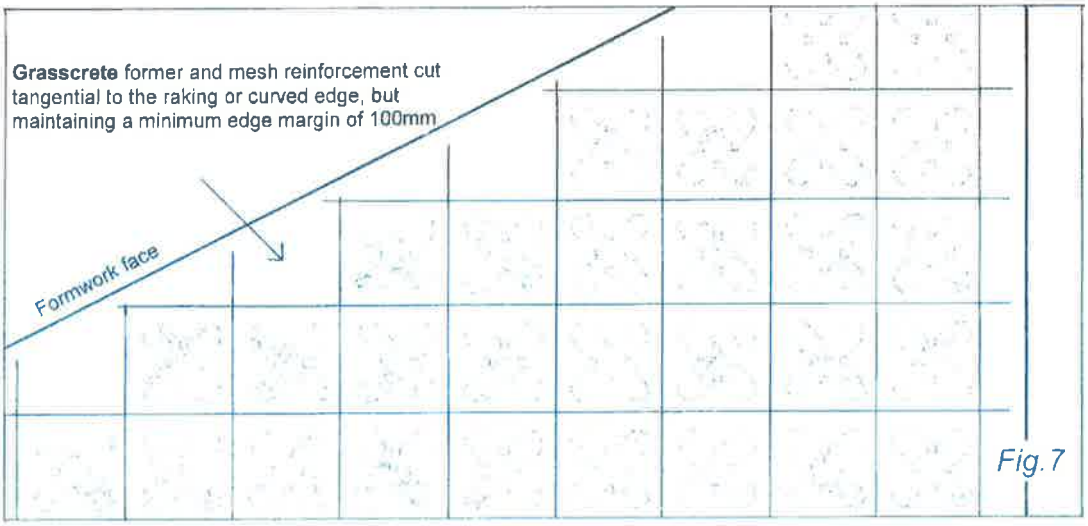


Fig.7

ii) Emergency Access

A fire and emergency access road fulfils an essential function and should not be compromised in design by its possible infrequent use. Indeed, it is often the case that a fire access is much more regularly used than its designed intent. A common feature is the contractor's use of the surface as a haul road during construction. Under such circumstances it is often subjected to much higher loads than a fire appliance would otherwise apply.

A rule of thumb design suggests the specification of a fire pumping appliance for buildings of up to 3 storeys in height. A typical special equipment tender will now have a gross vehicle weight of up to 13.3 tonnes.

For 3 storeys and above or in intensive residential circumstances, access is likely to be required for a hydraulic platform which are for UK applications 17 or 22 tonnes in gross vehicle weight. Much larger platforms are however found throughout the world although the point load in operation is likely to be similar.

The point load is an important feature of platform use where, in the presence of saturated ground conditions, the appliance will be supported on jacking legs. Under such conditions a paving layer of low tensile strength such as a precast system is likely to be punched into the sub-grade causing a loss of stability (see fig.8).

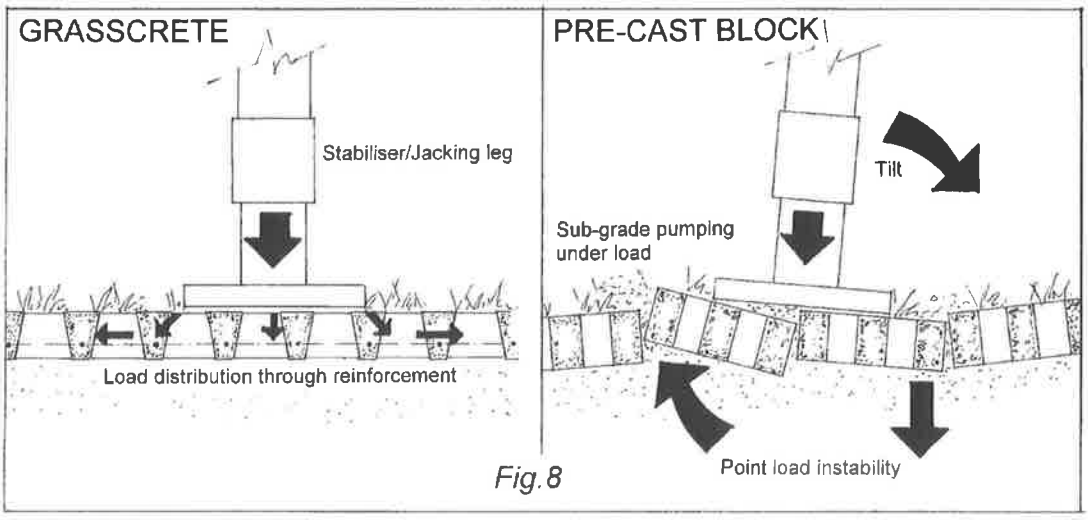
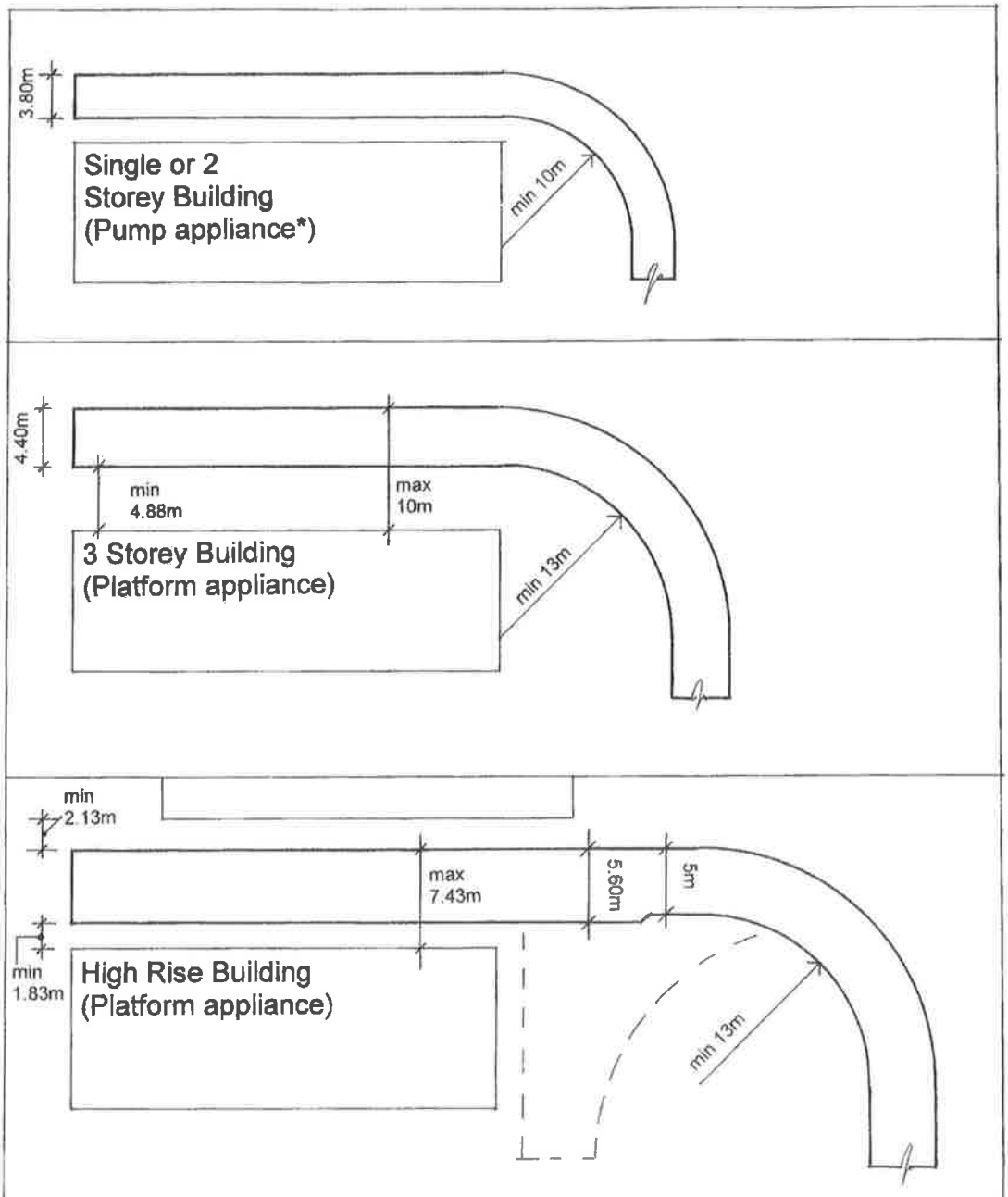


Fig.8

Typical access layouts for operational equipment can be viewed in fig.9.



*Check with local Fire Department, as certain residential buildings may receive a Platform appliance irrespective of the height of the building

Fig.9

A further factor in the specification of a fire access route is the intended first use, particularly when considering possible temporary construction activity or routine maintenance requirements. Precast concrete or plastic systems will generally require a full season's growth before a loading capability is achieved. This can often be a significant hurdle to overcome in programming the works.

GRASSCRETE on the other hand can be used immediately once its initial curing period has elapsed (see page 3). If construction activity is likely to introduce deleterious material on to the surface, the melting of the former tops, soiling and seeding can be held over for a more appropriate stage in the programme with the surface still usable in the meantime.

PART FIVE ~ LAYBYS

Highways often require laybys to be constructed, which are strictly not for public parking. These can be found in a variety of locations such as – CCTV kiosks, camera and lighting columns, petrol interceptors, police surveillance pads, wide load contra flows and sky cradle platforms.

The loading criteria may vary for each application though in the case of the latter two mentioned uses, the loading is significant and for such purposes, our GRASSCRETE GC2sc variant has been designed, permitting high point loads.

With its continuously reinforced structure, GRASSCRETE does not suffer from the lateral spread and settlement encountered with precast systems particularly under the turn in and turn out operation in using a typical trapezoidal layby.

The cast in place process also enables a total flexibility in the layout without the need for a kerb edge restraint. Manhole and inspection covers can be easily incorporated as can the jointing up to road kerbs or channels.

The comparatively low surface vibration provided from the level upper surface permits vehicles to quickly turn on to the area or merge back at speed where busy highways dictate such a need.

PART SIX ~ LOADING TABLES

SYSTEM	DEPTH	REINFORCEMENT (200 x 200)	POINT LOAD (150x150m contact)*	TYPICAL G.V.W. *
GC3	76mm	A142 (6mm diam.)	8.5kN	3.4 tonnes
GC3	76mm	A193 (7mm diam.)	10.8kN	4.3 tonnes
GC1	100mm	A193 (7mm diam.)	13.5kN	10.6 tonnes
GC1	100mm	A252 (8mm diam.)	16.7kN	13.3 tonnes
GC2	150mm	A252 (8mm diam.)	28.8kN	30.0 tonnes
GC2sc	150mm	A393 (10mm diam.)	41kN	40.0 tonnes

*Assumed minimum allowable ground bearing of 45kN/m^2, and an interpolation based upon typical numbers of tyre contacts.

CHAPTER THREE – EROSION CONTROL

PART ONE ~ RESERVOIR/FLOOD DEFENCE

A significant advantage in the specification of a cellular revetment can be found in the venting of hydrostatic pressures in an earth slope. This enables much slimmer paving sections to be utilised than would be required for 'solid' paving.

The performance of steeper reinforced grass waterways has been studied at length in the CIRIA Report 16 which identifies a number of key elements to be considered in the design criteria for a suitable revetment.

From information provided, we can broadly categorise armour layers as follows:-

LIGHTWEIGHT ~ geotextiles/geogrids

INTERMEDIATE ~ non-tied precast concrete blocks

HEAVYWEIGHT ~ cable tied precast blocks and GRASSCRETE

Causes of failure under hydraulic load can be associated with one or more of the following factors:-

Change of embankment profile, causing turbulent flow

Loss of grass cover where systems rely on grass for stability

Tail water jump at the base of spillways

Lack of an underlying geotextile layer

Displacement of individual units by vandalism

With Grasscrete's continuously reinforced structure, an even upper surface is provided which offers a consistent flow signature with no focal points for erosion. There is also no risk of vandalism to the surface and as such, maintenance inspections can be minimised.

With all waterborne applications we would recommend the use of an underlying geotextile to prevent sub-grade scour in the event of a loss of soil filling to the individual pockets. It should be noted that with a continuously reinforced structure, the deadweight of the armour layer means that a relatively inexpensive geotextile can be utilised as opposed to the high flow variants required to prevent precast units from lifting under hydrostatic pressure load. For a typical reservoir cross section (see fig.10).

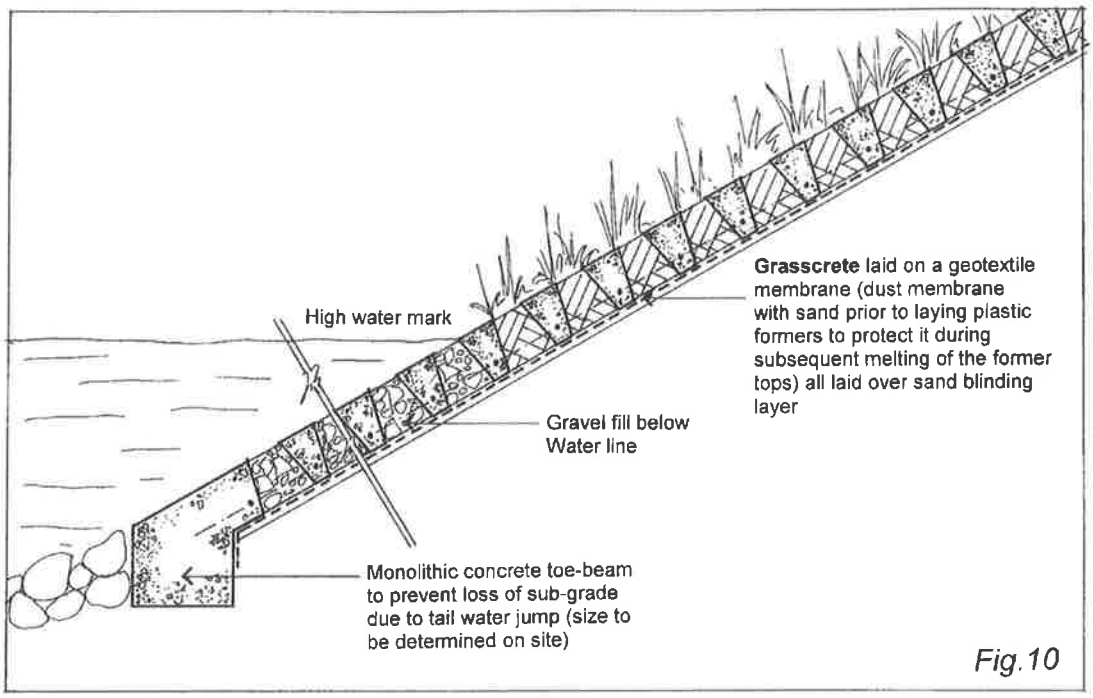


Fig.10

With its traffic bearing capability, GRASSCRETE can be specified as a 'total' armour layer to reservoir bunds with crest access for heavy vehicles being accommodated.

In environmentally sensitive areas such as salt flats etc. the GRASSCRETE pockets can be either sown with natural flora seed mixes or planted with indigenous rushes.

GRASSCRETE'S cast on site process often suggests a limitation in the angle to which the system can be laid, with the notion of concrete loss during pouring. On the contrary, the ribbed cruciform shape of the plastic former is designed to limit the flow of live concrete enabling slope angles of up to 45° to be accommodated.

PART TWO ~ STORM CHANNELS

Increasing urbanisation makes increasing demands upon the process of controlling storm water run off. Nowhere is this more evident than in tropical and sub-tropical climates where heavy rainfall leads to intense run off and the spectre of downstream flooding under inadequate control

It would be encouraging to think that the universal specification of porous paving systems will be a feature in years to come. The mitigation of run off at source being the best possible cure. In the absence of this approach, there will continue to be a need to accommodate high volumes of storm water.

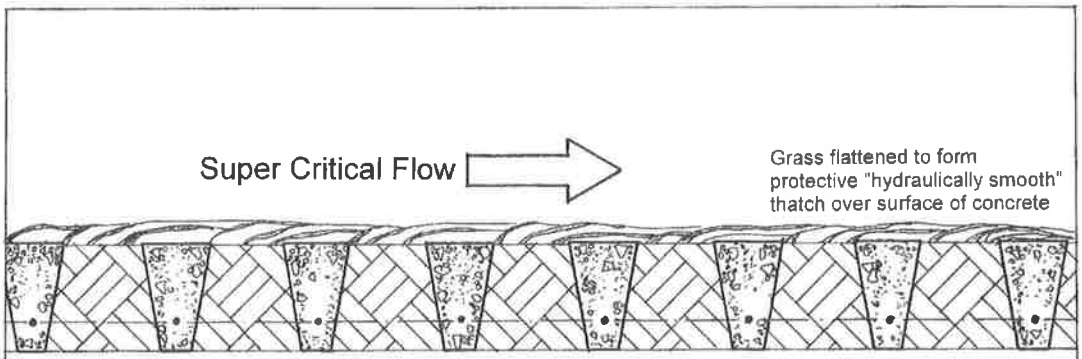
In temperate climates the use of storm channels will tend to be associated with overflow channels for swollen rivers. In such circumstances, the armour layer will be designed according to the anticipated erosion, with maximum protection adjacent to the spillway or weir.

In tropical or sub-tropical climates, the demands are much greater with a prolonged intense flow being encountered throughout the channel's length. To assist in the specialised design we have compiled a publication - "GRASSCRETE; PAVING DESIGN FOR RIVER AND STORM CHANNELS" which is available on request.

A principle design consideration in developing a channel section is the hydraulic roughness of the armour layer. The rougher the surface, the slower the flow, the greater the cross-section required.

A common misconception is that a grassed surface will increase the hydraulic roughness in comparison to plain concrete. Whereas it is true to say that a sub-critical flow will be slowed by grass stems, such a flow is not the determining factor in the design.

By contrast, a super critical flow will see a different situation occurring. Heavy impounding of grass stems will cause them to lay prostrate in a surface thatch, rather than being rougher than plain concrete,a Mannings 'n' value of 0.03 can be achieved under such conditions (see fig.11).



Grasscrete under High-flow conditions

Fig.11

A GRASSCRETE channel design can therefore provide the twin features of a natural grassed environment during dry season, low flow and a hardened wetland water course for peak season demand.

PART THREE ~ FLOW RATES

The CIRIA Trials of 1986 detailed in Part One were intended to assist in the production of a definitive guide for grass reinforcement systems. The subsequent guide Report No 16 was produced to create a benchmark for the hydraulic capabilities of available systems.

Under trial was our GRASSCRETE GC2 (150mm thick) system which was structurally unaffected by the maximum flow rate available to the trial. From the information provided, we have been able to interpolate the results into a recommendation for each of the Grasscrete variants (see fig.12).

SYSTEM TYPE	REINFORCEMENT	DEPTH	MAXIMUM FLOW RATE
GC3	A142/A193 *	76mm	4.5m/sec
GC1	A193/A252 *	100mm	6m/sec
GC2	A252 *	150mm	8m/sec

* Relates to British Standard BS4483 References

A142 = 200x200mm grids x 6mm diameter wires weighing 2.22kgs/m²
A193 = 200x200mm grids x 7mm diameter wires weighing 3.02kgs/m²
A252 = 200x200mm grids x 8mm diameter wires weighing 3.95kgs/m² Fig. 12

CHAPTER FOUR – OTHER APPLICATIONS

Tailored Projects

Throughout GRASSCRETE'S long history, there have been numerous occasions where the system has been called into use for previously unspecified roles. GRASSCRETE'S unique adaptability has enabled the product to rise to these new challenges, a few of which are detailed here.

1) Light Rail Engineering

The ability to tone down the environmental impact of a light rail network through city suburbs is compromised by the engineering considerations in the design. Whilst a grassed track encourages an environmental solution, a number of important factors need to be considered.

- The potential for vandalism if precast elements are used
- The need to provide access for maintenance vehicles
- Percolation of surface water when overlaying impervious stage 1 and 2 concrete bases
- A surface which requires little or no maintenance

Our response to such a brief was the following design which was subsequently incorporated into a city centre project (see fig.13).

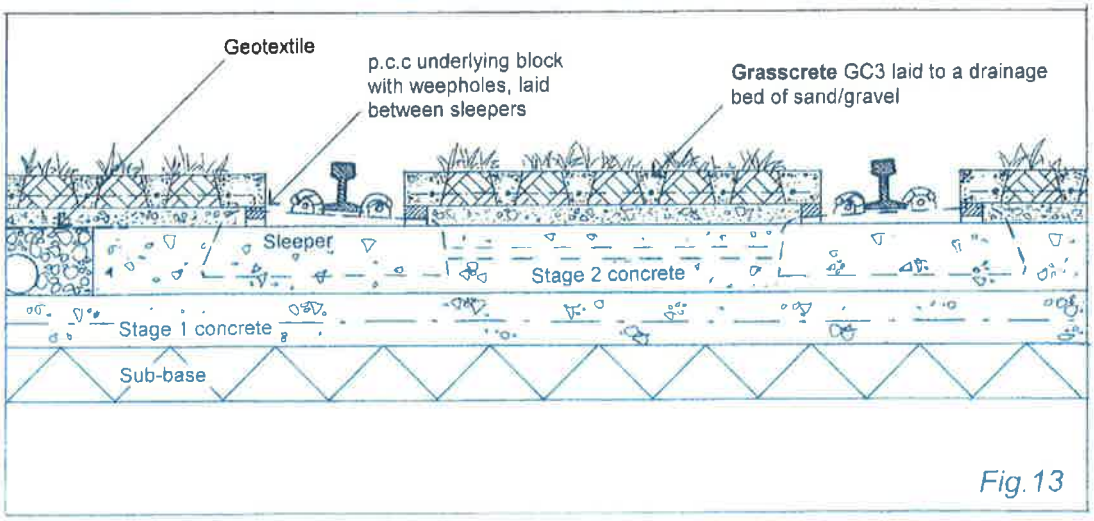


Fig.13

Helicopter Landing Pads

Using the essential criteria of a level stable surface and a natural grassed appearance, GRASSCRETE is the ideal solution to the provision of low intrusion helipads. Further benefit is gained by forming the 'H' monolithically within the surface by the elimination of the corresponding part sections of void former (see fig.14).

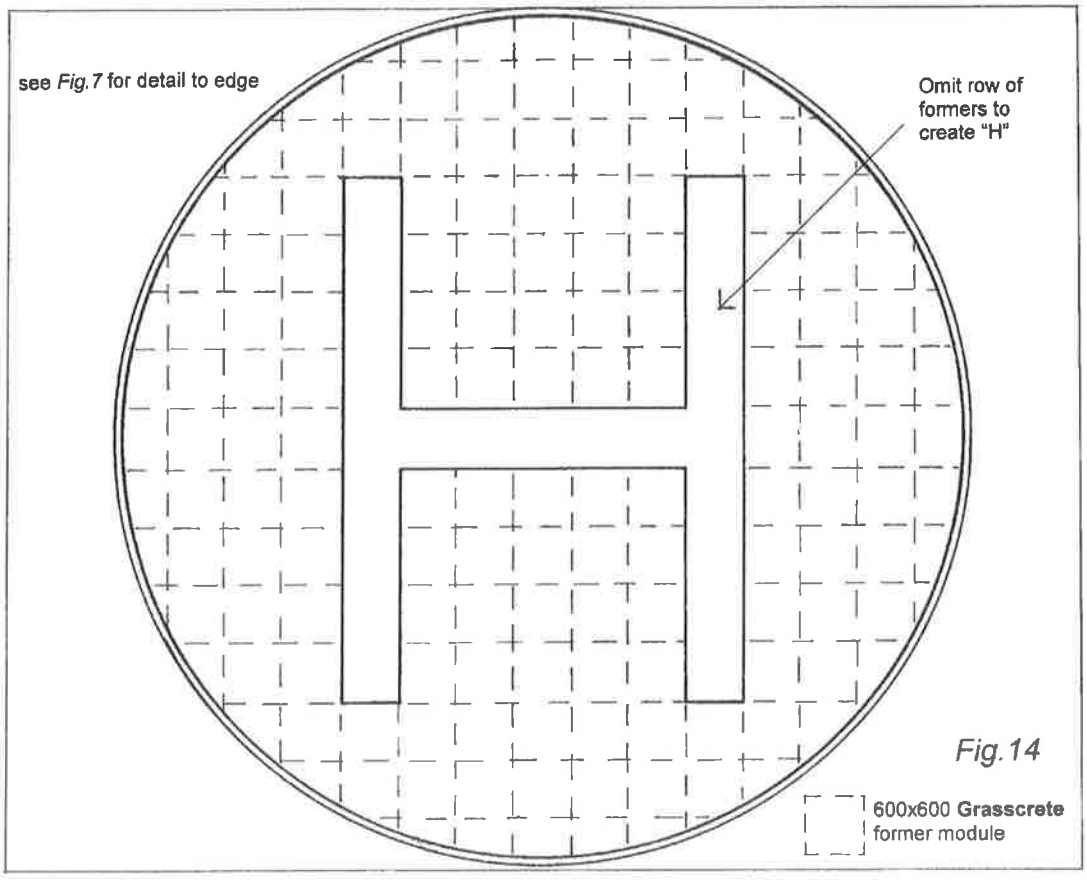


Fig.14

Sludge Cake Drying

Perhaps not the most glamorous application for GRASSCRETE and not one for our brochure photographs. Nevertheless, this particular application proved to be a successful result for the GRASSCRETE system.

In this instance, GRASSCRETE was designed to act as a drainage slab for residual moisture contained within sludge removed from waste water treatment plants. Using a controlled filtration, the system allowed the sludge to dry prior to its removal for blending into screened topsoils (see fig.15).

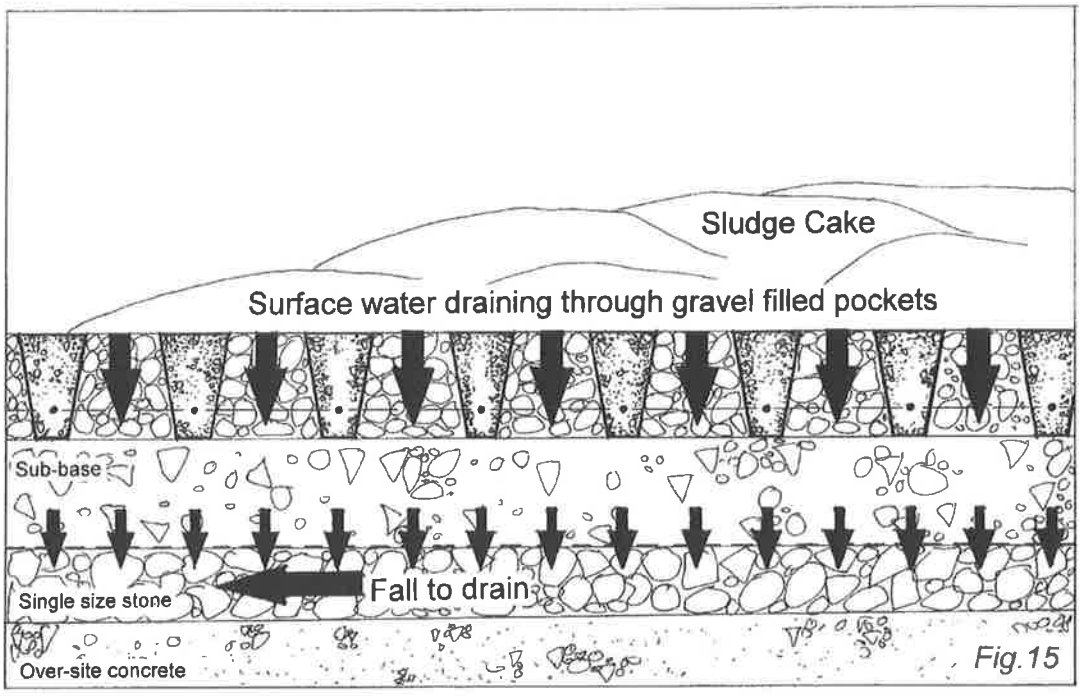


Fig.15

CHAPTER FIVE – USE AND MAINTENANCE

PART 1 ~ USE

A question often asked is one relating to the ease of use for both vehicles and pedestrians. Often the questions are influenced by previous experiences with other forms of grass reinforcement.

Vehicular Use

With a flat upper profile and a pocket shape designed to prevent tyre intrusion, vehicles have little difficulty in using the surface. The tyre rumble encountered is perhaps the lowest found amongst concrete systems and is in marked contrast to castellated precast units where the studded upstands cause discomfort in use and block displacement under vibration.

The integral solid edge margins to each bay prove a subtle definition for the user and is particularly important for fire access routes. This detail, together with the optional car bay markers, enables a fully delineated car park to be constructed without the need for painted lines.

Pedestrian Use

It cannot be expected that a grass and concrete surface will be as easy to walk on as a solid pavement system, particularly for high heel users. That said, the GRASSCRETE system is probably the easiest grass reinforcement system to walk on. The same advantages that hold for vehicles apply equally to pedestrian use, the plan shape of the pocket allowing feet to sit predominantly on concrete. The optional use of bay divisions also aids the process of disembarking from vehicles where the first foot is placed on a solid concrete surface.

PART 2 ~ MAINTENANCE

GRASSCRETE is not a miracle system – it grows natural grass. Just as a grassed lawn requires maintenance, then so will GRASSCRETE albeit to a lesser degree.

Regular vehicular use will trim the grass level down flush to the upper level of the concrete. In a typical car park application, the access routes may show a greater level of grass wear. It is advisable therefore to apply a routine maintenance programme, particularly to the access locations.

A simple maintenance programme can be described as –

1. Routinely cut areas subjected to infrequent use to even out growth levels
2. Apply liquid based fertilisers as follows – Spring : nitrogen based formula
   Autumn : phosphate based formula

   Powder or granule based fertilisers should be avoided due to potential for wind drift and build up on the concrete ribs which can result in scorching of the grass.
3. Regular trafficking may result in the soil levels falling slightly in the pockets. It is advisable to top up levels which are a potential trip hazard. Over filling should be avoided however as should compaction of the pocket fill which can injure grass growth.
4. After the construction of the pavement layer and if the surface is not to be used immediately, there is benefit to be gained from placing a fine layer of topsoil over the surface of the concrete. This will enable soil levels to be naturally replenished after settlement as well as providing a barrier against solar gain over the newly cast concrete.

PART 3 ~ GRASS TYPES

The actual grass seed specification will depend upon the climatic location or intended use. As GRASSCRETE is laid throughout the world, the type of indigenous grass will therefore vary with both rhizome or stolon growth types being encountered.

Grass types can be individually tailored for individual projects according to climate, use and aspect. For temperate climates, three amenity based mixes can be utilised to provide flexibility and economy.

Regularly Trafficked Areas

Such applications are generally associated with car parks where the grass will be required to grow under aggressive wear conditions. Normally, the concrete ribs are required to be visible to provide a surface which is less likely to slurry under use. The combination of these two factors suggests the specification of a ryegrass based mix which offers erect growth and excellent wear resistance. Our Mix No 1 suits this purpose.

Infrequently Trafficked Areas

The principle types of use under this category are fire access routes and road verges.

A typical fire access may be located around a high rise building which could place the roadway in shade. The seed mix should therefore be shade tolerant

A road verge for European applications will be subjected to surface water run off containing rock salt treatment applied to carriageway in winter months. The mix should therefore be saline tolerant.

Such applications call for minimal maintenance with a carpet of cover generally being required. The combination of these factors suggests the use of a mix with a high proportion of creeping red fescue. Our Mix No 2 is such a type.

Embankment/Slope Protection

A number of different variations upon a common theme can be considered. The mix should generally provide good root anchorage to prevent pull out.

A dry slope may call for a more manicured approach with a closer grass mix provided by creeping red fescues. Consideration should be given however to the potential for the surface to become slippery under wet conditions.

In waterborne slopes the grass will be required to perform a functional role. Our earlier chapters have described how a stemmed grass can form a protective thatch when laid prostate by heavy water flow. Such a mix will therefore call for a higher proportion of smooth stalked meadow grass. Maintenance of this type should be geared towards the period of maximum impounding, to achieve the maximum thatching effect, the grass should be left long during the wet season, our Mix No 3 is designed for such applications.

SEED SPECIFICATIONS

MIX	SOWING RATE	SPECIFICATION	APPLICATION
No 1	50gms/m^2	45% Creeping Red Fescue 5% Browntop Bent 50% Perennial Ryegrass	Vehicular Parking Amenity Areas
No 2	50gms/m^2	20% Chewing Red Fescue 45% Creeping Red Fescue 5% Browntop Bent 30% Hard Fescue	Fire Access Shaded low maintenance areas
No 3	50gms/m^2	52% Creeping Red Fescue 5% Smooth Stalked Meadow Grass 3% Browntop Bent 40% Perennial Ryegrass	Embankments

The difference between a good mix and a poor one is likely to be pence per m? on sowing but a much greater cost on failure. We would therefore recommend the selection of quality cultivars selected from the upper levels of the Sports Turf Research Institute's tables relative to the required function.

PART 4 ~ REMEDIAL WORKS

Occasionally it may be necessary to cut out sections of GRASSCRETE to allow for example, a new service trench to be constructed. Very occasionally, damage may occur due to inappropriate use. Under such circumstances, a remedial repair can be easily accommodated as shown in fig.16.

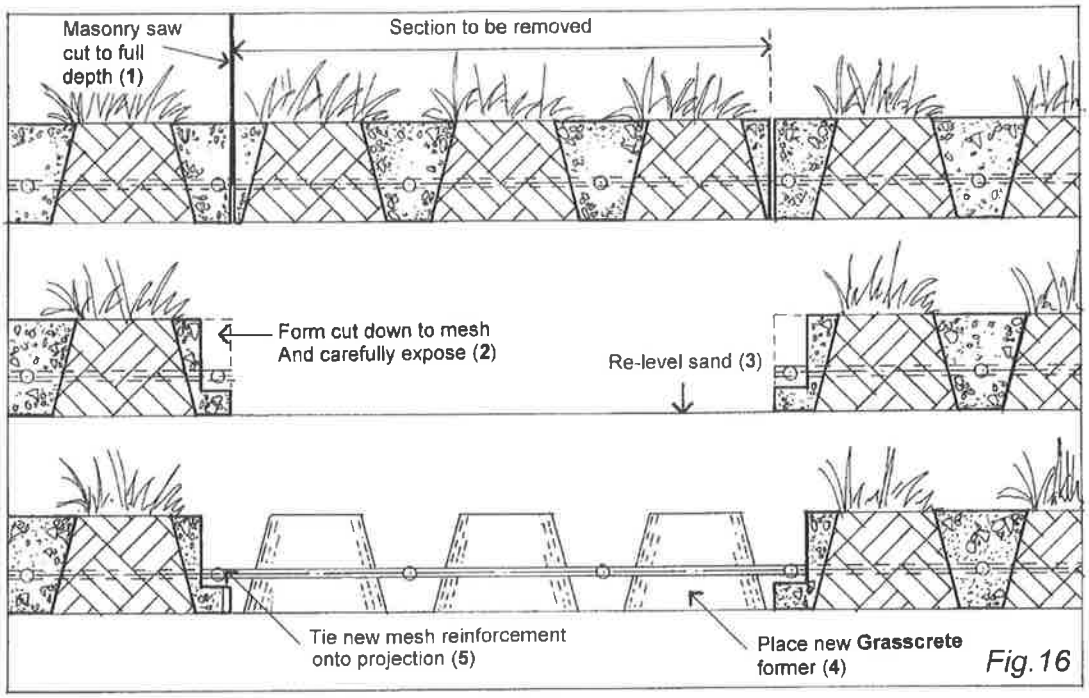


Fig.16

CHAPTER SIX – INFORMATION FOR THE QUANTITY SURVEYOR

PREAMBLE

(TRAFFIC)

GRASSCRETE® cast on site reinforced cellular paving. GRASSCRETE® formers type GC.....*, ...*mm deep laid on a consolidated sub-base with a 10/20mm sand blinding layer of sand. Steel mesh reinforcement to BS4483 reference .....*, weighing .....*kgs/m^2 shall be seated upon the integrally moulded spacers. Concrete 30MN/m^2 @ 28 days with air entrainment of 3%. 10mm maximum size aggregate and a .....*mm slump shall be placed around formers and mesh and levelled to tops of formers. After 48 hours (can be reduced under suitable conditions), melt exposed tops of formers and fill with soil. Following settlement, sow GRASSMIX No .....* at a rate of 50gms/m^2 and top up with fine friable topsoil, apply fertiliser as necessary.

(EMBANKMENT ~ DRY)

GRASSCRETE® cast on site reinforced cellular paving. GRASSCRETE® formers type GC.....*, ...*mm deep laid on a 10/20mm blindng layer of sand over a trimmed earth sub-grade with loose debris removed and depressions filled with selected granular material. Steel mesh reinforcement to BS4483 reference .....*, weighing .....*kgs/m^2 shall be seated upon the integrally moulded spacers. Concrete 30MN/m^2 @ 28 days with air entrainment of 3%. 10mm maximum size aggregate and a .....*mm slump shall be placed around formers and mesh and levelled to tops of formers. After 48 hours (can be reduced under suitable conditions), melt exposed tops of formers and fill with soil. Following settlement, sow GRASSMIX No .....* at a rate of 50gms/m^2 and top up with fine friable topsoil, apply fertiliser as necessary.

(EMBANKMENTS ~ WATERBORNE)

GRASSCRETE® cast on site reinforced cellular paving. GRASSCRETE® formers type GC……*, ……*mm deep laid on a fine dusting of sand over a woven polyester geotextile (see separate specification), on a 10/20mm blinding layer of sand over a trimmed earth sub-grade with loose debris removed and depressions filled with selected granular material. Steel mesh reinforcement to BS4483 reference ……..*, weighing ……*kgs/m^2 shall be seated upon the integrally moulded spacers. Concrete 30MN/m^2 @ 28 days with air entrainment of 3%. 10mm maximum size aggregate and a ……*mm slump shall be placed around formers and mesh and levelled to tops of formers. After 48 hours (can be reduced under suitable conditions), melt exposed tops of formers and fill with soil. Following settlement, sow GRASSMIX No ……* at a rate of 50gms/m^2 and top up with fine friable topsoil, apply fertiliser as necessary.

EXPANSION JOINTS

Expansion joints shall be incorporated at 10x10m centres and shall consist of a 25mm pre-soaked softwood filler (25mm close cell foamboard for high temperature zones); for **GC3, GC1, GC2 and GC2sc.**

Or

Expansion joints shall be incorporated at 10x10m centres and shall consist of a 25mm wide close cell foamboard filler with 20mm diameter x 300mm long sawn mild steel dowels at 400mm centres with cap and de-bond to one end. Joint shall be sealed with a cold applied sealant; for **GC2sc – load transferable slabs**.

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SECTION 03600

GROUT

PART 1 - GENERAL

1.1 Description

A. The Contractor shall furnish all materials, labor, and equipment required to provide all grout used in concrete work and as bearing surfaces for base plates as indicated on the Contract Drawings, in accordance with the requirements of the Contract Specifications and as specified herein.

1.2 Quality Assurance

A. Reference Standards and Codes: Comply with applicable provisions and recommendations of the following except as otherwise shown or specified:

1. ASTM C109 - Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 inch or 50 mm Cube Specimens).

2. ASTM C531 - Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts and Monolithic Surfacings.

3. ASTM C579 - Test Method for Compressive Strength of Chemical-Resistant Mortars and Monolithic Surfacings.

4. ASTM C939 - Test Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method).

5. ASTM C1107 - Packaged Dry, Hydraulic Cement Grout (Nonshrink).

6. CRD-C 621 - Corps of Engineers Specification for Nonshrink Grout.

B. All grout which has already been placed and which fails to meet the requirements of these Specifications, is subject to removal and replacement by the Contractor at no additional cost to the Village.

1.3 Submittals

A. The Contractor shall also submit the following:

1. Test results verifying the compressive strength, shrinkage and expansion requirements specified herein.

2. Manufacturer's literature containing instructions and recommendations on the mixing, handling, placement and appropriate uses for each type of grout used in the work.

PART 2 - PRODUCTS

2.1 Cement Grout

A. Cement grout shall be composed of Portland cement, sand and water. The sand to be used shall be selected to suit the spacing for placement. Where sand is not usable, the grout shall be composed of cement and water only.

B. Gradation of sand and mix proportioning shall be in accordance with the following table for grouts using natural sands and having a minimum 28-day compressive strength of 4,000 psi. For higher strength grouts or those using manufactured sands, strength shall be established by trial mixes.

1. Gradation for Natural Sand:

Sieve Size	Spaces less than 1 inch	Spaces 1 inch or more
Passing 3/8		100
Passing 4	100	95-100
Passing 8	95-100	80-100
Passing 16	70-100	50-85
Passing 30	40-75	25-60
Passing 50	10-35	10-30
Passing 100	2-15	2-10
Passing 200	--	--

2. Mix Proportioning:

	Non-Air Entrained Grouts (Maximum 4 Percent Entrapped Air)		Air Entrained Grouts (Air 8 Percent to 10 Percent)	
	Spaces less than 1 inch	Spaces 1 inch or more	Spaces less than 1 inch	Spaces 1 inch or more
By Weight				
Cement (bags)	10.8	10.5	11.3	11.0
Sand (lb)	2,150	2,240	1,930	1,990
Maximum water (gals)	59.5	57.8	57.5	55.8
Maximum water (gals per bag)	5.5	5.5	5.1	5.1

	Non-Air Entrained Grouts (Maximum 4 Percent Entrapped Air)		Air Entrained Grouts (Air 8 Percent to 10 Percent)	
	Spaces less than 1 inch	Spaces 1 inch or more	Spaces less than 1 inch	Spaces 1 inch or more
By Volume				
Cement	1	1	1	1
Sand (dry rodded)	1.85	2.10	1.6	1.7
Sand (damp and loose)	2.30	2.35	2.0	2.1
Maximum water (gals per bag)	5.5	5.5	5.1	5.1

C. Water shall be kept to a minimum, the amounts noted in the preceding table are the maximum for grout. Proportioning by volume shall be limited to small quantities mixed at the job site.

D. White Portland cement shall be mixed with the Portland cement as required to match the color of adjacent concrete.

2.2 Nonshrink Grout

A. The grout material shall be an approved ready to use mixture requiring only water for use at the job site. The compressive strength of 2-inch cubes shall be 3,000 psi at 7 days.

B. Nonshrink grout shall conform to CRD-C 621 and ASTM C1107, Grade B or C when tested at a maximum fluid consistency of 30 seconds per ASTM C939 at temperature extremes of 45 degrees Fahrenheit and 90 degrees Fahrenheit and an extended working time of 15 minutes.

C. Nonshrink grout shall be Euco N-S manufactured by Euclid Chemical Company; Masterflow 713 Plus manufactured by Master Builders; Sikagrout 212 manufactured by Sika Corporation or approved equal.

D. Nonshrink grouts depending on oxidation to limit shrinkage and containing additives such as iron or steel particles shall not be used.

2.3 Nonshrink Epoxy Grout

A. Epoxy grout shall be modified as required for each particular application with aggregate per manufacturer's instructions.

B. Nonshrink epoxy grout shall be Sikadur 32 Hi-Mod manufactured by Sika Corporation; Euco #452 manufactured by Euclid Chemical Company; or Axpandcrete-S by Anti-Hydro Company, or approved equal.

2.4 Dry Pack

A. Dry pack (to be packed or tamped in place) shall be made at no slump consistency.

B. When mixing the batch, only enough water shall be added to the dry materials to produce a rather stiff mixture, then additions of water may be made in small increments until the desired consistency is obtained.

2.5 Curing Materials

A. Curing materials for cement grout shall be as specified in Section 03300, Cast-in-Place Concrete, and as recommended by the manufacturer for prepackaged grouts.

2.6 High Strength, Non-Shrink Grout

A. The grout material shall be an approved ready to use mixture requiring only water for use at the job site. The compressive strength of 2-inch cubes shall be 4,000 psi minimum at 1 day and 9,000 psi minimum at 28 days. Volume change shall be +0.07% at 1 day and +0.07% at 28 days.

B. High strength, non-shrink grout shall conform to CRD-C 621 and ASTM C1107, Grades A, B or C. The grout shall be a positive expansive grout as per ASTM C1090.

C. High strength, non-shrink grout shall be Hi-Flow Grout manufactured by Euclid Chemical Company, Masterflow 830 manufactured by Master Builders, or approved equal.

D. Contractor shall use special procedures as recommended by the manufacturer to control temperature increase when placing grout in thicknesses exceeding 4 inches. These special procedures may include but not be limited to mixing 3/8" pea stone gravel into the mixture prior to placement. Proposed procedures shall be submitted to the Engineer for review and approval.

E. Non-shrink grouts depending on oxidation to limit shrinkage and/or containing metallic additives shall not be used.

PART 3 - EXECUTION

3.1 Grout Uses

A. The different types of grout shall be used for the applications stated below unless noted otherwise in the Contract Specifications or on the Contract Drawings. Where grout is called for in the Contract Specifications or on the Contract Drawings which does not fall under any of the applications stated below, nonshrink grout shall be used.

1. Cement grout shall be used for grout toppings and for patching of fresh concrete.

2. Nonshrink grout shall be used for grouting beneath base plates of equipment and structural metal framing.

3. Nonshrink epoxy grout shall be used for bonding new concrete to hardened concrete.

4. High strength non-shrink grout shall be used for grouting drilled surfaces.

B. New concrete surfaces to receive cement grout shall be as specified in Section 03300, Cast-in-Place Concrete, and shall be cleaned of all dirt, grease and oil-like films.

1. Existing concrete surfaces shall likewise be cleaned of all similar contamination and debris, including chipping or roughening the surface if a laitance or poor condition of concrete is evident. The finish of the grout surface shall match that of the adjacent concrete.

2. Curing and protection of cement grout shall be as specified in Section 03300, Cast-in-Place Concrete.

C. All mixing, surface preparation, handling, placing, consolidation, and other means of execution for prepackaged grouts shall be done according to the instructions and recommendations of the manufacturer.

3.2 Installation

A. The consistency of grouts shall be that necessary to completely fill the space to be grouted for the particular application. Dry pack consistency shall be such that the grout is plastic and moldable but will not flow.

B. Measurements for cement grout shall be made accurately by weight or by volume using containers. All measurements shall be made in a manner satisfactory to the Engineer. Prepackaged grouts shall have ingredients measured by means recommended by the manufacturer.

C. Grout shall be placed quickly and continuously, shall completely fill the space to be grouted, be thoroughly compacted and free of air pockets. The grout may be poured in place, pressure grouted by gravity, or pumped.

D. For grouting beneath base plates, grout shall be poured from one side only and shall flow across to the open side to avoid air-entrapment.

E. The use of pneumatic pressure or dry-packed grouting requires approval of the Engineer.

+ + END OF SECTION + +

SECTION 04100

MORTAR

PART 1 - GENERAL

1.1 Description

A. Scope:

1. Contractor shall furnish all labor, materials, equipment and incidentals required to provide mortar as shown and specified.

1.2 Quality Assurance

A. Requirements of Regulatory Agencies: Wherever a fire resistance classification is shown or scheduled for unit masonry construction (4-hour, 3-hour and similar designations), provide mortar in proportions complying with the requirements established by UL and the New York State Uniform Fire Prevention and Building Code.

B. Source Quality Control: Do not change source or brands of mortar materials during the course of the Work.

C. Presubmittal Meeting: Before submitting samples for approval, the Contractor and his supplier shall meet on-site with the Engineer to review existing masonry to be matched and preview proposed products.

D. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. ASTM C91, Masonry Cement.

2. ASTM C136, Sieve or Screen Analysis of Fine and Coarse Aggregates.

3. ASTM C144, and ASTM C404, Aggregate for Masonry Mortar.

4. ASTM C150, Portland Cement.

5. ASTM C207, Hydrated Lime for Masonry Purposes.

6. ASTM C270, Mortar for Unit Masonry.

1.3 Submittals

A. Samples: Submit for approval samples of each type of colored mortar, showing the range of color which can be expected in the Work. Label samples to indicate type and amount of colorant used. Engineer's review will be for color only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

B. Manufacturer's Data: Submit for approval, copies of manufacturer's specifications and instructions for each manufactured product.

1.4 Product Delivery, Storage and Handling

A. Delivery of Materials: Manufactured materials, such as cement and lime, shall be delivered and stored in their original unopened containers, plainly marked with identification of materials and manufacturer.

B. Storage of Materials:

1. Store mortar materials off the ground in a dry location and under a properly constructed shelter using tarpaulin, felt paper, or polyethylene sheets to prevent damage by the elements. Containers showing evidence of damage will be rejected.

2. Protect liquid admixtures from freezing.

3. Store aggregates in separate bins.

PART 2 - PRODUCTS

2.1 Materials

A. Portland Cement:

1. ASTM C150, Type I, nonstaining, without air entraining and of natural color or white, to produce the required color of mortar or grout.

2. Use ASTM C150, Type III, high early strength, for laying masonry when outside temperature is less than 50°F.

3. Provide nonstaining Portland cement, without air entraining and of natural color or of the color required to be compatible with the required colored mortar pigment selected by Engineer.

4. Product and Manufacturer: Provide one of the following:

a. Speed Portland Cement and Hi-Speed Portland Cement by Louisville Cement Company.

b. Atlas Type I and Atlas Type III Portland Cement by Lehigh Portland Cement Company.

c. Or equal.

5. Product and Manufacturer: Provide one of the following:

a. White Portland Cement by Ideal Basic Industries.

b. Atlas White Portland Cement Type I and Type III by Lehigh Portland Cement Company.

c. Or equal.

B. Masonry Cement: Provide the following for masonry cement mortars:

1. ASTM C91, Type S; proportioned as specified to comply with ASTM C270.

2. Maximum Air Content, ASTM C91: 18 percent.

3. Non-staining and of the color required to be compatible with the required colored mortar pigment selected by Engineer.

4. Product and Manufacturer: Provide one of the following:

a. Brixment-in Color Type S by Louisville Cement Company.

b. Atlas Custom Color Masonry Cement Type S by Lehigh Portland Cement Company.

c. Or equal.

C. Hydrated Lime: ASTM C207, Type S, or lime putty ASTM C5.

D. Sand Aggregates:

1. ASTM C144, except for joints less than 1/4-inch use aggregate graded with 100 percent passing the No. 16 sieve.

2. White Mortar Aggregates: Provide natural white sand or ground white stone for Portland cement lime mortars.

3. Colored Mortar Aggregates: Provide ground marble, granite or other sound stone, as required to match the sample approved by the Engineer for Portland cement lime mortars.

E. Colored Mortar Pigments: Provide the following for Portland Cement lime mortars:

1. Commercial iron oxide, manganese dioxide, ultramarine blue, chromium oxide, or carbon black, compounded for use in mortar mixes.

2. Do not exceed pigment to cement ratios, by weight of 1 to 35 for carbon black and 1 to 7 for other pigments.

3. Product and Manufacturer: Provide one of the following:

a. Truetone Mortar Colors by Frank D. Davis Company Subsidiary Rockwood Industries Incorporated.

b. Sonobrite by Sonneborn Building Products Division Rexnord Chemical Products Incorporated.

c. Or equal.

4. Submit complete selection of manufacturer's standard and custom colors for final selection by Engineer.

F. Water: Free from injurious amounts of oils, acids, alkalis, or organic matter, and clean, fresh and potable.

G. Waterproofing Admixture:

1. Proportion: In strict accordance with manufacturer's instructions.

2. Product and Manufacturer: Provide one of the following:

a. Omicron by Master Builders Co.

b. Hydroxide Powder by Sonneborn Building Products.

c. Or equal.

2.2 Mortar Mixes

A. General:

1. Anti-freeze Admixture or Agents: Not permitted.

2. Calcium chloride: Not permitted.

B. Fire Resistant Mortar:

1. Standard: UL Design Numbers 0901, 0902, 0903, 0904, 0905, 0906, 0907 and 0908.

2. Proportion: Use 1 part Portland cement, 3 parts clean sand, and 15 percent hydrated lime (by cement volume).

C. Mortar for All Unit Masonry: Comply with ASTM C270. Table 2, except limit materials to those specified herein, do not substitute ASTM C91 masonry cement for ASTM C150 Portland cement without an approved Shop Drawing review by Engineer, and limit cement to lime ration by volume as follows:

1. Type M:

a. Portland Cement Lime Mortar; provide the following proportions by volume:

1) Portland Cement: 1 part.

2) Masonry Cement: 1 part.

3) Aggregate Ratio (measured in damp loose condition): Not less than 2-1/4 and not more than 3 times to sum of the volumes of cement and lime.

4) Maximum air content, ASTM C270: 12 percent.

b. Portland Cement Masonry Mortar; provide the following proportions by volume:

1) Portland Cement: 1 part.

2) Masonry Cement: 1 part.

3) Aggregate Ratio (measured in damp loose condition): Not less than 2-1/4 and not more than 3 times to sum of the volumes of cement and lime.

4) Maximum air content, ASTM C270: 18 percent.

c. Property Specification:

1) Average Compressive Strength, ASTM C270: 2500 pounds per square inch.

2) Minimum Water Retention, ASTM C270: 75 percent.

2. Type S:

a. Portland Cement Lime Mortar; provide the following proportions by volume:

1) Portland Cement: 1 part.

2) Hydrated Lime or Lime Putty: Over 1/4 to 1/2 maximum.

3) Aggregate Ratio (measured in damp loose condition): Not less than 2-1/4 and not more than 3 times to sum of the volumes of cement and lime.

4) Maximum air content, ASTM C270: 12 percent.

b. Portland Cement Masonry Mortar; provide the following proportions by volume:

1) Portland Cement: 1/2 part.

2) Masonry Cement: 1 part.

3) Aggregate Ratio (measured in damp loose condition): Not less than 2-1/4 and not more than 3 times to sum of the volumes of cement and lime.

4) Maximum air content, ASTM C270: 18 percent.

c. Property Specification:

3) Average Compressive Strength, ASTM C270: 1800 pounds per square inch.

4) Minimum Water Retention, ASTM C270: 75 percent.

D. Colored Pigmented Cement Mortar: For Portland cement lime mortars proportion pigments with other ingredients as follows:

1. Mix to match sample approved by Engineer.

2. For black mortar mix with 1/8 part black iron oxide per part of Portland cement and reduce lime content to not more than 1/10 part.

E. Colored Aggregate Mortar: For Portland cement-lime mortars proportion colored aggregate with other ingredients to match sample approved by Engineer. Proportion colored aggregate with other ingredients as follows:

F. Stearate Additive: Add to mix in amount equal to not more than 3 percent of the weight of cement.

PART 3 - EXECUTION

3.1 Preparation

A. Measurement of Materials:

1. Mortar Cement and Hydrated Lime: Batched by the bag.

2. Sand: Batched by volume in suitably calibrated containers, provided proper allowance is made for bulking and consolidation and for weight per cubic foot, of contained moisture.

3. Proportion of volumetric Mixtures: One 94 pound sack of Portland cement or one 50 pound sack of hydrated lime constitute nominal one cubic foot.

4. Shovel measurement: Not permitted.

B. Mortar Mixing:

1. Type of Mixer: Machine mix in approved mixer in which the quantity of water is accurately and uniformly controlled.

2. While mixer is in operation add approximately 3/4 the required water, 1/2 the sand, all the cement, then add remainder of sand.

3. Allow batch to mix briefly then add water in small quantities until satisfactory workability is obtained.

4. Mix for not less than five minutes after all materials have been added.

5. Hydrated Lime for Mortar Requiring Lime Content: Use dry-mix method. Turn over together the materials for each batch until the even color of the mixed, dry materials indicates that cementitious material has been thoroughly distributed throughout the mass, then add water to obtain required plasticity.

6. Lime putty if approved for use, shall be prepared in accordance with ASTM C5.

7. Waterproofing Admixture: Add to mortar mix for all exterior masonry in strict accordance with manufacturer's instructions.

8. The mixer drum shall be completely emptied before recharging the next batch.

9. Limit batch size to avoid retempering. Retempering of mortar shall not be permitted.

10. Mixers, wheelbarrows, mortar boards, etc., shall be kept clean.

3.2 Field Quality Control

A. The County shall take samples and conduct tests to evaluate air entrainment, water retention and the compliance of materials with the specifications and to determine the compressive strength of mortar and grout. Tests shall be conducted in accordance with ASTM C 91. Tests results shall be made available prior to the commencement of work.

B. After the initial test, the County will require a maximum of five additional tests to be conducted at its discretion.

C. Installed mortar that does not meet the requirements of the specification shall be immediately removed and rebuilt.

+ + END OF SECTION + +

SECTION 05540

CASTINGS

PART 1 - GENERAL

1.1 Description

A. Scope:

1. Contractor shall furnish all labor, materials, equipment and incidentals required to provide all castings as shown and specified.

B. Castings shall include, but not be limited to the following:

1. Catch basin, manhole, dry wells, etc., frames, and grates.

C. Related Work Specified Elsewhere:

1. Section 02429, Drainage Structures.

1.2 Submittals

A. Shop Drawings: Submit for approval the following in accordance with Section 01300, “Submittals”:

1. Shop Drawings for the fabrication and erection of all casting assemblies:

a. Include plane, elevations, and details of sections and connections. Show anchorage and accessory items.

b. Include setting drawings for location and installation of castings and anchorage devices.

2. Copies of manufacturer’s specifications, load tables, dimension diagrams, anchor details and installation instructions.

3. Provide lettering to be cast into the top of the casting such as “Drain,” “Sewer,” etc.

1.3 Quality Assurance

A. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. ASTM A 48, Gray Iron Castings.

2. ASTM A 536, Ductile Iron Castings.

B. Shop Assembly: Preassemble items in the shop to the greatest extent possible, so as to minimize field splicing and assembly of units at the site. Disassemble units only to the extent necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.4 Product Delivery, Storage and Handling

A. Deliver materials to the site to ensure uninterrupted progress of the Work. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete in ample time to not delay that Work.

B. Store materials to permit easy access for inspection and identification. Keep materials off the ground, using pallets, platforms or other supports.

PART 2 - PRODUCTS

2.1 Details of Construction

A. General:

1. Design all frames, covers and grates to prevent rocking and rattling under traffic.

2. All castings shall be free from pouring faults, cracks, blow holes, or other defects affecting their strength and value for the service intended.

3. Castings shall be manufactured using tough, close grained material without the admixture of cinder iron or metal of inferior quality. Angles shall be boldly filleted and corners kept sharp and perfect.

4. No plugging of defective castings will be permitted.

5. Castings shall be fabricated true to pattern so that component parts fit together. The dimensions of all castings shall have a tolerance of plus or minus 1/16 inch and an additional tolerance of plus or minus 1/16 inch per foot of dimension. The weight deviation tolerance is 5%. Notwithstanding the above tolerances, all manhole frames rings and covers of the same nominal size shall assemble interchangeably.

B. Catch Basin, Manhole, Dry Well, etc., Frames and Grates:

1. Material: Cast iron conforming to ASTM A 48 Class 30.

2. Size: As shown on the Drawings.

3. Construction: Heavy duty with machined bearing surfaces.

2.2 Approved Manufacturers

A. Cambell Foundry

B. Neenah Foundry

C. U.S. Foundry

D. Or equal.

PART 3 - EXECUTION

3.1 Installation

A. Follow manufacturer's printed instructions and approved Shop Drawings.

B. Set castings accurately to required location, alignment and elevation, plumb, level, true and free of rock, measured from established lines and levels. Brace temporarily or anchor temporarily in formwork.

C. Protection from Dissimilar Materials: Painting, coat all surfaces of aluminum in contact with dissimilar materials such as concrete, masonry and steel or iron.

D. Castings shall be delivered to the project site unpainted and, after installation, all exposed surfaces shall receive two coats of asphaltic paint.

+ + END OF SECTION + +

NO TEXT ON THIS PAGE

SECTION 10400

SIGNAGE AND GRAPHICS

PART 1 – GENERAL

1.1 Scope of Work

A. This section specifies requirements for the sign, graphics and stanchion for the educational sign design.

B. Refer to the Green Innovation Grant Program (GIGP) Interpretative Sign Development Guidance Requirements for additional information.

1.2 Design and Performance Requirements

A. Solid composite panels shall be fire retardant, impervious to moisture, extremely resistant to UV rays, scratching, impact, and graffiti.

B. Outdoor panels shall be protected with a 10 year UV inhibitor. Graphics shall be made using 12-color high definition printing technology. Panels shall be entirely made in the U.S.A.

C. Laminate grades shall be manufactured with a smooth sub-surface image on one side and a sanded surface on the other side to allow proper bonding to the supporting sub state.

D. Bonding laminate to substrate materials should be done according to the proven principles of veneering. MDF shall be used as a suitable substrate on with laminate grade panels can be bonded.

1.3 Submittals

A. Submit the following in accordance with section 01300, “Submittals”:

1. Submit for approval detailed drawings and cut sheets showing size, color and type.

PART 2 – PRODUCTS

2.1 Sign Graphics

A. High pressure decorative laminate consisting of decorative surface papers, impregnated with melamine resins, bonded under hear and pressure to kraft papers impregnated with phenolic resins.

B. Panels shall be suited for commercial use where chemical products are used. They shall be resistant to common house-hold products, solvents, mild alkalis, and diluted mild acids.

C. Toxicity Test: LC50 Pittsburg Protocol Toxicity test. Equal or and no more toxic than wood or paper.

D. Thickness: 1/8 inch

E. Weight: 0.048" = 0.34 pounds/square foot

F. Surface Finish: Semi-Gloss: a reflective finish that accentuates detail and diminishes reflective light. Reflectivity of 30 +/- 5 glosses units. UV inhibitors added to outdoor finish.

G. Core Color: Black

H. Strength:
   1. Comprehensive strength: M.D. 193,064 Kpa (31,000 psi)
   2. Tensile Strength: M.D. 151,693 Kpa (22,000 psi)
   3. Flexural Strength: M.D. 158,588 Kpa (23,000 psi)
   4. Impact (edge wise): M.D. 0.6 ft/lbs/in
   5. Rockwell Hardness M scale: 95 to 115

I. Engineer will provide Graphic and sign language as a 24 inch x 36 inch graphic file in high resolution jpeg format.

J. Approved supplier: Fossil Graphics Industries or equal.

2.2 Stanchion

A. Stanchion to be provided by Fossil Graphics industries outlined on contract drawings.

B. Stanchion shall be NPS style pedestal in ground model constructed of aluminum and powder coated black sized for a 1/8 inch graphic thickness.

2.3 Maintenance

A. Fossil panels shall be protected with exclusive outdoor finish and shall be easy to clean. The surface shall be smooth and inert and an annual soap and water washing is all that shall be needed to keep signs looking clean and bright.

B. Paint and graffiti shall be easily removed with suitable commercial solvents without damage to the surface.

PART 3 - EXECUTION

3.1 Assembling

A. Refer to manufacturer's instructions for installation of sign graphic.

B. Refer to contract documents for stanchion installation.

3.2 Measurement and Payment.

A. No separate payment for the item, "Signage and Graphics," will be made for the installation of Sign and Stanchion. The cost of same shall be included in the Lump Sum Base Bid.

+ + END OF SECTION + +

NO TEXT ON THIS PAGE

SECTION 10700

PARK BENCH

PART 1 - GENERAL

1.1 Scope of Work

A. The work covered by this section consists of furnishing all labor, materials and equipment necessary to perform the installation of the park bench.

1.2 Submittals

A. Submit the following in accordance with section 01300, “Submittals”:

1. Submit for approval detailed drawings and cut sheets showing size, color and type.

PART 2 - PRODUCTS

2.1 Park Bench

A. The bench is comprised of recycled plastic with a cast aluminum frame. Slats to be 2” by 4” made of recycled plastic. Bases are zinc plated. Holes to be pre-drilled. All hardware is zinc plated.

1. Size of bench to be 4.0’ in length and detailed on contract drawings.

2.2 Manufacturers

A. Highland Products Group LLC

1. Product can be found using “The Park and Facilities Catalog”

B. Or Equal.

PART 3 - EXECUTION

3.1 Assembling

A. The bench is to be assembled on site.

B. Mount bench to Flexi Pave using ½” stainless steel expansion anchors.

3.2 Measurement and Payment

A. No separate payment for the item, “Park Bench,” will be made for the installation of Park Bench. The cost of same shall be included in the Lump Sum Base Bid.

+ + END OF SECTION + +

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APPENDIX A

BORING LOG

D&B ENGINEERS AND ARCHITECTS, P.C.

BORING LOG

JOB LOCATION

GREENPORT – MANOR PLACE

TEST PIT No 3

6-02-2014

BLOWS ON CASING	DEPTH (ft.)	S.P.T. – BLOWS PER 6"	SAMPLE	IDENTIFICATION	REMARKS
	1 2 3 4 5 6 7 8 9 10			GRASS – TOPSOIL — 0'-4"	
				MISC. FILL	
				Br, loam, cm to f Sand, Misc, Roots, Timbers, Coke — 2'-0" *	
				3'-7"	
				Gy c to f SAND some Cg $	MOIST
			S-1	Br c to f, some $, tr gravel	5'-6" Pl (water @ bottom of hole) **

* shift test pit to avoid timber (possible dead man for Bulkhead

** Set slotted pipe @ bottom of hole To Top @ grade

BACK FILL: 11:20 A.M.

EST. TOP OF HOLE = EL 4.3

EST. WATER EL = -1.2' ±

INSPECTOR J. F Baader

STERLING CREEK/BAY

OPEN WATER

OPEN WATER

OPEN WATER

MEAN HIGH WATER LINE
ELEV. = 0.80 (NAVD88)

RIGHT OF WAY LINE
PER TAX MAP

WOOD BULKHEAD

TP #3

LAWN

LAWN

RIP RAP

GUIDERAIL

POST RAIL FENCE

"A" INLET
GR 3.75
(FULL OF DEBRIS)

KS-2

WOOD RET. WALL

INV. 6"PVC
ELEV. 2.28

INLET
GR 5.05

ASPHALT

ASPHALT CURB

CONC. CURB

CONC. PATIO

BUSH

BUSH

LOT 35
BLOCK 2
DB 12399 PG 314

TWO STORY FRAME DWELLING

FF 10.83

S60°07'40"W 162.95' (SURV. & DEED)

MANOR PLACE
(50' WIDE R.O.W. PER TAX MAP)

SET AT 50'
PER TAX MAP

RIM 4.81

LOT 2
BLOCK 3
EASTERN LONG ISLAND HOSPITAL

D&B ENGINEERS AND ARCHITECTS, P.C.

BORING LOG

TEST PIT Nº 2.

JOB LOCATION: GREENPORT - JOHNSON PL

6-02-2014

BLOWS ON CASING	DEPTH (ft.)		S.P.T. — BLOWS PER 6"	SAMPLE	IDENTIFICATION	REMARKS
					ASPHALT / BASE	0-6" *
	1				Bn, f SAND, some $ tr c to f Gravel	
	2					
	3					3'-6"
	4				Br c to f SAND tr $, tr gravel	4'-10" (MOIST)
	5					
	6			S-1		6'-3" Water @ bot of hole **
	7					
	8					
	9					
	10					

* Excavate @ edge of asphalt; removed small section of asphalt

** SET slotted pipe @ bottom of hole to Top @ grade

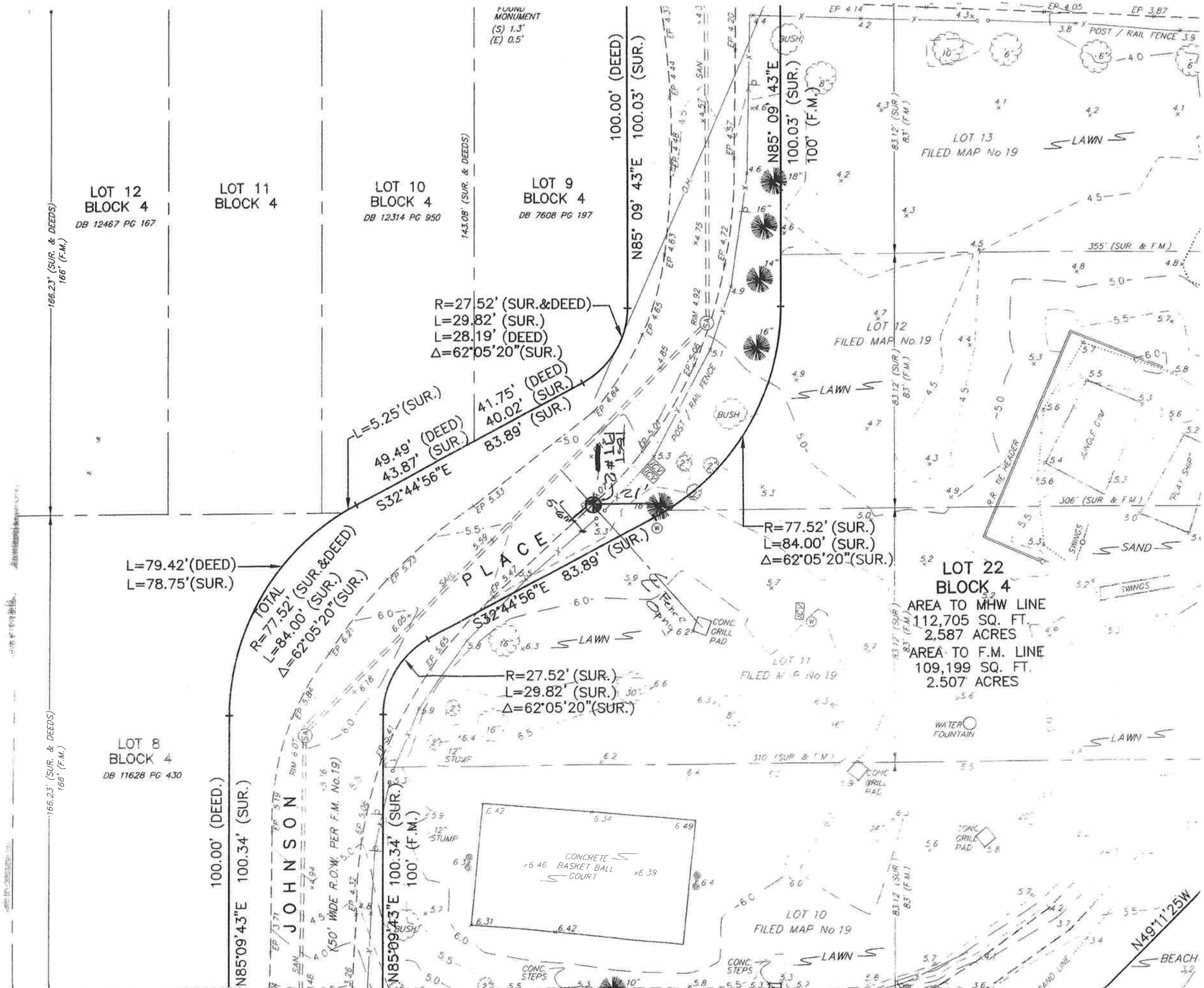
START: 9 53 A M

START BACKFILL 10.20 AM

Est Top of hole ≈ EL. 5.1

Est Water EL. ≈ -1.2

INSPECTOR: J.F. Raader



FOUND MONUMENT
(S) 1.3'
(E) 0.5'
LOT 12
BLOCK 4
DB 12467 PG 167
LOT 11
BLOCK 4
LOT 10
BLOCK 4
DB 12314 PG 950
LOT 9
BLOCK 4
DB 7608 PG 197
166.23' (SUR. & DEEDS)
166' (F.M.)
143.08' (SUR. & DEEDS)
100.00' (DEED)
100.03' (SUR.)
N85° 09' 43"E
N85° 09' 43"E
100.03' (SUR.)
100' (F.M.)
R=27.52' (SUR.&DEED)
L=29.82' (SUR.)
L=28.19' (DEED)
Δ=62°05'20"(SUR.)
L=5.25'(SUR.)
41.75' (DEED)
40.02' (SUR.)
83.89' (SUR.)
49.49' (DEED)
43.87' (SUR.)
S32°44'56"E
L=79.42'(DEED)
L=78.75'(SUR.)
TOTAL
R=77.52' (SUR.&DEED)
L=84.00' (SUR.)
Δ=62°05'20"(SUR.)
PLACE
S32°44'56"E 83.89' (SUR.)
R=77.52' (SUR.)
L=84.00' (SUR.)
Δ=62°05'20"(SUR.)
R=27.52' (SUR.)
L=29.82' (SUR.)
Δ=62°05'20"(SUR.)
LOT 8
BLOCK 4
DB 11628 PG 430
100.00' (DEED.)
100.34' (SUR.)
N85°09'43"E
JOHNSON
(50' WIDE R.O.W. PER F.M. No.19)
N85°09'43"E 100.34' (SUR.)
100' (F.M.)
POST / RAIL FENCE
LOT 13
FILED MAP No 19
LAWN
355' (SUR & F.M.)
LOT 12
FILED MAP No.19
BUSH
JUNGLE GYM
R.R. TIE HEADER
PLAY SHIP
306' (SUR & F.M.)
SWINGS
SAND
LOT 22
BLOCK 4
AREA TO MHW LINE
112,705 SQ. FT.
2.587 ACRES
AREA TO F.M. LINE
109,199 SQ. FT.
2.507 ACRES
CONC. GRILL PAD
LOT 11
FILED MAP No 19
83.12' (SUR.)
83' (F.M.)
WATER FOUNTAIN
310' (SUR & F.M.)
12" STUMP
CONCRETE BASKET BALL COURT
LOT 10
FILED MAP No 19
CONC. STEPS
N49°11'25W
BEACH
SAND LINE

D&B ENGINEERS AND ARCHITECTS, P.C.

BORING LOG

JOB LOCATION

GREENPORT FIFTH ST

TEST PIT NO 1

6.02.2014

BLOWS ON CASING	DEPTH (ft.)	S.P.T. – BLOWS PER 6"	SAMPLE	IDENTIFICATION	REMARKS
				Topsoil	0'-4"
	1		S-1	Br, c to f SAND some Gravel	2'-6' Moist
	2				
	3		S-2	Gy Organic Cy and $	4'-0"
	4		S-3	Gy M to f Sand some	4'-6' *
	5			Silt, pockets of Gy Organic Cy and Silt	6'-3
	6		S-4		**
	7			Cy $, trace of organics (meadow mat)	
	8				
	9				
	10				

* S-3 is sample of clay pockets - Did Not split sample with Gy M to f Sand

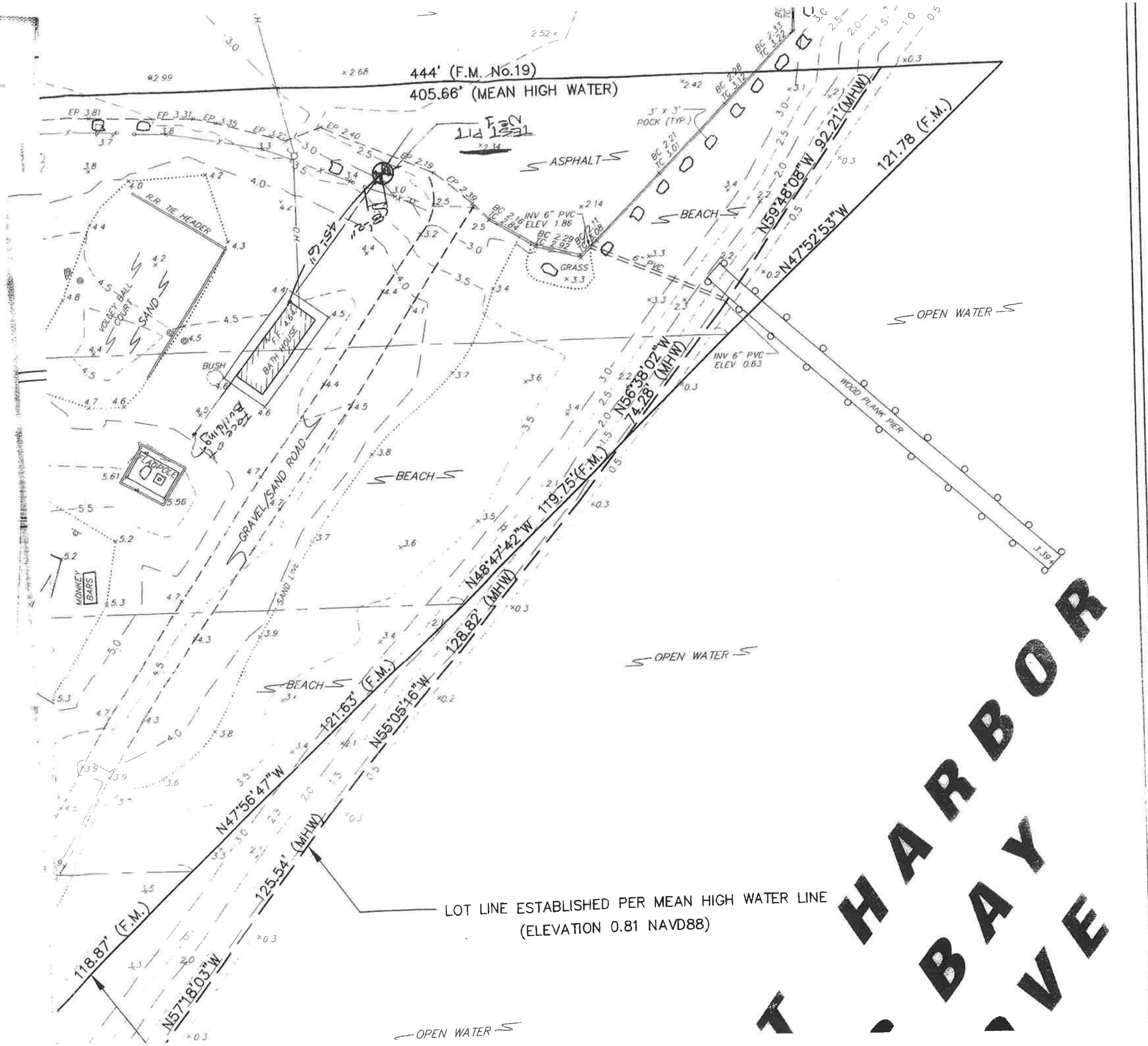
** S-4 is sample of meadow mat

NOTES:

1. Backfilled with graded SAND around slotted pipe
2. GENERAL CLASSIFICATION IS FILL
3. AT bottom of hole small amount of [illegible] water @ 8:45 A.M
4. Estimated Top of Hole EL. 3.0 Est. Water EL. ± -3.3

INSPECTOR J.F Baader

PAGE NO 1 OF 1



444' (F.M. No.19)
405.66' (MEAN HIGH WATER)
ASPHALT
BEACH
GRASS
3' x 3' ROCK (TYP.)
INV 6" PVC ELEV 1.86
INV 6" PVC ELEV 0.63
6" PVC
N59°48'08"W 92.21' (MHW)
121.78' (F.M.)
N47°52'53"W
OPEN WATER
N56°38'02"W 74.28' (MHW)
WOOD PLANK PIER
VOLLEY BALL COURT
SAND
R.R. TIE HEADER
BATH HOUSE
BUSH
FLAGPOLE
MONKEY BARS
GRAVEL/SAND ROAD
SAND LINE
N48°47'42"W 119.75' (F.M.)
128.82' (MHW)
N55°05'16"W
121.63' (F.M.)
N47°56'47"W
125.54' (MHW)
118.87' (F.M.)
N57°18'03"W
LOT LINE ESTABLISHED PER MEAN HIGH WATER LINE
(ELEVATION 0.81 NAVD88)
HARBOR
BAY