

SPECIFICATIONS
for
OWNER REVIEW

**BLOOMER PARK
IMPROVEMENTS**

**White Lake
Township**

**Mandatory Pre-Bid Meeting
August 9, 2012**

**Bid Due Date:
August 16, 2012**

Documents Issued:
Bids
August 1, 2012

Beckett & Raeder, Inc.
535 West William, Suite 101
Ann Arbor, MI 48103

734.663.2622 ph
734.663.6759 fx

www.bria2.com

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ADVERTISEMENT FOR BIDS
White Lake Township
Bloomer Park Improvement Project

White Lake Township will receive sealed bids for the construction of the Bloomer Park Improvement Project at the White Lake Township Hall, care of the Township Clerk's Office, 7525 Highland Road, White Lake, MI 48383 until **2:00 p.m., local time, Thursday, August 16, 2012.** At that time, the bids will be publicly opened and read aloud. Faxed, late or unsealed bids will be rejected.

The work includes, but is not limited to, site preparation, soil erosion/sedimentation control, miscellaneous demolition, clearing and grubbing, earthwork, drainage system installation, concrete sidewalk, stabilized gravel paths, gravel parking driveway, permeable paver parking spaces, regulatory and interpretive signage, site furnishings, park shelter, timber overlook and boardwalk, timber bollards and guardrail, and native landscaping.

The Landscape Architect/Engineer for the project is Beckett & Raeder, Inc. Contact person is Brian D. Barrick, LLA, who can be reached at 734.663.2622 or at bbarrick@bria2.com.

Bidding documents may be purchased from Michigan ARC's PlanWell Planroom beginning August 1, 2012. Non-refundable plan fees and shipping costs are as determined by Michigan ARC. The Michigan ARC PlanWell Planroom may be accessed at <https://order.e-arc.com>. Once on the website select "Michigan ARC" from the drop down menu and follow links to the public project plan room. Bidding documents will also be on file for examination at the office of the Landscape Architect / Engineer and the White Lake Township Community Development Department located in the Township Hall at 7525 Highland Road, White Lake, MI 48383.

A mandatory pre-bid meeting, conducted by the Landscape Architect/Engineer, will be held on **Thursday, August 9, 2012 at 2:00 PM EDT** at Bloomer Park, 3000 block of McKeachie Road, White Lake, MI 48383. The park is located on the west side of McKeachie Road and is marked by a large temporary park sign. The pre-bid meeting is for dissemination of information and clarification of intent of Bid Documents. Attendance is mandatory for interested bidders. In addition to the mandatory pre-bid meeting, bidders may make supplemental visits to the site as desired during daylight hours.

The Bloomer Park Improvement Project is a Michigan Natural Resources Trust Fund Grant project. As such, State funds are being used to assist in construction and relevant State requirements will apply.

Proposals shall be submitted in duplicate on the Bid Form (provided in the Specifications) and shall be accompanied by a Bid Bond or Certified Check in the amount of 5% of the Base Bid and an Affidavit of Non-collusion. The accepted bidder will be required to furnish a satisfactory Performance Bond and a Labor and Materials Payment Bond in the amount of 100% of the Contract Sum, and a Maintenance and Guarantee Bond in the amount of 100% of the Contract Sum for a period of one year.

Notice of Award is anticipated on or about August 21, 2012. Accordingly, construction is anticipated to commence thereafter with completion by November 15, 2012.

Firms desiring to bid shall be able to document at least five years successful experience on projects similar in both type and scope/scale as this project with references available to attest to successful completion of similar work; be licensed as required by state or local law; and maintain required insurance including general liability and worker's compensation.

Direct questions concerning the bidding documents will be addressed to the Landscape Architect/Engineer.

No Proposal may be withdrawn for at least sixty (60) consecutive calendar days after the official bid opening. The Township reserves the right to accept any bid, to reject any or all bids, to waive any irregularities and/or informalities in any bid, and to make the award in the manner deemed in the best interest of the Township. Only bids submitted in accordance with the specifications will be considered.

INSTRUCTIONS TO BIDDERS

1. PROPOSALS

All proposals shall be submitted in duplicate on approved forms provided within. Proposals shall include the fully executed Bid Form and Affidavit of Noncollusion. Bid Proposals shall be enclosed in an envelope and shall bear the name of the bidder and the name of the project. It shall be addressed as follows:

White Lake Township
Bloomer Park Improvement Project Bid
7525 Highland Road
White Lake, MI 48383

Attn: Clerk's office

Proposal submitted by telephone, fax or telegram will not be accepted. Proposal shall be for the complete work as required by the Contract Documents.

2. BID GUARANTEE:

Each proposal shall be accompanied by either a certified or cashier's check on an open, solvent bank or a bid bond with an authorized surety company in the amount of 5% of the base bid payable to the Owner as a guarantee of good faith. If the successful bidder fails to furnish satisfactory bonds and insurance within 15 days of notice of award, such guarantee shall be forfeited to the owner as liquidated damages. The guarantees of the three lowest bidders will be retained until the bonds and insurance of the Contractor have been approved by the Owner. The guarantees of all other bidders will be returned by the Owner within ten days after the bid opening.

3. BIDDING DOCUMENTS

The Bidder shall purchase at least one set of Bidding Documents, consisting of Drawings and Specifications.

4. TIME OF COMPLETION

The Bidder will be required to agree, if awarded a Contract, to complete the work on or before November 15, 2012.

- .01 The Contractor understands and agrees that work at the project site will be permitted Monday through Friday from 7:00 a.m. to 7:00 p.m., and that no work at the project site will be permitted on holidays, Saturdays or Sundays, except by written permission of the Owner.

5. CONTRACTS WITH SUBCONTRACTORS

All contracts made by the successful Bidder with Subcontractors shall be covered by the terms and conditions of the Contract. The successful Bidder shall see to it that his Sub-Contractors are fully informed in regard to these terms and conditions.

6. ADDITIONAL INFORMATION

If additional information is needed by the Bidder, or if revisions in the work are to be included in the proposal, written instructions covering such items will be issued by the Landscape Architect/Engineer to the Bidder, and such items shall be included in the proposal. No verbal instructions or interpretations will be considered as binding on the Owner unless confirmed by an addendum.

7. VISITING THE SITE

Bidder shall visit the existing site, examine and verify conditions under which their work must be conducted.

8. TAXES

All proposals in original Contract work, and for all other work there under, shall include all applicable taxes, including social security, unemployment, and sales or use taxes, and any other taxes specifically levied on the work or on wages by local, city, state or federal government, except real property taxes on the site. Proposals shall also include all premiums, assessments and other like payments, charges and costs incidental to the work covered by the Contract Documents.

8. OWNER'S RIGHT TO REJECT BIDS

All proposals submitted shall remain firm for a period of sixty (60) days after the date specified or receipt of proposals. The Owner reserves the right to reject any or all proposals submitted and to waive any informalities therein.

9. TEMPORARY SERVICES

The Owner will not provide temporary water and electricity for the duration of the project. The Contractor will be responsible for all connections, charges, removal, and any related work relative to these temporary services.

10. ADDENDA

Bidders will be notified of Addenda via the Michigan ARC PlanWell Planroom. Bidders shall provide contact information to Michigan ARC PlanWell Planroom as needed for notification. The Owner, Beckett & Raeder, and Michigan ARC will not be responsible for Bidders not receiving notices for Addenda. It is the Bidder's responsibility to check the Michigan ARC PlanWell Planroom for addenda prior to submitting a bid. Copies of addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

No Addenda will be issued later than three (3) days prior to the date for the receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

Each Bidder shall ascertain prior to submitting his bid that he has received all Addenda issued, and he shall acknowledge their receipt in the proper location on the Bid Proposal Form.

11. PERMITS

Contractor shall purchase and pick up all permits from applicable municipalities or agencies. Owner shall reimburse Contractor for all permits fees. Contractor shall provide receipts indicating costs of permits. No mark up of permit fees will be allowed.

12. NATIONAL STORM WATER DISCHARGE

Contractor shall file for National Storm Water Discharge permit (NOC) from the Michigan Department of Environmental Quality (MDEQ) and provide registered storm water operator for all work related to the permit requirements.

13. CONSIDERATION OF BIDS

It is expressly understood that White Lake Township reserves the right to award a contract based solely on criteria as established by White Lake Township. White Lake Township reserves the right to award a contract based solely on what they determine to be in the best interest of the Township.

14. PHASES AND SEQUENCING OF CONSTRUCTION

The bidder, if awarded agrees to proceed with construction as outlined within the Contract Documents and carry the project to completion without delay.

END OF SECTION

BID FORM

Owner: White Lake Township
Project: Bloomer Park Improvements
Landscape Architect/
Engineer: Beckett & Raeder Inc.
To: White Lake Township
7525 Highland Road
White Lake, MI 48383

The undersigned, having examined the Drawings and Specifications, and having familiarized him/herself with local conditions affecting the cost of work, hereby proposes to furnish all necessary machinery, tools, apparatus, and other means of construction, to do all work, to furnish all materials, and equipment except as otherwise specified herein; and for the lump sum price named to complete the work described herein in strict conformity with the requirements of the Drawings and Specifications entitled:

Bloomer Park Improvements

Prepared by Beckett & Raeder, Inc., including Addenda No.'s _____, _____, _____, and _____ issued thereto.

BASE PROPOSAL SUM

The Base Proposal Sum is solicited and the lump sum amount shall be inserted in the blank space provided below. The Base Proposal Sum shall be the lump sum bid amount for all Work shown on the Drawings and specified in the Specifications. Award of Contract, if made, will be to the Contractor whose bid is determined to be in the best interest of the Owner.

\$ _____

(Written Amount)

UNIT PRICES

Contractor shall submit installed unit prices for items of work stated below. Prices shall include all base material required for the installation of the item. The Owner reserves the right to increase or decrease the base proposal sum by up to thirty percent (30%) on the basis of the unit prices stated. The Owner reserves the right to negotiate with the Bidder on any or all unit prices listed in this Bid Form. Unit prices given shall include all profit and overhead. Contractor "mark-up" will not be paid in addition to the prices given below.

(Unit price list is not intended to be a complete representation of the entire progress)

DESCRIPTION	UNIT	UNIT COST
DEMOLITION		
Clearing and Grubbing Trees	ac	_____
Tree Removal (1-6" cal.)	ea	_____
Tree Removal (7-12" cal.)	ea	_____
Tree Removal (13-18" cal.)	ea	_____
Tree Removal (19-24" cal.)	ea	_____
Tree Removal (over 24" cal.)	ea	_____
Remove Remnant Playground Equipment - Complete	ls	_____
SOIL EROSION AND SEDIMENTATION CONTROL		
Stabilized Construction Access	ls	_____
Turbidity Curtain	lf	_____
Tree Protection Fence	lf	_____
Filter Fabric Fence	lf	_____
Permanent Erosion Control Mat	sf	_____
EARTHWORK		
Strip and Stockpile Topsoil	cy	_____
Cut & Fill	cy	_____
Class II Sand	cy	_____
Undercut and Backfill with Class II Sand	cy	_____
Aggregate Base (MDOT 21AA)	cy	_____
Open Graded Aggregate (ASTM No. 2)	cy	_____
Open Graded Aggregate (ASTM No. 57)	cy	_____
Open Graded Aggregate (ASTM No. 8)	cy	_____
Screen, Respread Topsoil	cy	_____
Fine Grade to Subgrade Elevation	sy	_____
Haul Material offsite and legally dispose	cy	_____
Boulder Wall	ff	_____
PAVING		
Vehicular Gravel Parking Drive 8"	sy	_____
Vehicular Porous Paver Parking Bays	sf	_____
Vehicular Concrete Pavement 8"	sf	_____
Concrete Sidewalk 4"	sf	_____
Stabilized Gravel Trail 8' Width	lf	_____

Stabilized Gravel Trail 6' Width lf _____

RECREATION AND SITE FURNISHINGS

Picnic Shelter (including footings, excluding railing & pavement) ls _____

Picnic Shelter Cable Railing lf _____

Overlook Pier (including auger piles, excluding railing & headwall) ls _____

Overlook Pier Cable Railing lf _____

Overlook Pier Auger Piles ft _____

Boardwalk (excluding headwalls) lf _____

Concrete Headwall (excluding transition plate) ea _____

Transition Plate ea _____

Timber Guardrail lf _____

Timber Bollard ea _____

Timber Removable Bollard ea _____

Regulatory Sign ea _____

Interpretive Sign ea _____

Park Identification Sign ea _____

Bench – In-ground Mount ea _____

Bench – Surface Mount ea _____

Trash Receptacle – In-ground Mount ea _____

Trash Receptacle – Surface Mount ea _____

Picnic Table – 8' ea _____

Picnic Table – 8' with 6' benches ea _____

Bike Hoop ea _____

UTILITIES

6" Trail Culvert with Drain ea _____

LANDSCAPE AND SEEDING

Fescue Seeding sy _____

Native Wet Swale Seeding sy _____

Native Woodland Seeding sy _____

Erosion Control Coconut Mulch Blanket x/Biodegradable Stakes sy _____

Acer rubrum, 3" B&B ea _____

Carya ovata, 3" B&B ea _____

Quercus alba, 3" B&B ea _____

Quercus rubra, 3" B&B ea _____

PROJECT LAYOUT

It shall be the responsibility of the Contractor to provide all instrumental surveying required to layout and construct the work. Surveying shall be performed by a Registered and Licensed Land Surveyor. The Owner and the Landscape Architect/ Engineer shall have access to the work site at all times to verify the project layout.

The undersigned affirms that neither he/she nor agents, officers or employees of the Contractor submitting this lump sum bid have directly or indirectly entered into any agreements, participated in any collusion, or otherwise taken action in restraint of free competitive bidding in connection with the bid for this project.

The undersigned agrees that if this lump sum proposal is accepted by the Owner, he/she will enter into the Contract, furnishing all bonds and other contract requirements and commence construction, within 10 business days of the Notice of Award/Notice to Proceed, and will complete the entire Work of the Contract within the given schedule and the provisions of the project specifications.

Dated and signed at _____ State of

_____ this _____ day of _____, 20__.

Signature _____

Bidder _____

By _____

Title _____

Business Address _____

Telephone _____

AFFIDAVIT OF NONCOLLUSION BY CONTRACTOR

State of Michigan _____)
County of Oakland _____) SS

_____, BEING DULY SWORN deposes and says

that he/she is _____
(Title)

of _____
(Insert Name of Bidder)

who submits herewith a Proposal and Bid to White Lake Township for Bloomer Park Improvements.

That all statements of fact in such proposal are true;

That such bidder has not, directly or indirectly by agreement, communication or conference with anyone attempted to induce action prejudicial to the interest of the White Lake Township, or of any other bidder or anyone else interested in the proposed contract; and further

That prior to the public opening and reading of proposals, said bidder:

- a. Did not directly or indirectly, induce or solicit anyone else to submit a false or sham proposal;
- b. Did not, directly or indirectly, collude, conspire, connive or agree with anyone else that said bidder or anyone else would submit a false or sham proposal, or that anyone should refrain from bidding or withdraw his proposal;
- c. Did not, in any manner, directly or indirectly seek by agreement, communication or conference with anyone to raise or fix the proposal price of said bidder or of anyone else, or to raise or fix any overhead profit or cost element of his proposal price, or of that of anyone else;
- d. Did not, directly or indirectly, submit his proposal price or any breakdown thereof, or the contents thereof, or divulge information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, or to any individual or group of individuals, except to any person or persons who have a partnership or other financial interest with said bidder in his business.

Subscribed and sworn to before me this _____

_____ day _____, 20 _____ by _____

Notary Public (Title)

CONTRACT
White Lake Township
Bloomer Park Improvements

ARTICLES OF AGREEMENT, made and entered into this ____ day of _____, 20____, by
and between White Lake Township, hereinafter designated FIRST PARTY and _____
_____ of the City of _____,
County of _____, State of _____, hereinafter designated SECOND PARTY;

WITNESSETH:

In consideration of the mutual promises of the parties hereto, IT IS HEREBY AGREED:

1. That all copies of the attached Proposals, Specifications, Plans, General Conditions, Instruction to Bidders, and the attached Bonds shall be and they are hereby made a part of this Agreement and Contract.
2. That the Second Party, under penalty of Bonds attached, shall furnish all labor, materials and appliances necessary and does hereby covenant, to do all the Work in accordance with the above referred to, in a manner, time and place, all and singular as therein set forth.
3. First Party hereby agrees and promises to pay to the Second party the sum _____ provided in the attached Proposal, namely all in the time and manner therein provided.
4. For the faithful performances of all and singular of the stipulations, terms and covenants and conditions of this Agreement, said parties hereto respectively bind themselves, their heirs, successors, personal representatives and assigns.

IN WITNESS WHEREOF, said parties have hereunto set their hands and seals, on the day and year first hereinabove written.

Authorized by Resolution _____

White Lake Township
FIRST PARTY

_____(Date)

White Lake Township
FIRST PARTY

_____(Date)

Township Clerk
FIRST PARTY

_____(Date)

WITNESS

BY _____

_____(Date)

Authorized Signature
SECOND PARTY

BY _____

_____(Date)

_____(Date)

(designate official capacity)
SECOND PARTY

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that _____, Contractor, as principal, and _____, as surety, are held and firmly bound unto White Lake Township, Owner, in the sum of _____ Dollars (_____) to be paid to the Owner for which payment well and truly to be made we jointly and severally bind ourselves, our heirs, executors, administrators, and assigned firmly by these presents.

THE CONDITIONS OF THE ABOVE OBLIGATIONS ARE such that, WHEREAS, the said _____, did, on the _____ day of _____, 20____, by articles that date enter into contract with the said Owner.

NOW THEREFORE, if the said Contractor shall indemnify, defend, and save harmless the said Owner from all public liability and damages of every description in connecting therewith, shall well and faithfully in all things fulfill the said contract according to all the conditions and stipulations therein contained in all respects, and shall save and hold harmless the said Owner from the against all liens and claims of every description in connection therewith, then this obligation shall be void and of no effect; but otherwise it shall remain in full force and virtue, and, in the event that the said Owner shall extend the time for the completion of said work or otherwise modify elements of the contract in accordance with the provisions thereof, such extension of time or modification of the contract shall not in any way release the sureties of the bond.

WITNESS our hands and seals this _____ day of _____, 20_____.

WITNESSES:

_____(Seal)
_____(Seal)
_____(Seal)
_____(Seal)

LABOR AND MATERIAL BOND

KNOW ALL MEN BY THESE PRESENTS, that we _____ of the _____ Hereinafter called the Principal and _____ Hereinafter called the Surety, are held and firmly bound unto White Lake Township _____ Dollars (\$ _____) to the payment whereof, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly to these presents.

Sealed with our seals, and dated this _____ day of _____, 20_____.

WHEREAS, the above named Principal has entered into a certain contract with the Owner, dated the _____ day of _____, 20_____, (Hereinafter called the Contract) for Bloomer Park Improvements, which Contract and the specifications for said work shall be deemed a part hereof as fully as if set out herein.

AND WHEREAS, this bond is given in compliance with and subject to the provisions of Act. No. 187 of the Public Acts of Michigan, for the Year 1905, as amended being MCL 570. 01-570.105.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the above named principal, legal representatives, or successors shall establish that it has paid or cause to be paid to all subcontractors, persons, firms, and corporations as the same may become due and payable, all indebtedness which may arise from said principal to a subcontractor or party performing labor or furnishing materials, or any subcontractor to any person, firm or corporation on account of any labor performed or materials furnished in connection with the Contract, construction, and work herein referred to, then this obligation shall be void; otherwise to remain in full force and effect for one year after completion and acceptance of the project.

This bond is given upon the express condition that any changes, alterations, or modifications that may be hereinafter recorded or made in the construction and complete installation of the work herein referred to, or the placing of an inspector or superintendent thereon by the Owner, shall not operate to discharge or release the sureties thereon.

IN WITNESS THEREOF, the parties hereto have caused this instrument to be executed by their respective authorized officers this _____ day of _____, 20_____.

Signed, sealed and delivered in the presence of _____

_____(SEAL)
_____(SEAL)
Principal
_____(SEAL)
_____(SEAL)
Surety

Bonds in correct form:

Attorney

MAINTENANCE AND GUARANTEE BOND

KNOW ALL MEN BY THESE PRESENTS, that we, _____
_____ as Principal,
and _____ as Surety
(Sureties), are held and firmly bound unto WHITE LAKE TOWNSHIP, MICHIGAN, hereinafter referred to
as the TOWNSHIP, in the sum of _____ Dollars (\$ _____), for the payment of
which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors,
administrators, successors and assigns.

THE CONDITION of the foregoing obligation is such that, whereas the Principal did on the _____ day of
_____, 20____, by the construction of _____

_____ and,
as a condition precedent to receiving final payment on said Contract, to execute the Bond herein described.

NOW THEREFORE, the Principal guarantees that for a period of one (1) year from the date of completion
and acceptance of the project he will, without cost to the TOWNSHIP, keep in good order and repair any
defect in the material or construction done under said Contract by his employees, agents, subcontractors,
or material suppliers, that may develop during said time due to improper materials, defective equipment,
workmanship or arrangements, and that he will likewise restore to good condition any work disturbed
while correcting such defects, excepting only such part or parts of said work which may have been
disturbed without his consent or approval after acceptance thereof by the TOWNSHIP; and that whenever
directed to do so by the TOWNSHIP, through written notice served personally or by mail upon the Principal
at _____, or upon
the Surety (Sureties) at _____, he will
proceed at once to make the repairs specified, and in case of failure to do so, within one week from the
date of service of said notice or such additional time as may be fixed therein, the TOWNSHIP shall have the
right to purchase such materials and employ such labor and equipment as may be necessary to undertake,
do and make such repairs, and to be reimbursed by the Principal or Surety (Sureties) for the full expense
thereof. If it is necessary to make any repair or set a barricade at once to protect life and property, the
TOWNSHIP may take such action immediately, without notice to the Principal or Surety (Sureties). The
TOWNSHIP shall not be obliged to obtain the lowest bids for doing the work, or and part thereof, but all
sums actually paid therefore shall be reimbursed by either the Principal or Surety (Sureties). In this
connection, the judgment of the TOWNSHIP shall be final and conclusive. If the Principal, for a period of
one (1) year from the date of completion and acceptance, shall keep the work done under the aforesaid

Contract in good order and repair, excepting only such part or parts of said work which may have been disturbed without his consent or approval after acceptance thereof by the TOWNSHIP, and shall, whenever given notice as herein provided immediately proceed to make specified repairs, or, in default thereof, shall reimburse the TOWNSHIP for expenses incurred in making such repairs, and shall fully indemnify, defend and save the TOWNSHIP harmless from all suits and actions for damages of every name and description brought or claimed against it, for or on account of any injury or damage to person or property received or sustained by any party or parties, by or from any of the acts or omissions or through the negligence of the Principal's employees, agents, subcontractors or material suppliers in the performance of the work required by said Contract, and from any and all claims arising under the Workman's Compensation Act of the State of Michigan, as amended, then the above obligation shall be void, otherwise to remain in full force and effect.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed by their respective authorized officers this _____ day of _____, A.D. 20____.

Signed, Sealed and Delivered in the Presence of:

_____	_____ (L.S.)
_____	_____ (L.S.)
_____	_____ (L.S.)

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by



AMERICAN COUNCIL OF ENGINEERING COMPANIES

ASSOCIATED GENERAL CONTRACTORS OF AMERICA

AMERICAN SOCIETY OF CIVIL ENGINEERS

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
A Practice Division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by



CONSTRUCTION SPECIFICATIONS INSTITUTE

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

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(703) 684-2882
www.nspe.org

American Council of Engineering Companies
1015 15th Street N.W., Washington, DC 20005
(202) 347-7474
www.acec.org

American Society of Civil Engineers
1801 Alexander Bell Drive, Reston, VA 20191-4400
(800) 548-2723
www.asce.org

Associated General Contractors of America
2300 Wilson Boulevard, Suite 400, Arlington, VA 22201-3308
(703) 548-3118
www.agc.org

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**STANDARD GENERAL CONDITIONS OF THE
CONSTRUCTION CONTRACT**

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.
 3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
 5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 6. *Bidder*—The individual or entity who submits a Bid directly to Owner.
 7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
 8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.
 9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
 10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
 11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.
15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.
16. *Cost of the Work*—See Paragraph 11.01 for definition.
17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
19. *Engineer*—The individual or entity named as such in the Agreement.
20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
21. *General Requirements*—Sections of Division 1 of the Specifications.
22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.
23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
30. *PCBs*—Polychlorinated biphenyls.
31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
43. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.
46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.
47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.
48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
49. *Unit Price Work*—Work to be paid for on the basis of unit prices.
50. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an

addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 Terminology

A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day:*

1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective:*

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents; or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide:*

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
 2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
 3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
 4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 Delivery of Bonds and Evidence of Insurance

- A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 Copies of Documents

- A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 Commencement of Contract Times; Notice to Proceed

- A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
 - 2. a preliminary Schedule of Submittals; and
 - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
 - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of

the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

- A. Standards, Specifications, Codes, Laws, and Regulations
 1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

- A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
 - a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:
 1. A Field Order;
 2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

- A. Contractor and any Subcontractor or Supplier shall not:
 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or
 2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

- A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the

Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

- 1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and
- 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

- 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
- 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
- 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed either:

- 1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
- 2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer's Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
 - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
 - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
 - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other

professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and
2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all such information and data;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents;
 - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and
 - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price

or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

- A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by

Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.

- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
- G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 Performance, Payment, and Other Bonds

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.
- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 Licensed Sureties and Insurers

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 Certificates of Insurance

- A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

- B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.
- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
 - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
 - 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
 - 4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
 - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
 - b. by any other person for any other reason;
 - 5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
 - 6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
- B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
6. include completed operations coverage:
 - a. Such insurance shall remain in effect for two years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

- A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;
 2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.
 3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
 4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
 5. allow for partial utilization of the Work by Owner;
 6. include testing and startup; and
 7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.
- B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.
- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property

insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

- E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:
 - 1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 - 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery

against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

- A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.
- B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

6.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner’s written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.
1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
 - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and
 - 3) it has a proven record of performance and availability of responsive service.
 - b. Contractor certifies that, if approved and incorporated into the Work:
 - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items:*

- a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
- b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
- c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.
- d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
 - 1) shall certify that the proposed substitute item will:
 - a) perform adequately the functions and achieve the results called for by the general design,
 - b) be similar in substance to that specified, and
 - c) be suited to the same use as that specified;
 - 2) will state:
 - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,
 - b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
 - c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
 - 3) will identify:
 - a) all variations of the proposed substitute item from that specified, and
 - b) available engineering, sales, maintenance, repair, and replacement services; and

- 4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.
- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.
- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.
- B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or

other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

- C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:
1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor
 2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all

court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas:*

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor

shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

- D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
1. all persons on the Site or who may be affected by the Work;
 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.
- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

- A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*
 - a. Submit number of copies specified in the General Requirements.
 - b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.
 2. *Samples:*
 - a. Submit number of Samples specified in the Specifications.
 - b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.
- B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. *Submittal Procedures:*
1. Before submitting each Shop Drawing or Sample, Contractor shall have:
 - a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
 - c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
 2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.
 3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop

Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures:*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
1. observations by Engineer;
 2. recommendation by Engineer or payment by Owner of any progress or final payment;
 3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 4. use or occupancy of the Work or any part thereof by Owner;
 5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;
 6. any inspection, test, or approval by others; or
 7. any correction of defective Work by Owner.

6.20 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .
- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor,

Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

- C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
 - 1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
 - 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
1. written notice thereof will be given to Contractor prior to starting any such other work; and
 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.
- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:
1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
 2. the specific matters to be covered by such authority and responsibility will be itemized; and
 3. the extent of such authority and responsibilities will be provided.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

- A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

- A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

- A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents.

9.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits

and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

- A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

- A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

- B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.
- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
 2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The

opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
1. deny the Claim in whole or in part;
 2. approve the Claim; or
 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.
- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 Cost of the Work

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:
1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on

Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
 - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
 - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
- 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
- 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

- D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 *Allowances*

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances:*

1. Contractor agrees that:

- a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
- b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance:*

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

- D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:
1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 2. there is no corresponding adjustment with respect to any other item of Work; and
 3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 Change of Contract Price

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
 2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
 3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).
- C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:
1. a mutually acceptable fixed fee; or
 2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

- c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
- d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
- e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
- f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.
- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the

control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 Notice of Defects

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 Access to Work

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

13.03 Tests and Inspections

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
 - 1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;
 - 2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and
 - 3. as otherwise specifically provided in the Contract Documents.

- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.
- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.
- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).
- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. repair such defective land or areas; or
 - 2. correct such defective Work; or
 - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute

resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and

equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 Schedule of Values

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 Progress Payments

A. Applications for Payments:

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the

Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications:*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work, or

- b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
 - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:
- a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
 - d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due:

- 1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. Reduction in Payment:

- 1. Owner may refuse to make payment of the full amount recommended by Engineer because:
 - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
 - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - c. there are other items entitling Owner to a set-off against the amount recommended; or

- d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.
3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities

pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 *Partial Utilization*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
 1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.
 2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
 3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
 4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;
 - b. consent of the surety, if any, to final payment;
 - c. a list of all Claims against Owner that Contractor believes are unsettled; and
 - d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance:*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Payment Becomes Due:*

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

- A. The making and acceptance of final payment will constitute:
 1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
 2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
 2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
 3. Contractor's repeated disregard of the authority of Engineer; or
 4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:
1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);
 2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and
 3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.
- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
 - 3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
 - 4. reasonable expenses directly attributable to termination.
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 Methods and Procedures

- A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.
- B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.
- C. If the Claim is not resolved by mediation, Engineer’s action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:
 1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or
 2. agrees with the other party to submit the Claim to another dispute resolution process; or
 3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 Giving Notice

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
 1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or
 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 Computation of Times

- A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SUPPLEMENTAL GENERAL CONDITIONS

1. Overview
 - A. All requirements contained in the *SUPPLEMENTAL GENERAL CONDITIONS* shall take precedence over conflicting information found elsewhere in the *SPECIFICATIONS*.
2. Bonds
 - A. In addition to the Performance Bond and Labor and Materials Bond required in the Standard General Conditions of the Construction Contract, Contractor shall provide a Maintenance and Guarantee Bond payable to the Owner in an amount equal to 100 percent of the Contract Price for a period of one year.
3. Insurance Requirements
 - A. Prior to commencement of the Work, the Contractor shall purchase and maintain during the term of the project such insurance as will protect him, the Owner and the Landscape Architect/Engineer from claims arising out of the Work described in this Contract and performed by the Contractor, Subcontractor(s) or Sub-subcontractor(s) consisting of:
 1. Workers Compensation Insurance including Employer's Liability to cover employee injuries or disease compensable under the Worker's Compensation Statutes of the states in which work is conducted under this Contract; disability benefit laws, if any; or Federal compensation acts such as US Longshoremen or Harbor Worker's, Maritime Employment, or Railroad Compensation Act(s), if applicable. Self-insurance plans approved by the regulatory authorities in the state in which work on this project is performed are acceptable.
 2. A Comprehensive General Liability policy to cover bodily injury to persons other than employees and for damage to tangible property, including loss of use thereof, including the following exposure:
 - a. All premises and operations.
 - b. Explosion, collapse and underground damage.
 - c. Contractor's Protective coverage for independent contractors or subcontractors employed by him.
 - d. Contractual Liability for the obligation assumed in the Indemnification or Hold Harmless agreement found in Paragraph 6.20 of the Standard General Conditions of the Construction Contract.
 - e. The usual Personal Injury Liability endorsement with no exclusions pertaining to employment.
 - f. Products and Completed Operations coverage. This coverage shall extend through the contract guarantee period.
 3. A Comprehensive Automobile Liability policy to cover bodily injury and property damage arising out of the ownership, maintenance or use of any motor vehicle, including owned, non-owned and hired vehicles. In light of standard policy provisions concerning (a) loading and unloading and (b) definitions pertaining to motor vehicles licensed for road use vs. unlicensed or self-propelled construction equipment, it is strongly recommended that the Comprehensive General Liability and the Comprehensive Auto Liability be written by the same insurance carrier, though not necessarily one policy.

4. The Contractor will purchase for the Owner an Owner's Protective Liability policy to protect the Owner, the Landscape Architect/Engineer, their consultants, agents, employees, and such public corporations in whose jurisdiction the work is located for their contingent liability for work performed by the Contractor, the Subcontractor(s) or the Sub-subcontractor(s) under the Contract.
5. The Contractor shall purchase a Builder's Risk-Installation Floater in a form acceptable to the Owner covering property of the project for full cost of replacement as of the time of any loss which shall include, as named insureds, (a) the Contractor, (b) all Subcontractors, (c) all Sub-subcontractors, (d) the Owner, (e) the Landscape Architect/Engineer, (f) the Landscape Architect/Engineer's subconsultants, and their respective interests may provide to be at the time of loss, covering insurable property which is the subject of this contract, whether in place, stored at the job site, stored elsewhere, or in transit at the risk of the insured(s). Coverage shall be effected on an "ALL RISK" form including, but not limited to, the perils of fire, wind, vandalism, collapse, theft, and earthquake, with exclusions normal to cover.
6. Umbrella or Excess Liability: The Owner or its representative may, for certain projects, require limits higher than those stated in the following paragraphs. The Contractor is granted the option of arranging coverage under a single policy for the full limit required or by a combination of underlying policies with the balance provided by an Excess or Umbrella Liability policy equal to the total limit(s) requested. Umbrella or Excess policy working shall be at least as broad as the primary or underlying policy(ies) and shall apply both to the Contractor's general liability and to his automobile liability insurance.

B. Limits of Liability: The required limits of liability for insurance coverages shall be not less than the following:

1.	Workers Compensation	
	Coverage A – Compensation	500,000.00
	Coverage B – Employer's Liability	500,000.00
2.	Comprehensive General Liability	
	Bodily Injury – Each occurrence	1,000,000.00
	Bodily Injury – Aggregate (Completed Operations)	1,000,000.00
	Property Damage – Each occurrence	500,000.00
	Property Damage – Aggregate or Combined Single Limit	1,000,000.00
3.	Comprehensive Automobile Liability	
	Bodily Injury	1,000,000.00
	Property Damage	500,000.00
	Or Combined Single Limit	1,000,000.00
4.	Owner's Protective	
	Bodily Injury – Each occurrence	1,000,000.00
	Property Damage – Each occurrence	500,000.00
	Property Damage – Aggregate or Combined Single Limit	500,000.00 1,000,000.00
5.	Builder's Risk – Installation Floater	Cost to Replace At Time of Loss

6. Umbrella or Excess Liability 1,000,000.00

C. Other Requirements

1. Notice of Cancellation or Intent Not to Renew: Policies will be endorsed to provide that at least 30 days written notice shall be given to the Owner and to the Landscape Architect/Engineer of cancellation or of intent not to renew.
2. Evidence of Coverage: Prior to commencement of Work, the Contractor shall furnish to the Owner four (4) Certificates of Insurance. The Owner reserves the right to request complete copies of policies it deemed necessary to ascertain details of coverage not provided by the certificates. Such policy copies shall be "Originally Signed Copies" and so designated.

D. Insurance Required for the Contractor

1. Worker's Compensation and Employer's Liability Comprehensive General Liability including:
 - a. All premises and operations.
 - b. Explosion, collapse and underground damage.
 - c. Contractor's Protective.
 - d. Contractual Liability for obligations assumed in the Indemnification or Hold Harmless agreement found in Paragraph 6.20 of the Standard General Conditions of the Construction Contract.
 - e. Personal Injury Liability.
 - f. Products and Completed Operations.
2. Comprehensive Automobile Liability including owned, non-owned and hired vehicles.
3. Umbrella or Excess Liability.

E. Insurance Required for the Owner

1. Owners' Protective Liability which names as insured the Owner, the Landscape Architect/Engineer, their consultants, agents, and employees and such public corporations in whose jurisdiction the work is located.
2. Additional Insured:
 - a. Beckett & Raeder, Inc.
 - b. SDI - Structures
 - c. White Lake Township

F. Insurance Required for the Contractor and the Owner

1. Builder's Risk – Installation Floater which names as insured(s) the Owner, Landscape Architect/Engineer, their consultants, agents, and employees, the Contractor and all Subcontractors.

G. Qualification of Insurers

1. In order to determine financial strength and reputation of insurance carriers, all companies providing the coverage required shall be licensed or approved by the Insurance Bureau of the State of Michigan and shall have a financial rating not lower

than X1 and a policyholder's service rating no lower than B+ as listed in A.M. Best's Key Rating Guide, current edition. Companies with ratings lower than B+:X1 will be acceptable only upon written consent of the Owner.

H. Delete Paragraph 5.06 of the Standard General Conditions of the Construction Contract.

4. Discrimination Clause

A. In connection with the performance of services to be provided, the Contractor agrees to comply with the provisions of the Elliott-Larsen Civil Rights Act, Public Act- (MCL 37.2101 – 37.2804), the Persons With Disabilities Civil Rights Act (MCL 37.1101 – 37.1607 and specifically agrees not to discriminate against any individual, employee or applicant for employment with respect to hire, tenure, terms conditions, or privileges of employment because of a handicap that is unrelated to the individual's ability to perform the duties of a particular job position, or because of race, color, religion, national origin, age, sex, height, weight, or marital status. Breach of this covenant may be regarded as a material breach of this agreement.

5. Prevailing Wage Requirements

Payment of prevailing wage is a requirement on this project. The contractor agrees that all craftsmen, mechanics and laborers it employs to work on this project shall, at a minimum, receive the prevailing wages and fringe benefits of the Building Trade Department for corresponding classes of craftsmen, mechanics and laborers for the Washtenaw County area, as determined and published by the Davis-Bacon Division of the United States Department of Labor as of 08-14-2009. Contractor agrees that all sub-contracts entered into by the Contractor shall contain a similar provision covering any sub-contractor's employees who perform work on this project. Interviews with workers may be conducted and certified payroll records may be requested to verify compliance.

- END OF SUPPLEMENTAL GENERAL CONDITIONS -

Testing Engineers & Consultants, Inc.

White Lake Township
c/o Beckett & Raeder, Inc.
535 West William Street, Suite 101
Ann Arbor, MI 48103

GEOTECHNICAL INVESTIGATION

FOR
Bloomer Park Improvements
McKeachie Road South of Jackson Boulevard
White Lake Township, Michigan

TEC Report: 51997

By:

Testing Engineers & Consultants, Inc.
1343 Rochester Road
P.O. Box 249
Troy, Michigan 48099-0249
(248) 588-6200

November 16, 2011



Testing Engineers & Consultants, Inc.

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(248) 588-6200 or (313) T-E-S-T-I-N-G

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TEC Report: 51997

Date Issued: November 16, 2011

White Lake Township
c/o Mr. Brian Barrick, LLA, Senior Landscape Architect
Beckett & Raeder, Inc.
535 West William Street, Suite 101
Ann Arbor, MI 48103

Re: Geotechnical Investigation for
Bloomer Park Improvements
McKeachie Road South of Jackson Boulevard
White Lake Township, Michigan

Dear Mr. Barrick:

Please find enclosed the results of a geotechnical investigation performed at the above referenced site. This geotechnical report presents our field and laboratory results; engineering analysis; and our recommendations for design of foundation and pavements, as well as important construction considerations.

As you may know, Testing Engineers & Consultants, Inc. (TEC) has more than forty five years of experience in Quality Control Testing and Construction Inspection. We would be pleased to provide these services on this project.

Should you have any questions regarding this report, please let us know. It has been a pleasure to be of service to you.

Respectfully submitted,

TESTING ENGINEERS & CONSULTANTS, INC.

Carey J. Suhan, P.E.,
Vice President, Geotechnical
& Environmental Services

CJS/ln
Enclosure

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CONSULTING ENGINEERS & FULL-SERVICE PROFESSIONAL TESTING AND INSPECTION

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FOUNDED IN 1966

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APPENDIX

TEST BORING LOCATION PLAN

LOGS OF TEST BORINGS

PARTICLE SIZE DISTRIBUTION RESULTS

GENERAL NOTES FOR SOIL CLASSIFICATION

Testing Engineers & Consultants, Inc.

White Lake Township
c/o Mr. Brian Barrick, LLA, Senior Landscape Architect
Beckett & Raeder, Inc.
November 16, 2011

TEC Report: 51997

1.0 INTRODUCTION

This report presents the results of a geotechnical investigation for the proposed development at Bloomer Park in White Lake Township, Michigan. Authorization to perform this investigation was given by Mr. Gregory R. Baroni on October 19, 2011 in the form of a signed copy of TEC Proposal 060-11-0214.

The purpose of this investigation was to obtain information necessary to determine basic engineering properties of soils at the site through a series of infiltration tests, test borings, and laboratory tests performed on the soil samples obtained during the field investigation. This information has been evaluated to provide the general recommendations for site development preparations, foundation requirements, pavement designs and other geotechnical information.

2.0 FIELD INVESTIGATION

Twelve test borings were drilled on the site at the locations shown on the Test Boring Location Plan. The locations are accurate to within a short distance of the locations shown on the plan. The test borings were drilled on October 31, 2011 and November 3, 2011 with a drill rig mounted on an all-terrain vehicle (ATV) to depths ranging from eight to fifteen feet.

Drilling methods and standard penetration tests were performed in general accordance with the current ASTM D-1452 and D-1586 procedures, respectively. These procedures specify that a standard 2-inch O.D. split-barrel sampler be driven by a 140-pound hammer with a free fall of 30 inches. The number of hammer blows required to drive the split-barrel sampler through three successive 6-inch increments is recorded on the Test Boring Log. The first 6-inch increment is used for setting the sampler firmly in the soil and the sum of the hammer blows for the second and third increments is referred to as the "Standard Penetration Index" (N).

From the standard penetration test a soil sample is recovered in the liner sampler tubes that are located inside the split-barrel sampler. Upon recovery of a soil sample, the liner tubes are removed from the split-barrel sampler and placed in a container which is sealed to minimize moisture losses during transportation to the laboratory. Standard penetration tests are usually made at depths of 2 ½, 5, 7 ½ and 10 feet and at 5-foot depth intervals thereafter. These parameters may vary for a given project depending on the nature of the subsoils and the geotechnical information required.

Additionally, three double-ring infiltrometer field tests were performed adjacent to Boring Nos. 1, 2, and 3. The infiltration tests were performed on November 3, 2011 and November 9, 2011. They were

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2.0 FIELD INVESTIGATION (Cont'd)

performed in general accordance with the current Michigan Low Impact Design Manual Method for Soil Infiltration Testing. This procedure specifies that an outer ring, to prevent divergent flow, be driven into the level soil surface a minimum depth of two inches. An inner ring is then centered inside of the outer ring and driven to the same depth. The test area is presoaked for 60 minutes by filling both rings with water to the water level indicator mark. Depending on the drop in water level during the presoaking period, readings are obtained every 10 or 30 minutes and the rings are subsequently filled to the water level mark to be re-measured. Readings continue until either a stabilized rate of drop is obtained or a minimum of eight readings are completed. The drop in the water level within the inner ring is determined and used to calculate the infiltration rate which is the drop in the water level per unit of time. The results are included in Section 5.3.1 Permeable Pavement.

3.0 LABORATORY TESTING

The laboratory testing consisted of determining the unconfined compressive strength, the natural bulk density and the natural moisture content of the soil samples recovered in the liner sampler tubes. In the unconfined compression tests, the compressive strength of the soil is determined by axially loading a soil sample until failure is observed or 15% strain, whichever occurs first. The above referenced test data are recorded on the boring logs. Some test results may deviate from the norm because of variations in texture, imperfect samples, presence of pebbles and/or sand streaks, etc. The results are still reported although they may not be relevant.

The particle size distribution of two granular soil samples was also determined. The distribution provides estimates of the permeability and permeability-related behavior of the granular soil. The results are included in the appendix.

Samples taken in the field are retained in our laboratory for 60 days and are then destroyed unless special disposition is requested by the client. Samples retained over a long period of time are subject to moisture loss and are then no longer representative of the conditions initially encountered.

4.0 GENERAL SUBSURFACE CONDITIONS

4.1 Subsoil Conditions

The soil conditions encountered in the borings are presented on the individual boring logs. Each log presents the soil types encountered at that location as well as laboratory test data, ground water data,

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4.1 Subsoil Conditions (Cont'd)

and other pertinent information. Descriptions of the various soil consistencies, relative densities and particle sizes are given in the Appendix. Definitions of the terms and symbols utilized in this report may be found in ASTM D-653.

The ground surface generally consisted of 4 to 9 inches of topsoil. The exceptions were Boring Nos. 5 and 7 that consisted of clayey sand to a depth of 5 inches and clayey silt to a depth of 1 foot, respectively. The thickness of the topsoil indicated on the boring logs should be considered approximate since it is difficult to note small variations in soils within small diameter boreholes. Some mixing of the soils at Boring Nos. 5 and 7 with topsoil, although not noted, may be anticipated. The underlying native soils of all at the borings consisted of mainly clayey sand with some layers of fine sand and clay with some silt to the terminal depths of the borings at 10 to 15 feet.

Standard penetration values range from 4 to 56 blows per foot with unconfined compressive strengths of 660 to 7000 pounds per square foot (psf). Bulk densities range from 100 to 145 pounds per cubic foot with moisture contents of 3 to 25 percent of the dry weight of the soil.

4.2 Ground Water Observations

Water level readings were taken in the bore holes during and after the completion of drilling. These observations are noted on the respective Test Boring Logs. Ground water was encountered in Boring Nos. 2, 6, 7 and 12 during drilling at depths ranging from 1 to 9 feet. Ground water was again encountered during drilling at Boring No. 7 at a depth of 5 1/2 feet. After completion of drilling and removal of the augers, water was noted at Boring Nos. 7 and 12 at depths of 1'4" and 6'1" respectively. After completion of drilling the boreholes at Boring Nos. 2 and 6 caved in at depths of 9 feet and 5'3", respectively. No ground water was noted either during drilling or after completion of drilling at the other borings.

5.0 ANALYSIS AND RECOMMENDATIONS

5.1 Proposed Development

The proposed development is to consist of the construction of a multi-use shelter with footings, an overlook pier with helical piers, limestone fines trails, timber stairs with footings, a permeable aggregate or permeable paver parking area and a bioswale. The intended grades will be as close as possible to the existing grades to preserve as much vegetation as possible.

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5.2 Ground Water Conditions

The position of water levels found in test borings may vary somewhat depending on seasonal precipitation. At the level encountered in the borings, it should present no significant problems for design or construction of foundations and pavements. Any surface or seepage water encountered in excavations can be directly pumped from sumps in the excavations. The ground water was shallow at Boring No. 7 adjacent to the lake, however, this should have no significant impact on installation of helical piers.

5.3 Recommended Earthwork Operations

Within the limits of areas to be developed with paths, parking, drives, pavements or slabs, the surface vegetation and topsoil should be removed. The sand and clayey sand should be rolled with a vibratory roller to densify any loose sand. The site should then be proofrolled with a heavily loaded rubber tired vehicle to identify any soft or yielding areas. Much of the subgrade appears to be a clayey sand. The moisture contents are elevated over their expected optimum moisture content for compaction. In particular the moisture contents are relatively high at Boring Nos. 6, 7 and 8. At these moisture contents it is expected that the subgrade will be unstable and fail a proofroll.

If the work is performed in the dry summer months the areas could be disked and allowed to dry and then be re-compacted. Otherwise, the soils would need to be removed, likely to depths of 8 to 12 inches and then be stabilized with crushed stone or concrete. Engineered backfill required for construction excavations or fill required to achieve desired grades should preferably consist of clean and well graded granular soils. Fill should be placed in uniform layers not more than 9 inches in thickness with the soils in each layer compacted to a minimum of 95% of the maximum density as determined by ASTM D-1557. Fill should be at approximately the optimum moisture content during placement and compaction. Furthermore, frozen material must not be used as fill and fill should not be placed on frozen ground.

5.3.1 Permeable Pavement

Permeable pavement is being considered for the parking lot. The functionality of porous pavement is dependent on soil permeability and the elevation of the ground water. The porous pavement will likely consist of a permeable grass paver or other type of paver in the parking area with gravel in the drives. Typically the surface paving system is constructed over a choker layer of washed stone over a thick reservoir layer of washed stone. True to its name the reservoir layer stores the storm water until it can infiltrate into the ground or discharge through a subsurface drainage system to a storm system or detention pond.

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5.3.1 Permeable Pavement (Cont'd)

Based upon the soil classification and the infiltrometer test results the drainage capabilities of the shallow soils range from fair to good. The infiltrometer test results are as follows:

Boring Location	Infiltration Rate In/Hour
B-1	1.3 – 2.5
B-2	9.8
B-3	1.6

The existing ground surface in this area is topsoil underlain by fine sand with clayey seams. The infiltration testing revealed results that are wide ranging. The test near Boring No. 2 resulted in an infiltration rate of 9.8 inches per hour. The test near Boring No. 3 resulted in a rate of 1.6 inches per hour. The greatest infiltration rate was in Boring No. 2 within the parking area. At this location the soils are fine sand with clayey seams to a depth of about 5 1/2 feet followed by fine sand with occasional silt layers extending to 8 feet. The clay seams and silt layers can dramatically limit vertical infiltration, however, the layered soil profile would allow lateral drainage through the cleaner sand layers. At Boring No. 3 in the drive area the fine sand with clayey seams only extended to 3 feet below existing grade and infiltration was much slower. At the bio-swale location south of the parking area (Boring No. 3) the infiltration was considerably slower where the upper soils were clayey sand extending to 5 feet. Because of this wide variation in a relatively small area, it should be budgeted to import clean open graded stone for the reservoir layer and choker course.

5.3.2 Bio-Swale Infiltration

It is our understanding that a bio-swale, south of the proposed parking lot, will be used for storm water management at the site. We do not have any specific depths of proposed bio-swales but offer the following comments.

The area south of the proposed parking lot, near Boring No. 1, consists of clayey sand and clay soils. Because the soil contains significant amounts of clay, this will reduce the soils infiltration rate dramatically, making this area a poor to fair candidate for a bio-swale. The results of the infiltration testing indicate an infiltration rate of 1.3 to 2.5 inches per hour.

Infiltration rates can vary widely and is very dependent on the amount of fines (silt and clay) in the sand. In general, it takes the addition of about 15 percent clay to turn the behavior of clean sand into the behavior of clay (since the typical pore space of a sand is about 15 percent) and in the process reduce the infiltration to nearly the rate of a clay which is considered practically impermeable. As can

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5.3.2 Bio-Swale Infiltration (Cont'd)

be seen from the infiltration rates outlined in Section 5.3.1 Permeable Pavement, the infiltration rate is much faster in the parking lot area. Furthermore, the soils in Boring No. 4, west of the parking lot appear to be cleaner fine sand with a trace of silt. It is expected that infiltration rates in this area would be faster. Consideration should be given to locating the bio-swale west of the parking area. Additional test pits and infiltration tests could be performed to better define the soil variations and infiltration rates to optimize the location of the bio-swale.

5.3.3 Limestone Fines Trail

The subgrade resulting from the site preparation, as outlined in the recommended earthwork operations section, will provide a fair subgrade for support of the gravel pathway. We understand that the pathway surface will consist of limestone fines anticipating in-frequent light maintenance truck traffic. An additional layer of compacted coarser aggregate should be placed beneath the limestone fines. This will provide stability for placement and long term performance of the limestone fines. We would recommend an MDOT 21AA aggregate for the lower layer with a minimum thickness of six inches.

5.4 Foundation Recommendations

5.4.1 Shelter Foundation

The on-site soils are acceptable for support of the proposed multi-purpose shelter on shallow foundations. Local building codes and climatic conditions require that exterior foundations be placed at a minimum depth of 3 ½ feet below finished grade to provide for adequate frost protection. Interior foundations may be below the floor at a lesser depth if not exposed to frost penetration. In any case, the footings should be deep enough to bear on original soil below the fill. At minimum depths, foundations can be designed for a maximum net allowable bearing pressure of 3000 psf. The recommended design bearing pressure should provide a factor of safety of about 2.5 to 3 against shear failure and limit differential settlements between adjacent columns to less than ¼ inch.

The subgrade resulting from the site preparation, as outlined in the recommended earthwork operations section, will provide a fair subgrade for support of floor slabs. To improve the uniformity of support, the slab should be placed on a minimum of 4 inches of clean compacted granular fill meeting MDOT Class II grading specifications.

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5.4.2 Overlook Pier Foundation

For the overlook pier, we recommend the use of screw-in helical piers for support. It is estimated that a 12 inch diameter helix at a depth of about 12 feet would achieve an allowable capacity of 8,000 pounds and a 14 inch diameter helix at the same depth would achieve an allowable capacity of 11,000 pounds. A capacity of 19,000 pounds could be achieved if a double helix system consisting of a 14 inch and 12 inch helix is used. The allowable pier capacities are based upon a factor of safety of 3 and assuming soil conditions below 15 feet are similar to those in the 10 to 15 foot depths. Furthermore, the overlook will be constructed partly into the lake and soil conditions could vary in the lake. The piers should be installed by an experienced helical pier contractor with pier capacities verified by appropriate torque correlations.

For this foundation system it is assumed that the area will not be filled which could induce downdrag forces on the helical piers. Consequently we have not included any downdrag in the allowable capacities. If additional fill over one foot thick is anticipated the capacities should be re-evaluated.

5.4.3 Timber Stairs Foundation

The site preparations resulting from the Recommended Earthwork Operations section will provide a good subbase for timber stairs placed into the slope. Special consideration needs to be taken that each tread is compacted starting at the base and working upwards. If conventional stair cases are constructed, foundations should extend to frost depth of 42 inches below grade. It is not finalized where stairs will be located, however, based upon the borings it appears that foundations at frost depth could be designed for a net allowable bearing capacity of 2000 psf nearly anywhere at the site. Close field inspection and testing during excavation should be performed to verify the capacity.

6.0 DESIGN REVIEW AND FIELD MONITORING

The evaluations and recommendations presented in this report relative to site preparation and foundations have been formulated on the basis of assumed and provided data relating to the location, type and finished grades for the proposed structures and adjacent areas. Any significant change in this data should be brought to our attention for review and evaluation with respect to the prevailing subsoil conditions.

When the building and foundation plans are finalized, a consultation should be arranged with us for a review to verify that the evaluations and recommendations have been properly interpreted.

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White Lake Township
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6.0 DESIGN REVIEW AND FIELD MONITORING (Cont'd)

Soil conditions at the site could vary from those generalized on the basis of test borings made at specific locations. It is therefore recommended that Testing Engineers & Consultants, Inc. be retained to provide soil engineering services during the site preparation, excavation and foundation phases of the proposed project. This is to observe compliance with the design concepts, specifications and recommendations. Also, this provides opportunity for design changes to be made in the event that subsurface conditions differ from those anticipated prior to the start of construction.



Jill M. Inman
Staff Engineer



Carey J. Suhan, P.E.
Vice President, Geotechnical
& Environmental Services

JMI/CJS/ln

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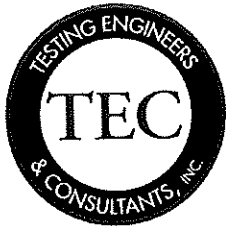
APPENDIX

Test Boring Location Plan

Logs Of Test Borings

Particle Size Distribution Results

General Notes For Soil Classification



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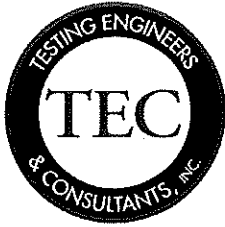
Boring No.: 1	Job No.: 51997	Project: Bloomer Park Improvements
Client: White Lake Township c/o Beckett and Raeder, Inc.		Location: White Lake Township, Michigan
Type of Rig: All-Terrain Vehicle		Drilled By: I. Mickle
Drilling Method: Solid Stem Augers		Started: 10/31/2011
Ground Surface Elevation:		Completed: 10/31/2011

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.58	Moist Dark Brown Sandy TOPSOIL (7")	10.4	118	
2.5	LS	4 7 9		Medium Compact Moist Brown Clayey SAND With Trace Of Gravel	17.5	111	
5.0	LS	6 7 8	5	Stiff Moist Brown Oxidized CLAY With Some Silt & Trace Of Gravel	16.3	140	15410
7.5	LS	4 8 14	8	Dense Moist Brown Clayey SAND With Some Gravel	7.0	127	
10.0	LS	18 22 34	10	Bottom of Borehole at 10'			
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
 SS - 2" J.D. Split Spoon Sample
 LS - Sectional Liner Sample
 ST - Shelby Tube Sample
 AS - Auger Sample

w - H₂O, % of dry weight
 d - Bulk Density, pcf
 qu - Unconfined Compression, psf
 DP - Direct Push

Water Encountered: None
 At Completion: None
 Boring No. 1



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Boring No.: 2	Job No.: 51997	Project: Bloomer Park Improvements
Client: White Lake Township c/o Beckett and Raeder, Inc.		Location: White Lake Township, Michigan
Type of Rig: All-Terrain Vehicle		Drilled By: I. Mickle
Drilling Method: Solid Stem Augers		Started: 10/31/2011
Ground Surface Elevation:		Completed: 10/31/2011

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.67	Moist Dark Brown Sandy TOPSOIL (8")	11.9	121	
2.5	LS	5 5 7		Medium Compact Moist Brown Fine SAND With Trace Of Gravel & Clayey Seams	7.0	132	
5.0	LS	5 6 9	5.5	Loose Moist Brown Fine SAND With Occasional Silt Layer	7.1	120	
7.5	LS	3 3 4	8	Firm Moist Gray CLAY With Some Silt & Trace Of Gravel	12.2	145	
10.0	LS	5 8 8	10	Medium Compact Wet Gray Fine SAND With Trace Of Gravel			
12.5				Bottom of Borehole at 10'			
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
 SS - 2" D. Split Spoon Sample
 LS - Sectional Liner Sample
 ST - Shelby Tube Sample
 AS - Auger Sample

w - H₂O, % of dry weight
 d - Bulk Density, pcf
 qu - Unconfined Compression, psf
 DP - Direct Push

Water Encountered: 9'0"

At Completion: Caved At 9'0"

Boring No. 2



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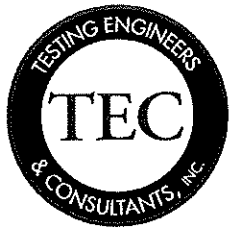
Boring No.: 3	Job No.: 51997	Project: Bloomer Park Improvements
Client: White Lake Township c/o Beckett and Raeder, Inc.		Location: White Lake Township, Michigan
Type of Rig: All-Terrain Vehicle		Drilled By: I. Mickle
Drilling Method: Solid Stem Augers		Started: 10/31/2011
Ground Surface Elevation:		Completed: 10/31/2011

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.67	Moist Dark Brown Sandy TOPSOIL (8")	5.2	113	
2.5	LS	2 5 6	3	Medium Compact Moist Brown Fine SAND With Clayey Seams	14.8	133	
5.0	LS	8 14 21		Compact Moist Brown Clayey SILT & Sand With Trace Of Gravel	9.4	116	
7.5	LS	7 15 16	8				
10.0	LS	9 11 15	10	Medium Compact Moist Brown Clayey SILT & Sand With Trace Of Gravel	11.9	141	
12.5				Bottom of Borehole at 10'			
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
 SS - 2" J.D. Split Spoon Sample
 LS - Sectional Liner Sample
 ST - Shelby Tube Sample
 AS - Auger Sample

w - H₂O, % of dry weight
 d - Bulk Density, pcf
 qu - Unconfined Compression, psf
 DP - Direct Push

Water Encountered: None
 At Completion: None
 Boring No. 3



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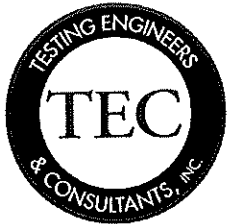
Boring No.: 4	Job No.: 51997	Project: Bloomer Park Improvements
Client: White Lake Township c/o Beckett and Raeder, Inc.		Location: White Lake Township, Michigan
Type of Rig: All-Terrain Vehicle		Drilled By: I. Mickle
Drilling Method: Solid Stem Augers		Started: 10/31/2011
Ground Surface Elevation:		Completed: 10/31/2011

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
0.0 - 0.75	LS	2	.75	Moist Dark Brown Sandy TOPSOIL (9")	8.5	102	
0.75 - 2.5		3					
2.5 - 2.5		5	2.5	Loose Moist Brown Fine SAND With Trace Of Silt			
2.5 - 5.0	LS	4			2.8	108	
5.0 - 5.0		7		Medium Compact Moist Brown Fine SAND With Trace Of Gravel With Trace Of Silt			
5.0 - 7.5	LS	9	6.5		7.9	101	
7.5 - 7.5		19					
7.5 - 7.5		21	7.5	Compact Moist Brown Fine SAND With Trace Of Gravel			
7.5 - 10.0	LS	6			10.0	135	7000
10.0 - 10.0		8		Stiff Moist Gray CLAY With Some Silt & Trace Of Gravel			
10.0 - 10.0		13	10	Bottom of Borehole at 10'			
10.0 - 12.5							
12.5 - 15.0							
15.0 - 17.5							
17.5 - 20.0							
20.0 - 22.5							
22.5 - 22.5							

"N" - Standard Penetration Resistance
 SS - 2" J.D. Split Spoon Sample
 LS - Sectional Liner Sample
 ST - Shelby Tube Sample
 AS - Auger Sample

w - H₂O, % of dry weight
 d - Bulk Density, pcf
 qu - Unconfined Compression, psf
 DP - Direct Push

Water Encountered: None
At Completion: None
Boring No. 4



Testing Engineers & Consultants, Inc.

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 (248) 588-6200 or (313) T-E-S-T-I-N-G
 Fax (248) 588-6232

Boring No.: 5	Job No.: 51997	Project: Bloomer Park Improvements
Client: White Lake Township c/o Beckett and Raeder, Inc.		Location: White Lake Township, Michigan
Type of Rig: All-Terrain Vehicle		Drilled By: I. Mickle
Drilling Method: Solid Stem Augers		Started: 10/31/2011
Ground Surface Elevation:		Completed: 10/31/2011

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.42	Moist Dark Brown Clayey SAND With Trace Of Gravel (5")	7.4	106	
2.5	LS	9 18 14	3	Compact Moist Brown Clayey SAND With Trace Of Gravel			
5.0	LS	5 8 8/3"	5	Medium Compact Moist Brown Fine SAND With Trace Of Gravel	3.8	105	
7.5	LS	28 50/4"	8	Dense Moist Brown Clayey SAND With Some Gravel & Gravel Seams	6.1	102	
10.0				Boulder At 8' Bottom of Borehole at 8'			
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
 SS - 2" I.D. Split Spoon Sample
 LS - Sectional Liner Sample
 ST - Shelby Tube Sample
 AS - Auger Sample

w - H₂O, % of dry weight
 d - Bulk Density, pcf
 qu - Unconfined Compression, psf
 DP - Direct Push

Water Encountered: None
 At Completion: None
 Boring No. 5



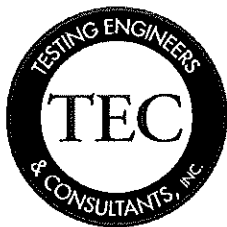
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 Fax (248) 588-6232

Boring No.: 6	Job No.: 51997	Project: Bloomer Park Improvements
Client: White Lake Township c/o Beckett and Raeder, Inc.		Location: White Lake Township, Michigan
Type of Rig: All-Terrain Vehicle		Drilled By: I. Mickle
Drilling Method: Solid Stem Augers		Started: 10/31/2011
Ground Surface Elevation:		Completed: 10/31/2011

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.33				
2.5	LS	6 12 22	1.5	Moist Dark Brown Sandy TOPSOIL (4")	17.2	100	3130
			3	Medium Compact Moist Brown Clayey SAND			
5.0	LS	10 12 14	5	Extremely Stiff Moist Brown Oxidized CLAY With Some Silt & Trace Of Gravel	7.2	106	
7.5	LS	8 8 7		Medium Compact Moist Brown Clayey Medium To Coarse SAND With Trace Of Gravel	11.8	114	
10.0	LS	7 9 11	10	Medium Compact Wet Brown & Gray Clayey SAND & Gravel			
12.5				NOTE: Could not extend boring to 15 feet due to sloping ground surface Bottom of Borehole at 10'			
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance SS - 2" D. Split Spoon Sample LS - Sectional Liner Sample ST - Shelby Tube Sample AS - Auger Sample	w - H ₂ O, % of dry weight d - Bulk Density, pcf qu - Unconfined Compression, psf DP - Direct Push	Water Encountered: 5'0" At Completion: Caved At 5'3" Boring No. 6
---	--	--



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Fax (248) 588-6232

Boring No.: 7	Job No.: 51997	Project: Bloomer Park Improvements
Client: White Lake Township c/o Beckett and Raeder, Inc.		Location: White Lake Township, Michigan
Type of Rig: All-Terrain Vehicle		Drilled By: I. Mickle
Drilling Method: Solid Stem Augers		Started: 10/31/2011
Ground Surface Elevation:		Completed: 10/31/2011

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
2.5	LS	2 2 2	1	Very Moist Dark Gray Clayey SILT	19.2	135	2230
			2	Very Loose Wet Gray Clayey SAND			
5.0	LS	2 3 4	3.5	Plastic Moist Variegated CLAY With Some Silt	24.5	122	660
			5.5	Loose Very Moist Gray Clayey SAND With Trace Of Gravel			
7.5	LS	5 8 12	9	Medium Compact Wet Gray Medium SAND With Some Gravel	10.4	123	
				10.0			
12.5	LS	6 18 25	12	Medium Compact Wet Gray Medium SAND With Some Gravel	10.0	102	
				15.0			
15.0	LS	7 10 14	15	Bottom of Borehole at 15'	6.5	142	
				17.5			
20.0							
22.5							

"N" - Standard Penetration Resistance
 SS - 2" D. Split Spoon Sample
 LS - Sectional Liner Sample
 ST - Shelby Tube Sample
 AS - Auger Sample

w - H₂O, % of dry weight
 d - Bulk Density, pcf
 qu - Unconfined Compression, psf
 DP - Direct Push

Water Encountered: 1' & 5'6"

At Completion: 1'4"

Boring No. 7



Testing Engineers & Consultants, Inc.

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Boring No.: 8	Job No.: 51997	Project: Bloomer Park Improvements
Client: White Lake Township c/o Beckett and Raeder, Inc.		Location: White Lake Township, Michigan
Type of Rig: All-Terrain Vehicle		Drilled By: I. Mickle
Drilling Method: Solid Stem Augers		Started: 11/3/2011
Ground Surface Elevation:		Completed: 11/3/2011

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
2.5	LS	4 7 11	.75	Moist Dark Brown Sandy TOPSOIL (9")	16.7	106	
			1.5	Loose Moist Brown Clayey SAND With Trace Of Gravel			
5.0	LS	9 12 16	5.5	Stiff Moist Brown CLAY With Some Silt & Trace Of Gravel	11.1	104	
				8			
7.5	LS	7 5 5	8	Loose Moist Brown Fine SAND	1.8	131	
				12			
15.0	LS	13 13 15	15	Bottom of Borehole at 15'			

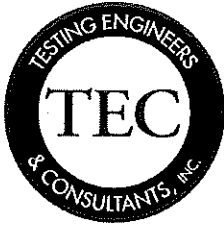
"N" - Standard Penetration Resistance
 SS - 2" J.D. Split Spoon Sample
 LS - Sectional Liner Sample
 ST - Shelby Tube Sample
 AS - Auger Sample

w - H₂O, % of dry weight
 d - Bulk Density, pcf
 qu - Unconfined Compression, psf
 DP - Direct Push

Water Encountered: None

At Completion: None

Boring No. 8



Testing Engineers & Consultants, Inc.

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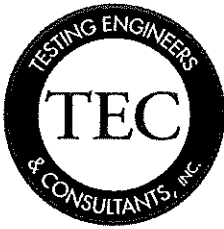
Boring No.: 9	Job No.: 51997	Project: Bloomer Park Improvements
Client: White Lake Township c/o Beckett and Raeder, Inc.		Location: White Lake Township, Michigan
Type of Rig: All-Terrain Vehicle		Drilled By: I. Mickle
Drilling Method: Solid Stem Augers		Started: 11/3/2011
Ground Surface Elevation:		Completed: 11/3/2011

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.42	Moist Dark Brown Sandy TOPSOIL (5")	9.8	107	
2.5	LS	4 7 10	3	Medium Compact Moist Brown Clayey SAND With Trace Of Gravel			
5.0	LS	6 8 11		Stiff Moist Brown CLAY With Some Silt & Trace Of Gravel	19.4	115	
7.5	LS	6 8 12			16.8	120	7830
10.0	LS	9 23 31	9 10	Dense Moist Brown Clayey SILT	18.8	124	
12.5				Bottom of Borehole at 10'			
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
 SS - 2" J.D. Split Spoon Sample
 LS - Sectional Liner Sample
 ST - Shelby Tube Sample
 AS - Auger Sample

w - H₂O, % of dry weight
 d - Bulk Density, pcf
 qu - Unconfined Compression, psf
 DP - Direct Push

Water Encountered: None
At Completion: None
Boring No. 9



Testing Engineers & Consultants, Inc.

1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
 (248) 588-6200 or (313) T-E-S-T-I-N-G
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Boring No.: 10	Job No.: 51997	Project: Bloomer Park Improvements
Client: White Lake Township c/o Beckett and Raeder, Inc.		Location: White Lake Township, Michigan
Type of Rig: All-Terrain Vehicle		Drilled By: I. Mickle
Drilling Method: Solid Stem Augers		Started: 11/3/2011
Ground Surface Elevation:		Completed: 11/3/2011

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.33	Moist Dark Brown Sandy TOPSOIL (4")	13.4	136	
2.5	LS	3 8 14		Medium Compact Moist Brown Clayey SAND With Trace Of Gravel			
5.0	LS	6 10 11			8.2	107	
7.5	LS	7 7 6			9.5	107	
10.0	LS	6 9 12	10	Bottom of Borehole at 10'	5.6	112	
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
 SS - 2" J.D. Split Spoon Sample
 LS - Sectional Liner Sample
 ST - Shelby Tube Sample
 AS - Auger Sample

w - H₂O, % of dry weight
 d - Bulk Density, pcf
 qu - Unconfined Compression, psf
 DP - Direct Push

Water Encountered: None

At Completion: None

Boring No. 10



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Boring No.: 11	Job No.: 51997	Project: Bloomer Park Improvements
Client: White Lake Township c/o Beckett and Raeder, Inc.		Location: White Lake Township, Michigan
Type of Rig: All-Terrain Vehicle		Drilled By: I. Mickle
Drilling Method: Solid Stem Augers		Started: 11/3/2011
Ground Surface Elevation:		Completed: 11/3/2011

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.33				
	LS	2	1.5	Moist Dark Brown Sandy TOPSOIL (4")	15.0	107	
2.5		5					
		12		Loose Moist Brown Clayey SAND			
	LS	5			7.9	107	
5.0		22/6"		Medium Compact Moist Brown Clayey SAND With Trace Of Gravel & Gravel Seams			
	LS	28/6"	5.5		4.3	103	
7.5				Dense Moist Brown SAND & Gravel			
	LS	13	8		3.8	112	
10.0		22		Compact Moist Brown Medium SAND With Trace Of Gravel			
		24	10				
12.5				Bottom of Borehole at 10'			
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
 SS - 2" J.D. Split Spoon Sample
 LS - Sectional Liner Sample
 ST - Shelby Tube Sample
 AS - Auger Sample

w - H₂O, % of dry weight
 d - Bulk Density, pcf
 qu - Unconfined Compression, psf
 DP - Direct Push

Water Encountered: None

At Completion: None

Boring No. 11



Testing Engineers & Consultants, Inc.

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(248) 588-6200 or (313) T-E-S-T-I-N-G

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Boring No.: 12	Job No.: 51997	Project: Bloomer Park Improvements
Client: White Lake Township c/o Beckett and Raeder, Inc.		Location: White Lake Township, Michigan
Type of Rig: All-Terrain Vehicle		Drilled By: I. Mickle
Drilling Method: Solid Stem Augers		Started: 11/3/2011
Ground Surface Elevation:		Completed: 11/3/2011

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.42	Moist Dark Brown Sandy TOPSOIL (5")	15.6	136	
2.5	LS	3 5 5		Loose Moist Brown Clayey SAND With Trace Of Gravel			
5.0	LS	3 3 3			13.2	102	
7.5	LS	5 7 10	6	Medium Compact Wet Brown Medium SAND With Trace Of Gravel	10.0	133	
10.0	LS	8 10 10	10	Bottom of Borehole at 10'	17.2	103	
12.5							
15.0							
17.5							
20.0							
22.5							

*N - Standard Penetration Resistance
 SS - 2" J.D. Split Spoon Sample
 LS - Sectional Liner Sample
 ST - Shelby Tube Sample
 AS - Auger Sample

w - H₂O, % of dry weight
 d - Bulk Density, pcf
 qu - Unconfined Compression, psf
 DP - Direct Push

Water Encountered: 6'0"

At Completion: 6'1"

Boring No. 12



Testing Engineers & Consultants, Inc.

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 (248) 588-6200 or (313) T-E-S-T-I-N-G
 Fax (248) 588-6232

Date: November 14, 2011

TEC Job No. 51997

Project: Bloomer Park Improvements

Client: White Lake Township

Submitted By: I. Mickle

Source: Boring No. 2 At 7'6"

Tested By: J. Trenum

Use:

Remarks:

Date Sampled: October 31, 2011

MECHANICAL ANALYSIS FORM

SIEVE SIZE	RETAINED WEIGHT	FRACTIONAL PERCENT	PERCENTS RETAINED	CUMULATIVE PASSING	SPEC.
3"					INITIAL WT. 203.6
2 1/2"					WT. AFT/WASH 181.9
1 1/2"					LBW GMS. 21.7
1"					LBW % 10.7
3/4"					CRUSHED %
1/2"					REQ'D CRSH. %
3/8"	0	0	0	100	CLAY IRONSTONE %
#4	0.3	0.1	0.1	99.9	SOFT PARTICLES %
#10	0.6	0.3	0.4	99.6	CHERT %
#20	3.5	1.7	2.1	97.9	SOFT & CHERT %
#30	9.1	4.5	6.6	93.4	FN. MODULUS
#40	15.5	7.6	14.2	95.8	MATERIAL DESCRIPTION
#100	119.7	59.0	73.2	26.8	Brown Fine Sand With
PAN	32.8	16.1	89.3		Silt Layers
LBW	21.7	10.7		10.7	
TOTAL	203.6	100			



Testing Engineers & Consultants, Inc.

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 Fax (248) 588-6232

Date: November 14, 2011

TEC Job No. 51997

Project: Bloomer Park Improvements

Client: White Lake Township

Submitted By: I. Mickle

Source: Boring No. 3 At 2'6"

Tested By: J. Trenum

Use:

Remarks:

Date Sampled: October 31, 2011

MECHANICAL ANALYSIS FORM

SIEVE SIZE	RETAINED WEIGHT	FRACTIONAL PERCENT	PERCENTS RETAINED	CUMULATIVE PASSING	SPEC.
3"					INITIAL WT. 237.9
2 1/2"					WT. AFT/WASH 166.6
1 1/2"					LBW GMS. 71.3
1"					LBW % 30.0
3/4"					CRUSHED %
1/2"					REQ'D CRSH. %
3/8"	0	0	0	100	CLAY IRONSTONE %
#4	0.5	0.2	0.2	99.8	SOFT PARTICLES %
#10	1.1	0.5	0.7	99.3	CHERT %
#20	3.7	1.6	2.3	97.7	SOFT & CHERT %
#30	5.9	2.5	4.8	95.2	FN. MODULUS
#40	10.3	4.3	9.1	90.9	MATERIAL DESCRIPTION
#100	82.6	34.6	43.7	56.3	Brown Fine Sand With
PAN	62.5	26.3	70.0		Clayey Seams
LBW	71.3	30.0		30.0	
TOTAL	237.9	100			

Testing Engineers & Consultants, Inc.

White Lake Township
c/o Mr. Brian Barrick, LLA, Senior Landscape Architect
Beckett & Raeder, Inc.
November 16, 2011

TEC Report: 51997

SOIL DESCRIPTIONS

In order to provide uniformity throughout our projects, the following nomenclature has been adopted to described soil characteristics:

CONSISTENCY AND RELATIVE DENSITY

COHESIVE SOILS		GRANULAR SOILS	
<u>"N"</u>	<u>CONSISTENCY</u>	<u>"N"</u>	<u>RELATIVE DENSITY</u>
<u>VALUES</u>		<u>VALUES</u>	
0 – 2	Very Soft	0 – 4	Very Loose
2 – 4	Soft	4 – 10	Loose
4 – 8	Plastic	10 – 30	Med. Compact
8 – 15	Firm	30 – 50	Compact
15 – 30	Stiff	50+	Dense
30 – 60	Ex. Stiff		
60+	Hard		

Material Types By Particle Size

BOULDERS
COBBLES
GRAVEL
COARSE SAND
MEDIUM SAND

ASTM D2487

Stones Over 12" In Diameter
Stones 3" To 12" In Diameter
#4 To 3" Diameter
#10 To #4 Sieves
#40 To #10 Sieves

Testing Engineers & Consultants, Inc.

White Lake Township
c/o Mr. Brian Barrick, LLA, Senior Landscape Architect
Beckett & Raeder, Inc.
November 16, 2011

TEC Report: 51997

SOIL DESCRIPTIONS (Cont'd)

Material Types By Particle Size

ASTM D2487

FINE SAND

#200 To #40 Sieves

SILT

Minus #200 Sieve Material,
Fairly Non-Plastic, Falls Below
"A"-Line

CLAY

Minus #200 Sieve Material Plastic
Material That Has A Tendency To
Stick Together, Can Be Rolled
Into Fine Rods When Moistened;
Falls Above "A"-Line

PEAT

Black Organic Material
Containing Partially Decayed
Vegetable Matter

MARL

Fresh Water Deposits Of Calcium
Carbonate, Often Containing
Percentages Of Peat, Clay
& Fine Sand

SWAMP BOTTOM DEPOSITS

Mixtures Of Peat, Marl,
Vegetation & Fine Sand
Containing Large Amounts Of
Decayable Organic Material



Notice of Authorization

Permit Number 12-63-0076-P

Issued: 6/20/2012

Expiration Date: 6/20/2017

The Michigan Department of Environmental Quality, Water Resources Division, P.O. Box 30458, Lansing, Michigan 48909-7958, under provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, and specifically:

- Part 31, Floodplain Regulatory Authority of the Water Resources Protection.
- Part 301, Inland Lakes and Streams.
- Part 303, Wetlands Protection.
- Part 315, Dam Safety.
- Part 323, Shorelands Protection and Management.
- Part 325, Great Lakes Submerged Lands.
- Part 353, Sand Dunes Protection and Management.

Authorized activity:

Install a dock/observation platform on Grass Lake and wetland with a 20 foot by 20 foot platform and as shown on the attached, DEQ approved plans.

All work shall be in accordance with DEQ approved plans and the conditions of this permit.

To be conducted at property located in: Oakland County, Waterbody: Grass Lake Section 8 , Town 3N, Range 8E, White Lake Township.

Permittee: White Lake Township
Attn: Jason Iacoangeli
7525 Highland Road
White Lake, MI 48383

Melanie Foose
Water Resources Division
586-753-3700

*This notice must be displayed at the site of work.
Laminating this notice or utilizing sheet protectors is recommended.*

Please refer to the above Permit Number with any questions or concerns.



**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER RESOURCES DIVISION
PERMIT**

ISSUED TO:

White Lake Township
Attn: Jason Iacoangeli
7525 Highland Road
White Lake, MI 48383

Permit No.	12-63-0076-P
Issued	June 20, 2012
Extended	
Revised	
Expires	June 20, 2017

This permit is being issued by the Michigan Department of Environmental Quality (MDEQ) under the provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), and specifically:

- | | |
|--|---|
| <input checked="" type="checkbox"/> Part 301, Inland Lakes and Streams | <input type="checkbox"/> Part 315, Dam Safety |
| <input type="checkbox"/> Part 325, Great Lakes Submerged Lands | <input type="checkbox"/> Part 323, Shorelands Protection and Management |
| <input checked="" type="checkbox"/> Part 303, Wetlands Protection | <input type="checkbox"/> Part 353, Sand Dunes Protection and Management |
| <input checked="" type="checkbox"/> Part 31, Floodplain/Water Resources Protection | |

Permission is hereby granted, based on permittee assurance of adherence to State of Michigan requirements and permit conditions, to:

Permitted Activity:

Install a dock/observation platform on Grass Lake and wetland with a 20 foot by 20 foot platform and as shown on the attached, DEQ approved plans.

All work shall be in accordance with DEQ approved plans and the conditions of this permit.

Water Course Affected: Grass Lake

Property Location: Oakland County, White Lake Township, Section 8

Subdivision, Lot Town/Range 3N, 8E Property Tax No. 12-08-300-007

Authority granted by this permit is subject to the following limitations:

- A. Initiation of any work on the permitted project confirms the permittee's acceptance and agreement to comply with all terms and conditions of this permit.
- B. The permittee, in exercising the authority granted by this permit, shall not cause unlawful pollution as defined by Part 31, Water Resources Protection, of the NREPA.
- C. This permit shall be kept at the site of the work and available for inspection at all times during the duration of the project or until its date of expiration.
- D. All work shall be completed in accordance with the plans and specifications submitted with the application and/or plans and specifications attached to this permit.
- E. No attempt shall be made by the permittee to forbid the full and free use by the public of public waters at or adjacent to the structure or work approved.
- F. It is made a requirement of this permit that the permittee give notice to public utilities in accordance with Act 53 of the Public Act of 1974 and comply with each of the requirements of that Act.
- G. This permit does not convey property rights in either real estate or material, nor does it authorize any injury to private property or invasion of public or private rights, nor does it waive the necessity of seeking federal assent, all local permits, or complying with other state statutes.
- H. This permit does not prejudice or limit the right of a riparian owner or other person to institute proceedings in any circuit court of this state when necessary to protect his rights.
- I. Permittee shall notify the MDEQ within one week after the completion of the activity authorized by this permit, by completing and forwarding the attached preaddressed postcard to the office addressed thereon.
- J. This permit shall not be assigned or transferred without the written approval of the MDEQ.

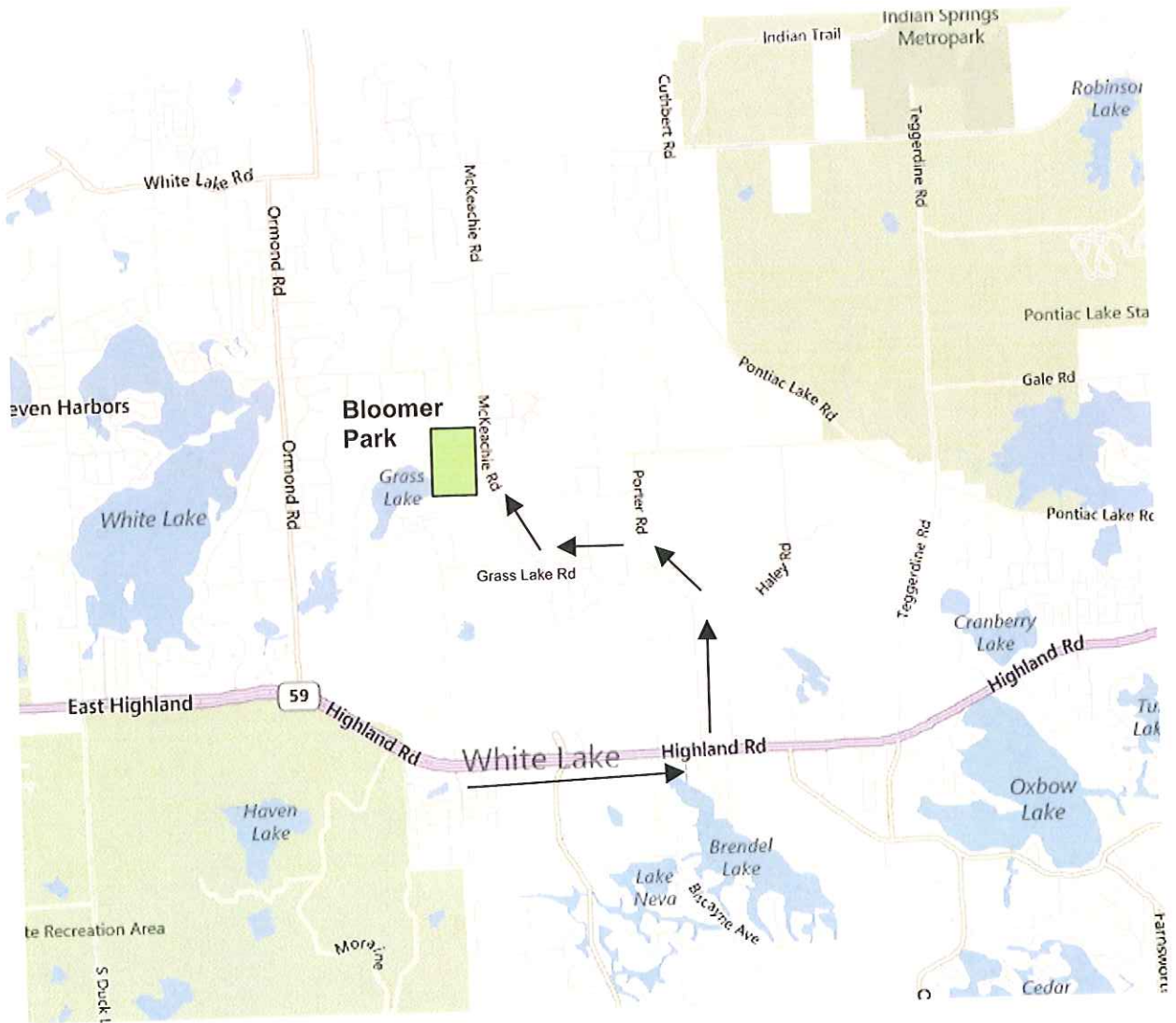
- K. Failure to comply with conditions of this permit may subject the permittee to revocation of permit and criminal and/or civil action as cited by the specific state act, federal act, and/or rule under which this permit is granted.
- L. All dredged or excavated materials shall be disposed of in an upland site (outside of floodplains, unless exempt under Part 31, and wetland).
- M. In issuing this permit, the MDEQ has relied on the information and data that the permittee has provided in connection with the submitted application for permit. If, subsequent to the issuance of a permit, such information and data prove to be false, incomplete, or inaccurate, the MDEQ may modify, revoke, or suspend the permit, in whole or in part, in accordance with the new information.
- N. The permittee shall indemnify and hold harmless the State of Michigan and its departments, agencies, officials, employees, agents and representatives for any and all claims or causes of action arising from acts or omissions of the permittee or employees, agents, or representatives of the permittee undertaken in connection with this permit. This permit shall not be construed as an indemnity by the State of Michigan for the benefit of the permittee or any other person.
- O. Noncompliance with these terms and conditions and/or the initiation of other regulated activities not specifically authorized shall be cause for the modification, suspension, or revocation of this permit, in whole or in part. Further, the MDEQ may initiate criminal and/or civil proceedings as may be deemed necessary to correct project deficiencies, protect natural resource values, and secure compliance with statutes.
- P. If any change or deviation from the permitted activity becomes necessary, the permittee shall request, in writing, a revision of the permitted activity from the MDEQ. Such revision request shall include complete documentation supporting the modification and revised plans detailing the proposed modification. Proposed modifications must be approved, in writing, by the MDEQ prior to being implemented.
- Q. This permit may be transferred to another person upon written approval of the MDEQ. The permittee must submit a written request to the MDEQ to transfer the permit to the new owner. The new owner must also submit a written request to the MDEQ to accept transfer. The new owner must agree, in writing, to accept all conditions of the permit. A single letter signed by both parties which includes all the above information may be provided to the MDEQ. The MDEQ will review the request and if approved, will provide written notification to the new owner.
- R. Prior to initiating permitted construction, the permittee is required to provide a copy of the permit to the contractor(s) for review. The property owner, contractor(s), and any agent involved in exercising the permit are held responsible to ensure that the project is constructed in accordance with all drawings and specifications. The contractor is required to provide a copy of the permit to all subcontractors doing work authorized by the permit.
- S. Construction must be undertaken and completed during the dry period of the wetland. If the area does not dry out, construction shall be done on equipment mats to prevent compaction of the soil.
- T. Authority granted by this permit does not waive permit requirements under Part 91, Soil Erosion and Sedimentation Control, of the NREPA, or the need to acquire applicable permits from the County Enforcing Agent.
- U. Authority granted by this permit does not waive permit requirements under the authority of Part 305, Natural Rivers, of the NREPA. A Natural Rivers Zoning Permit may be required for construction, land alteration, streambank stabilization, or vegetation removal along or near a natural river.
- V. The permittee is cautioned that grade changes resulting in increased runoff onto adjacent property is subject to civil damage litigation.
- W. Unless specifically stated in this permit, construction pads, haul roads, temporary structures, or other structural appurtenances to be placed in a wetland or on bottomland of the waterbody are not authorized and shall not be constructed unless authorized by a separate permit or permit revision granted in accordance with the applicable law.
- X. For projects with potential impacts to fish spawning or migration, no work shall occur within fish spawning or migration timelines (i.e., windows) unless otherwise approved in writing by the MDNR, Fisheries Division.
- Y. Work to be done under authority of this permit is further subject to the following special instructions and specifications:
1. No equipment shall enter the wetland or Grass Lake. Installation of the dock/observation platform shall be done from the upland shoreline or from the dock/observation platform using the cantilever method of installation.
 2. No fill, excess soil, or other material shall be placed in any wetland or surface water area not specifically authorized by this permit, its plans, and specifications.
 3. Excess soil materials from the project shall not be deposited in wetlands or surface water without first securing a permit under Part 303, Wetlands Protection, of the NREPA or other applicable statute. Prior to the initiation of any permitted construction activity, a silt fence shall be installed along the edge route of the disturbed wetland area and maintained in good working order until permanent stabilization and re-vegetation of all disturbed areas has occurred. The silt fence shall be removed after re-vegetation. All excess soil material shall be placed on an upland location and then seeded and mulched to prevent erosion into waters, floodplain, or wetlands.

4. Prior to the start of construction, all non-work wetland areas shall be bounded by properly trenched filter fabric fence and orange construction fencing to prevent sediment from entering the wetland and to prohibit construction personnel from entering or performing work in these areas. Fence shall be maintained daily throughout the construction process. Upon project completion, the accumulated materials shall be removed and disposed of at an upland site. The erosion barrier shall then be removed in its entirety and the area restored to its original configuration and cover.

By: Melanie D. Foose
Melanie Foose
Water Resources Division
586-753-3700

cc: White Lake Township Clerk
Oakland County Drain Commissioner
Oakland CEA

Site Location Map
Bloomer Park Improvements
USACE/MDEQ Joint Permit Application



DEQ-WRD-WRU
FILE# 12-63-0076-P
APPROVED PLANS
1 OF 4
SEMI DIST.

RECEIVED

APR 13 2012

DNRE/WRD
PERMIT CONSOLIDATION UNIT

B R O
Becker&Raeder
 Landscape Architecture
 Planning & Engineering
 301 E. 10th St.
 Grand Rapids, MI 49503
 616.782.2424
 Fax: 616.782.2425

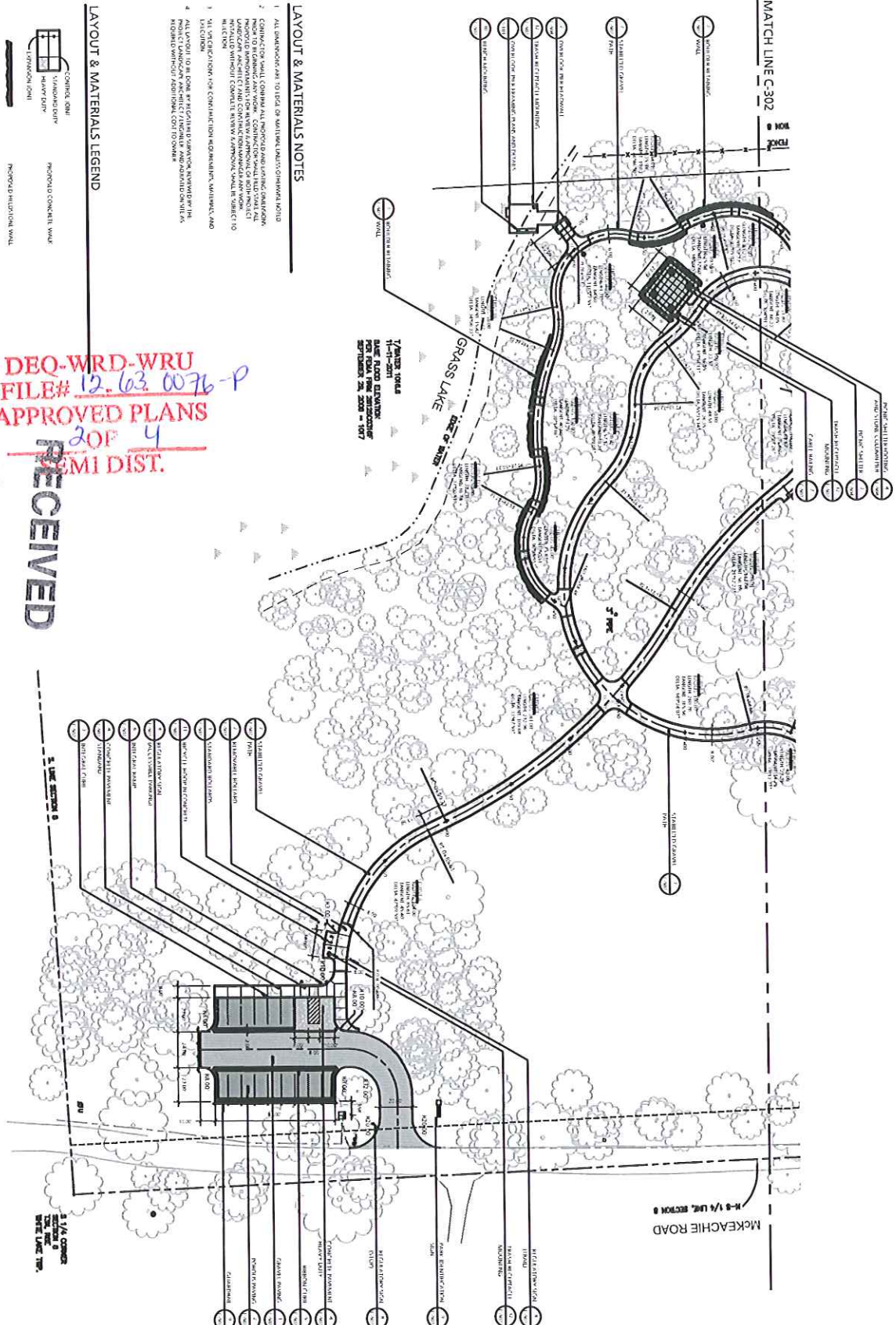
sdi structures
 2718 E. Gateway | Grand Rapids, MI 49508
 616.782.5000
 Fax: 616.782.5001

Arbor Land Consultants, Inc.
 2010 Lakeside Blvd.
 Grand Rapids, MI 49503
 Tel: 616.455.9000

White Lake Township
 Bloomer Park Improvements
 White Lake Township, Michigan

Project Title
 Layout & Materials Plan - Area A

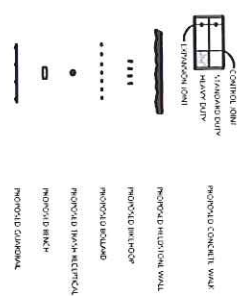
Date:	11/14/2011
By:	John M. Brown
Checked By:	John M. Brown
Scale:	1" = 30' 0"
Quality Control:	
Project Number:	201133-06
Sheet Number:	C-301



LAYOUT & MATERIALS NOTES

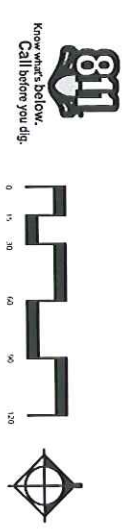
1. ALL DIMENSIONS ARE TO FACE, UNLESS OTHERWISE NOTED.
2. CONTRACTOR SHALL VERIFY ALL PROPOSED AND EXISTING CONDITIONS BEFORE BEGINNING ANY WORK. CONTRACTOR SHALL NOTIFY ALL APPLICABLE AGENCIES OF ANY CHANGES TO THE PLAN AND OBTAIN ALL NECESSARY PERMITS BEFORE COMMENCING WORK.
3. ALL DIMENSIONS FOR CONCRETE SHALL BE INDICATED IN MILLIMETERS, METERS, AND FRACTIONS.
4. ALL MATERIALS TO BE USED IN THIS PROJECT SHALL BE APPROVED BY THE PROJECT ENGINEER AND APPROVED ON THE PLAN.

LAYOUT & MATERIALS LEGEND



DEQ-WRD-WRU
 FILE# 12-63-0076-P
 APPROVED PLANS
 2 OF 4
 SEMI DIST.

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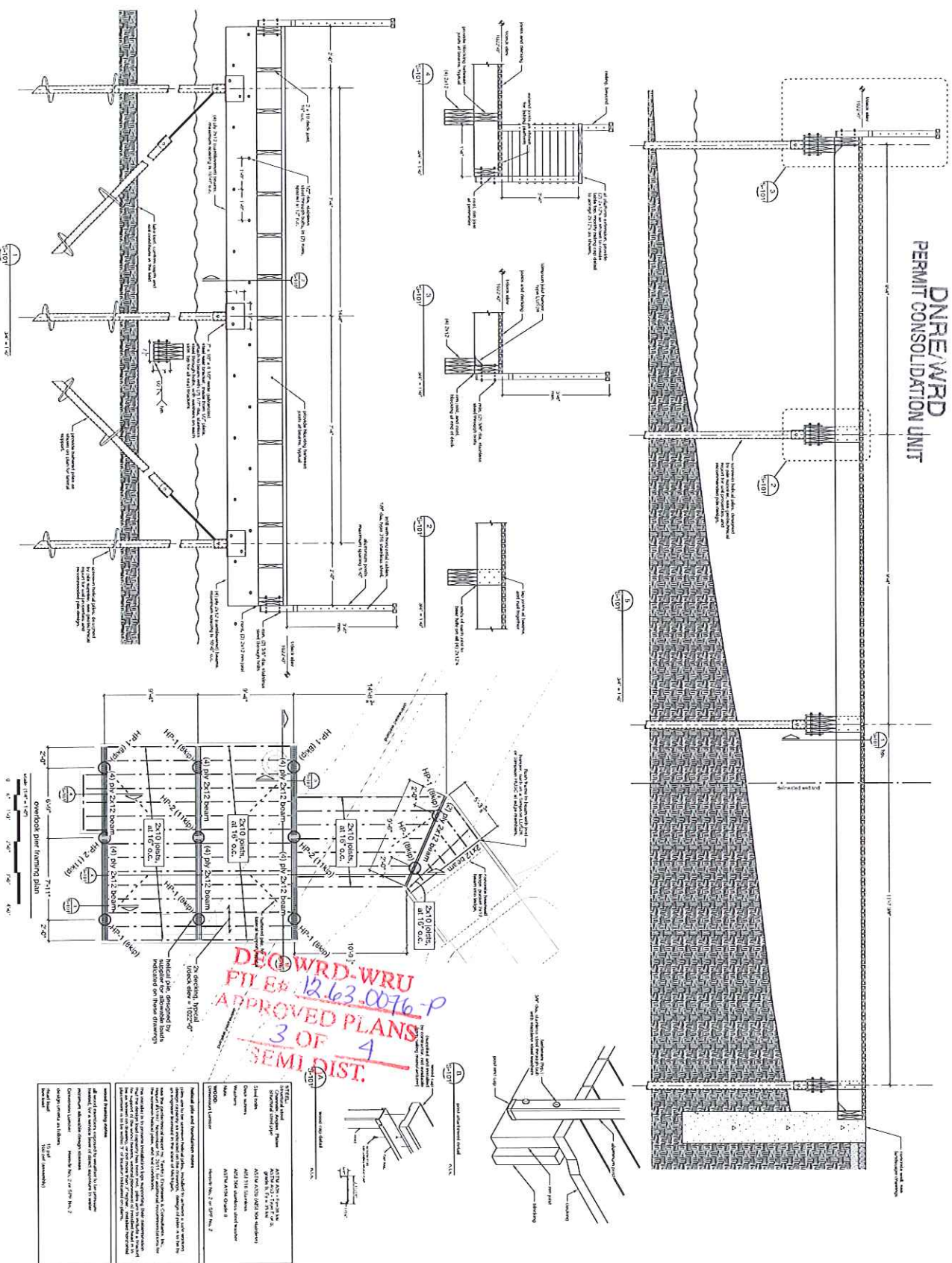


Know what's below.
 Call before you dig.
811

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BeckettRader
Professional Engineer
No. 10000
20111306

sd structures
275 E. Liberty | Lees Ferry, AZ 86004
480.241.1700
www.sdstructures.com

White Lake Township
Bloomer Park Improvements

Overlook Pier Framing Plans
and Details

DATE	DESCRIPTION
12/15/11	Initial Design
1/10/12	Revised Design
2/10/12	Final Design
3/10/12	Permitting
4/10/12	Construction

Project Information:
Project Name: Bloomer Park Improvements
Project Location: White Lake Township, Arizona
Project Number: 20111306
Design Revised As Shown

S-101

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01000
OVERVIEW

Sections of Division 1 - General Requirements, are specifications written to cover the administrative requirements and Work-related requirements of the Contract. The basic titles and section numbers are as follows:

<u>SECTION NO.</u>	<u>TITLE</u>
01010	Summary of Work
01040	Coordination
01050	Field Engineering and Surveying
01060	Regulatory Requirements
01070	Abbreviations and Symbols
01100	Special Project Procedures
01200	Project Meetings
01300	Submittals
01400	Quality Control
01500	Construction Facilities and Temporary Controls
01600	Material and Equipment
01700	Contract Close Out

SECTION 01010
SUMMARY OF WORK

Section 01011
Work Covered by Contract Documents

General information covering the "Scope of Work" is defined as follows:

The Work includes, but is not limited to, site preparation, soil erosion/sedimentation control, miscellaneous demolition, clearing and grubbing, earthwork, drainage system installation, concrete sidewalk, stabilized gravel paths, gravel parking driveway, permeable paver parking spaces, regulatory and interpretive signage, site furnishings, park shelter, timber overlook and boardwalk, timber bollards and guardrail, and native landscaping.

Section 01012
Work By Others

Salvage: The Owner reserves the right to salvage certain items and equipment. Such items will be identified to the bidder at the time of his inspection of the proposed Work. Salvaged items will be removed by Owner prior to commencement of Work under the Contract unless specifically noted on the drawings.

SECTION 01040

COORDINATION

Section 01043
Cooperation By Contractor

Prior to beginning Work the Contractor shall meet with the Owner and Landscape Architect/Engineer to arrange the schedule for the project. Once the project is started, it shall be carried to completion without delay.

Phasing of Work shall be clearly established and verified with the Landscape Architect/Engineer prior to commencing Work in any area. No cutting or removal Work shall begin until authorized by Landscape Architect/Engineer.

Any utility service interruptions or outages required by the Contractor in performing the Work shall be prearranged with the staff of the Owner, or affected party and shall occur only during those scheduled times.

Section 01045
Cutting and Patching

The Contractor shall do all cutting, fitting or patching of the Work that may be required to make its several parts fit together properly or make new Work join with the existing conditions. The Contractor shall take proper precautions so as not to endanger any Work by cutting or digging. The Contractor shall not cut or alter existing structural members or foundations, except where called for on the Drawings or in the specifications or where later approved by the Landscape Architect/Engineer.

All adjacent finished surfaces that are damaged by the Work shall be patched with materials matching existing surfaces. Joints between patched and existing material shall be straight, smooth and flush. All patching material shall be applied by workers skilled in its installation.

SECTION 01050
FIELD ENGINEERING AND SURVEYING

The Contractor shall employ a licensed surveyor who shall establish property boundaries and maintain all lines and levels for layout and constructing the work. The Contractor agrees to assume all responsibility due to inaccuracy of any work of said surveyor and including incorrect bench works, their loss or disturbance. Upon completion of the project, the Contractor shall submit two copies of the site layout drawings prepared for the project and certified by the surveyor.

SECTION 01060
REGULATORY REQUIREMENTS

Section 01061
Applicable Codes

The Contractor shall comply with all State rules, ordinances and regulations relating to buildings, environment, employment, the preservation of public health and safety, and so forth. All necessary permits or certificates of inspection shall be paid for and obtained by the Contractor.

Flammable Liquid Storage: The Materials and installation shall meet all local requirements and be in strict conformance with current Michigan State Police, Fire Marshal Division, Flammable Liquid Regulations.

SECTION 01070
ABBREVIATIONS AND SYMBOLS

Section 01071
Abbreviations

"MDOT" - The Michigan Department of Transportation
"ASTM" - The American Society of Testing Materials
"AWWA" - The American Water Works Association
"ANSI, ASA" - The American National Standards Institute (Formerly: The American Standards Association and United States of American Standards Institute)
"AISI" - The American Iron and Steel Institute
"ASME" - The American Society of Mechanical Engineers
"ACI" - American Concrete Institute
"SSPC" - Steel Structures Painting Council
"IEEE" - The Institute of Electrical and Electronic Engineers
"NEC" - The National Electric Code
"NEMA" - The National Electric Manufacturer's Association
"IPCEA" - The Insulated Power Cable Engineers Association
"AASHTO" - American Association of State Highway and Transportation Officials
"ASCE" - American Society of Civil Engineers
"AWS" - American Welding Society
"CRSI" - Concrete Reinforcing Steel Institute
"Fed Sec" - Federal Specification
"NPC" - National Plumbing Code
"OSHA" - Occupational Safety and Health Act
"UL" - Underwriter Laboratories

SECTION 01100
SPECIAL PROJECT PROCEDURES

Section 01101
Demolition Procedures

Furnish all equipment, materials, labor and services necessary to complete all demolition required in connection with the existing conditions, in order to permit the installation of new Work called for on the Drawings.

Preparation: Protect all existing Work, which is to remain and restore in an approved manner any such Work, which becomes damaged.

Rubbish and debris resulting from the Work shall be removed immediately from the site by the Contractor.

Coordination: Demolition work, in connection with any new unit of Work, shall not be commenced until all new materials required for completion of that new item of work are at hand.

Permits: Contractor shall be responsible to obtain all necessary demolition permits from any and all applicable state and local agencies prior to demolition.

SECTION 01200
PROJECT MEETINGS

Section 01201
Preconstruction Conferences

The Landscape Architect/Engineer may schedule a preconstruction conference to be attended by the Owner and the Contractors. When no organizational meeting is called, the Contractor, prior to beginning any Work, shall meet with the Landscape Architect/Engineer and arrange a Work schedule for the project. Once the project has been started, the Contractor shall carry it to completion without delay.

Section 01202
Progress Meetings

The Landscape Architect/Engineer will schedule meetings to be held on the job site whenever needed to supply information necessary to prevent job interruptions, to observe the Work or view completed Work. The Contractor shall be represented at each progress meeting by persons with full authority to act for the Contractor in regard to all portions of the Work.

SECTION 01300
SUBMITTALS

SECTION 01310
Construction Schedules

Within five days of Notice of Award of Contract and prior to start of any work, the Contractor shall submit to the Landscape Architect/Engineer, a progress schedule showing the work sequence for all trades involved in the project and all major work items.

Section 01340
Shop Drawings and Product Data

Within 10 days of Notice of Award of Contract and prior to the delivery of any material or equipment to the job site, the Contractor shall submit to the Landscape Architect/Engineer, a complete list of material suppliers, subcontractors, and brand names of all materials proposed to be used in the project. The Contractor shall check and verify all field measurements. Thereafter the Contractor shall submit to the Landscape Architect/Engineer, with such promptness as to cause no delay in the Work, a minimum of five copies of Shop Drawings, product data catalogs, material schedules, etc. Following examination by the Landscape Architect/Engineer, two copies will be retained for Owner's use and remaining copies will be returned to the Contractor with indication of approval or with notations for correction.

Submit the following information printed on each and every sheet of Shop Drawings and on the cover page of each and every specification, catalog or pamphlet.

- Name and location of the project.
- Drawing Number.
- Date of Drawing.
- Contractor's Signature or approval stamp indicating that the information is accurate and complete and conforms to the intent of the drawings and specifications.
- A 3" x 4" space for Landscape Architect/Engineer approval stamp.

Section 01341
Samples

The Contractor shall deliver all samples of material or equipment to the job site or as directed by the Landscape Architect/Engineer for examination. Samples will be examined for conformance with the design concept of the project and for compliance with the information given in the Contract Documents. The Contractor shall furnish all Work in accordance with approved samples.

Section 01370
Schedule of Values

Before submission of first application for payment, the Contractor shall submit a Schedule of Values, approved by the Landscape Architect/Engineer, of the various tasks that must be performed to complete all the Work. The schedule shall show each task and the corresponding value of the task, including separate monies allocated for General Condition items and project close out. The aggregate total value for all tasks shall be equal to the total contract sum.

SECTION 01400
QUALITY CONTROL

All testing required by state law shall be done at the expense of the Contractor.

The Owner will employ an Independent Testing Laboratory, which will perform all compaction and materials testing required, except as otherwise called for in the Specifications. For materials covered by ASTM, AWWA, MDOT, or Federal Specifications, unless otherwise stipulated, the required material tests are to be made by the product manufacturer, at no additional expense to the Owner, and the certificate thereof submitted to the Owner.

All compaction and material tests, aside from required agency specification tests listed above, shall be coordinated by the Contractor and made at the expense of the Owner. If the Contractor fails to coordinate compaction and material tests, Contractor shall be liable to remove installed materials at Contractor's expense and shall reimburse the Owner for compaction and material testing prior to installation of materials. Owner shall be reimbursed for cancelled testing operations that result in hourly charges to the Owner when no testing is performed. If a compaction and material test fails at a specific location, the Owner will pay for a subsequent test. If the subsequent test fails, the Contractor shall reimburse the Owner for each test thereafter.

SECTION 01500
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

The Contractor shall furnish and install all temporary facilities and controls required by the Work, shall adjust or relocate controls as necessary for the duration of the project in order to facilitate construction and shall remove them from Owner's property upon completion of the Work, and shall restore the grounds and existing facilities to their original condition.

Section 01511
Water and Electricity

Water and electricity is not available in the area where Work will be performed, and will not be provided by the Owner. The Contractor shall arrange for temporary provision of these items as needed for construction operations and will pay any charges for use. The Contractor shall pay costs for installation and removal of any temporary connections including necessary safety devices and controls. Use of services shall not disrupt or interfere with operations of the Owner.

Toilet facilities are not available on site. Contractor shall provide a port-a-john on the project site in a location approved by the Landscape Architect/Engineer.

Section 01520
Construction Aids

The Contractor shall furnish, install and maintain as long as necessary and remove when no longer required, safe and adequate scaffolding, ladders, staging, platforms, chutes, railings, hoisting equipment, etc., as required for proper execution of the Work. All construction aids shall conform to federal, state and local codes or laws for protection of workmen and the public.

Pumping and Drainage: The Contractor shall provide all pumping necessary to keep excavations and trenches free from water, including ground and river water as anticipated based on the information in the soil borings and on the survey, throughout the entire period of work on the contract. The Contractor shall construct and maintain any necessary surface drainage systems on the Work site so as to prevent water entering existing structures or to flow onto public or private property adjacent to the Owner's land except for existing drainage courses or into existing drainage systems. The Contractor shall prevent erosion of soils and blockage of any existing drainage system.

Section 01530
Barriers

Barriers, Signs and Lights: The Contractor shall furnish, install and maintain as long as necessary and remove when no longer required adequate barriers, warning signs or lights at all dangerous points throughout the Work for protection of property, workers and the public. The Contractor shall hold the Owner and Landscape Architect/Engineer harmless from damage or claims arising out of any injury or damage that may be sustained by any person or persons as a result of the Work under the Contract.

Street Barricades: The Contractor shall erect and maintain all street barricades, signal lights and lane change markers during the periods that a traffic lane is closed for his operations, adhering to all requirements of the Michigan Manual of Uniform Traffic Control Devices and the jurisdictional agency of the road right-of-way. There shall be full compliance with rules and ordinances respecting such street barricading and devices shall be removed when hazard is no longer present.

Section 01590
Field Offices and Sheds

Field Office: The Contractor may provide a field office and storage building at the site in a location approved by the Landscape Architect/Engineer and Owner. The Contractor shall provide such other temporary buildings as he may require for the use of workers and safe storage for tools and materials.

SECTION 01600
MATERIAL AND EQUIPMENT

Section 01620
Storage and Protection

All materials and equipment delivered to and used in the Work shall be suitably stored and protected from the elements. The areas used for storage shall only be those approved by the Landscape Architect/Engineer. The Owner and Landscape Architect/Engineer assume no responsibility for stored material. The ownership and title to materials will not be vested in the Owner before materials are incorporated in the Work, payment will not be made by the Owner for stored materials and equipment. After delivery, before and after installation, the Contractor shall protect materials and equipment against theft, injury or damage from all causes.

Bulk materials subject to deterioration because of dampness, the weather or contamination shall be covered and protected while in storage. Materials in containers shall be kept in original sealed containers, unopened, with labels plainly indicating manufacturer's name, brand, type and grade of material. Containers which are broken, opened, watermarked and/or contain caked, lumpy or otherwise damaged materials are unacceptable and shall be immediately removed from the Work site.

Equipment stored outdoors shall be kept from contact with the ground, away from areas subject to flooding and covered with weatherproof plastic sheeting or tarpaulins.

SECTION 01700
CONTRACT CLOSEOUT

Section 01705
Substantial Completion

The Contractor shall notify the Landscape Architect/Engineer when the Work will be substantially complete and ready for inspection and preparation of a list of minor replacement, correction and adjustment items. The Contractor shall be represented on the job site at the time this inspection is made and thereafter shall complete all Work by the date set for final acceptance by the Landscape Architect/Engineer.

Section 01710
Cleaning

Regular Cleaning: All scrap or removed material, debris or rubbish shall be regularly removed from the building at the end of each working day and more frequently whenever the Inspector deems such material to be a hazard to the building or its occupants. No discarded material shall be deposited on the grounds of the Owner without the expressed permission of the Owner. No salvage or surplus material may be sold on the premises of the Owner.

Final Cleaning: Just prior to final acceptance by the Owner, the Contractor shall clean all of the Work and existing surfaces, building elements and contents that were soiled by his operations and make repairs for any damage or blemish that was caused by the Work.

Section 01720
Project Record Documents

The Contractor shall furnish to the Landscape Architect/Engineer with his request for final payment, reproducible and digital Drawings of plans, and any sections or details necessary, clearly showing the actual path and location of material and equipment installed in this project. Plans shall be drawn at the same scale as the Drawings. Digital files to be in AutoCad (version to be compatible with A & E.)

Section 01740
Guarantees and Bonds

The Contractor shall obtain and forward to the Office of the Landscape Architect/Engineer statements concerning Guarantee and Indebtedness, and any other special guarantees or requirements of the Contract Documents. All required material shall accompany Contractor's request for final payment.

Contractor shall include all operation and maintenance data required by the Contract Documents.

- END OF DIVISION 1 -

SECTION 02050
DEMOLITION

- 1. GENERAL
 - 1.01 Work Included
 - .01 Demolition of remnant playground equipment.
 - .02 Demolition of existing metal guardrail.
 - .03 Fill voids caused by demolition and removals.
 - .04 Removal and disposal of demolished material.
 - 1.02 Submittals
 - .01 Submit demolition and removal procedures and schedule.
 - .02 Submit record documents.
 - 1.03 Existing Conditions
 - .01 Conduct demolition to minimize interference with adjacent structures or features.
 - .02 Provide, erect, and maintain temporary barriers and security devices.
 - .03 Conduct operations with minimum interference to public and private thoroughfares. Maintain egress and access at all times.
 - .04 Do not close or obstruct roadways without permits.
 - 1.04 Protection
 - .01 Protect trees, rock outcropping and other features remaining as portion of final landscaping.
 - .02 Protect bench marks, existing structures, fences, and roads.
 - .03 Protect above or below grade utilities which are to remain.
 - 1.05 Environmental Requirements
 - .01 Burning on site will not be permitted.
 - .02 Use of explosives will not be permitted.
 - .03 Keep work area dampened to minimize dust. Provide hoses and watermain or hydrant connection for this purpose. The site shall be kept clean of all loose paper, rubbish and debris.
 - .04 All site debris removed from site shall be disposed of at a licensed landfill in strict accordance with any rules, regulations, or ordinances of the Township, City and the State of Michigan.

- 1.06 Ownership of Items to be Removed
 - .01 All materials to be removed shall become property of Contractor at the time of demolition or severing from the real estate.

- 1.07 Tests
 - .01 The Owner will employ a qualified testing laboratory to furnish all of the soil engineering services required for testing and inspections.
 - .02 The testing laboratory will make all tests of materials to determine their suitability for compaction and optimum water content and will supervise continuously the placing of the fill and backfill.
 - .03 A representative of the testing laboratory and the Landscape Architect/Engineer shall have the power of rejection of materials, equipment or operating procedures, of the filling or backfilling operation. The trade Contractor shall replace, rework or correct work which does not meet the specifications as directed by the testing laboratory and/or the Landscape Architect/Engineer.

- 1.08 References
 - .01 ANSI/ASTM D1557 – Moisture-Density Relations of Soils and Soil-Aggregate Mixture.
 - .02 Surface Concrete: MDOT 35S, 5-7% air entrainment. 564 pounds of cement per cubic yard.
 - .03 Concrete Encasement: MDOT 30M, 517 pounds of cement per cubic yard.

- 2. PRODUCTS
 - 2.01 Backfill: MDOT Class II material.

- 3. EXECUTION
 - 3.01 Preparation
 - .01 Contractor shall obtain all necessary demo permits from the Township prior to beginning demolition.
 - .02 Protect existing utilities which are not to be demolished.
 - .03 Protect existing trees and vegetation are not to be demolished.

 - 3.02 Demolition
 - .01 Demolish indicated structures, and appurtenances in an orderly and careful manner.
 - .02 Cease operations and notify Landscape Architect/Engineer immediately if adjacent vegetation or improvements appear to be endangered. Do not resume operations until corrective measures have been taken.
 - .03 Immediately remove demolished material from site.

- 3.03 Inspection
 - .01 Excavation must be inspected by Landscape Architect prior to backfilling.
- 3.04 Backfilling
 - .01 Backfill open pits and holes caused by demolition.
 - .02 Place and compact common fill material in continuous layers not exceeding 8 inches loose depth.
 - .03 Top of fill shall be held down six inches from proposed finish grade.
 - .04 Maintain optimum moisture content of back fill materials to achieve 95% modified proctor density ASTM D1557.
 - .05 Rough grade and compact areas affected by demolition to maintain site grades and contours.
- 3.05 Field Quality Control
 - .01 Representatives of the testing laboratory will supervise the proof-rolling and placement of the fill material.

- END OF SECTION -

- 1. GENERAL
 - 1.01 WORK INCLUDED
 - .01 Clear site of vegetation.
 - .02 Remove root system of trees and shrubs.
 - .03 Stripping and Stockpiling topsoil
 - .04 Remove miscellaneous items.
 - 1.02 PROJECT CONDITIONS
 - .01 Supplemental confirming information as deemed necessary by construction guarantee requirements are recommended at Contractor's expense.
 - .02 Neither the Owner or Landscape Architect/Engineer shall be responsible for any conclusions or interpretations which the Contractor may make on the basis of this information.
 - 1.03 RELATED WORK SPECIFIED ELSEWHERE
 - .01 Section 02050: Demolition
 - .02 Section 02210: Soil Erosion and Sedimentation Control
 - .03 Section 02211: Rough Grading
 - .04 Section 02218: Finish Grading
 - 1.04 PROTECTION
 - .01 Maintain in service and protect from damage the existing utilities that are to remain.
 - .02 Maintain and protect from damage the erosion and sedimentation controls and aggregate laydown area.
 - .03 Before commencing any site preparation activity, contact all municipal service departments, service companies and other utilities affected, and arrange to have the lines that are within the work area accurately located and identified with appropriate surface markers.
 - .04 If any other utility lines are known to extend beyond the work area, such lines shall be located and identified as in the above paragraph.
 - .05 The use of explosives is prohibited. No burning will be allowed on site.
 - .06 Conduct site preparation operations to ensure safety of all persons and to prevent damage to existing structures and utilities, trees and other vegetation to be left in place, construction in progress, and other property.

2. PRODUCTS Not Used

3. EXECUTION

3.01 PREPARATION

.01 Identify limits of removal; employ a Registered Land Surveyor for layout.

.02 Install tree protection fence around all trees to be saved where indicated on Drawings.

3.02 CLEARING AND GRUBBING

.01 Clear the site of existing trees, shrubs and other vegetation as indicated on the plans and as required for new construction.

.02 Roots shall be removed to a depth of 12 inches below subgrades in all areas to be compacted, and under proposed pavement and buildings. At other areas the stumps shall be removed but roots may be cut off and left in the ground.

.03 All material including merchantable timber and soil material shall become the property of the Contractor and shall be removed from the site. No burning will be permitted.

3.03 PAVEMENT REMOVAL

.01 Remove pavement as indicated on drawings; sawcut full depth.

3.04 STRIPPING TOPSOIL

.02 Strip topsoil to depth encountered in all areas shown for grading.

.03 Stockpile topsoil on-site for re-distribution. Do not mix topsoil with other soils encountered.

3.05 MISCELLANEOUS REMOVALS

.01 Remove miscellaneous items as indicated on plans.

.02 Remove debris from site.

END OF SECTION 02110

SECTION 02210
SOIL EROSION AND SEDIMENTATION CONTROL

- 1. GENERAL
 - 1.01 Work Included
 - .01 Construction of erosion controls.
 - .02 Maintenance of erosion controls.
 - .03 Removal of erosion controls.
 - 1.02 Regulatory Requirements
 - .01 The Contractor shall comply with Part 91, Soil Erosion and Sedimentation Control of the Natural Resources and Environmental Protection Act, 1994, Public Act 451 as amended, in executing this work.
 - 1.03 Submittals
 - .01 Submit manufacturer product data.
 - .02 Submit seed dealer's guaranteed statement of the percentages of purity and germination.
- 2. PRODUCTS
 - 2.01 Sediment Control Fabric Fence: shall be AMOCO Propex Silt Stop Sediment Control fabric or approved equal.
 - 2.02 Seed (temporary): shall be perennial Ryegrass with a minimum purity of 98% and a minimum germination of 90%. Seed Shall be fresh, clean, new-crop seed.
 - 2.03 Permeable Filter Material: MDOT 6A aggregate washed.
 - 2.04 Erosion Control Blanket: High Velocity Straw Blanket. Acceptable manufacturers include, but are not limited to:
 - .01 Price and Company
 - .02 CSI Geoturf
 - .03 North American Green
 - .04 Erosion Control Systems
 - 2.05 Turbidity Curtain: shall be Granite Environmental Type I Silt Curtain or approved equal.

3. EXECUTION

3.01 Timing, Maintenance and Removal of Soil Erosion and Sedimentation Control

- .01 Construct controls prior to grubbing or grading wherever possible.
- .02 Where controls cannot be constructed before work begins, temporary controls may be required between successive construction stages, as directed by the Landscape Architect/Engineer or jurisdictional agency.
- .03 Time Limitations: All grading sections shall be brought to final grade immediately as grading progresses. Permanent soil erosion controls for all slopes, channels, ditches or any disturbed areas shall be completed within 15 days after completion of the grading in any area. All areas not brought to final grades shall have temporary controls implemented within 30 days after grading is completed. All temporary measures shall be maintained as necessary until permanent controls are completed.
- .04 Area Limitations: The area of excavation, borrow, embankment, or other exposed areas shall be limited commensurate to the Contractor's ability to keep the finish grading, mulching, seeding and other controls current.
- .05 Construction of erosion and sedimentation controls shall meet the requirements specified or as directed by the Landscape Architect/Engineer. Additional measures beyond those indicated may be required to prevent soil erosion and sedimentation. The contractor shall all measures required by the landscape Architect/Engineer or jurisdictional agency as part of their base bid.
- .06 Maintenance of erosion and sedimentation controls shall be done by the Contractor for temporary and permanent controls until contract completion and acceptance. Maintenance consists of repair of all damaged areas, replacements of lost facilities, and periodic removal of sediment.
- .07 Temporary sedimentation controls shall be removed after permanent controls are in place or as directed by the Landscape Architect/Engineer.
- .08 Specific control measures and their locations shall be as shown on the drawings or as indicated above.

3.02 Certified Storm Water Operator (CSWO)

- .01 Prior to beginning any earth change, the contractor shall submit a Notice of Coverage (NOC) to the MDEQ and retain an MDEQ Certified Storm Water Operator (CSWO) to provide the required SESC reports (which include the weekly and storm event reports as well as all follow up reports for both violations and storm event corrections) on the standard MDEQ form. The contractor shall provide the reports to the Owner on a weekly basis, and retain those reports for three years.

END OF SECTION 02210

SECTION 02211
ROUGH GRADING

1. GENERAL

1.01 Work Included

- .01 Excavation
- .02 Backfilling
- .03 Disposal of excess material
- .04 Compaction
- .05 Grading

1.02 Project Conditions

- .01 Verify existing utility locations prior to beginning earthwork operations.
- .02 Promptly repair damage to adjacent facilities caused by earthwork operations. Cost of repairs at Contractor's expense.
- .03 Promptly notify Landscape Architect/Engineer of unexpected sub-surface conditions.

1.03 Project Record Documents

- 01. Submit Record Documents.

1.04 Protection

- .01 Protect trees, shrubs, lawns, and other features remaining as portion of final landscaping.
- .02 Protect bench marks and existing structures.
- .03 Protect above or below grade utilities which are to remain.
- .04 Repair damage.

1.05 Tests

- .01 The Owner will employ a qualified testing laboratory to furnish all of the soil engineering services required for testing and inspections.
- .02 The testing laboratory will make all tests of materials to determine their suitability for compaction and optimum water content, and will supervise continuously the placing of the fill and backfill.

- .03 The representatives of the testing laboratory shall have the power of rejection of materials, equipment or operating procedures, of the filling or backfilling operation. The Contractor shall replace, rework or correct work which does not meet the specifications as directed by the testing laboratory and/or the Landscape Architect/Engineer.

1.06 References

- .01 ANSI/ASTM D1557 - Moisture-Density Relations of Soils and Soil-Aggregate Mixture.

2. PRODUCTS

2.01 Common Fill Materials

- .01 Subsoil: reused, free of gravel larger than 4 inch size, and debris as directed by Testing Engineer.
- .02 When necessary, compact subsoil surfaces to density requirements for backfill material.
- .03 Imported fill material, if needed, shall be clean, free of any organics or clay, debris, or stones larger than 2". Provide sample for Testing Engineer's review. Provide certification of material source location.

2.02 Cut Material

- .01 All cut material shall be relocated on site as fill, where possible, as indicated on the drawings.
- .02 Stones larger than four (4) inch diameter are not permitted within two feet of the subgrade and must be well distributed.
- .03 Boulders larger than six (6) inch diameter are to be removed and disposed of legally off-site.

3. EXECUTION

3.01 Preparation

- .01 Identify required lines, levels, contours, and datum. Employ registered land surveyors for layout.
- .02 Identify known below grade utilities. Stake and flag locations.
- .03 Identify and flag above grade utilities.
- .04 Maintain and protect existing utilities which pass through work area.
- .05 Upon discovery of unknown utility or concealed conditions, discontinue affected work; notify Landscape Architect/Engineer.
- .06 When necessary, compact subsoil surfaces to density requirements for backfill material.

- .07 Cut out soft areas of subsoil not readily capable of compaction. Backfill with subsoil and compact to density equal to requirements for subsequent backfill material.
- 3.02 Hold Downs
- .01 Do all rough grading to lines, contours and/or spot elevations shown on plans.
 - .02 Finish grades are shown on plans by solid contour line and/or spot elevations. The rough grades shall be held down to allow for finish materials as shown on drawings.
- 3.03 Topsoil Excavation
- .01 Excavate topsoil from areas to be further excavated or regraded and stockpile in area as directed by Landscape Architect/Engineer. No topsoil shall be left under proposed paved areas.
 - .02 Do not excavate wet topsoil.
 - .03 Stockpile topsoil to depth not exceeding 8 feet. Seed to protect from erosion.
- 3.04 Subsoil Excavation
- 01. Excavate subsoil from areas to be regraded and stockpile in area designated on site.
 - .02 Do not excavate wet subsoil.
 - .03 Stockpile subsoil to depth not exceeding 8 feet.
- 3.05 Backfilling
- .01 Backfill areas to contour and elevations. Use unfrozen materials.
 - .02 Fill lowest elevation first and the fill shall be spread in approximately horizontal layers.
 - .03 Backfill systematically, as early as possible, to allow maximum time for any natural settlement. Do not backfill over porous, wet, or spongy subgrade surfaces.
 - .04 Place and compact common fill material in continuous layers not exceeding 8 inches loose depth.
 - .05 Employ a placement method so not to disturb or damage drainage utilities in trenches.
 - .06 The surface of the fill shall be finished to such contour that it will not impound water. If at the end of the day's work it appears that there may be rain prior to the next working day, the surface shall be finished smooth.
 - .07 Maintain optimum moisture content of backfill materials to achieve 95% modified proctor density ASTM D1557 beneath play areas and paved areas (building pad, asphalt pavement, concrete walks and curbs), and 90% modified proctor density beneath all lawn areas.
 - .08 Make changes in grade gradual. Blend slopes into level areas.

- .09 Remove and legally dispose of excess cut material off-site
- 3.06 Tolerances
 - .01 Top Surface of Subgrade: Plus or minus 0.10 foot.
- 3.07 Site Balance
 - .01 The Contractor is responsible for import or export of soil materials as required to balance the site. The Contractor shall thoroughly investigate existing and proposed conditions prior to bidding and include import or export of material as required. Import or export of material shall not be considered for additional compensation.
- 3.08 Field Quality Control
 - .01 Representatives of the testing laboratory will supervise the placing of the fill material.

END OF SECTION 02211

SECTION 02218
FINISH GRADING

1. GENERAL

1.01 Work Included

- .01 Finish grade subsoil and proof roll.
- .02 Place, level and compact topsoil.

1.02 Protection

- .01 Protect landscaping and other features remaining as final work.
- .02 Protect existing structures, fences, roads, sidewalks, paving and curbs.

1.03 Submittals

- .01 Submit a certified analysis of topsoil from each offsite source prior to delivery. Deficiencies in the criteria indicated in 2.01.03 below shall be corrected.
- .02 Submit a deficiency correction plan prepared by the MSU Extension Service specifically addressing the criteria indicated in 2.1.03 below.

2. PRODUCTS

2.01 Materials

- .01 Reuse stockpiled topsoil. Stockpiled topsoil placed within 4" of final grade in all proposed seed type areas shall be screened.
- .02 Additional topsoil from offsite, if required, shall be fertile, sandy clay loam without admixture of subsoil, and shall be free of stones 1/2 inches in diameter or larger, roots, sticks, or other extraneous material including viable plants, plant parts, or seeds of bermuda or quack grass, bluegrass, poison ivy, Canada thistle, buckthorn, honeysuckle, or other invasive species.
- .03 Offsite topsoil, if needed, shall be screened and meet the following attributes:

- pH range between 5.0 and 7.5
- soluble salts maximum 500 parts per million (ppm)
- organic content between 5 and 30%
- clay content between 5 and 25%

3. EXECUTION

3.01 Inspection

- .01 Verify site conditions and note irregularities affecting work of this section.
- .02 Beginning work of this section means acceptance of existing conditions.

- 3.02 Subsoil Preparation
 - .01 Eliminate uneven areas and low spots. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove subsoil contaminated with petroleum products.
 - .02 In un-compacted areas, scarify subgrade to depth of 2 inches where topsoil is scheduled. Scarify in areas where equipment used for hauling has compacted subsoil to a depth of 12 inches.
- 3.03 Placing Topsoil
 - .01 Spread topsoil in lawn areas to a minimum depth of 4 inches.
 - .02 Use topsoil in relatively dry state. Place during dry weather.
 - .03 Fine grade topsoil eliminating rough or low areas. Maintain levels, profiles, and contours or subgrade.
 - .04 Remove stones larger than 1/2", roots, grass, weeds, debris and foreign material while spreading.
 - .05 Manually spread topsoil within dripline of trees to prevent damage.
 - .06 Lightly compact placed topsoil.
 - .07 Remove and legally dispose of surplus subsoil and topsoil off-site.
 - .08 Leave stockpile area and site clean and raked, ready to receive landscaping.
- 3.04 Tolerances
 - .01 Top of Topsoil: Plus or minus 0.05 foot.
- 3.05 Site Balance
 - .01 The Contractor is responsible for import or export of soil materials as required to balance the site. In addition, the Contractor is responsible for importing topsoil to fulfill proposed conditions described in these documents if sufficient stockpiled topsoil is not available on site. The Contractor shall thoroughly investigate existing and proposed conditions prior to bidding and include import or export of material, including topsoil, as required. Import or export of material, including topsoil, shall not be considered for additional compensation.

END OF SECTION 02218

SECTION 02511
AGGREGATE AND GRANULAR BASE

1. GENERAL

1.01 Work Included

- .01 Aggregate Base
- .02 Granular Base
- .03 Stabilized Gravel Path

1.02 References

- .01 Michigan Department of Transportation (MDOT): 2003 Standard Specification for Construction.

1.03 Submittals

- .01 Submit aggregate and granular base certification.
- .02 Submit product data for stabilizing agent.

1.04 Tests

- .01 Representatives of the Testing Laboratory will make all tests of aggregate base materials to determine compaction and may supervise the placement of aggregate base.
- .02 Representatives of the Testing Laboratory and the Landscape Architect/Engineer shall have the power of rejection of materials, equipment or operating procedures of the aggregate base operation. The Contractor shall replace, rework or correct work which does not meet the specifications as directed by the Testing Laboratory and/or the Landscape Architect/Engineer.

2. PRODUCTS

2.1 Aggregate Base for stabilized gravel path: MDOT designated 21AA limestone aggregate.

2.2 Aggregate Base for parking lot drive: MDOT 21AA

2.3 Aggregate Subbase for permeable paver parking spaces: ASTM No. 2

2.4 Aggregate Base for permeable paver parking spaces: ASTM No. 57

2.5 Aggregate Leveling for permeable paver parking spaces: ASTM No. 8

2.02 Granular Base: MDOT Class II sand.

2.03 Stabilized gravel path surface shall be 3/8" to 1/4" crushed aggregate screenings and shall be inert sand and crushed stone materials that are hard, durable and free from surface coatings and deleterious materials. Crushed aggregate surface shall meet the following gradation:

US Sieve No.	Percent Passing by Weight
1/2"	100
3/8"	100
#4	95-100
#8	75-80
#16	55-65
#30	40-50
#50	25-35
#100	20-25
#200	5-15

2.04 Stabilizer for Stabilized Gravel Path:

- .01 Stabilizer Natural Binder, as manufactured by Stabilizer Solutions, Inc.; Phoenix, AZ 800.336.2468, or approved equal.
- .02 Local Stabilizer dealers who can also provide pre-mixed product, if desired: Toledo, OH: Natural Sand Company (419.973.3695 or 866.867.0052); Stratford, WI: Kafka Granite (800.852.7415).
- .03 Binder shall be a natural, non-toxic, non-staining, odorless, environmentally safe powder consisting of 95% Plyllium with 70% Mucilliod content. The powder shall be of a size not more than 10% retained on a U.S. Standard #40 Mesh Sieve. Color shall be selected from manufacturer's standard options.

3. EXECUTION

3.01 Inspection

- .01 Proof roll subbase as directed by Testing Laboratory Representative. Verify compacted subbase is dry and ready to support aggregate base and imposed loads. Soft or yielding areas which cannot be mechanically stabilized shall be removed and replaced with approved compacted granular material.
- .02 Verify gradients and elevations of base are correct.
- .03 Beginning of installation means acceptance of existing conditions.

3.02 Placing Aggregate and Granular Base

- .01 Place aggregate base or granular base and surface materials within 24 hours of subbase preparation.
- .02 Spread aggregate or granular material over prepared subbase to achieve a total compacted depth as indicated on drawings.
- .03 Place aggregate or granular material in 6 inch layers and compact.
- .04 Level surfaces to elevations and gradients indicated.
- .05 Compact placed aggregate and granular materials to achieve 95% Modified Proctor Density (ASTM D1557).

- .06 Add water to assist compaction. With an excess water condition, rework topping and aerate to reduce moisture content.

3.03 Placing Stabilized Gravel Path Surface

- .01 Pre-soak base material with water prior to installing crushed aggregate.
- .02 Mechanically pre-mix Stabilizer, per manufacturer's instructions, with crushed aggregate at the rate of 15 lbs per 1 ton of aggregate. (Drop spreading of Stabilizer over pre-placed aggregate, mixing by rototilling and bucket blending is not acceptable.) Add water to the pre-blended crushed aggregate and Stabilizer mixture at a rate of 35 gallons per ton of pre-blended material. Contractor may elect to purchase pre-mixed product from a Stabilizer dealer or mechanically mix on site, such as with the use of a concrete mixer or truck.
- .03 Place the crushed aggregate surface and Stabilizer mixture on a prepared aggregate base and rake smooth to desired grade and cross section. Place material to depth indicated on Plans.
- .04 Make 3 to 4 passes with non-vibratory roller.
- .05 Water the surface area with a light spray following compaction. Do not disturb the aggregate surface with the spray action.
- .06 Finished surface shall be uniform and solid, with no evidence of chipping and cracking. Dried, compacted paving material shall be firm to full depth with no soft areas. Loose material shall not be presented on the surface.
- .07 Furnish and install construction fencing around new paving to prevent public access to the new surface for a minimum of 12 to 72 hours.

3.04 Tolerances

- .01 Top Surface of Aggregate Base: Plus or minus 0.05 foot.
- .02 Top Surface of Granular Base: Plus or Minus 0.05 foot.
- .03 Top Surface of Stabilized Gravel Path: Plus or Minus 0.05 foot or Slope limitations of the United States Access Board's Accessibility Guidelines for Outdoor Developed Areas, whichever is more restrictive.

3.05 Field Quality Control

- .01 Representatives of the testing laboratory will confirm compaction of the aggregate base.

END OF SECTION 02511

SECTION 02514
PORTLAND CEMENT CONCRETE PAVING

1. GENERAL

1.01 Work Included

- .01 Concrete walks and slabs.
- .02 Reinforcement.
- .03 Surface finish.
- .04 Curing.

1.02 References

- .01 ACI 301 - Specifications for Structural Concrete for Buildings.
- .02 ANSI/ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.
- .03 ASTM A615 - Deformed and Plain Billet-Steel for Concrete Reinforcement.
- .04 ASTM C33 - Concrete Aggregates.
- .05 ASTM C94 - Ready Mixed Concrete.
- .06 ASTM C150 - Portland Cement.
- .07 ASTM C260 - Air-Entraining Admixtures for Concrete.
- .08 ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
- .09 ASTM C494 - Chemical Admixture for Concrete.
- .10 Michigan Dept. of Transportation (MDOT) 2003 Standard Specification for Construction.
- .11 CRSI-Concrete Reinforcing Steel Institute, Manual of Standard Practice.

1.03 Quality Assurance

- .01 Obtain materials from same source throughout.
- .02 Perform work in accordance with Michigan Dept. of Transportation (MDOT) 2003 Standard Specification for Construction.

1.04 Tests

- .01 The Owner will employ a qualified Testing Laboratory to furnish all required testing and inspection.

- .02 Submit proposed mix design to Landscape Architect/Engineer for review prior to commencement of work.
 - .03 Testing firm will take cylinders, perform slump and air entrainment tests in accordance with ACI 301.
- 1.05 Submittals
- .01 Submit product data on joint filler, admixtures, and curing compounds.
- 1.06 Environmental Requirements
- .01 Do not place concrete on frozen base, or when rain is threatening.
2. PRODUCTS
- 2.01 Concrete Materials
- .01 Cement: ASTM C150 - Type I Portland type, gray color.
 - .02 Fine and Coarse Aggregates: ASTM C33, MDOT designated 6AA.
 - .03 Water: Clean and not detrimental to concrete.
- 2.02 Form Materials
- .01 Wood or steel form materials, profiled to suit conditions and capable of resisting deflection from true alignment during paving operations
- 2.03 Reinforcement
- .01 Reinforcing Steel: ASTM A615; 60 ksi yield grade; deformed billet steel bars, uncoated finish.
 - .02 Welded steel wire fabric: plain type, ANSI/ASTM A185; in flat sheets or coiled rolls; uncoated finish.
 - .03 Tie wire: annealed steel, minimum 16 gauge.
- 2.04 Accessories
- .01 Curing Compound: ASTM C309, type 2, Class B Vehicle, Clear membrane curing compound.
 - .02 Expansion Joint: 1/2" or as specified, non-extruding, premolded.
- 2.05 Admixtures
- .01 Air Entrainment: ASTM C260.
 - .02 Chemical Admixture: ASTM C494, Type B and D only, Type B - Retarding, Type D - water reducing and retarding.

- 2.06 Concrete Mix
 - .01 Mix concrete in accordance with ASTM C94.
 - .02 Concrete mixture shall meet MDOT designated grade 35S, 3500 psi 28 day compressive strength, 5-7% air-entrainment, 564 lbs. cement content per cubic yard.
 - .03 Use set-retarding admixtures during hot weather only when approved by Testing Laboratory.
- 3. EXECUTION
 - 3.01 Inspection
 - .01 Verify compacted subgrade is ready to support paving and imposed loads.
 - .02 Verify gradients and elevations of base are correct.
 - .03 Beginning of installation means acceptance of existing conditions.
 - 3.02 Preparation
 - .01 Set and adjust all utility structures located within pavement area.
 - .02 Place and compact granular base material under pavement to thickness as detailed on plans.
 - .03 Form concrete flatwork using steel or wood forms. Masonite is not an acceptable form material. All transitions between radii and tangents shall be smooth and true to intended alignment.
 - .04 Moisten base to minimize absorption of water from fresh concrete.
 - .05 Notify Landscape Architect/Engineer minimum 24 hours prior to commencement of concreting operations.
 - 3.03 Reinforcement
 - .01 Place reinforcement as detailed on plans.
 - .02 Interrupt reinforcement at expansion joints.
 - 3.04 Formed Joints
 - .01 Place expansion and control joints in the EXACT location shown on the drawings.
 - .02 Place expansion joint filler between paving components and building or other appurtenances. Recess top of filler 1/2 inch.
 - .03 All joints to be hand tooled. Sawcut joints shall not be permitted.
 - 3.05 Placing Concrete

- .01 Place concrete in accordance with ACI 301.
- .02 Hot Weather Placement: ACI 301.
- .03 Ensure reinforcement, inserts, embedded parts and formed joints are not disturbed during concrete placement.
- .04 Place concrete continuously between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.
- .05 Place concrete to scoring pattern indicated on drawings. All joints to be straight lines or smooth curves.

3.06 Finishing

- .01 Walk Paving: Medium broom.

3.07 Field Quality Control

- .01 Field inspection and testing will be performed by Testing Laboratory.
- .02 Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature and test samples taken.

3.08 Protection

- .01 Immediately after placement, protect concrete from premature drying, excessive hot or cold temperatures, mechanical injury and vandalism.

END OF SECTION 02514

SECTION 02751
POROUS PAVING

1. GENERAL
 - 1.01 Work Included
 - .01 Porous Concrete Pavers.
 - 1.02 References
 - .01 ASTM C 936 for Concrete Paving Units
 - .02 ASTM D448 for Aggregate Materials
 - .03 Michigan Dept. of Transportation (MDOT) 2012 Standard Specification for Construction.
 - 1.03 Quality Assurance
 - .01 Obtain materials from same source throughout.
 - .02 Perform work in accordance with Michigan Dept. of Transportation (MDOT) 2012 Standard Specification for Construction.
 - 1.04 Tests
 - .01 The Owner will employ a qualified Testing Laboratory to furnish all required testing and inspection.
 - .02 Testing firm will sample aggregate materials for compliance with ASTM specifications.
 - .03 Testing firm will test for compaction of sub-base and base materials.
 - 1.05 Submittals
 - .01 Submit product data on porous concrete pavers.
 - 1.06 Environmental Requirements
 - .01 Do not place base materials or pavers on frozen sub-base or base materials, or when rain is threatening.
2. PRODUCTS
 - 2.01 Concrete Unit Pavers
 - .01 Solid Concrete Pavers for Porous Paving: Solid interlocking paving units of shapes that provide openings between units, complying with ASTM C 936, resistant to freezing and thawing when tested according to ASTM C 67, and made from normal-weight aggregates.
 - a. Product: Subject to compliance with requirements, provide the following:

Aqua-bric Type 1 as manufactured by Advanced Pavement Technology, Oswego, IL.

- b. Thickness: 3-1/4 inches.
- c. Color: As selected by Architect from manufacturer's full range.

2.02 Aggregate Setting Bed Materials

- .01 Graded Aggregate for Subbase: Sound crushed stone or gravel complying with ASTM D 448 for Size No. 2.
- .02 Graded Aggregate for Base Course: Sound crushed stone or gravel complying with ASTM D 448 for Size No. 57.
- .03 Graded Aggregate for Leveling Course: Sound crushed stone or gravel complying with ASTM D 448 for Size No. 8.
- .04 Graded Aggregate for Porous Paver Fill: Sound crushed stone or gravel complying with ASTM D 448 for Size No. 8.

2.03 Separation Geotextile

- .01 Separation Geotextile: Woven geotextile fabric, manufactured for separation applications; made from polyolefins or polyesters, with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
 - b. Survivability: Class 2; AASHTO M 288.
 - c. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
 - d. Permittivity: 0.02 per second, minimum; ASTM D 4491.
 - e. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

3. EXECUTION

3.01 Inspection

- .01 Verify compacted subgrade is ready to support paving and imposed loads.
- .02 Verify gradients and elevations of base are correct.
- .03 Beginning of installation means acceptance of existing conditions.

3.02 Preparation

- .01 Proof-roll prepared subgrade according to requirements in Division 2 Section "Earthwork" to identify soft pockets and areas of excess yielding. Proceed with

porous paver installation only after deficient subgrades have been corrected and are ready to receive subbase and base course for porous paving.

3.03 Installation, General

- .01 Do not use unit pavers with chips, cracks, voids, discolorations, and other defects that might be structurally unsound or visible in finished work.
- .02 Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.
- .03 Joint Pattern: Single soldier course edge. 90-degree herringbone infill.
- .04 Tolerances:
 - a. Variation in Plane between Adjacent Units (Lipping): Do not exceed 1/16-inch unit-to-unit offset from flush.
 - b. Variation from Level or Indicated Slope: Do not exceed 1/8 inch in 24 inches and 1/4 inch in 10 feet or a maximum of 1/2 inch.
- .05 Provide edge restraints as indicated. Install edge restraints before placing unit pavers.

3.04 Setting Bed Installation

- .01 Compact soil subgrade uniformly to at least 95 percent of laboratory density.
- .02 Proof-roll prepared subgrade to identify soft pockets and areas of excess yielding. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.
- .03 Place separation geotextile over prepared subgrade, overlapping ends and edges at least 12 inches.
- .04 Place aggregate subbase and base as separate lifts of no more than 4" each. Compact each lift to 100 percent of ASTM D 1557 maximum laboratory density, and screed to depth indicated.
- .05 Place leveling course and screed to a thickness of 2 to 2-1/2 inches, taking care that moisture content remains constant and density is loose and constant until pavers are set and compacted.

3.05 Paver Installation

- .01 Set unit pavers on leveling course, being careful not to disturb leveling base. If pavers have lugs or spacer bars to control spacing, place pavers hand tight against lugs or spacer bars. If pavers do not have lugs or spacer bars, place pavers with a 1/16-inch-minimum and 1/8-inch-maximum joint width. Use string lines to keep straight lines. Fill gaps between units that exceed 3/8 inch with pieces cut to fit from full-size pavers.

- .02 Compact pavers into leveling course with a low-amplitude plate vibrator capable of a 3500- to 5000-lbf compaction force at 80 to 90 Hz. Use vibrator with neoprene mat on face of plate or other means as needed to prevent cracking and chipping of pavers. Perform at least three passes across paving with vibrator.
 - a. Compact pavers when there is sufficient surface to accommodate operation of vibrator, leaving at least 36 inches of uncompacted pavers adjacent to temporary edges.
 - b. Before ending each day's work, compact installed concrete pavers except for 36-inch width of uncompacted pavers adjacent to temporary edges (laying faces).
 - c. As work progresses to perimeter of installation, compact installed pavers that are adjacent to permanent edges unless they are within 36 inches of laying face.
 - d. Before ending each day's work and when rain interrupts work, cover pavers that have not been compacted and leveling course on which pavers have not been placed with nonstaining plastic sheets to protect them from rain.
- .03 Place graded aggregate fill immediately after vibrating pavers into leveling course. Spread and screed aggregate fill level with tops of pavers.
 - a. Before ending each day's work, place aggregate fill in installed porous paving except for 42-inch width of unfilled paving adjacent to temporary edges (laying faces).
 - b. As work progresses to perimeter of installation, place aggregate fill in installed paving that is adjacent to permanent edges unless it is within 42 inches of laying face.
 - c. Before ending each day's work and when rain interrupts work, cover paving that has not been filled with nonstaining plastic sheets to protect it from rain.
- .04 Remove and replace pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.

3.06 Finishing

- .01 Walk Paving: Medium broom.

3.07 Field Quality Control

- .01 Field inspection and testing will be performed by Testing Laboratory.
- .02 Maintain records of placed items. Record date, location of work, quantity, air temperature and test samples taken.

3.08 Protection

- .01 Protect pervious paving from contamination during and following installation for the duration of the project. Portions of pervious paving contaminated by soil, mulch, or other debris will be rejected.

END OF SECTION 02781

1. GENERAL

1.01 Work Included

- .01 Provide and install benches.
- .02 Provide and install bike racks.
- .03 Provide and install trash receptacles.
- .04 Provide and install picnic tables.
- .05 Provide and install cable railing.
- .06 Provide and install regulatory signage.
- .07 Provide and install interpretive signage.
- .08 Provide and install metal transition plates.
- .09 Provide and install timber guardrail.
- .10 Provide and install picnic shelter.
- .11 Provide and install park identification sign.

1.02 Related Work Specified Elsewhere

- .01 Section 02514: Portland Cement Concrete Paving
- .02 Section 03000: Concrete
- .03 Section 02950: Trees, Shrubs and Groundcover and Herbaceous Materials

1.03 Submittals

- .01 Submit complete engineered shop drawings and product data for cable railing, custom regulatory signs, metal transition plates, timber guardrail, park identification sign with footings, and picnic shelter with footings and stone column piers.
- .02 Submit color chips for each product specified.
- .03 Submit product data for each product specified.

2. PRODUCTS

2.01 Benches

- .01 Benches shall be 6' ft., product number FS-50, round bar steel, powder coated, as manufactured by Victor Stanley (800.368.2573), or approved equal. Color: Black.
 - a. (4) benches to be in-ground mount
 - b. (2) benches to be surface mount

- 2.02 Bike Racks
- .01 Bike Hoops shall be 1.5" Schedule 40 steel tubing, zinc galvanized internally and externally, vinyl coated, as manufactured by S & G Products (517.546.9240, or approved equal. Color: Matte black. In-ground mount.
- 2.03 Trash Receptacles
- .01 Trash Receptacles shall be product number RTC-40, round bar steel, powder coated, as manufactured by Victor Stanley (800.368.2573), or approved equal. Lid shall be optional convex lid with self-closing door. Color: Black.
- a. (2) trash receptacles to be surface mount on concrete sidewalk
 - b. (1) trash receptacle to be surface mount on concrete pad in gravel path
- 2.04 Picnic Tables
- .01 Picnic Tables shall be 8' ft., product number F-565, powder coated frame, lpe wood slats, as manufactured by Victor Stanley (800.368.2573), or approved equal. Frame color: Black. Wood slat color: lpe.
- a. (2) 8' tables with 8' benches
 - b. (1) 8' table with 6' benches
- 2.05 Cable Railing
- .01 Cable Railing shall have the following attributes and options listed below as manufactured by Feeney, Inc. (800.888.2418), or approved equal.
- a. Frame Material: Aluminum
 - b. Frame Finish: Manufacturer's powder coat
 - c. Frame Color: Black
 - d. Frame Options: Foot rail and intermediate vertical picket between foot rail and cap rail. Intermediate vertical picket does not extend to ground.
 - e. Post Size: Heavy duty commercial 2-3/8" square post with 3/32" wall thickness.
 - f. Post Mount at Picnic Shelter: Surface Mount
 - g. Post Mount at Overlook Pier: Fascia Mount
 - h. Cap Rail: Series 400 aluminum channel to accept Contractor supplied and installed wood rail
 - i. Wood Rail: No. 1 clear Hem-fir or SPF supplied and installed by Contractor. Not available from manufacturer. Exposed corners of rail shall have 1/2" smooth radius. Rail shall be sanded smooth and be free of any burrs, splinters, dents, saw marks, etc.
 - j. Wood Rail Finish: Contractor supplied and applied clear sealant as recommended by manufacturer approved by Landscape Architect. Sealant shall provide a hard, durable finish resistant to vandalism.
 - k. Accessible Fishing Table on Overlook Pier: No. 1 clear Hem-fir or SPF supplied and installed by Contractor. Not available from manufacturer. Exposed corners of rail shall have 1/2" smooth radius. Rail shall be sanded smooth and be free of any burrs, splinters, dents, saw marks, etc.
 - l. Accessible Fishing Table Finish: Contractor supplied and applied clear sealant as recommended by manufacturer approved by Landscape Architect. Sealant shall provide a hard, durable finish resistant to vandalism.
 - m. Cables: Horizontal T316 stainless steel cables 3" o.c. with associated fittings and terminations.

- 2.06 Regulatory Signage
- .01 Regulatory Signage as listed below shall meet MDOT and MMUTCD requirements for parking lot use.
- a. (1) "Stop" sign
 - b. (2) Accessible Parking signs
 - c. (3) custom signs that read "Pedestrian and Bicycle Trail", "Horses and ATV's Prohibited"
- 2.07 Interpretive Signage
- .01 Interpretive Signs shall be Traditional Low Profile Base model as manufactured by Winsor Fireform (360.786.8200), or approved equal. In addition, the model shall have the following attributes and options:
- a. Sign Panel Size: 24"x36"
 - b. Frame Finish: Manufacturer's standard powder coat
 - c. Frame Color: Black
 - d. Sign Mount: In-ground mount.
- .02 Sign panel content will be provided by Landscape Architect in a production ready electronic format acceptable to sign manufacturer. Sign panel content will include 2 color and grayscale text and images.
- 2.08 Metal Transition Plates
- .01 Transition Plate shall be 8' wide by 18" long Walkway Transition Plate constructed of 1/4" heavy gauge aluminum diamond plate with piano hinge entire length of plate as manufactured by Wahoo Dock's (866.532.8411), or approved equal.
- 2.09 Timber Guardrail
- .01 Timber Guardrail shall be Lot Guard product constructed of 6"x8"x5' posts spaced 6' o.c., 3"x12"x12' rails, 1/4" splice plates, and miscellaneous hardware as manufactured by S.I. Storey Lumber (888.934.1605), or approved equal.
- 2.10 Picnic Shelter
- .01 Picnic Shelter shall be Marquee model as manufactured by Poligon Steel Shelters. (616.399.1963), or approved equal. The shelter shall have the following attributes and options:
- a. Frame Material: Steel
 - b. Frame Finish: Manufacturer's powder coat
 - c. Frame Color: Black
 - d. Frame Clearance: 8' clearance height under lowest beam.
 - e. Column Option: K98 Stub Columns
 - f. Column Mount: Contractor to submit engineered shop drawings for piers and column mounting.
 - g. Column Piers: Contractor to coordinate shelter and fieldstone pier detailing to achieve result outlined in design guidance details on drawings. Contractor to submit engineered shop drawings for approval of detailed design and construction detailing.
 - h. Roof Type: 4/12 pitch roof with clerestory
 - i. Roof Material: Standing seam metal with 1-3/4" ribs 16" o.c.
 - j. Roof Finish: Manufacturer's standard paint.
 - k. Roof Color: Brandywine

- l. Ceiling Material: 2"x6" Tongue & Groove #1 Pine
- m. Ceiling Finish: Contractor supplied and applied clear sealant as recommended by manufacturer approved by Landscape Architect.
- n. Foundations: Contractor to coordinate shelter foundation and fieldstone pier detailing to achieve result outlined in design guidance details on drawings. Contractor to submit engineered shop drawings for approval of detailed design and construction detailing.

2.11 Park Identification Sign

- .01 Park Identification Sign shall conform to design guidance details provided in drawings. Detailed design and installation of sign shall be completed by a specialized sign contractor with a minimum of 5 years designing and constructing signs of similar scale and materials. Detailed shop drawings of sign foundation, wall, pier, timber sign frame, and sign panel shall be submitted to Landscape Architect for material and design approval prior to construction. Mock ups shall be provided as requested by Landscape Architect.

3. EXECUTION

- 3.01 Provide and install all furnishings indicated as detailed on the Drawings and per respective manufacturers' specifications, instructions, recommendations, and approved shop drawings.

END OF SECTION 02870

SECTION 02936
SEEDING

- 1. GENERAL
- 1.01 Work included:
 - .01 Preparation of topsoil.
 - .02 Fertilizing.
 - .03 Seeding.
 - .04 Mulching.
 - .05 Maintenance.
- 2.3 Related Work Elsewhere
 - .01 Section 02218: Finish Grading
 - .02 Section 02937: Native Grass and Forb Seeding
- 1.03 References
 - .01 Michigan Department of Transportation (MDOT) - 2012 Standard Specification for Construction.
- 1.04 Definitions
 - .01 Weeds: includes dandelion, jimsonweed, quackgrass, horsetail, morning glory, rush grass, mustard, lambsquarter, chickweed, cress, crabgrass, Canadian thistle, nutgrass, poison oak, blackberry, tansy ragwort, Bermuda grass, Johnson grass, poison ivy, nut sedge, nibble will, bindweed, bent grass, wild garlic, perennial sorrel and brome grass.
- 1.05 Quality Assurance
 - .01 Provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging and location of packaging.
- 1.06 Tests
 - .01 Analyze topsoil to ascertain percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter content, and pH value.
- 1.07 Submittals
 - .01 Submit test results on topsoil and recommended methods to correct deficiencies, if any.
- 1.08 Delivery, Storage, and Handling

- .01 Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.
- .02 Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.09 Maintenance Service

- .01 Maintain seeded areas immediately after placement until grass is well established and exhibits a vigorous growing condition (minimum of three cuttings).

2. PRODUCTS

2.3 Seed Mixtures: Proportioned by weight as indicated below:

.01 Fescue Mix:

<u>Seed Type</u>	<u>Proportion</u>	<u>Minimum Purity</u>	<u>Germination</u>
Creeping Red Fescue	35%	95%	80%
Compass Chewings Fescue	35%	95%	80%
Turf Type Perennial Rye	20%	90%	80%
Poa Trivialis	10%	90%	80%

Sow at a rate of 350 lbs/acre

- .02 Native Wet Swale and Woodland Seed Mixes: See Section 02937 Native Grass and Forb Seeding

2.02 Mulch:

- .01 Leaf mulch: Will be finely shredded leaf debris collected from site or from a local approved source, a City or County recycling program. Leaf mulch will be free of weed seed and free of seed germination inhibitors like 'Preen' herbicide.

2.3 Fertilizer:

- .01 Recommended for grass with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil as indicated in analysis shall contain in minimum 4% phosphorus acid, 2% soluble potash and sufficient nitrogen to provide one pound of actual nitrogen per 1000 square feet of lawn area.

2.4 Herbicides:

- .01 Weed killer recommended for use with newly seeded lawns.

3. EXECUTION

3.01 Inspection

- .01 Verify that prepared topsoil base is ready to receive the work of this section.
 - .02 Beginning of installation means acceptance of existing site conditions.
- 3.02 Preparation of Topsoil
- .01 Work topsoil to a smooth, uniform surface compacted firmly. Any lumps or depressions which occur shall be regraded and rerolled until a satisfactory grade is obtained.
 - .02 Areas may be machine-finished provided:
 - (1) that a smooth finely pulverized seedbed is produced
 - (2) that machinery and method of operations are approved
 - .03 Hand rake three foot (3') strip adjacent to paving or structures.
 - .04 Remove roots or other objectionable material over one inch (.05") in any dimension which might interfere with the formation of a finely pulverized seedbed.
 - .05 The prepared area shall be thoroughly rolled with an approved lawn roller and all low spots leveled up.
- 3.03 Planting Season: April 1st through May 31st or August 16th through October 10th unless otherwise noted on plans or directed by Owner's Representative.
- 3.04 Fertilizing
- .01 Apply fertilizer in accordance with manufacturer's instructions.
 - .02 Apply after smooth raking of topsoil.
 - .03 Do not apply fertilizer at same time or with same machine as will be used to apply seed.
 - .04 Mix thoroughly into upper two inches (2") of topsoil.
- 3.05 Mechanical Seeding
- .01 Apply seed at a rate of 4 lbs./1000 s.f. evenly in two intersecting directions. Rake in lightly. Do not seed area in excess of that which can be mulched on same day.
 - .02 Do not sow immediately following rain, when ground is too dry, or during windy periods.
 - .03 Within 24 hours after seeding, all areas shall be mulched using leaf mulch. Mulch shall be placed over seed by hand or mechanical blower. Mulch shall be placed to achieve 1/8" uncompacted depth.

3.06

Maintenance

- .01 Mow grass a minimum of three (3) times at regular intervals to maintain at a maximum height of 3 inches. Do not cut more than 1/3 of grass at any one mowing.
- .02 Immediately remove clippings after mowing and trimming.
- .03 Water the lawn until final acceptance to prevent grass and soil from drying out.
- .04 Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from the improper use of herbicides.
- .05 Immediately reseed areas which show bare spots.

3.07

Acceptance

- .01 It is the responsibility of the Contractor to establish a dense stand of grasses, free from lumps and depressions. Any part of the area that fails to show a uniform germination shall be reseeded and such reseeded shall continue until a dense stand is established. Damage to seeded areas resulting from erosion shall be repaired by the Contractor. Scattered bare spots will not be allowed over 3% of the area.
- .02 Acceptance: When the above requirements of the specifications have been fulfilled, the Contractor will request acceptance of the lawn areas and the Owner will continue with the maintenance. Any areas that are not acceptable at this time shall be reseeded and will continue under the Contractor's maintenance until final acceptance. Continued maintenance shall include watering until final acceptance as necessary to keep the seeded areas in a thriving condition. Continued maintenance of lawns shall also include mowing whenever the grass reaches a height of three (3) inches.

- END OF SECTION -

SECTION 02937
NATIVE GRASS AND FORB SEEDING

1. GENERAL

1.01 Description

- .01 Provide seeded native grasses and wildflowers as shown and specified. The work includes:
 - a. Control of invasive plants
 - b. Soil preparation and fine grading
 - c. Native wet swale and woodland seeding
 - d. Control of weeds and invasive species after initial seeding
 - e. Maintenance and warranty

1.02 Related Work

- .01 Section 02936 – Seeding
- .02 Section 02950 – Trees, Shrubs and Ground Cover

1.03 Submittals

- .01 Submit contractor resume of similar work completed within the last five years. The contractor will prove experience with the establishment of native grasses and forbs, as well as maintenance required after installation, for at least five years. Provide locations and pictures of projects completed. Pre-qualified contractors include:
 - a. Michigan Wildflower Farm, Portland, MI 517.647.6010
 - b. Native Connections, Three Rivers, MI 269.580.4765
- .02 Submit seed vendor's certification for required seed mixture, indicating percentage by weight of purity, germination, dormant seed, and weed seed for each grass and forb species. Dormant seed will not be higher than 35%. Seed shall be of Michigan genotypes.
- .03 Provide type of herbicide being used for approval by Landscape Architect/ Engineer. The applicator will be pesticide certified as a handler for the herbicide used.
- .04 Provide sample of leaf compost for approval.

1.04 Delivery, Storage and Handling

- .01 Deliver seed in original unopened containers, showing weight, analysis and name of manufacturer. Store in a manner to prevent moisture, mold, and excessive heating.

- 1.05 Project Conditions
- .01 Work notification: Notify the Landscape Architect/Engineer at least 7 working days prior to the start of removing invasive plant material and seeding operations.
 - .02 Protect existing utilities, paving and other facilities from damage caused by seeding operations.
 - .03 Perform seeding work only after all other planting, irrigation system installation and other work affecting ground surface has been completed.
 - .04 Restrict traffic from lawn areas until grass is established. Erect signs and barriers as required.

- 1.05 Warranty
- .01 This Contractor will provide full coverage of grasses and forbs and will re-seed and provide weed control as required for two full growing seasons until approved by the Landscape Architect and Owner.

2. PRODUCTS

2.01 Materials

- .01 Native seed: Will be fresh, clean and new crop seed mixture. All species of grasses and forbs will be Michigan genotypes seed. If Michigan genotype is not available, Great Lakes Basin seed sources will be used. Seed tags must be made available for approval prior to planting. All seed weights used will be PLS (Pure Live Seed).
 - a. Mix by approved method
 - b. Composed of the following varieties, by weight and tested to minimum percentages of purity and germination. Noxious weed seed free.

NATIVE WOODLAND MIX

<i>Type</i>	<i>Rate (oz Per acre)</i>
Hairy Wood Chess (<i>Bromus purgans</i>)	2.0 ounces
Crested Sedge (<i>Carex cristatella</i>)	0.5 ounces
Long-beaked Sedge (<i>Carex sprengeii</i>)	0.3 ounces
Silky Wild Rye (<i>Elymus villosus</i>)	12.0 ounces
Virginia Wild Rye (<i>Elymus virginicus</i>)	40.0 ounces
Fowl Manna Grass (<i>Glyceria striata</i>)	1.0 ounce
Bottlebush Grass (<i>Hystrix patula</i>)	7.4 ounces
Path Rush (<i>Juncus tenuis</i>)	0.8 ounces
Canada Thimbleweed (<i>Anemone canadensis</i>)	1.0 ounce
Wild Columbine (<i>Aquilegia canadensis</i>)	0.4 ounces
Jack-in-the-Pulpit (<i>Arisaema triphyllum</i>)	0.3 ounces
Heart-leaved Aster (<i>Aster cordifolius</i>)	0.3 ounces
Short's Aster (<i>Aster shortii</i>)	0.3 ounces
Devil's Beggarticks (<i>Bidens frondosa</i>)	3.0 ounces
Tall Bellflower (<i>Campanula americana</i>)	0.3 ounces
Sweet Joe Pye Weed (<i>Eupatorium purpureum</i>)	2.7 ounces
White Snakeroot (<i>Eupatorium rugosum</i>)	0.3 ounces
Wild Geranium (<i>Geranium maculatum</i>)	0.2 ounces

Woodland Sunflower (<i>Helianthus divaricatus</i>)	0.2 ounces
Pale-leaved Sunflower (<i>Helianthus strumosus</i>)	3.0 ounces
Foxglove Beardtongue (<i>Penstemon digitalis</i>)	6.0 ounces
Great Solomon's Seal (<i>Polygonatum canaliculatum</i>)	2.0 ounces
Golden Glow (<i>Rudbeckia laciniata</i>)	3.0 ounces
Brown-eyed Susan (<i>Rudbeckia triloba</i>)	6.0 ounces
Late Figwort (<i>Scrophularia marilandica</i>)	0.5 ounces
False Solomon's Seal (<i>Smilacina racemosa</i>)	4.0 ounces
Blue-stemmed Goldenrod (<i>Solidago caesia</i>)	0.2 ounces
Rough Goldenrod (<i>Solidago rugosa</i>)	0.3 ounces
Common Spiderwort (<i>Tradescantia ohiensis</i>)	3.0 ounces
Golden Alexander (<i>Zizia aurea</i>)	3.0 ounces

NATIVE WET SWALE MIX

Type	Rate (oz Per acre)
Fringed Brome (<i>Bromus ciliatus</i>)	3.0 ounces
Blue Joint Grass (<i>Calamagrostis canadensis</i>)	0.3 ounces
Bebb's Oval Sedge (<i>Carex bebbii</i>)	0.5 ounces
Bristly Sedge (<i>Carex comosa</i>)	2.0 ounces
Crested Sedge (<i>Carex cristatella</i>)	0.3 ounces
Porcupine Sedge (<i>Carex hystericina</i>)	3.0 ounces
Fox Sedge (<i>Carex vulpinoidea</i>)	0.5 ounces
Virginia Wild Rye (<i>Elymus virginicus</i>)	32.0 ounces
Soft Rush (<i>Juncus effusus</i>)	0.2 ounces
Torrey's Rush (<i>Juncus torreyi</i>)	0.3 ounces
Switchgrass (<i>Panicum virgatum</i>)	2.0 ounces
Dark Green Bulrush (<i>Scirpus atrovirens</i>)	0.5 ounces
Soft-stem Bulrush (<i>Scirpus validus</i>)	0.4 ounces
Prairie Cordgrass (<i>Spartina pectinata</i>)	3.0 ounces
Angelica (<i>Angelica atropurpurea</i>)	3.0 ounces
Swamp Milkweed (<i>Asclepias incarnata</i>)	3.0 ounces
New England Aster (<i>Aster novae-angliae</i>)	1.0 ounce
Swamp Aster (<i>Aster puniceus</i>)	1.0 ounce
Wild Senna (<i>Cassia hebecarpa</i>)	6.0 ounces
Turtlehead (<i>Chelone glabra</i>)	0.3 ounces
Tall Coreopsis (<i>Coreopsis tripteris</i>)	0.5 ounces
Joe Pye Weed (<i>Eupatorium maculatum</i>)	0.5 ounces
Boneset (<i>Eupatorium perfoliatum</i>)	0.3 ounces
Bottle Gentian (<i>Gentiana andrewsii</i>)	0.3 ounces
Sneezeweed (<i>Helenium autumnale</i>)	1.0 ounce
Tall Sunflower (<i>Helianthus giganteus</i>)	0.3 ounces
Great St. John's Wort (<i>Hypericum pyramidatum</i>)	1.0 ounce
Southern Blue Flag Iris (<i>Iris virginica</i>)	2.5 ounces
Marsh Blazingstar (<i>Liatris spicata</i>)	4.0 ounces
Cardinal Flower (<i>Lobelia cardinalis</i>)	0.3 ounces
Great Blue Lobelia (<i>Lobelia siphilitica</i>)	0.3 ounces
Foxglove Beardtongue (<i>Penstemon digitalis</i>)	2.0 ounces
Obedient Plant (<i>Physostegia virginiana</i>)	1.0 ounce
Mountain Mint (<i>Pycnanthemum virginianum</i>)	0.5 ounces
Orange Coneflower (<i>Rudbeckia fulgida</i>)	2.0 ounces
Black-eyed Susan (<i>Rudbeckia hirta</i>)	3.0 ounces
Cup Plant (<i>Silphium perfoliatum</i>)	4.0 ounces
Ohio Goldenrod (<i>Solidago ohioensis</i>)	1.0 ounce
Purple Meadow Rue (<i>Thalictrum dasycarpum</i>)	0.5 ounces

Blue Vervain (<i>Verbena hastata</i>)	3.0 ounces
Missouri Ironweed (<i>Vernonia missurica</i>)	0.4 ounces
Culver's Root (<i>Veronicastrum virginicum</i>)	0.5 ounces
Golden Alexander (<i>Zizia aurea</i>)	5.0 ounces

Note that in areas where herbicide weed control is used for weed control, seeding delays of at least 60 days will occur for some species. Verify before seeding.

- c. Fertilizer will not be used.
- d. Straw mulch will not be used.
- e. Leaf mulch and compost: Will be finely shredded leaf debris collected from site or from a local approved source, a City or County recycling program. Leaf mulch will be free of weed seed and free of seed germination inhibitors like 'Preen' herbicide.

3. EXECUTION

3.01 Inspection

- .01 Examine finish surfaces, grades, soil tests and topsoil depth. Do not start seeding work until unsatisfactory conditions are corrected. Landscape Architect/ Engineer must approve finish surfaces, grades and depth. Remove any silt fencing from earlier operations.

3.02 Weed and Invasive Plant Control

- .01 In native seed areas, apply non-selective herbicide as required to eliminate any existing invasive species. Method of application to be approved by Landscape Architect.

3.03 Soil Preparation

- .01 In native seed areas, fine grade as per section 02218 Finish Grading specifications.
- .02 In all meadow lawn areas, apply and till in 2" of compost until thoroughly mixed.

3.04 Installation

- .01 Seeding: Seed immediately after preparation of bed.
- .02 Seed indicated areas. Perform seeding operations when the soil is dry and when winds do not exceed 5 miles per hour velocity.
- .03 Broadcast grass seed with approved equipment and then roll or cultipack until firm.
- .04 Sow seed at rate indicated per acre and make sure not to sow any seeds that may be impacted by previously used herbicides.
- .05 Leaf Mulch: Mulch shall be placed over seed by hand or mechanical blower. Mulch shall be placed to achieve 1/8" uncompacted depth.

3.05 Maintenance

- .01 Re-seed and provide weed and invasive species control for any areas that are not establishing for two full growing seasons until approved by Landscape Architect / Engineer.
- .02 During first season and when growth reaches 12", mow all areas to 6" height. Cut all areas once in late fall and once in spring as directed during the two year maintenance period.
- .03 Warranty is for two years after initial application and the project will be reviewed the fall of the second year for final approval. Mowing, herbicide application or a combination of both may be necessary for weed and invasive species control and shall be accomplished as directed. The Contractor will notify the Landscape Architect/Engineer which method of maintenance will be used.
- .04 During the maintenance period, the Contractor shall make visits to the site every three weeks April through October. Contractor shall provide visit reports to Landscape Architect indicating date, time, weather conditions, establishment observations, weed and invasive species observations, and actions taken.

3.06 Cleaning

- .01 Perform cleaning during installation of work and upon completion of the work. Remove from the site all excess materials debris and equipment. Repair damage resulting from seeding operation.

END OF SECTION

SECTION 02950
TREES, SHRUBS AND GROUND COVER

1. GENERAL

1.01 Work Included

- .01 Plant material
- .02 Planting, guying, staking and pruning of plant material
- .03 Maintenance service.
- .04 Guarantee

1.02 Related Work Specified Elsewhere

- .01 Section 02218: Finish Grading
- .02 Section 02936: Seeding
- .03 Section 02937: Native Grass and Forb Seeding

1.03 References

- .01 Michigan Department of Transportation (MDOT) - 2003 Standard Specification for Construction.
- .02 American Association of Nurserymen - American Standards of Nursery Stock, latest Edition.
- .03 U.S. Department of Agriculture, Agricultural Research Services - Plant Hardiness Zone Map.
- .04 American Joint Committee on Horticultural Nomenclature - Standardized Plant Names.

1.04 Quality Assurance

- .01 Perform work with personnel experienced in the work required in this Section under direction of a skilled foreman.
- .02 Plant Material Quality Assurance.

- (1) The Contractor may elect either of the following options:

All trees required by this contract shall be tagged at the source by the Contractor. He shall request in writing inspection and approval of the trees by the Landscape Architect/Engineer at least two weeks prior to each desired inspection date. For remote sources, photographs of the materials will be required for preliminary inspection of materials.

OR,

The Contractor may elect to bring trees to the site without prior inspection by the Landscape Architect/Engineer. The Contractor then assumes the risk that the materials may be rejected at that time.

- (2) All plant material shall be subject to final approval by the Landscape Architect/Engineer at the site before installation.

1.05 Delivery, Handling and Storage

- .01 Deliver plant materials to site in closed vehicles or in open vehicles, with the entire load properly covered in transit for protection from drying winds.
- .02 Move plant materials with solid balls wrapped in burlap.
- .03 Deliver plant materials immediately prior to placement. Keep plant materials moist.
- .04 All plants will be rejected when ball of earth surrounding roots has been cracked or broken preparatory to or during process of planting.
- .05 All plants will be rejected when burlap, stakes, and ropes required in connection with transplanting have been displaced prior to acceptance.
- .06 If plants need to be stored prior to planting, cover ball with topsoil. Sawdust or woodchip mulch is not acceptable. Keep moist.

1.06 Guarantee

- .01 The Contractor agrees to guarantee all plants for one year from the time of acceptance. This guarantee includes furnishing new plants as well as labor and materials for installation of replacements. Replacement plantings shall meet or exceed all requirements of original plant materials including specific varieties and sizes.
- .02 The Contractor shall not assume responsibility for damages or loss of plants caused by fire, flood, lightning storms, freezing rains, winds over 60 miles per hours, or vandalism.
- .03 Inspection of the plantings will be made jointly by the Contractor and the Landscape Architect/Engineer at the completion of planting. All plants not in a healthy growing condition shall be removed and replaced with plants of like kind, size, and quality as originally specified before the close of the next planting season. The Owner may request that any unhealthy or dead materials be removed immediately even though replacement may be delayed as specified.

1.07 Acceptance

- .01 At the end of the guarantee period, final acceptance will be made by the Landscape Architect/Engineer and the Owner provided all requirements of the specifications have been fulfilled. Contractor shall submit letter to Landscape Architect/Engineer requesting final acceptance and release of maintenance responsibilities.

1.08

Maintenance Service

- .01 Begin maintenance of plant materials immediately after planting and continue until termination of guarantee period. During this period, the Contractor shall make a minimum of one maintenance trip every three weeks during April through October, and as many more as necessary to keep the plantings in a thriving condition.
- .02 Maintenance shall include measures necessary to establish and maintain plants in a vigorous and healthy growing condition. Include the following:
 - (1) Water plant materials during each visit from May 15 to September 25th, or as required to maintain plants in a healthy vigorous growing condition.
 - (2) Keep planting beds and tree saucers free from weeds to the satisfaction of the Owner.
 - (3) Spraying shall encompass 1) dormant oil with ethion for scale insects, 2) malathion for leaf eating insects, and 3) bordeaux mixture for fireblight control. These shall be applied in accordance with the manufacturer's recommendations and in the proper strength and number of applications for the particular insect or disease. The Contractor must provide the Owner and Landscape Architect/Engineer a written record of applications and dates.
 - (4) Refertilization shall be per MDOT specification 6.50.11, 1990 edition. Provide fertilizer in the 1st and 2nd waterings of the second growing season with a nitrogen enriched solution providing 8.3 lbs. available per 1000 gallons water. Provide the Owner and Landscape Architect/Engineer a written record of applications and dates.
 - (5) Keep trees erect. Raise trees that settle below grade to the established elevation. Keep tree wrap and wire in neat condition. Remove at completion of guarantee period.
 - (6) Prune dead or broken branches from all deciduous trees and shrubs.
 - (7) Fill to the original grade level areas that have settled around trees and shrubs.
 - (8) Winter protection shall include late fall spraying of all evergreen trees and evergreen shrubs with anti-desiccant, emulsion type agent, at the manufacturer's recommended rate to prevent winter desiccation and late fall watering if required by a dry season.
- .03 Notify the Landscape Architect/Engineer by calling Beckett & Raeder, Inc. (734) 663-2622 at least two work days prior to each maintenance trip and send a written record of what maintenance was performed within two days after each maintenance trip.

1.09

Submittals

- .01 Submit a certified analysis of topsoil per the requirements of Section 02218 Finish Grading.
- .02 Submit sample of shredded bark mulch prior to delivery to the site.
- .03 Submit product data for anti-desiccants tree wound dressing and herbicides to be used.

- 1.10 Seasonal requirements
- .01 Plantings are to be installed within the contract period described in the scope of work and as noted on the drawings.
2. PRODUCTS
- 2.01 Plant Materials
- .01 Quality and Size:
- (1) Plant material shall be true to name and variety in accordance with the American Joint Committee on Horticultural Nomenclature - Standardized Plant Names.
 - (2) Plant material shall conform to sizes given in the plant list. All measurements, such as spread, ball size, number of canes, quality designations, etc. shall be in accordance with AAN - American Standards for Nursery Stock.
 - (3) Plant materials shall be typical of their species or variety and shall be sound, healthy, vigorous, and free from plant diseases and insect pests or their eggs. They shall have healthy, well developed root systems.
 - (4) Materials planted in rows shall be uniform in size and shape.
- .02 Sources: Plant material shall be nursery grown in the same or higher hardiness zone as determined by the latest edition of the Plant Hardiness Zone Map, Agricultural Research Service, U.S. Department of Agriculture.
- .03 Substitutions: Substitutions will be permitted only upon submission of proof that specified plants are not obtainable and with the authorization of the Landscape Architect/Engineer. All requests for price adjustments due to substitutions must be submitted in writing to the Landscape Architect and Owner for approval along with the request for use of the substitutions.
- .04 Root Protection:
- (1) Plants designated "B&B" in the plant list shall be balled and burlapped. They shall be dug with firm, natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root systems necessary for full recovery of the plant. Balls shall be securely wrapped with burlap and bound with cord. No balled and burlapped plant shall be planted if the ball is cracked or broken. No planting with rot proof burlap or ties shall be permitted. Sand balls shall not be acceptable.
 - (2) Plants designated "Cont." in the plant list shall be container grown. They shall be plants that have been transplanted into a container and grown long enough for the new fibrous root system to retain its shape when removed from the container. The container shall be rigid enough to hold the ball shape during shipping.

2.02 Plant Mixture

.01 Standard planting mixture shall be a mixture of 1/3 topsoil, 1/3 sand and 1/3 peat per cubic yard of mixture. Add fertilizer to planting mixture per Manufacturer's requirements.

- (1) Peat shall be granulated raw Canadian peat or baled Canadian peat, containing not more than 9% mineral on a dry basis. For ericaceous plants, baled peat with a pH of 4.0 shall be used.
- (2) Sand: Clean, coarse, ungraded conforming to ASTM C3 for fine aggregates.
- (3) Topsoil: shall meet the criteria outlined in Section 02218 Finish Grading.
- (4) Fertilizer: 'Osmocote Pro' 18-7-10 + iron (800-492-8255), apply per Manufacturer's recommendations and soil analysis.

2.03 Shredded Bark Mulch

.01 Shredded bark mulch shall be processed shredded hardwood bark, free of leaves, twigs or other extraneous materials.

2.04 Peat Moss Mulch

.01 Peat mulch shall be granulated raw Canadian peat moss or baled Canadian peat moss, containing not more than 9% mineral on a dry basis.

2.05 Guying and Staking

.01 Guying stakes shall be wood, 2" x 2" x 30" long, minimum size.

.02 Tree stakes shall be as noted on plans.

.03 Staking wire shall be as noted on plans.

.04 Hose for covering wire shall be new black, two-ply fiber reinforced hose, not less than 1/2" inside diameter.

2.06 Accessories

.01 Anti-desiccant: Emulsion type, film-forming agent similar to Dowax by Dow Chemical Co., or Wilt-Pruf by Nursery Specialty Products, Inc., designed to permit transpiration but retard excessive loss of moisture from plants. Deliver in manufacturer's fully identified containers and mix in accordance with manufacturer's instructions.

.02 Tree Wound Dressing: an approved black paint which will not harm the cambium of the plants.

.03 Herbicides: a pre-emergent weed killer such as "Banlon" or approved equal shall be used on all mulched areas as directed by the manufacturer.

3. EXECUTION

3.01 Inspection

- .01 Verify site conditions and note irregularities affecting work of the section.
- .02 Beginning work of this section means acceptance of existing conditions.

3.02 Layout Preparation

- .01 Field stake the location of all trees for the Landscape Architect's approval prior to planting. The Contractor shall schedule work and arrange to stake enough planting work for two weeks. The Contractor shall arrange periodic site meetings with the Landscape Architect/Engineer for the purpose of reviewing the work that has taken place in the prior two weeks and the staking for the next two weeks. The Contractor shall notify the Landscape Architect/Engineer at least three working days prior to the desired date for inspection of staking.
- .02 Minor Changes: It is understood and agreed that should minor changes and deviations from the plans or staking be required by the Landscape Architect/Engineer, this shall be done by the Contractor at no additional cost, providing such instructions are given to the Contractor before work other than staking is started.
- .03 Method of Staking: The Contractor shall accurately stake plant material according to the plans. Stakes shall be three feet (3') high above grade and painted a bright color to be clearly visible for inspection. Distinguish by color between types of materials, i.e., evergreen trees, canopy trees, shrubs, flowering trees.

3.03 Planting Method

- .01 Tree pits and planting beds shall be excavated as shown on the drawings. The Contractor shall dispose of subsoil dug from pits, trenches and beds off-site.
- .02 The Contractor is responsible for planting to correct grades and alignment and all plants shall be set so that, when settled, they will bear the same relation to finish grade as they did before being transplanted. No filling will be permitted around trunks or stems.
- .03 The root ball shall be set on a compacted base as detailed.
- .04 Burlap shall be cut away from top 1/3 of the root ball and all ropes, wires, etc. securing the ball shall be removed.
- .05 All plastic tape and/or plastic fabric shall be completely removed from the root ball during the planting operation. "Rot proof" or treated burlap shall also be totally removed.
- .06 When the plant has been properly set, the pit shall be backfilled with planting mixture, gradually filling, tamping and settling with water. No soil in a frozen or muddy condition shall be used for backfilling. A ring of soil shall be formed around the edge of each plant to hold water.
- .07 Perennials shall have 3" of double processed shredded bark mulch. Mulch these areas first and then plant ground cover through the mulch.

- .08 All other plantings shall be mulched with a four inch (4") cover of shredded bark mulch as shown on the drawings and details, including all tree pits, unless otherwise indicated on the drawings. Mulch depths shall be 4" at time of inspection.
- .09 All plants shall be thoroughly soaked after planting. After each watering, all beds shall be raked and left in a complete and finished manner.
- .10 Upon completion of planting, all trees and shrubs shall have been pruned and injuries repaired. The amount of pruning shall be limited to the minimum necessary to remove dead or injured twigs and branches and to compensate for the loss of roots and from transplanting. Pruning shall be done in such a manner as not to change the natural habit or shape of the plant, as directed by the Landscape Architect/Engineer. All cuts shall be made flush, leaving no stubs. Paint all cuts over 3/4" in diameter with tree paint. Notify the Landscape Architect/Engineer at least one (1) week prior to pruning operations.
- .11 Guying and staking shall be completed immediately after planting. The trunks of all deciduous trees larger than the 6' to 8' grade shall be wrapped with standard tree wrap from the first branch down to the ground and secured at every second wrap with twine. Stake all shade trees 2-1/2" cal. or smaller; guy all trees 3" cal. or larger. Guy all coniferous trees as detailed.
- .12 If deciduous trees or shrubs are moved in full-leaf, spray with anti-desiccant at nursery before moving and again two weeks after planting. Use power spray to provide an adequate film over trunks, branches, stumps, twigs and foliage.

3.04 Removals of Guying, Staking and Wrapping

- 1. At the end of the guarantee period, the Contractor shall remove all guying, staking and wrapping. Saucers are to remain and will be maintained by Owner

END OF SECTION 02950

1. GENERAL

1.01 Work Included

.01 Footings.

1.02 Work Specified Elsewhere

.01 Section 02211: Rough Grading

.02 Section 02218: Finish Grading

.03 Section 02710: Drainage Systems

.04 Section 02870: Site Furnishings

1.03 References

.01 Michigan Department of Transportation - 2003 Standard Specifications for Construction.

.02 ASTM A615 - Deformed and Plain Billet-Steel for Concrete Reinforcement.

.03 ASTM C33 - Concrete Aggregates.

.04 ASTM C94 - Ready-Mixed Concrete.

.05 ASTM C150 - Portland Cement.

.06 ASTM C260 - Air Entraining Admixtures for Concrete.

.07 ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.

.08 CRSI - Concrete Reinforcing Steel Institute, "Manual of Standard Practice".

1.04 Quality Assurance

.01 Perform work in accordance with MDOT Section 5.03

.02 Obtain materials from same source throughout.

1.05 Tests

.01 Testing and analysis of concrete will be performed by a Testing Laboratory hired by the Owner through the Landscape Architect/Engineer.

.02 Submit proposed mix design to Landscape Architect/Engineer for review prior to commencement of work.

.03 Testing Laboratory will take cylinders, perform slump and air entrainment tests in accordance with MDOT Section 7.01.

2. PRODUCTS

2.01 Form Materials

- .01 Forms for Exposed Concrete: MDOT designated Type A Surface. Inside of forms shall be free of holes or irregularities.
- .02 Forms for Unexposed Concrete: MDOT designated Type B Surface.
- .03 Forms Ties: Sufficient size and strength to hold the form work securely in place during placement of concrete. The ends shall be removed to a depth of 3/4 inch from surface. Shall not be used with any device that will leave a opening in the face greater than 1 inch in diameter.

2.02 Concrete Materials

- .01 Cement: ASTM C150, normal - Type 1, Portland type, grey color.
- .02 Fine and Coarse Aggregates: ASTM C33, fine MDOT designated 2NS, coarse MDOT designated 6AA.
- .03 Water: Clean and not detrimental to concrete.

2.03 Admixtures

- .01 Air Entrainment Admixture: ASTM C260.

2.04 Accessories

- .01 Form Release Agent: Light, clear, paraffin-base oil material which will not stain concrete, absorb moisture.

2.05 Curing Materials

- .01 Water: Clean and drinkable:
- .02 Membrane Curing Compound: ASTM C309, Type 2, Class B vehicle, clear membrane.

2.06 Concrete Mix

- .01 Mix concrete in accordance with ASTM C94.
- .02 Concrete mixture shall meet MDOT designated grade 35-P, 3500 psi - 28 day compressive strength, 5-7% air-entrainment, 564 lbs. cement content per cubic yard.
- .03 Use accelerating admixtures in cold weather only when approved by Landscape Architect/Engineer. Use of admixtures will not relax cold weather placement requirements.
- .04 Use set-retarding admixtures during hot weather only when approved by Landscape Architect/Engineer.

3. EXECUTION

3.01 Installation

- .01 Verify lines, levels, and measurement before proceeding with formwork.
- .02 Hand trim sides and bottom of earth forms; remove loose dirt, wood shavings, trash, ice, snow and water.
- .03 Align form joints, make mortar tight.
- .04 Coat forms with approved form release agent.
- .05 Place, and support against displacement.
- .06 Notify Landscape Architect/Engineer minimum 24 hours prior to commencement of concreting operations.
- .07 All exposed concrete surface shall be treated with a liquid membrane-forming curing compound.
- .08 Concrete shall be protected and cured a minimum of seven (7) days.
- .09 Do not use crowbars or other wrecking tools directly against concrete when removing forms.
- .10 Formed surface shall be treated immediately upon removal of forms and at completion of patching.
- .11 Patch mortar shall be same as concrete, except omit coarse aggregate.
- .12 Fill all tie holes solid.

END OF SECTION 03000

SECTION 04470
CAST STONE

- 1. GENERAL
 - 1.01 Work included
 - .01 Copings for picnic shelter stone column piers.
 - 1.02 References
 - .01 Cast Stone Institute, CSI file 04465
 - .02 Inspection and Quality Control: ACI Committee 311 Manual of Concrete Inspection
 - .03 Concrete Reinforcing Steel Institute, "Manual of Standard Practice"
 - .04 Pre-stressed Concrete Institute MNL 117, "Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products"
 - 1.03 Fabricator Qualifications
 - .01 The fabricator must have a minimum of five years of successful experience in the fabrication of architectural cast stone units similar to the units required for this project. Fabricator must have sufficient production capacity to produce, transport, and deliver required units without causing a delay in the work.
 - A. Fabricator must be a producer member of the Precast Concrete Institute (PCI) or participate in its plant certification program.
 - 1.04 Submittals
 - .01 Product data and instructions for manufactured materials and products. Include water absorption test reports for units with exterior exposure.
 - .02 Shop drawings prepared by or under the supervision of a qualified professional engineer showing complete information for fabrication and installation of cast stone. Indicate member dimensions and cross section; fabrication tolerances, location, size, and type of reinforcement, including special reinforcement, and lifting devices necessary for handling and erection.
 - .03 Show location and details of anchorage devices to be embedded in other construction.
 - .04 Submit 12" x 12" x 2" samples to illustrate quality, color, and texture of surface finish.
 - .05 Submit units for required wall mock-up, see *Masonry - Section 04000*.
 - 1.05 Quality Assurance
 - .01 Erectors performing the work of this section shall have a minimum of five years of documented cast stone erection experience.
 - 1.06 Delivery, Storage and Handling

- .01 Deliver cast stone materials in undamaged condition.
- .02 Store cast stone materials off ground, under cover and in a dry location.

1.07 Environmental Requirements

- .01 Maintain materials and surrounding air temperature to minimum 45° F prior to, during, and 48 hours after completion.
- .02 Do not erect cast stone in freezing weather unless suitable means are provided to heat materials, protect work from cold and frost and insure that mortar will harden without freezing. No antifreeze ingredient shall be used.
- .03 Cover top of walls with waterproof sheeting prior to erection of cast stone copings.

1.08 Mock-up

- .01 *See Masonry - Section 04000.*

2. PRODUCTS

2.01 Formwork

- .01 Provide forms and, where required, form facing materials of metal, plastic, wood, or other acceptable material that is non-reactive with concrete and will produce required finish surfaces.

2.02 Reinforcement

- .01 Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- .02 Steel Wire: ASTM A 82, plain cold-drawn steel
- .03 Welded Wire Fabric: ASTM A 185.
- .04 Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing.

2.03 Cast Stone

- .01 Materials
 - A. Portland Cement: ASTM C 150, Type I
 - B. Aggregates: ASTM C 33, fine and coarse.
 - C. Fine Aggregates: Carefully graded and washed natural sand, or manufactured granite, quartz, or limestone sands except that the gradation may vary to achieve desired finish and texture.
 - D. Coarse Aggregates: Carefully graded and washed natural gravels, or crushed, graded stone such as granite, quartz, limestone, or other durable stone except that the gradation may vary to achieve desired finish and texture.
 - E. Water: Potable.
 - F. Coloring Agent: ASTM C 979 inorganic iron oxide pigments, manufactured by cast stone Manufacturer to be light-fast and lime proof. Amount of pigment to

cement shall not exceed 1:10 by weight. *Color to approximate natural Oolitic Limestone, 'buff' color.*

- G. Compressive Strength: not less than 6500 psi at 28 days.
- H. Water Absorption: shall not exceed 6% by dry weight.
- I. Tolerances: plus or minus 1/8" for stone dimensions or allowance out-of-plane from adjacent unit.
- J. Galvanized Reinforcing Bars: ASTM A 767, Class 2.

.02 Manufacturers - Subject to compliance with requirements, the following are **Pre-Approved** manufacturers:

- A. W. N. Russell & Company, 36-60 Albertson Avenue, Westmont, N.J. 08108. Phone: 609-858-1057.
- B. THR Products Corporation, 58-15 49th Place, Masbeth, N.Y., 11378. Phone: 718-326-4210.
- C. Edwards Precast Concrete Company, 777 Edwards Road, Dubuque, IA, 52003. Phone: 319-556-0535.

.03 Mortar

- A. ASTM C 270, *See Masonry - Section 04300.*

.04 Accessories

- A. Solid Dowels: 1/2" Diameter, Stainless steel Type 304.
- B. Setting Buttons: Lead or plastic, sized to maintain uniform joint width and with sufficient surface area to avoid crushing.

3. FABRICATION

3.01 General: Accurately cast stone units complying with manufacturing and testing procedures, quality control recommendations, and the following dimensional tolerances:

3.02 Forms: Accurately construct forms mortar-tight and of sufficient strength to withstand pressures due to concrete placing operations, temperature changes. Maintain form work to provide completed units of shapes, lines, and dimensions indicated, within fabrication tolerances.

3.03 Dimensional Tolerances of Finished Units:

- .01 4 foot length: Plus or minus 3/32 inch.
- .02 4 to 10 feet: Plus or minus 1/8 inch. Each additional 10 feet: Plus or minus 1/16 inch per 10 feet.
- .03 Angular deviation of plane of side mold: 1/32 inch per 4 inches.
- .04 Out of Square (difference in length of diagonal measurements): 3/32 inch total, whichever is greater.
- .05 Thickness: Plus or minus 3/32 inch.
- .06 Fabricate units straight, smooth, and true to size and shape, with exposed edges and corners precise and square unless otherwise indicated.

- .07 Expansion Joints: Free of grout, mortar, or other obstructions to expansive movement, with expansion joint filler. See drawings for locations.
- .08 Cast-In Items: Provide reglets, slots, holes, and other accessories as required to receive cramps, dowels, reglets, waterstops, and other similar work.
- .09 Anchorages: Provide clip angles, seat angles, anchors, dowels, cramps, hangers, and other miscellaneous steel shapes not provided by other trades, necessary for securing cast stone to adjacent construction.
- .10 Surface Finish: Fabricate cast stone with surface as follows:
 - A. Exposed Surfaces - Smooth surface finish free of pockets, sand streaks, and honeycomb, with uniform color and texture. To match smooth finished natural limestone.
 - B. Un-Exposed Surfaces - As-cast float finish.
- .11 Maximum length of single unit is 4'. Minimum length of single unit is 2'.

4. EXECUTION

4.01 Setting

- .01 All cast stone will be set by experienced masons, accurately and in accordance with the shop and setting drawings. All stone shall be set in a full bed of mortar with all vertical joints flushed full. All anchors and dowels shall be firmly placed and all anchors holes and dowel holes and similar holes filled with non-shrink grout.
- .02 All anchors, dowels and other anchoring devices shall be furnished by the setting contractor as shown on the approved shop drawings using, whenever possible, standard building stone anchors commercially available in stainless steel, Type 304.
- .03 When setting with mortar, all stones not thoroughly wet shall be drenched with clear water just prior to setting.
- .04 After each stone has been set, all joints shall be raked to a depth of $\frac{3}{4}$ " from the face for pointing. The face of each stone shall than be sponged off to remove any splashed mortar or mortar smears. The balance of the joint is to be left open until pointing of stone work.
- .05 Tuck point on face to a depth of $\frac{3}{4}$."
- .06 All stone shall be protected from splashing mortar or damage by other trades.

4.02 Patching and Cleaning

- .01 Repair of chipped or damaged cast stone shall be done only by mechanics skilled in this class of work, with materials furnished by the Manufacturer. And according to this specification.

Repair/patching must be done to the Landscape Architect's satisfaction. If unacceptable to the Landscape Architect, stone is to be removed and replaced.

- .02 Before pointing, scrub face of cast stone with a fiber brush, using soap powder and water, and thoroughly rinse with clean running water. Any mortar on the face of the cast stone shall be removed. No acids or prepared cleaners shall use without the written approval of the Manufacturer.

4.03 Pointing and Caulking

- .01 When ready for pointing, joints shall be dampened and carefully pointed to a slight concave. No pointing shall be done in freezing done in freezing weather nor in locations exposed to hot sun, unless properly protected. Pointing mortar shall be 1 part non-staining cement (ASTM C 91), 1 part hydrate lime (ASTM C 207, Type S), and 4 parts clean, washed sand (ASTM C 144). Coloring pigments added to match color of existing mortar: Approval of Landscape Architect required prior to pointing.
- .02 Head joints in copings and similar stones shall be caulked with a joint sealant used in accordance with manufacturer's instructions.

4.04 Final Cleaning and Inspection

- .01 Remove and replace damaged or defective cast stone to match adjacent acceptable cast stone.
- .02 Clean cast stone not less than 6 days after placement with clean water and stiff bristle fiber brushes.

- END OF SECTION -

1.GENERAL

1.01 RELATED DOCUMENTS

01. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

01. This Section includes the following:
 - (1) Natural fieldstone boulder walls.

1.03 SUBMITTALS

01. Product Data: For each type of natural stone and manufactured products specified.
02. Photographs for Verification: Contractor shall provide photographs of similar past work to verify material size, colors, and completed wall stacking character.
03. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
04. Product Test Reports: Indicate compliance of natural stone and soil reinforcement with requirements based on comprehensive testing of current products.
 - (1) Include test data verifying properties of natural stone. Stone shall carry the correct name and trademark of that specified.
 - (2) Include test data required by "Source Quality Control" Article for each roll of soil reinforcement.

1.04 QUALITY ASSURANCE

01. Installer Qualifications: Engage an experienced installer who has completed natural stone installations similar in material, design, and extent to that indicated for Project that has resulted in construction with a record of successful in-service performance.
 - (1) Contractor shall list number of years of experience company has with similar project.
 - (2) Contractor shall list number of years crew leaders have with similar projects.
 - (3) Contractor shall list equipment necessary for project installation and include whether equipment is owned by the company or will be rented for the project. If equipment is to be rented, information should be provided regarding experience company has with this type of equipment.
 - (4) Contractor shall list at least three (3) similar projects constructed within past two (2) to ten (10) years. Information should include location and cost of the projects.
 - (5) Contractor shall list at least one (1) similar project constructed within the past one (1) year to the present. Information should include location and cost of the project(s).

1.05 DELIVERY, STORAGE, AND HANDLING

01. Deliver materials to Project Site in an undamaged condition.

02. Store and handle stone and related materials to prevent deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breaking, chipping, or other causes.
03. Store accessories to prevent corrosion and accumulation of dirt and oil.
04. Store and handle geotextiles according to ASTM D 4873.

2.PRODUCTS

2.01 NATURAL STONE

01. Natural fieldstone boulders
 - (1) Boulders shall be natural Michigan Boulders as available from Northern Hardscape Supply, Northville, Michigan or approved equal. Michigan Boulders shall consist of granite native material and be naturally weathered to a rounded shape without sharp edges or broken faces. Boulders shall be minimum 2'-3' diameter in their smallest dimension. Smaller boulders and cobble may be used to choke spaces between larger boulders.

2.02 INSTALLATION MATERIALS

01. Aggregates: Aggregates for boulder wall base shall be MDOT 21AA.
02. Drainage Fill: Comply with requirements in Division 2 Section "Subdrainage."
03. Nonreinforced-Soil Fill: Comply with requirements in Division 2 Section "Earthwork" for satisfactory soils.
04. Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent.
 - (1) Apparent Opening Size: No. 70 to 100 sieve, maximum; ASTM D 4751.
 - (2) Minimum Grab Tensile Strength: 110 lb; ASTM D 4632.
 - (3) Minimum Weight: 4 oz./sq. yd.

3.EXECUTION

3.01 EXAMINATION

01. Examine areas to receive natural stone installations and conditions under which walls will be installed, with Installer present, for compliance with requirements for excavation tolerances, condition of subgrades, and other conditions affecting performance of retaining walls.
 - (1) Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

01. General: Install stone installations in accordance with these specifications and in reasonably close conformity with the lines, grades and dimensions shown on the plans.
02. Excavate for base material.
03. Compact subgrade.

04. Install geofabric of adequate dimensions to wrap around base material at front face of wall and to wrap around back and top of backfill material at rear of wall.
05. Base Material: Place and compact base material to thickness indicated for first (lower) row of natural stone. Compact base material to not less than 90 percent of maximum density as determined by AASHTO T-99. The moisture content of the backfill material prior and during compaction shall be uniformly distributed throughout each layer and shall be within 2 percentage points (dry) of optimum.
06. First Course: Place first course of natural stone on base material for full length of installation course. The bottom of the first course shall be set to be minimum of 12" below the proposed finish grade at the bottom of wall.
07. Subsequent Courses: Place backfill material for previous course and compact. Set subsequent row of stone as indicated and choke spaces between large boulders with smaller cobble as required create secure and stable bedding for boulders free of rocking.
08. Top Course: Set top row of stone and choke spaces between large boulders with smaller cobble as required create secure and stable bedding for boulders free of rocking. When immediately adjacent to a stabilized gravel path, the top row of boulders shall extend 6" above the path surface and be placed such that the boulders create a continuous 6" curb along the path edge. Size, placement, and choking of top boulders shall be such that they are secure and free of any rocking. The top row of stone shall be placed to sufficiently withstand walking, kicking, or pushing without movement, dislodging, or rocking.

3.03 FILL PLACEMENT

01. General: Comply with requirements of Division 2 Section "Earthwork" issued for information purposes.
02. Place, spread, and compact fill in uniform 8" lifts for full width and length of embankment as wall is laid. Begin at back of wall and place and spread fill toward embankment.
 - (1) Use only hand-operated compaction equipment within 36 inches (900 mm) of wall.
 - (2) Compact subgrade to not less than 95 percent maximum dry density according to ASTM D 698.
 - (3) Compact reinforced backfill to not less than 90 percent maximum density according to AASHTO T-99.
03. Place geofabric as shown on Contract Drawings and as indicated above.

3.04 FIELD QUALITY CONTROL

01. Comply with requirements indicated above for in-place soil density testing.
 - (1) In each compacted base layer, perform at least 1 field in-place density test for each 100 feet (30 m) or less of retaining wall length, but no fewer than 2 tests along a wall face.

3.05 ADJUSTING AND CLEANING

01. Remove and replace natural stone units of the following description:
 - (1) Broken, chipped, stained, or otherwise damaged units.
 - (2) Natural stone or wall character not matching approved photographs.
 - (3) Natural stone not complying with other requirements indicated.

02. Replace in a manner that results in stone retaining/revetment matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.

END OF SECTION 04861

SECTION 06125
SITE WOOD CONSTRUCTION

PART 1 - GENERAL

1.01 Work Included

- 01. Wood Boardwalk.
- 02. Wood Overlook Pier.

1.02 Reference Standards

- 01. NEPA, National Forest Products Association – National Design Specification for stress grade lumber and its fastenings.
- 02. FS-MM-L-751 H Lumber, softwood.
- 03. PS-20 American Softwood Lumber Standard.
- 04. American Wood Preservers Association – Quality Standards.
- 05. AWPA Standards P-5.
- 06. Hot-Dip Zinc Galvanizing Coating for fasteners, connectors, anchors and accessories, AST, -A-153.

1.03 Quality Assurance

- 01. Shop pressure treat, precut, drill and kiln dry or air-seasoned all wood members as required, and deliver to job site ready for installation.

1.04 Submittals

- 01. Submit certification that required pressure treatment comply with specification requirements.
- 02. Submit complete engineered shop drawings for wood boardwalk and overlook pier including helical pile design.
- 03. Submit product data for all hardware.

1.05 Delivery, Storage and Handling

- 01. Deliver, store and handle all wood members with care during shipping and installation to maintain undamaged and unmarked exposed faces. Damaged members will be rejected.
- 02. Submit complete shop drawings for all wood components including wood type, wood source, and mechanical fasteners.

PART 2 - PRODUCTS

2.01 Wood

01. All lumber, except railing caps, shall be pressure treated Hem-fir No. 2 or SPF No. 2, in accordance with NFPA grading rules. All wood members shall be pressure treated for a service level of direct exposure to water.
02. Lumber for railing caps shall be pressure treated Hem-fir or SPF, No. 1, clear. Refer to Site Furnishings specification.
03. All lumber shall be kiln dried, or air-seasoned, to moisture.
04. Any lumber which shall remain exposed as a part of any finish work shall be totally free of any type of defects.
05. Discard pieces bowed, warped, twisted or checked to the extent of causing a detrimental effect.
06. Lumber sizing and shapes as indicated on drawings.

2.02 Pressure Treatment:

01. Wood Preservative: Preservative shall not be Chromated Copper Arsenate (CCA). Wood preservative shall be of low toxicity approved by the Environmental protection Agency.
02. Provide pressure treatment for wood members from the same specified source, of same type color to maintain uniformity in color of the work with the treatment.
03. Pressure treatment retention shall be .40 Lb./Cu.Ft.

2.03 Hardware

01. Fasteners: Bolts, screws, washers, and nuts shall be stainless steel as described on plan notes. All connections shall be of type shown on details.
02. Structural Steel: Channels, angles, and plates shall meet ASTM A36 as indicated on plan notes.
03. Structural Pipe: Pipe shall meet ASTM A53, Type E or S, Grade B as indicated on plan notes.

PART 3 - EXECUTION

3.01 General Workmanship

01. General workmanship for all carpentry work shall be accurately set, rigidly secured, and closely fit conform with all finish lines and levels and shall be straight and plumb.

3.02 Installation

01. Refer to applicable AWI Quality Standards.

02. Set and secure materials and components in place, plumb and level.
03. Footings and posts shall be spaced as called for on the drawings.
04. Perform cutting and fitting necessary to properly secure work included herein.
05. Seal all end cuts prior to installing rails and cap. Keep surfaces "flood coated" for not less than 10 minutes. Coat sealer shall be of the same material specified for pressure treatment of lumber.

END OF SECTION 06125

