

BID DOCUMENTS AND SPECIFICATIONS FOR:

# **Magnolia Park Improvements Arlington, Massachusetts**

Bid # 16-14

March 2016

Prepared for:

Park & Recreation Commission  
Town of Arlington, Massachusetts

Prepared by:

Hedlund Design Group, LLC  
Landscape Architecture + Planning  
Arlington, MA

**SEALED BIDS will be received:**

Date: Thursday, April 14, 2016

Time: 11:00 AM

Place: Office of the Purchasing Agent  
730 Massachusetts Avenue  
Arlington, MA 02476



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**TOWN OF ARLINGTON  
MASSACHUSETTS**

**INVITATION TO BID**

**BID No. 16-14 RECONSTRUCTION OF MAGNOLIA PARK  
PLAYGROUND/BASKETBALL COURT/COMMUNITY GARDEN**

Sealed bids for Reconstruction of Magnolia Park Playground/Basketball Court/Community Garden for the Town of Arlington, Massachusetts, will be received at the Purchasing Department, 730 Massachusetts Avenue, Arlington, MA 02476 until **11:00 AM prevailing time, on Thursday April 14, 2016** at which time and place said bids will be publicly opened and read aloud.

All bids must be in a sealed envelope plainly marked: **BID No. 16-14 RECONSTRUCTION OF MAGNOLIA PLAYGROUND/BASKETBALL COURT/COMMUNITY GARDEN.**

The scope of work of the Base Bid includes improvements to the existing Magnolia Park in the town of Arlington, Massachusetts. The project includes a new playground with play equipment and safety surfacing. The project also includes new pathway construction, shrub and tree plantings, and site furnishings including benches and picnic tables. Utility improvements include new drain lines and area drains for the garden and park. The project also includes a new half-basketball court and a community garden with fencing, raised garden beds with a water source.

The Deduct Alternate includes the project site furnishings including benches, picnic tables, and trash receptacles. Add Alternate #1 includes a walkway extension. Add Alternate #2 includes landscape boulders. Add Alternate #3 includes electric supply and an outdoor electric outlet in the park. Add Alternate #4 includes two extra picnic tables at the park. Alternate #5 includes steel edging for the bituminous asphalt walkways. Alternate #6 includes planting in a specific area of the park. Alternate #7 includes the installation of poles and foundations for future birdhouses and salvaging existing trees onsite to create stepping logs.

***Bid Security in the form of a bid bond, cash, certified check, treasurer's or cashier's check payable to the Owner, is required in the amount of five percent of the bid, in accordance with Section 00200, INSTRUCTIONS TO BIDDERS.***

A pre-bid site visit will be held on Tuesday April 5, 2016 at 10:00 AM at Magnolia Park, Thorndike Road, Arlington, MA

The contract duration for the Base Bid is 150 consecutive days.

Copies may be obtained at the Office of the Purchasing Agent, located at 730 Massachusetts Avenue, Arlington, Massachusetts 02476, from 9 a.m. to 12 noon and 1 to 4 p.m., upon payment of \$100.00 for each set made payable to "Town of Arlington". Any unsuccessful bidder or non-bidder, upon returning such set within the time specified in the Instructions to Bidders and in good condition, will be refunded his payment.

Contract Documents and plans will not be mailed.

Contract Documents and plans are available for down load and review on the Town Website:

**[www.arlingtonma.gov/purchasing](http://www.arlingtonma.gov/purchasing)**

The selected contractor shall furnish a performance bond and a payment bond in amount at least equal to one hundred percent (100%) of the contract price as stipulated in Section 00700 GENERAL CONDITIONS of these specifications.

By-law of the Town of Arlington, Title 1, Article 16, Minority/Woman Workforce Participation in Construction Projects which exceed \$200,000.00 is part and parcel of the bid.

Minimum Wage Rates as determined by the Commissioner of the Division of Occupational Safety of the Executive Office of Labor and Workforce Development under the provisions of the Massachusetts General Laws Chapter 149, Section 26 to 27D, as amended, apply to this project. It is the responsibility of the Bidder, before bid opening, to request if necessary, any additional information on Minimum Wage Rates for those trades people who may be employed for the proposed work under this contract.

All bids for this project are subject to applicable bidding laws of Massachusetts, including General Laws Chapter 30, Section 39M as amended.

The Bidder agrees that this bid shall be good and may not be withdrawn for a period of 30 working days, Saturdays, Sundays and legal holidays excluded after the opening of bids.

The Owner reserves the right to waive any informalities or to reject any or all bids.

TOWN OF ARLINGTON

Adam W. Chapdelaine  
Town Manager

## **INSTRUCTIONS TO BIDDERS**

- I. COMPLEMENTARY DOCUMENT
  - A. INVITATION TO BID, including herewith, is complementary to this document and shall be reviewed by bidder for specific instruction which are not repeated herein.
  
2. STATUTES REGUALTING COMPETITIVE BIDDING
  - A. Bidding procedures and award of general contract and subcontracts shall be in accordance with the provisions of Chapter 30, Section 39M and Chapter 149, Section 44A through 44L inclusive, of the General Laws of the Commonwealth of Massachusetts, including all current amendments.
  - B. In the event of any discrepancy or inconsistency between the provisions of these Bid and Contract Documents and the above-mentioned statutes, the provisions of the above-mentioned statutes shall govern. In such event, the application of all remaining provisions not in conflict to any circumstance other than that in which the conflict occurs shall not be affected thereby.
  
3. BIDDER'S QUALIFICATIONS
  - A. DCPO Certification not required.
  - B. The Contractors' Update Statements are not public records and will not be open to public inspection.
  
4. INTERPRETATION OF DOCUMENTS: NOTIFICATION OF ERRORS
  - A. Interpretations of the provisions of the Bid and Contract Documents will be made by the designer upon written request of any general bidder or subbidder, provided that such request is received by the Designer at least seven (7) days prior to the date of the applicable bid opening, and that the Designer considers such interpretation to be of sufficient importance. Oral or telephone interpretations will not generally be made, and if made shall be strictly informal and not legally valid or binding.
  - B. Such written interpretations shall be in the form of Addenda to the Bid and Contract Documents.
  - C. Bidders are urged to communicate all errors and discrepancies found in the Bid and Contract Documents to the Designer. Telephone calls pointing out any such errors or discrepancies will be taken by the Designer, but only for the purpose of receiving the information in order that it may be properly processed, and not for interpretation or clarification.
  
5. EXAMINATION OF BIDDING AND CONTRACT DOCUMENTS
  - A. Each Bidder shall carefully examine the Bid and Contract Documents to obtain a thorough understanding of the work of his bid in addition to the work of related trades. In addition, each General Bidder shall personally visit the

site to thoroughly acquaint himself/herself with the conditions as they exist hereon.

- B. Failure of any Bidder to thoroughly examine the Bid and Contract Documents or to visit and examine the site shall in no way relieve him/her of any obligation with respect to his/her bid or of any responsibility assigned to him under the Contract.

6. PRE-BID CONFERENCE

- A. Pre-bid conference will be held at the location and time stipulated in the Invitation to Bid.

7. MODIFICATION AND WITHDRAWAL OF BIDS

- A. Modification of withdrawal of Bids will be permitted after the submission of such bids provided clearly written, readily understandable instructions for same are received by the Owner in writing prior to the time established for opening of such bids. No Bid may be withdrawn after that time, except as otherwise provided herein or by law.

8. ADDENDA

- A. Addenda may be required during the bidding period to modify, clarify or interpret the Bid and Contract Documents. It is intended, but not guaranteed, that such Addenda shall be mailed by the Owner to all persons or parties to whom Bid and Contract Documents have been issued (Bidders of Record). Failure to receive such Addenda shall in no way relieve any bidder from the execution of its provisions. All bidders are cautioned to verify the number of Addenda which have been issued and to secure any needed copies from the Designer before submitting a Bid.

9. FORM FOR BIDS

- A. The Owner will make available, to every person applying therefor, a Bid Form. Each bona fide Bidder will be furnished forms for his proposal upon request. Such forms will be made available at the Owner's office during the regular office hours throughout the bidding period. Bids must be submitted on the forms provided by Owner or of forms included in the bid documents of the Project Manual.
- B. All blank spaces provided on the bid forms shall be filled in with ink or typewriter. Where space is provided, sums shall be expressed in both words and figures. In case of a discrepancy between the two, the written words shall govern.
- C. No interlineations, additional, alterations or erasures shall be made on the forms.

10. ALTERNATES

- A. Each Bidder shall bid on alternatives listed. In the event that any alternate does not involve a change in the amount of the Bid, the Bidder shall so



indicate by using the words "No Change" in the space provided for that alternate.

- B. General Bidders shall enter on the form for General Bid a single amount for each alternate, each amount to consist of the total of all the subbidders' amounts for the given alternate plus the amount of for work of the alternate to be performed by the General Contractor.
- C. If alternate(s) are accepted, they shall be accepted in the order listed. The low bidder will be determined on the basis of the sum of the Base Bid and the alternates accepted.

11. SUBMISSION OF BIDS

- A. The Bid Form shall be properly executed and enclosed with the required bid deposit in a sealed envelope plainly marked on the outside with the following information.

Bid For:

\_\_\_\_\_

SUBMITTED BY:

\_\_\_\_\_  
(Name of Bidder)

\_\_\_\_\_  
(Address of Bidder)

- B. If Bids are mailed; the above required envelope shall be enclosed in a second envelope identified with the above markings and mailed to the place of bid opening, as described in the Invitation to Bid. Mailed Bids must be received before the time scheduled for opening of Bids.

12. PERFORMANCE AND PAYMENT BONDS

- A. The Performance and Labor and Materials Payment Bonds required of the General Contractor shall each be in the amount of 100% of the contract sum from a surety company qualified to do business under the laws of the Commonwealth of Massachusetts and approved by the Owner.

13. FOREIGN CORPORATIONS

- A. The attention of bidders is called to General Laws, Chapter 30, Section 39L, as amended by Acts of 1967, Chapter 3, under which the Owner may not enter into a contract with a foreign corporation as a subcontractor unless the foreign corporation has filed with the Owner a certificate by the State Secretary stating that the foreign corporation has complied with General Laws Chapter 181, Sections 3 and 5 and stating the date of such compliance.

14. AWARD OF CONTRACT

- A. The Contract will be awarded to the lowest responsible and eligible bidder except in the event of a substitution as provided by under Chapter 149, Sections 44E and 44F of the above-reference General Laws.

15. COMMENCEMENT AND COMPLETION OF WORK

- A. The successful bidder, upon completion of the Contract Agreement, shall commence the work of the Contract within seven (7) calendar days from receipt of written Notice to Proceed issued by the Owner within fourteen (14) calendar days after said execution of the Contract Agreement, and shall therefore diligently and continuously carry on the work in such manner as to substantially complete the work on or before September 30, 2016 except as noted herein.

16. LIQUIDATED DAMAGES

- A. The attention of bidders is particularly called to the requirements as to the conditions of employment to be observed, the minimum wage rates to be paid under the Contract and affirmative action to ensure equal employment opportunity.
- B. Contractor shall make full good faith efforts to secure at least ten percent (10%) of the Labor and Materials incorporated in the Work from Minority Business Enterprises and five percent (5%) of the Labor and Materials incorporated in the Work from Women Business Enterprises certified by the Commonwealth of Massachusetts and consistent with the Federal Equal Employment Opportunity requirements attached hereto as Attachment A. Satisfactory documentation of such effort shall be furnished promptly upon request by Owner.
- C. The Owner is an equal employment opportunity employer and has an active Affirmative Action Plan (AAP). For more information, direct correspondence to Patricia M. Libby, Affirmative Action Officer for the Town of Arlington.

**BID FORM**

For: Magnolia Park Improvements (Bid #16-14)

Proposal (BID) of \_\_\_\_\_  
(hereinafter called "Bidder") a corporation, organized and existing under the laws of the Commonwealth of Massachusetts.

\_\_\_\_\_ doing business as \_\_\_\_\_  
(corporation, proprietorship, partnership)

to the TOWN OF ARLINGTON hereinafter called "Owner".

Gentlemen:

A. The Bidder, in compliance with your invitation for bids for the Magnolia Park Improvements, Arlington Massachusetts, having examined the plan and specifications with related documents and the site of the proposed project including the availability of materials and labor, hereby proposes to furnish all labor, materials and supplies, and to construct the project in accordance with the Contract Documents, within the time set forth therein, and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents, of which this proposal is a part.

Bidder hereby agrees to commence work under this Contract on or before a date to be specified in the written "Notice to Proceed" from the Owner, and to complete the work by Friday, September 30, 2016. The Bidder further agrees to pay as liquidated damages, the sum of \$100.00 for each consecutive calendar day thereafter that the works remains incomplete, as provided in the Instruction to Bidders, Modifications to General Conditions. Required completion dates are as follows:

B. Bidder acknowledges receipt of the following addendum:

\_\_\_\_\_ Dated \_\_\_\_\_  
\_\_\_\_\_ Dated \_\_\_\_\_  
\_\_\_\_\_ Dated \_\_\_\_\_

C. Bidder agrees to perform all work described in the specifications and shown on the drawings, for the following lump sum price of:

1. Total Proposed Base Bid Contract Price:

\_\_\_\_\_ Dollars (\$ \_\_\_\_\_)

2. Bid Deposit on total bid price, including alternates, in the sum of:

\_\_\_\_\_ Dollars (\$ \_\_\_\_\_) in

the form of \_\_\_\_\_ is submitted herewith in accordance with the INSTRUCTION FOR BIDDERS and is to become property of the Owner in the event the

Contract and bonds are not executed within the time above set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby.

- 3. The Bid does not include premiums on Performance/Labor and Materials Bond. Cost of required Bond Premiums (for base bid and any and all alternates):

Bond Premiums Add \$\_\_\_\_\_

- 4. Alternates  
This bid includes Alternates as follows:

ADD Alternate No. 1: \_\_\_\_\_ dollars  
and \_\_\_\_\_ cents \$({\_\_\_\_\_}).

ADD Alternate No. 2: \_\_\_\_\_ dollars  
and \_\_\_\_\_ cents \$({\_\_\_\_\_}).

ADD Alternate No. 3: \_\_\_\_\_ dollars  
and \_\_\_\_\_ cents \$({\_\_\_\_\_}).

ADD Alternate No. 4: \_\_\_\_\_ dollars  
and \_\_\_\_\_ cents \$({\_\_\_\_\_}).

ADD Alternate No. 5: \_\_\_\_\_ dollars  
and \_\_\_\_\_ cents \$({\_\_\_\_\_}).

ADD Alternate No. 6: \_\_\_\_\_ dollars  
and \_\_\_\_\_ cents \$({\_\_\_\_\_}).

ADD Alternate No. 7: \_\_\_\_\_ dollars  
and \_\_\_\_\_ cents \$({\_\_\_\_\_}).

D. If the Bid is accepted by the Owner, the undersigned agrees to complete the entire work provided to be done under the contract within the time stipulated by the Owner.

E. The undersigned agrees that for extra work, if any, performed in accordance with the AGREEMENT, he will accept compensation as stipulated therein in full payment for such extra work.

- F. Bidder understands that the Owner reserves the right to reject any and all bids.
- G. The undersigned hereby agrees that he will not withdraw the Bid within sixty (60) consecutive calendar days after the actual date of the opening of Bids and that, if the Owner accepts this Bid, the undersigned will duly execute and acknowledge the required Contract Bonds within 10 days after notification that the AGREEMENT is ready for signature.
- H. Should the undersigned fail to fulfill any of his agreements as here in before set forth, the Owner shall have the right to retain as liquidated damages the amount of the Bid security, which shall become the Owner/s property. If a bid was furnished as bid security, it is agreed that the amount thereof shall be paid as liquidated damages to the Owner by the Surety.
- I. The Undersigned certifies under penalty of perjury that this Bid is in all respect bona fide, fair and made without collusion or fraud with any other person. As used in this subsection the "person" shall mean natural person, joint venture, partnership, corporation or other business or legal entity.
- J. The undersigned certifies that he is able to furnish labor that can work in harmony with all with all laws and regulations applicable to awards made subject forty-four A.
  - 1. Have been in business under the present name for \_\_\_\_\_ years.
  - 2. Ever failed to complete any work awarded? \_\_\_\_\_ (Yes), \_\_\_\_\_ (No). If yes, explain: \_\_\_\_\_
  - 3. Bank Reference: \_\_\_\_\_
- K. The Bidder is required to state below all work he/she and his/her subcontractors (if subcontractors are to perform substantial portions of the work) has complete within the past 5 years of a similar character and value to that of the work included in the proposed Contract and to give references that will enable the Owners to judge the Bidder's experience, skill and business standing. The Bidder is required to list a minimum of 3 completed projects that are comparable in scope, complexity and value. For each project, include the name, location, type, date complete, construction value and owner contact.

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(add supplementary page if necessary)



**FORM A**

**CERTIFICATE OF NON-COLLUSION**

The undersigned certifies under penalties of perjury that this bid is in all respects bona fide, fir and made without collusion or fraud with any other person. As used in this section the word 'person' shall mean any natural person, joint venture, partnership, corporation or other business or legal entity.

\_\_\_\_\_  
Authorized Name

\_\_\_\_\_  
Authorized Signature Date

\_\_\_\_\_  
Social Security Number or Federal Identification Number

\_\_\_\_\_  
Legal Name of Business Entity (Print or Type)

\_\_\_\_\_  
Address

\_\_\_\_\_  
City, State, Zip Code

Corporate Seal (If applicable)

**FORM B**

**CERTIFICATE OF FOREIGN CORPORATION**

The undersigned certifies that it has been duly established, organized, or chartered as a corporation under the laws of:

\_\_\_\_\_

Jurisdiction

The undersigned further certifies that it complies with the requirements of M.G.L, c. 30, sec. 39L and with the requirements of M.G.L, c. 181 relative to the registration and operation of foreign corporations within the Commonwealth of Massachusetts.

\_\_\_\_\_  
Name of Person Signing the Bid or Proposal Date

\_\_\_\_\_  
Signature of Person Signing the Bid or Proposal Date

\_\_\_\_\_  
Name of Business (Print or Type)

Corporate Seal (If applicable)



**FORM C**

COMMONWEALTH OF MASSACHUSETTS

SCHEDULE FOR PARTICIPATION BY WOMEN/MINORITY BUSINESS ENTERPRISE BIDDER

CERTIFICATION

A bidder agrees to expend at least the amount of the contract set forth below if awarded, for W/MNE. For the purposes of this commitment, the designation means a business that has been certified by SOMWBA as such. The Bidder must indicate the W/MBE it intends to utilize in this document as follows: (Attach another sheet of necessary.)

Company Name and Address	Nature of Participant	Dollar Value of Participation
<hr/>		
1.		\$ _____
2.		\$ _____
3.		\$ _____

The undersigned hereby certifies that he or she read the terms of this condition and is authorized to bind the Bidder to the commitment herein set forth.

\_\_\_\_\_  
Name of Person Signing the Bid or Proposal

\_\_\_\_\_  
Signature of Person Signing the Bid or Proposal

\_\_\_\_\_  
Title

\_\_\_\_\_  
Name of Business (Print or Type)

Corporate Seal (If applicable)

**FORM D**

**BIDDER CERTIFICATION REGARDING PAYMENT OF PREVAILING WAGES**

The undersigned hereby certifies, under pains and penalties of perjury, that the foregoing bid is based upon the payment to laborers to be employed on the project of wages in an amount no less than the applicable wage rates established for the project by the Massachusetts Department of Labor and Industries. The undersigned bidder agrees to identify the awarding authority for, from, and against any loss, expense, damages, action, or claims, including any expense incurred in connection with any delay or stoppage of the project work, arising out of or as a result of (1) the failure of the said bid to be based upon the payment of the said applicable prevailing wage rates or (2) the failure of the bidder, if selected as the contractor, to pay laborers employed on the project the said applying prevailing wage rates.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Name of Person Signing the Bid or Proposal

\_\_\_\_\_  
Signature of Person Signing the Bid or Proposal      Title

\_\_\_\_\_  
Name of Business (Print or Type)

Corporate Seal (If applicable)

**FORM E**

**CERTIFICATION OF PAYMENT OF STATE TAXES**

Legislation enacted by the Commonwealth of Massachusetts, effective, 1983, requires that attestation below be signed:

Pursuant top M.G.L c. 62C, sec. 49A, I certify under the penalties of perjury, that I, to my best knowledge and belief, have filed all state tax returns and paid all state taxes required by law.

**APPROVAL OF A CONTRACT OR ANY OTHER AGREEMENT WILL NOT BE GRANTED UNLESS THIS CERITFCATION CLAUSE IS SIGNED BY AN AUTHORIZED CORPROATE OFFICER.**

**THE TAX PAYER IDENTIFICATION NUMBER WILL BE FURNISHED TO THE MASSACHUSETIS DPEARTMENT OF REVENUE TO DETERMINE IF TAX FILINGS AND/OR TAX PAYMENT OBLIGATIONS HAVE BEEN MET. PROVIDERS WHO FAIL TO CORRECT THIER NON-FILING AND/OR DELIQUENCY STATUS SHALL NOT HAVE A CONTRACT OR ANY OTHER AGREEMENT ISSUED, RENEWED OR EXTENDED**

\_\_\_\_\_  
(Signature of Individual) Title

\_\_\_\_\_  
Social Security Number or Federal Identification Number

\_\_\_\_\_  
Corporate Name

\_\_\_\_\_  
Name of Person Signing the Proposal (Print or Type) Date

\_\_\_\_\_  
Legal Name of Business Entity (Print or Type)

\_\_\_\_\_  
Business Address

Corporate Seal (If applicable)

**FORM F**

**CERTIFICATION OF AUTHORITY  
MEETING OF BOARD OF DIRECTORS**

(Note: if business entity is a partnership or individual, all owners shall sign this form.)

At a meeting of the Directors of the \_\_\_\_\_ duly called and held at

(Corporation)

\_\_\_\_\_ on the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_,  
(Location)

at which a quorum was present and acting, it was voted that \_\_\_\_\_, the  
(Name)

\_\_\_\_\_ of this Corporation, is hereby authorized and empowered to make,  
(Title/Position)

into, sign, seal and deliver on behalf of the Corporation a Contract for \_\_\_\_\_

with the \_\_\_\_\_, and the performance and payment bonds each in the amount as specified by the Owner.

I hereby certify that the above is a true and correct copy of the record, that said vote has not been amended or repealed and is in full force, and effect as of this date and that

\_\_\_\_\_ is duly elected \_\_\_\_\_ of the corporation  
(Name) (Title/Position)

\_\_\_\_\_  
Clerk or secretary of the Corporation

\_\_\_\_\_  
Date

(Note: If the Bidder is a corporation, affix corporate seal and give below the names of its president, treasurer, and general manager, if any: if a partnership, give full names and residential addresses of all partners; and if an individual, give residential dress if different from business address.)

the required names and addresses of all person interested in this proposal, as Principals, are as follows:

\_\_\_\_\_

**CONTRACT FOR MAGNOLIA PARK IMPROVEMENTS AGREEMENT**

THIS AGREEMENT, made as of this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_, by and between the TOWN OF ARLINGTON, MASSACHUSETTS, acting through its TOWN

MANAGER, hereinafter called the 'Owner' and \_\_\_\_\_, (Name of Contractor) of \_\_\_\_\_, country of \_\_\_\_\_ and State of \_\_\_\_\_, hereinafter called the 'Contractor'.

WITNESSETH; That the Contractor and the Owner for the consideration hereinafter named agrees as follow:

1. SCOPE: The Contractor will furnish at his own proper cost and expense all materials, supplies, machinery, equipment, appliances, tools, superintendence, labor, insurance and other items and services necessary to complete the work as shown and described on the Contract Documents entitled "Magnolia Park Improvements", Arlington, Massachusetts, hereinafter called the 'Project', prepared by Hedlund Design Group, LLC, hereinafter called the 'Designer', or 'Landscape Architect'.
2. CONTRACT SUM: The owner agrees to pay the contractor, and the contractor agrees to accept in full consideration for the performance of the contract, subject to additions and deductions provided for in the contract documents, in current funds, the sum of \_\_\_\_\_ dollars (\$) \_\_\_\_\_), hereinafter called the 'Contract Sum' and to make payments on account thereof, as described below and elsewhere in the Contract Documents.
3. COMMENCEMENT OF WORK AND TIME OF COMPLETION: The contractor agrees to commence work on the contract within seven (7) calendar days from the receipt of written Notice to Proceed issued by the Owner and/or within fourteen (14) calendar days after execution of the contract Agreement and to thereafter diligently and continuously carry on the work. He agrees to complete the work on or before Friday, September 30, 2016, except as herein noted.
4. LIQUIDATED DAMAGES: The Contractor agrees to pay the Owner liquidated damages for failure to complete the Project in conformance with the time allowances as set forth above at the rate of \$100.00 per calendar day.
5. ALTERNATES: The following Alternates have been accepted and the Contract Sum stated in Paragraph 2 of this Agreement includes and is adjusted to reflect the total cost of each accepted alternate:

Alternate No.	Indicate Accepted or Rejected	Original Bid Value of Alternate
DEDUCT Alt. No. 1	_____	_____
ADD Alt. No. 1	_____	_____
ADD Alt. No. 2	_____	_____
ADD Alt. No. 3	_____	_____
ADD Alt. No. 4	_____	_____

ADD Alt. No. 5 \_\_\_\_\_

ADD Alt. No. 6 \_\_\_\_\_

ADD Alt. No. 7 \_\_\_\_\_

6. PAYMENTS TO CONTRACTOR: Payments shall be made in accordance with Chapter 30, Section 39K of the General Laws of the Commonwealth of Massachusetts, including all current amendments, generally as follows:

- A. Within fifteen days after receipt from the Contractor, at the place designated by the Owner if such a place is so designated, of a period estimate requesting payment of the amount due for the preceding month, the Owner will make a periodic payment to the Contractor for the work performed during the preceding month and for the - materials not incorporated in the work but delivered and suitably stored at the site (or at some location agreed upon in writing) to which the Contractor has title or to which a subcontractor has title and has authorized Contractor to transfer title to the Owner, less (1) a retention based on its estimate of the fair value of its claims against the Contractor and less (2) a retention for direct payments to subcontractors based on demands for same in accordance with the provisions of Section 39F, and less (3) a retention not exceeding five percent of the approved amount of the periodic payment. After the receipt of a periodic estimate requesting final payment and within sixty-five days after (a) the Contractor fully completes the work or substantially completes the work so that the value of the work remaining to be done is, in the estimate of the Owner, less than one percent of the original contract price, or (b) the Contractor substantially completes the work and the Owner takes possession for occupancy, whichever occurs first, the Owner shall pay the Contractor the entire balance due on the Contract less (1) a retention based on its estimate of the fair value of its claim against the Contractor and of the cost of completing the incomplete and unsatisfactory items of work and less (2) a retention for direct payments to subcontractors based on the demands for same in accordance with the provisions of Section 39F, or based on the record of payments by the Contractor to the subcontractors under this contract if such record of payment indicates that the Contractor has not paid subcontractors as provided in Section 39F. If the Owner fails to make payment as herein provided, there shall be added to each such payment daily interest at the rate of five percent per annum commencing on the first day after said payment is due and continuing until the payment is delivered or mailed to the Contractor, provided, that no interest shall be due, in any event, on the amount due on a periodic estimate for Final Payment until fifteen days after receipt of such a periodic estimate from the Contractor, at the place designated by the Owner if such a place is so designated. The Contractor agrees to pay to each subcontractor a portion of any such interest paid in accordance with the amount due each subcontractor.
  
- B. The Owner may make changes in any periodic estimate submitted by the Contractor and the payment due on said periodic estimate shall be computed in accordance with the changes so made, but such changes or any requirement for a corrected periodic estimate shall not affect the due date for the periodic payment or the date for the commencement of interest charges on the amount of the periodic payment computed in accordance with the changes made, as provided herein; provided that the Owner may, within seven days after receipt, return to the Contractor for correction any periodic estimate which is not in the required form or which contains computations not arithmetically correct and, in that event, the date of receipt for such periodic estimate in proper form and with arithmetically correct computations. The date of receipt of a periodic estimate received on a Saturday shall be the first working day thereafter. The provisions of Section 39G shall not apply to any contract for the construction, reconstruction, remodeling, repair or demolition of any public building to which this section applies.

7. PAYMENTS TO SUBCONTRACTORS: Payments shall be made in accordance with Chapter 30, Section 39F of the General Laws of the Commonwealth of Massachusetts, including all current amendments, generally as follows:

A. Forthwith after the General Contractor receives payment on account of a period estimate, the General Contractor shall pay to each Subcontractor the amount paid for the labor performed and the materials furnished in any court proceedings barring such payment and also less any amount claimed due from the Subcontractor by the General Contractor.

B. Not later than the sixty-fifth day after each Subcontractor substantially completes his work in accordance with the plans and specifications, the entire balance due under the Subcontract less amounts retained by the Owner as the estimated cost of completing the incomplete and unsatisfactory items of work, shall be due the Subcontractor, and the Owner shall pay that amount to the General Contractor. The General Contractor shall forthwith pay to the Subcontractor the full amount received from the Owner less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the Subcontractor by the General Contractor.

C. Each payment made by the Owner to the General Contractor pursuant to subparagraphs (A) and (B) of this paragraph for the labor performed and the materials furnished by a Subcontractor shall be made to the General Contractor for the account of that Subcontractor: and the Owner shall take reasonable steps to compel the General Contractor to make each payment to each such Subcontractor. If the Owner has received a demand for direct payment from a Subcontractor for any amount which has already been included in a payment to the General Contractor for payment to the Subcontractor as provided in subparagraphs (A) and (B), the Owner shall act upon demand as provided in this Section.

D. If, within seventy days after the Subcontractor has substantially completed the Subcontract work, the Subcontractor has not received from the General Contractor the balance due under the Subcontract including any amount due for extra labor and materials furnished to the General Contractor, less any amount retained by the Owner as the estimated cost of completing the incomplete and unsatisfactory items of work, the Subcontractor may demand direct payment of that balance from the Owner. The demand shall be by a sworn statement delivered to or sent by certified mail to the Owner, and a copy shall be delivered to or sent by certified mail to the General Contractor at the same time. The demand shall contain a detailed breakdown of the balance due under the Subcontract and also a statement of the status of completion of the Subcontract work. Any demand made after Substantial Completion of the Subcontract work shall be valid even if delivered or mailed prior to the seventieth day after the Subcontractor has substantially completed the Subcontract work. Within ten days after the Subcontractor has delivered or so mailed the demand to the Owner and delivered or so mailed a copy to the General Contractor, the General Contractor may reply to the demand. The reply shall be a sworn statement delivered to or sent by certified mail to the Owner and a copy shall be delivered to or sent by

certified mail to the Subcontractor at the same time. The reply shall contain a detailed breakdown of the balance due under the Subcontract including any amount due for extra labor and materials furnished to the General Contractor and of the amount due for each claim made by the General Contractor against the Subcontractor.

E. Within fifteen days after receipt of the demand by the Owner, but in no event prior to the seventieth day after Substantial Completion of the Subcontract work, the Awarding Authority shall make direct payment to the Subcontractor of the balance due under the Subcontract, less any amount (i) retained by the Owner as the estimated cost of completing the incomplete or unsatisfactory items of work, (ii) specified in any court proceedings barring such payment, or (iii) disputed by the General Contractor in the sworn reply: provided, that the Owner shall not deduct from a direct payment any amount as provided in part (iii) if the reply is not sworn to, or for which the sworn reply does not contain the detailed breakdown required in subparagraph (D); The Owner shall make further direct payments to the Subcontractor forthwith after the removal of the basis for deductions from direct payments made as provided in parts (i) and (ii) of this subparagraph.

F. The Owner shall forthwith deposit the amount deducted from a direct payment as provided in part (iii) of subparagraph (E) in an interest-bearing joint account in the names of the General Contractor and the Subcontractor in a bank in Massachusetts; selected by the Owner and agreed upon by the General Contractor and the Subcontractor and shall notify the General Contractor and the Subcontractor of the date of deposit and the bank receiving the deposit. The bank shall pay the amount on the account, including accrued interest, as provided in an agreement between the General Contractor and the Subcontractor or as determined by decree of a court of competent jurisdiction.

G. All direct payments and all deductions from demands for direct payments deposited in an interest-bearing account or accounts in a bank pursuant to subparagraph (F) shall be made out of amounts payable to the General Contractor at the time of receipt of a demand for direct payment from a Subcontractor and out of amounts later become payable to the General Contractor and in order of receipt of such demands from Subcontractors. All direct payments shall discharge the obligation of the Owner to the General Contractor to the extent of such payment.

H. The Owner shall deduct from payments to a General Contractor amounts which, together with the deposits in interest-bearing accounts pursuant to subparagraph (F), are sufficient to satisfy all unpaid balances of demands for direct payment received from Subcontractors. All such amounts shall be earmarked for such direct payments, and the Subcontractors shall have a right in such deductions prior to any claims against such amounts by creditors of the General Contractor.

I. On all contracts for building construction subject to the provisions of Sections 44A to 44L, inclusive, of Chapter 149, periodic payments for work performed by a Subcontractor shall be made to the General Contractor for payment to the Subcontractor and shall be paid to the Subcontractor forthwith after receipt thereof by the General Contractor and without any ten day waiting period as provided above, less any amount claimed by the General Contractor in a letter containing a breakdown of the claim and sent to the Subcontractor with such payment, provided that a General Contractor, who has received a periodic estimate for a periodic payment in proper form from a Subcontractor three days, Saturdays, Sundays and holidays excluded, before the due date of the General Contractor's periodic estimate for the same periodic payment period less any amount claimed by the



General Contractor in a letter containing a breakdown of the claim and sent to the Subcontractor with such payment, even though the General Contractor does not submit a periodic estimate to the Owner for that payment period; and provided, further, that the Owner shall take all reasonable steps to compel the General Contractor to make payment to the Subcontractors as provided in this paragraph, and upon the written request of a Subcontractor setting forth the amount payable but not paid, a copy of which shall be sent to the General Contractor, shall make direct payment to a Subcontractor, as provided for above, which shall discharge the obligation of the Owner to the General Contractor to extent of any such payment.

J. The Owner shall not include in any direct payment to a Subcontractor pursuant to this section any amount claimed from that Subcontractor by the General Contractor in a letter containing a breakdown of the claim and sent to the Owner within ten days after the receipt by the General Contractor of the copy of the request of the Subcontractor to the Owner for direct payment.

8. CONDITIONS OF EMPLOYMENT

A. The schedule of Minimum Wage Rates and Health and Pension Fund Contributions as determined by the Commissioner under the provisions of the Massachusetts General Laws, Chapter 149, Sections 26 m 27D, inclusive, AS amended, is hereby made a part of this Agreement.

B. The Contractor shall pay to any reserve police officer employed by him in any city or town the prevailing rate of wages paid to regular police officers in such city or town.

C. No laborer, workman, mechanic, foreman or inspector working within the Commonwealth, in the employ of the Contractor, Subcontractor or any other person doing or contracting to do the whole or a part of the work contemplated by the Contract, shall be required or permitted to work more than eight hours in any one day or forty-eight hours in any one week, or more than six days in any one week, except in cases of emergency.

D. Every employee of the Contractor or any Subcontractor shall lodge, board and trade where and with whom he elects; and no person or his agents or employees shall be directly or indirectly required, as a condition of employment that the employee to lodge, board or trade at a particular place or with a particular person.

9. SUBCONTRACTORS

A. The Contractor will employ the following Subcontractors on the work and will pay for the execution of his as defined in the Contract Documents; and subject to the additions and deductions provided in the subject to the additions and deductions provided in the Contract Documents, the sum shown opposite his name.

<u>Class Of Work</u>	<u>Subcontractor</u>	<u>Subcontractor Sum</u>

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B. The names of any additional Subcontractors whom the Contractor proposed to employ shall be submitted to the Designer for approval. No such Subcontractor shall be employed to whose standing or ability the Owner or the Designer has any reasonable objection.

10. THE CONTRACT DOCUMENTS: The General Conditions of the Contract, the Specifications and the Drawings, together with this Agreement, for the Contract, and they are as fully a part of the Contract as if hereto attached or herein repeated Drawings and Specifications titled: FLORENCE AVENUE PLAYGROUND IMPROVEMENTS

11. INCORPORATION OF STATUTES BY REFERENCE: If statutes of the Commonwealth of Massachusetts in any way relating to the construction, alterations, repair and installation of public works, particularly with reference to labor and labor rates, they shall be strictly complied with by the Contractor and it is understood that all such statutes are incorporated by reference in this Contract.

12. It is expressly agreed that this Agreement is to be executed for and in behalf of the Owner by the members of its Board of Selectmen and any of its appoints and that such persons are acting in a representative capacity for and in behalf of Owner, and that such persons shall not incur any personal liability hereunder.

IN WITNESS whereof, inhabitants of the Town of Arlington and

\_\_\_\_\_

have caused these presents to be executed by their

\_\_\_\_\_

hereunto duly authorized the day and year first written.

TOWN OF ARLINGTON

\_\_\_\_\_  
Adam W. Chapdelaine, Town Manager

\_\_\_\_\_

\_\_\_\_\_

Certification:  
I hereby Certify that an appropriation in the amount of the Contract is available.

\_\_\_\_\_  
Town Accountant

\_\_\_\_\_  
Contractor

By: .(Title)

Approved as to Matter of Form:

\_\_\_\_\_  
Town Counsel

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**PERFORMANCE BOND**

KNOW ALL MEN BY THESE PRESENTS: That we

\_\_\_\_\_

(Name of Contractor)

a \_\_\_\_\_

(Corporation, Partnership or Individual)

hereinafter called "Principal" and

\_\_\_\_\_  
(Surety)  
of \_\_\_\_\_, State of \_\_\_\_\_, hereinafter called the  
"Surety", are held and firmly bound into

THE TOWN OF ARLINGTON, MASSACHUSETTS  
(Owner)

acting through its TOWN MANAGER

ARLINGTON, MASSACHUSETTS  
(City and State)

hereinafter called "Owner", in the penal sum of  
\_\_\_\_\_ Dollars (\$ \_\_\_\_\_) in lawful money  
of the United states, for the payment of which sum well and truly to be made, we bind  
ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly  
by these presents.

THE CONDITION OF THIS OBLIGATION is such that Whereas, the Principal entered into a  
certain contract with the Owner, dated \_\_\_\_\_ day of \_\_\_\_\_ a copy of  
which is hereto attached and made a part hereof for the construction of

\_\_\_\_\_  
Arlington, Massachusetts

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the  
undertakings, covenants, terms, conditions, and agreements of said contract during the  
original term thereof, and any extensions thereof which may be granted by, the Owner, with  
or without notice to the Surety, and if he shall satisfy all claims and demands incurred under  
such contract, and shall fully indemnify and save harmless the Owner from all costs and  
damages which it may suffer by reason of failure to do so, and shall reimburse and repay  
the Owner all outlay and expense which the Owner may incur in making good any default,  
then this obligation shall be void; otherwise to remain in full force and effect.

· PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and  
agrees that no change, extension of time, alteration or addition to the terms of the Contract  
or to the work to be performed thereunder or the specifications accompanying the same

shall in any way affect its obligation of this, Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

INWITNESS WHEREOF, the parties to these present have duly executed in this Bond on the day of \_\_\_\_\_

ATTEST:

\_\_\_\_\_  
Principal

By \_\_\_\_\_  
Secretary

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
(Address - zip code)

\_\_\_\_\_  
Witness as to Principal

(Seal)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
(Address - zip code)

ATTEST:

\_\_\_\_\_  
Surety

BY \_\_\_\_\_  
(Surety)

\_\_\_\_\_  
Secretary

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
(Address-Zip Code)

\_\_\_\_\_  
Witness as to Surety

(Seal)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
(Address-Zip Code)

NOTE: Date of Bond must not be prior to date of Contract. If Contractor is a Partnership, all partners should execute Bond.

END OF DOCUMENT

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**LABOR AND MATERIALS PAYMENT BOND**

KNOW ALL MEN BY THESE PRESENTS: That we

\_\_\_\_\_ (Name of Contractor)

a \_\_\_\_\_ (Corporation, Partnership of Individual) hereinafter called "Principal" and

\_\_\_\_\_ (Surety)

of \_\_\_\_\_, State of \_\_\_\_\_, hereinafter called the "Surety", are held and firmly bound into

TOWN OF ARLINGTON, MASSACHUSETTS  
(Owner)  
acting through its TOWN MANAGER

ARLINGTON, MASSACHUSETTS  
(City and State)

herein called "Owner", in the penal sum of \_\_\_\_\_, Dollars (\$) ) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that 'Whereas, the Principal entered into a certain contract with the Owner, dated the day of \_\_\_\_\_, \_\_\_\_\_ a copy of which is hereto attached and made a part hereof for the construction of:

MAGNOLIA PARK IMPROVEMENTS IN ARLINGTON MASSACHUSETTS.

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the work provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used 'in connection with the construction of such work, and all insurance premiums on said work, and for all labor, performed in such work whether by subcontractor or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder or the specifications accompanying the Same shall in any wise affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, the parties to these present have duly executed in this Bond on the day of \_\_\_\_\_,

ATTEST:

\_\_\_\_\_  
Principal

BY  
Secretary

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
(Address - zip code)

\_\_\_\_\_  
Witness as to Principal

(Seal)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
(Address - zip code)

ATTEST:

\_\_\_\_\_  
Surety

\_\_\_\_\_  
Secretary

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
(Address-Zip Code)

\_\_\_\_\_  
Witness as to Surety

(Seal)

\_\_\_\_\_  
(Address-Zip Code)

NOTE: Date of Bond must not be prior to date of Contract. If Contractor is a Partnership, all partners should execute Bond.

END OF DOCUMENT

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STANDARD  
GENERAL CONDITIONS  
OF THE  
CONSTRUCTION CONTRACT

Prepared by

**ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE**

and

Issued and Published Jointly By

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE  
*a practice division of the*  
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

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AMERICAN CONSULTING ENGINEERS COUNCIL

-----  
AMERICAN SOCIETY OF CIVIL ENGINEERS

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Construction Specifications Institute

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## GENERAL CONDITIONS

### ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

---

#### 1.01 *Defined Terms*

A. Wherever used in the Contract Documents and printed with initial or all capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof.

1. *Addenda*--Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the 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. *Bidding Documents*--The Bidding Requirements and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

7. *Bidding Requirements*--The Advertisement or Invitation to Bid, Instructions to Bidders, Bid security form, if any, and the Bid form with any supplements.

8. *Bonds*--Performance and payment bonds and other instruments of security.

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*--The Contract Documents establish the rights and obligations of the parties and include the Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR's Bid (including documentation accompanying the Bid and any post Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Notice to Proceed, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all Written Amendments, Change Orders, Work Change Directives, Field Orders, and ENGINEER's written interpretations and clarifications issued on or after the Effective Date of the Agreement. Approved Shop Drawings and the reports and drawings of subsurface and physical conditions are not Contract Documents. Only printed or hard copies of the items listed in this paragraph are Contract Documents. Files in electronic media format of text, data, graphics, and the like that may be furnished by OWNER to CONTRACTOR 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 Substantial Completion; and (ii) 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.A 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. *ENGINEER's Consultant*--An individual or entity having a contract with ENGINEER to furnish services as ENGINEER's independent professional associate or consultant with respect to the Project and who is identified as such in the Supplementary Conditions.

21. *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.

22. *General Requirements*--Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

23. *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 in connection with the Work.

24. *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.

25. *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.

26. *Liens*--Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

27. *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.

28. *Notice of Award*--The written notice by OWNER to the apparent successful bidder stating that upon timely compliance by the apparent successful bidder with the conditions precedent listed therein, OWNER will sign and deliver the Agreement.

29. *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.

30. *OWNER*--The individual, entity, public body, or authority with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be performed.

31. *Partial Utilization*--Use by OWNER of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.

32. *PCBs*--Polychlorinated biphenyls.

33. *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.

34. *Project*--The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part as may be indicated elsewhere in the Contract Documents.

35. *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.

36. *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.

37. *Resident Project Representative*--The authorized representative of ENGINEER who may be assigned to the Site or any part thereof.

38. *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.

39. *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.

40. *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.

41. *Specifications*--That part of the Contract Documents consisting of written technical descriptions of materials, equipment, systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.

42. *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.

43. *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.

44. *Supplementary Conditions*--That part of the Contract Documents which amends or supplements these General Conditions.

45. *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 any Subcontractor.

46. *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.

47. *Unit Price Work*--Work to be paid for on the basis of unit prices.

48. *Work*--The entire completed 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.

49. *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.

50. *Written Amendment*--A written statement modifying the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the nonengineering or nontechnical rather than strictly construction-related aspects of the Contract Documents.

1.02 *Terminology*

A. *Intent of Certain Terms or Adjectives*

1. Whenever in the Contract Documents the terms “as allowed,” “as approved,” or terms of like effect or import are used, or 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 action or determination will be solely to evaluate, in general, the completed Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed 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 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 9.10 or any other provision of the Contract Documents.

B. *Day*

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

C. *Defective*

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it does not conform to the Contract Documents or does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents, or 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).

D. *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.

E. Unless stated otherwise in the Contract Documents, words or phrases which 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

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2.01 *Delivery of Bonds*

A. When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds as CONTRACTOR may be required to furnish.

2.02\* *Copies of Documents*

A. OWNER shall furnish to CONTRACTOR up to ten copies of the Contract Documents. 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 com-

mence 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.

\*See Supplementary Conditions

#### 2.05\* *Before Starting Construction*

A. *CONTRACTOR's Review of Contract Documents:* 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 may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby; however, 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 knew or reasonably should have known thereof.

B. *Preliminary Schedules:* Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for its 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 Shop Drawing and Sample submittals which will list each required submittal and the times for submitting, reviewing, and processing such submittal; 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.

\* C. *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.

#### 2.06 *Preconstruction Conference*

A. Within 20 days after the Contract Times start to run, but before any Work at the Site is started, a conference attended by 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.B, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

#### 2.07 *Initial Acceptance of Schedules*

A. Unless otherwise provided in the Contract Documents, at least ten 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.B. CONTRACTOR shall have an additional ten 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 any specified Milestones and 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 Shop Drawing and Sample 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.

\*See Supplementary Conditions

### ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

#### 3.01\* *Intent*

A. The Contract Documents are complementary; what is called for by one is as binding as if called for 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 may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended 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, nor shall any such provision or instruction be effective to assign to OWNER, ENGINEER, or any of ENGINEER's Consultants, agents, or employees 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. 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 any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, CONTRACTOR shall report it to ENGINEER in writing at once. 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; provided, however, that CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any such conflict, error, ambiguity, or discrepancy unless CONTRACTOR knew or reasonably should have known 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, code, or instruction (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 in one or

\*See Supplementary Conditions

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: (i) a Field Order; (ii) ENGINEER's approval of a Shop Drawing or Sample; or (iii) ENGINEER's written interpretation or clarification.

### 3.05 *Reuse of Documents*

A. CONTRACTOR and any Subcontractor or Supplier or other individual or entity performing or furnishing any of the Work under a direct or indirect contract with OWNER: (i) shall not 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 ENGINEER's Consultant, including electronic media editions; and (ii) shall not reuse any of 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 adaption by ENGINEER. This prohibition will survive final payment, completion, and acceptance of the Work, or termination or completion of the Contract. Nothing herein shall preclude CONTRACTOR from retaining copies of the Contract Documents for record purposes.

## ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL 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, 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 of explorations and tests of subsurface conditions at or contiguous to the Site that ENGINEER has used in preparing the Contract Documents; and

2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that ENGINEER has used in preparing the Contract Documents.

B. *Limited Reliance by CONTRACTOR on Technical Data Authorized:* CONTRACTOR may rely upon the general 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, ENGINEER, or any of ENGINEER's Consultants with respect to:

1. the completeness of such reports and drawings for CONTRACTOR's purposes, includ-



ing, 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.

\*See Supplementary Conditions

#### 4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If CONTRACTOR believes that any subsurface or physical condition at or contiguous to the Site 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 9.08 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 in respect of 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 within the time and 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, OWNER, ENGINEER, and ENGINEER's Consultants 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.

#### 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; 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 of 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*: Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the ENGINEER in the preparation of the Contract Documents.

B. *Limited Reliance by CONTRACTOR on Technical Data Authorized*: CONTRACTOR may rely upon the general 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, ENGINEER or any of ENGINEER's Consultants 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

\*See Supplementary Conditions

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); 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.

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 to CONTRACTOR written notice: (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, ENGINEER, ENGINEER's Consultants and the officers, directors, partners, employees, agents, other 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.E 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, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, other 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.F 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 are not intended to apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

\*See Supplementary Conditions

## 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 CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, 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 current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Compa-

nies" 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 must be accompanied by a certified copy of such agent's authority to act.

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 within 20 days thereafter substitute 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 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. OWNER shall deliver to CONTRACTOR, with copies to each additional insured 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.

### 5.04\* *CONTRACTOR's Liability Insurance*

A. CONTRACTOR shall purchase and maintain such liability and other 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: (i) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR, or (ii) 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 so required by this paragraph 5.04 to be purchased and maintained shall:

\*See Supplementary Conditions

1. with respect to insurance required by paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insureds (subject to any customary exclusion in respect of professional liability) OWNER, ENGINEER, ENGINEER's Consultants, 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, partners, employees, agents, and other 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 completed operations insurance;

4. include contractual liability insurance covering CONTRACTOR's indemnity obligations under paragraphs 6.07, 6.11, and 6.20;

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least thirty 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);

6. 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

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment (and 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, ENGINEER, ENGINEER's Consultants, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an additional insured;

2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, 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, 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);

\*See Supplementary Conditions

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 additional insured to whom a certificate of insurance has been issued.

B.\* OWNER shall purchase and maintain such boiler and machinery 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, ENGINEER, ENGINEER's Consultants, and any other individuals or entities identified in the Supplementary Conditions, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

C.\* All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with 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 additional insured 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 paragraph 5.06, OWNER shall, if possible, include such insurance, and the cost thereof will be charged to CONTRACTOR by appropriate Change Order or Written Amendment. 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, ENGINEER, ENGINEER's Consultants, and all other

individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other 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 additional insureds thereunder. OWNER and CONTRACTOR waive all rights against each other and their respective officers, directors, partners, employees, agents, and other 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, ENGINEER, ENGINEER's Consultants, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other 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, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them for:

\*See Supplementary Conditions

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 peril 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, ENGINEER, or ENGINEER's Consultants and the officers, directors, partners, employees, agents, and other 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 insureds, 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 or Written Amendment.

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 2.05.C. 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

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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

\*See Supplementary Conditions

the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction, but 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. CONTRACTOR shall be responsible to see that the completed Work complies accurately with the Contract Documents.

B. At all times during the progress of the Work, CONTRACTOR shall assign a competent resident superintendent thereto who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the Site and shall have authority to act on behalf of CONTRACTOR. All communications given to or received from the superintendent shall be binding on CONTRACTOR.

6.02 *Labor; Working Hours*

A. CONTRACTOR shall provide competent, suitably qualified personnel to survey, lay out, and construct the

Work 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, and CONTRACTOR will not permit overtime work or the performance of Work on 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 General Requirements, 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 warranties and guarantees specifically called for 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. 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 (or Milestones). Such adjustments will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the progress schedule that will change the Contract Times (or Milestones) shall be submitted in accordance with the requirements of Article 12. Such adjustments may only be made by a Change Order or Written Amendment in accordance with Article 12.

#### 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: (i) it is at least equal in quality, durability, appearance, strength, and design characteristics; (ii) it will reliably perform at least equally well the function imposed by the design concept of the completed Project as a functioning whole, and;

b. CONTRACTOR certifies that: (i) there is no increase in cost to the OWNER; and (ii) it will conform substantially, even with deviations, 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 that 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 procedure for review by ENGINEER will be as set forth in paragraph 6.05.A.2.d, as supplemented in the General Requirements and as ENGINEER may decide is appropriate under the circumstances.

d. CONTRACTOR shall first 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 shall certify

that the proposed substitute item will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified, and be suited to the same use as that specified. The application will state the extent, if any, to which the use of the proposed substitute item will prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not 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 work on the Project) to adapt the design to the proposed substitute item and whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute item from that specified will be identified in the application, and available engineering, sales, maintenance, repair, and replacement services will be indicated. The application will also 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, all of which will be considered by ENGINEER in evaluating the proposed substitute item. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute item.

**B. *Substitute Construction Methods or Procedures:***

If a specific means, method, technique, sequence, or procedure of construction is shown or indicated in and 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 procedure for review by ENGINEER will be similar to that provided in subparagraph 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 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 either a Change Order for a

substitute or 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 time required by ENGINEER and ENGINEER's Consultants in evaluating substitute proposed or submitted by CONTRACTOR pursuant to paragraphs 6.05.A.2 and 6.05.B and in making changes in the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) occasioned thereby. Whether or not ENGINEER approves a substitute item so proposed or submitted by CONTRACTOR, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER's Consultants for evaluating each such 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 or Written Amendment signed. 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 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 shall it 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 an additional insured on the property insurance provided in paragraph 5.06, the agreement between the CONTRAC-

TOR and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against OWNER, CONTRACTOR, ENGINEER, ENGINEER's Consultants, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other 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. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees or agents, and other consultants 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. CONTRACTOR shall pay all charges of utility owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto, such as plant investment fees.

#### 6.09 *Laws and Regulations*

A. CONTRACTOR shall give all notices and 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 primary 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 may 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,

\*See Supplementary Conditions

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, ENGINEER, ENGINEER's Consultant, and the officers, directors, partners, employees, agents, and other consultants 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 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, Written Amendments, 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. 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. 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 ENGINEER's Consultant, 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). 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 to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals. All submittals will be identified as ENGINEER may require and in the number of copies specified in the General Requirements. The 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.E.

B.\* CONTRACTOR shall also submit six (6) Samples to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals. Each Sample will be identified clearly as to material, Supplier, pertinent data such as catalog numbers, and the use for which intended and otherwise as ENGINEER may require to enable ENGINEER to review the submittal for the limited purposes required by paragraph 6.17.E. The numbers of each Sample to be submitted will be as specified in the Specifications.

C. Where a Shop Drawing or Sample is required by the Contract Documents or the schedule of Shop Drawings and Sample submittals acceptable to ENGINEER as required by paragraph 2.07, 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.

#### D. *Submittal Procedures*

1. Before submitting each Shop Drawing or Sample, CONTRACTOR shall have determined and verified:

a. all field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

b. all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

c. all information relative to means, methods, techniques, sequences, and procedures of construction and safety precautions and programs incident thereto; and

d. CONTRACTOR shall also have reviewed and coordinated each Shop Drawing or

\*See Supplementary Conditions

Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

2. Each submittal shall bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's obligations under the Contract Documents with respect to CONTRACTOR's review and approval of that submittal.

3. At the time of each submittal, CONTRACTOR shall give ENGINEER specific written notice of such variations, if any, that the Shop Drawing or Sample submitted may have from the requirements of the Contract Documents, such notice to be in a written communication separate from the submittal; and, in addition, shall cause a specific notation to be made on each Shop Drawing and Sample submitted to ENGINEER for review and approval of each such variation.

#### E. *ENGINEER's Review*

1. ENGINEER will timely review and approve Shop Drawings and Samples in accordance with the schedule of Shop Drawings and Sample 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 of Shop Drawings or Samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of each submittal as required by paragraph 6.17.D.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 approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for complying with the requirements of paragraph 6.17.D.1.

#### F. *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, ENGINEER, and ENGINEER's Consultants that all Work will be in accordance with the Contract Documents and will not be defective. 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.

B. 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 acceptance by OWNER or any failure to do so;
6. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by ENGINEER;
7. any inspection, test, or approval by others; or
8. 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, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, and other 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:

1. 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; and

2. is caused in whole or in part 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, regardless of whether or not caused in part by any negligence or omission of an individual or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations regardless of the negligence of any such individual or entity.

B. In any and all claims against OWNER or ENGINEER or any of their respective consultants, agents, officers, directors, partners, or employees 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 Consultants or to the officers, directors, partners, employees, agents, and

other consultants and subcontractors of each and any of them 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.

ARTICLE 7 - OTHER WORK

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7.01 *Related Work at Site*

A. OWNER may perform other work related to the Project at the Site by OWNER's employees, or let 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 and each utility owner (and OWNER, if OWNER is performing the other work with OWNER's employees) proper and safe access to the Site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly coordinate the Work with theirs. Unless otherwise provided in the Contract Documents, 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 their work and will only cut or alter their 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.

### ARTICLE 8 - OWNER'S RESPONSIBILITIES

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#### 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 Promptly When Due*

A. OWNER shall make payments to CONTRACTOR promptly 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 in respect of 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 in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by ENGINEER in preparing the Contract Documents.

\*See Supplementary Conditions

#### 8.06\* *Insurance*

A.\* OWNER's responsibilities, if any, in 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 in 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. If and to the extent OWNER has agreed to furnish CONTRACTOR reasonable evidence that financial arrangements have been made to satisfy OWNER's obligations under the Contract Documents, OWNER's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

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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 and will not be changed without written consent of OWNER and ENGINEER.

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 9.10, and 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 responsibilities and authority and limitations thereon of any such Resident Project Representative and assistants will be as provided in paragraph 9.10 and in the Supplementary Conditions. If OWNER designates another representative or agent to represent OWNER at the Site who is not ENGINEER's Consultant, agent or employee,

\*See Supplementary Conditions

the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Clarifications and Interpretations*

A. ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents as ENGINEER may determine necessary, which shall be consistent with the intent of and reasonably inferable from the Contract Docu-

ments. Such written clarifications and interpretations will be binding on OWNER and CONTRACTOR. 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, that should be allowed as a result of a written clarification or interpretation, a Claim may be made therefor as provided in paragraph 10.05.

#### 9.05 *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 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, as a result of a Field Order, a Claim may be made therefor as provided in paragraph 10.05.

#### 9.06 *Rejecting Defective Work*

A. ENGINEER will have authority to disapprove or 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.

#### 9.07 *Shop Drawings, Change Orders and Payments*

A. In connection with ENGINEER's authority as to Shop Drawings and Samples, see paragraph 6.17.

B. In connection with ENGINEER's authority as to Change Orders, see Articles 10, 11, and 12.

C. In connection with ENGINEER's authority as to Applications for Payment, see Article 14.

#### 9.08 *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.

#### 9.09 *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. Claims, disputes and other matters relating to the acceptability of the Work, the quantities and classifications of Unit Price Work, the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, and Claims seeking changes in the Contract Price or Contract Times will be referred initially to ENGINEER in writing, in accordance with the provisions of paragraph 10.05, with a request for a formal decision.

B. When functioning as interpreter and judge under this paragraph 9.09, 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. The rendering of a decision by ENGINEER pursuant to this paragraph 9.09 with respect to any such Claim, dispute, or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.07) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such Claim, dispute, or other matter.

\*See Supplementary Conditions

#### 9.10 *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 9.10 shall also apply to ENGINEER's Consultants, Resident Project Representative, and assistants. See Article 18.

## ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

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### 10.01 *Authorized Changes in the Work*

A. Without invalidating the Agreement 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 Written Amendment, 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.B.

### 10.03 *Execution of Change Orders*

A. OWNER and CONTRACTOR shall execute appropriate Change Orders recommended by ENGINEER (or Written Amendments) 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 notice 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) is required by the provisions of any Bond to be given to a surety, 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 and Disputes*

A. *Notice:* Written notice stating the general nature of each Claim, dispute, or other matter 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. Notice of the amount or extent of the Claim, dispute, or other matter 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, dispute, or other matter). 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 Time 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).

B. *ENGINEER's Decision:* ENGINEER will render a formal decision in writing within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any. ENGINEER's written decision on such Claim, dispute, or other matter will be final and binding upon OWNER and CONTRACTOR unless:

1. an appeal from ENGINEER's decision is taken within the time limits and in accordance with the dispute resolution procedures set forth in Article 16; or

2. if no such dispute resolution procedures have been set forth in Article 16, a written notice of intention to appeal from ENGINEER's written decision is delivered by OWNER or CONTRACTOR to the other and to ENGINEER within 30 days

after the date of such decision, and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction within 60 days after the date of such decision or within 60 days after Substantial Completion, whichever is later (unless otherwise agreed in writing by OWNER and CONTRACTOR), to exercise such rights or remedies as the appealing party may have with respect to such Claim, dispute, or other matter in accordance with applicable Laws and Regulations.

C. If ENGINEER does not render a formal decision in writing within the time stated in paragraph 10.05.B, a decision denying the Claim in its entirety shall be deemed to have been issued 31 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any.

D. No Claim for an adjustment in Contract Price or Contract Times (or Milestones) will be valid if not submitted in accordance with this paragraph 10.05.

ARTICLE 11 - COST OF THE WORK; CASH ALLOWANCES; UNIT PRICE WORK

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11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs 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 include only the following items, and shall not include any of the costs itemized in paragraph 11.01.B.

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 at the Site. 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, 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, expressage, and similar petty cash items in connection with the Work.

i. When the Cost of the Work is used to determine the value of a Change Order or of a Claim, the cost of premiums for additional Bonds and insurance required because of the changes in the Work or caused by the event giving rise to the Claim.

j. When all the Work is performed on the basis of cost-plus, 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, 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 and 11.01.B.

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 *Cash 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 as may be acceptable to OWNER and ENGINEER. CONTRACTOR agrees that:

1. the 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

2. CONTRACTOR's costs for unloading and handling on the Site, labor, installation costs, overhead, profit, and other expenses contemplated for the 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.

B. 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. 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 9.08.

B. 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.

C. 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 any other item of Work; and
3. if 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

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12.01\* *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order or by a Written Amendment. 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 paragraph 12.01.C.2.a 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;

\*See Supplementary Conditions

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 (or Milestones) may only be changed by a Change Order or by a Written Amendment. Any Claim for an adjustment in the Contract Times (or Milestones) 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 (or Milestones) covered by a Change Order or of any Claim for an adjustment in the Contract Times (or Milestones)

will be determined in accordance with the provisions of this Article 12.

#### 12.03 *Delays Beyond CONTRACTOR's Control*

A. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) 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.

#### 12.04 *Delays Within CONTRACTOR's Control*

A. The Contract Times (or Milestones) will not be extended due to 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.

#### 12.05 *Delays Beyond OWNER's and CONTRACTOR's Control*

A. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Times (or Milestones) in an amount equal to the time lost due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay.

#### 12.06 *Delay Damages*

A. In no event shall OWNER or ENGINEER be liable to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from:

1. delays caused by or within the control of CONTRACTOR; or

2. delays beyond the control of both OWNER and CONTRACTOR including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God, or acts or neglect by utility

owners or other contractors performing other work as contemplated by Article 7.

B. Nothing in this paragraph 12.06 bars a change in Contract Price pursuant to this Article 12 to compensate CONTRACTOR due to delay, interference, or disruption directly attributable to actions or inactions of OWNER or anyone for whom OWNER is responsible.

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

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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. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02\* *Access to Work*

A. OWNER, ENGINEER, ENGINEER's Consultants, 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, inspecting, and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's Site 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 said paragraph 13.04.B; 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, it must, if requested by ENGINEER, be uncovered 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. If it is found that such 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. If, however, such 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 Milestones), 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.

\*See Supplementary Conditions

#### 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. 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).

#### 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 Laws or Regulations or 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: (i) repair such defective land or areas, or (ii) correct such defective Work or, if the defective Work has been rejected by OWNER, remove it from the Project and replace it with Work that is not defective, and (iii) 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. If CONTRACTOR does not promptly comply with the terms of such 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, and 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.

B. 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 or by Written Amendment.

C. 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.

D. 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 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 and remedy any such deficiency.

B. In exercising the rights and remedies under this paragraph, OWNER shall proceed expeditiously. In connection with such corrective and 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 (or Milestones) 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

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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 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 pro-gress payments will be as stipulated in the Agreement.

\*See Supplementary Conditions

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 on the Site 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, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.08, and to 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: (i) 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 (ii) that 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 to supervise, direct, or control the Work or for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for CONTRACTOR's failure to comply with Laws and Regulations applicable to CONTRACTOR's performance of the Work. Additionally, said review or recommendation will not impose responsibility on ENGINEER to make any examination to ascertain how or for what purposes CONTRACTOR has used the moneys paid on account of the Contract Price, or 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 referred to 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 Written Amendment or 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 must 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 corrects to OWNER's satisfaction the reasons for such action.

3. If it is subsequently determined 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.

#### 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. Promptly thereafter, 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. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and 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. 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.

B. OWNER shall have the right to exclude CONTRACTOR from the Site after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

#### 14.05 *Partial Utilization*

A. Use by OWNER at OWNER's option of 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, may be accomplished prior to Substantial Completion of all the Work subject to the following conditions.

1. OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees that such part of the Work is substantially complete, CONTRACTOR will certify to OWNER and ENGINEER that such part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. 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. 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.

2. No 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: (i) all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by subparagraph 5.04.B.7; (ii) consent of the surety, if any, to final payment; and (iii) 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 or OWNER's property might in any way be responsible 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. *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 will become due and, when due, 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 and recommendation of ENGINEER, and without terminating the Agreement, 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 writing which are still unsettled.

### ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

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#### 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 allowed 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 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 the surety, if any) seven days written notice, terminate the services of CONTRACTOR, 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), 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 finish the Work as OWNER may deem expedient. In such case, CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. 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.

C. 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.

#### 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, elect to terminate the Contract. In such case, CONTRACTOR shall be paid (without duplication of any items):

1. for 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. for 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. for 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. for 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, the Work is suspended for more than 90 consecutive days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within 30 days after it is submitted, or 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. 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. Dispute resolution methods and procedures, if any, shall be as set forth in the Supplementary Conditions. If no method and procedure has been set forth, and subject to the provisions of paragraphs 9.09 and 10.05, OWNER and CONTRACTOR may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any dispute.

### ARTICLE 17 - MISCELLANEOUS\*

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#### 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 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 if 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, and 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 Agreement.

17.05 *Controlling Law*

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

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## SUPPLEMENTARY CONDITIONS

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Article Number	Title
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## SUPPLEMENTARY CONDITIONS

### AMENDMENTS TO GENERAL CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (No. 1910-8, 1996 edition) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

#### ARTICLE I. DEFINITIONS AND TERMINOLOGY

Add the following language at the beginning of definition I.QI A.12 entitled "Contract Documents" in the General-Conditions:

"The Advertisement for Bids, Instructions to Bidders, State Regulations, ..."

Delete the words "The individual or entity named as such in the Agreement" in 1.01.A.19 and insert the following in their place:

"The individual or entity duly appointed by the Owner to undertake the duties and powers herein assigned to the Engineer, acting either directly or through duly appointed representatives."

Delete the words "and who is identified as such in the Supplementary Conditions" at the end of definition 1.01 A.20, entitled "ENGINEER'S Consultant."

Delete definition 1.01 A.41 entitled "Specifications" in the General Conditions in its entirety and insert the following in its place:

"Sections included under Division 1 through Division 16 of the Contract Documents:"

#### ARTICLE 2. PRELIMINARY MATTERS

##### SC-2.05

Delete paragraph 2.0SC of the General Conditions in its entirety and insert the following in its place:

"C. Evidence of Insurance: CONTRACTOR shall deliver to OWNER, with a copy to the ENGINEER, Certificates of Insurance within 10 days after receipt of the notice of the acceptance of bid (and other evidence requested by OWNER) which CONTRACTOR is required to purchase and maintain in accordance with the requirements of Article 5."

ARTICLE 3. CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE  
SC-3.0

Add the following sentence at the end of Paragraph 3.01A of the General Conditions:

"...by all. Each and every provision of law and clause required by law to be inserted in these Contract Documents shall be deemed to be inserted herein, and they shall be read and enforced as though it were included herein, and if through mistake or otherwise, any such provision is not inserted, or if not correctly inserted, then upon the application of either party, the Contract Documents shall forthwith be physically amended to make such insertion."

ARTICLE 4. AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS;  
REFERENCE POINTS

SC-4.02

Delete the term "Supplementary Conditions" of paragraph 4.02 A of the General Conditions and replace it with "Contract Documents".

SC-4.04

Change "of" to "or" on line 6 of paragraph 4.04 B.2 of the General Conditions. Delete the following words from lines 8 and 9 of paragraph 4.04 B.2 of the General Conditions:

"...Or not shown or indicated with reasonable accuracy..."

SC-4.05

Add a new paragraph immediately after paragraph 4.05A of the General Conditions which is to read as follows:

B. ENGINEER may check the lines elevations and reference marks set by CONTRACTOR, and CONTRACTOR shall correct any errors disclosed by such check. Such a check shall not be considered as approval of CONTRACTOR'S work and shall not relieve CONTRACTOR of the responsibility for construction of the entire Work in accordance with the Contract Documents. CONTRACTOR shall furnish personnel to assist ENGINEER in checking lines and grades."

SC-4.06

Delete the term Supplementary Conditions in paragraph 4.06A of the General Conditions and replace it with "Contract Documents".

ARTICLE 5. BOND AND INSURANCE

NOTICE TO CONTRACTOR:

1. Proof of Insurance coverage shall be furnished to the OWNER in accordance with the schedule for submittal of Bonds and Agreements.
2. Additionally refer to Article 2. PRELIMINARY MATTERS, Paragraph SC-2.05.C

SC-5.01

Insert these sentences following SC-5.01.A: The Surety Company providing the bonds shall have a rating of A or better within the Best Key Rating Guide and be licensed by the Massachusetts Division of Insurance. The contractor shall pay the premiums for such Bonds.

SC-5.03

Delete the second sentence following SC-5.03.A: of the General Conditions, which beings "OWNER shall deliver to..."

SC-5.04

The limits of liability for the insurance required by paragraph 5.04A of the General Conditions shall provide coverage for not less than the following amounts or greater where required by law:

5.4 A.1 and 5.04 A.2 Worker's Compensation

(1) Worker's Compensation	Statutory Requirements
(2) Coverage B - Employer's Liability	\$100,000/\$500,000/\$100,000

5.04 A.3, 5.04 A.4, and 5.04 A.5 Commercial General Liability Limits shall include Coverage for... independent Contractors, Personal Injury, Owners and Contractors Protective Liability, Explosion, Underground and Collapse, Broad Form Property Damage, Blanket Contractual Liability per locations/project endorsement.

Commercial General Liability	\$1,000,000/\$2,000,000
Products/completed Operations	\$2,000,000 Aggregate

5.4 A.6 Automobile Liability for owned, hired and non-owned vehicles:

(1) Bodily injury:	\$1,000,000/\$1,000,000	Each person
	\$1,000,000/\$1,000,000	Each accident
(2) Property damage	\$1,000,000	Each occurrence

*The following indemnity agreement: shall be made part of this contract:*

1.To the fullest extent permitted by law, Contractor(s) hereby acknowledges and agrees that it shall indemnify, hold harmless and defend the Engineer, the Owner, the Engineer and any of their officers, directors, employees, agents, affiliates, subsidiaries and partners from and against all-claims, damages, losses and expenses, including but not limited to, attorney's fees, arising out of or resulting from the performance of the contractor's work under this contract, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury to or destruction of tangible property (other than to the work itself) including loss of use resulting therefrom, and (2) is (CAUSED) in whole or in part by any



negligent acts omissions of the contractor, its employees, agents or contractors or anyone directly or indirectly employed by any of them, or anyone whose acts any of them may be liable.

2. The Contractor hereby acknowledges its obligation under the foregoing paragraph to indemnify the Engineer and Owner against judgments suffered because of the contractor's work and to assume the cost of defending the Engineer and Owner against claims as described in the foregoing paragraph.

A. Engineer and Owner shall be named as Additional Insured on contractors General Liability and Umbrella Liability Contractors.

The Contractual Liability required by paragraph s.04n.4 of the General Conditions shall provide coverage for not less than the following amounts:

- |  |   |
|--|---|
| (1) Bodily injury:   | \$1,000,000 Each occurrence<br>\$1,000,000 Annual aggregate |
| (2).Property damage, including explosion, collapse and underground coverage: | \$1,000,000 Each occurrence<br>\$1,000,000 Annual aggregate |

#### SC-5.04

Add two new paragraphs immediately after paragraph-5.04B of the General Conditions, which are to read as follows:

"C. The CONTRACTOR shall also provide:

1. CONTRACTOR shall, as a minimum, purchase and maintain excess liability insurance in the umbrella form with a combined single limit of not less than \$5,000,000 per claim and in the aggregate. Evidence of such excess liability shall be delivered to OWNER in accordance with paragraph 2.0SC in the form of a certificate indicating the policy numbers and limits of liability of all underlying insurance.

A. General Liability, Workers' Compensation, Automobile Liability and Umbrella Liability Policies will contain waivers of subrogation in favor of the Engineer and Owner.

2. If the aggregate limits of liability indicated in CONTRACTOR' insurance provided in accordance with paragraphs 5.03 and 5.04 are not sufficient to cover all claims for damages arising from his operations under this Contract and from any other work performed by him or if policies of insurance do not provide that the aggregate limits of liability for bodily injury and property damage apply to each contract or project separately, CONTRACTOR shall have such policies amended so that the aggregate limits of liability required by this Contract will be available to cover all claims for damages due to operations under this Contract."

#### SC-5.05

Delete paragraph 5 .05 of the General Conditions in its entirety.

SC-5.06

Delete Paragraph 5.06 A of the General Conditions in its entirety and insert the following in its place:

"A. CONTRACTOR shall purchase and maintain, until final payment, property insurance upon the Work at the site in an amount equal to the total bid price for the completed construction. This insurance shall include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER and ENGINEERS consultants in the Work, shall insure against the perils of fire and extended coverage, shall include "all risk" insurance for physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage, and shall include damages, losses and expenses rising out of or resulting from any insured loss or incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers, architects, attorneys and other professionals). This insurance shall be provided on the completed value form.' If not covered under the "all risk" insurance or otherwise provided in these Supplementary Conditions, CONTRACTOR shall purchase and maintain similar property insurance on portions of the Work stored on and off the site or in transit when such portions of the Work are to be included in an Application for Payment." A \$20,000 deductible shall be acceptable. Any other deductible amount shall be approved in advance by the OWNER and any deductible amount shall be borne by the CONTRACTOR.

Delete paragraph 5.068 of the General Conditions in its entirety.

Delete Paragraph 5.06C of the General Conditions in its entirety and insert the following in its place:

"C. All the policies of insurance (or the certificates or other evidence thereof) required to be purchased and maintained by CONTRACTOR in accordance with paragraphs 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 thirty days' prior written notice has been given to OWNER by certified mail and will contain waiver provisions in accordance with paragraph 5.078. The words "**Endeavor** to" shall be struck from the Certificate Of Insurance in the Cancellation Statement"

Delete paragraph 5.06D of the General Conditions in its entirety.

Delete paragraph 5.06E of the General Conditions in its entirety.

SC-5.07

Amend the last sentence of paragraph 5.07A of the General Conditions by striking out the words "held by OWNER as trustee or." As so amended, paragraph 5.07A remains in effect.

SC-5.08

Delete paragraph 5.08A of the General Conditions in its entirety.

Delete paragraph 5.0813 of the General Conditions in its entirety.

SC-5.09

Delete paragraph 5.09A of the General Conditions in its entirety and insert the following in its place:

"A. If OWNER has any objection to the coverage afforded by or other provisions of the insurance required to be purchased and maintained by CONTRACTOR in accordance with this Article 5 on the basis of its not complying with the Contract Documents, OWNER will notify CONTRACTOR in writing thereof within thirty days of the date of delivery of such certificates to OWNER in accordance with paragraph 2.0SC. CONTRACTOR will provide such additional information in respect of insurance provided by him as OWNER may reasonably request."

ARTICLE 6. CONTRACTOR'S RESPONSIBILITIES

SC-6.01

Delete paragraph 6.01B of the General Conditions in its entirety and replace with the following:

"B. At the site of the Work the CONTRACTOR shall employ a full-time construction superintendent or foreman who shall have full authority to act for the CONTRACTOR. It is understood that such representative shall be acceptable to the ENGINEER and shall be one who will be continued in the capacity for the particular job involved unless the representative ceases to be on the CONTRACTOR'S payroll. If at any time during the Work the representative is deemed by the ENGINEER to be no longer acceptable, the representative shall be promptly replaced by the CONTRACTOR. All communications to the superintendent shall be as binding as if given to the CONTRACTOR."

SC-6.04

Add the following paragraph after paragraph 6.04 A.2 of the General Conditions: -

"B. The CONTRACTOR's resident superintendent shall attend monthly progress meetings at the site of the work with the ENGINEER and others as appropriate to review schedule status and such other pertinent subjects as may be listed on the agenda by the ENGINEER."

SC-6.17

In paragraph 6.17 E.1 of the General Conditions, delete the word "timely" from the first line.

SC-6.20

Delete paragraph 6.20A of the General Conditions in its entirety and replace with the following:

"A. To the fullest extent permitted by law, the CONTRACTOR shall indemnify and hold harmless the OWNER, the ENGINEER, ENGINEER'S consultants, and their agents and employees from and against all claims, damages, losses and expenses, including but not limited to attorneys fees, arising out of or resulting from the performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness,

disease or death, or to injury to or destruction of tangible property (other than the Work itself) including loss of use resulting therefrom, but only to the extent caused in whole or in part by acts or omissions of the CONTRACTOR, a subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall apply to any such claims, damages, losses and expenses which arise and/or are incurred by any person or entity either during the performance of the Work and/or alter completion of construction. Nothing in this paragraph shall be construed to negate, abridge, or reduce other rights or obligations of indemnity or contribution which would otherwise exist as to a party or person indemnified hereunder. CONTRACTOR hereby assumes the responsibility and liability for injury to or death of any and all persons, including the. CONTRACTOR's employees, and for any and all damage to property caused by, resulting from, or arising out of any act, omission or neglect on the part of the CONTRACTOR, or of any Subcontractor or of anyone directly or indirectly employed by any of them or of anyone for whose acts, any of them may be liable."

Delete paragraph 6.20C of the General Conditions in its entirety.

#### ARTICLE 8. OWNER'S RESPONSIBILITIES

##### SC-8.06

Delete paragraph 8.06A of the General Conditions in its entirety.

#### ARTICLE 9. ENGINEER'S STATUS DURING CONSTRUCTION

##### SC-9.01

Add a new paragraph 9.0113 after paragraph 9.01A of the General Conditions, which is to read as follows:

"B. Nothing contained in the Contract Documents shall be construed to create a contractual relationship of any kind (1) between the ENGINEER and CONTRACTOR, (2) between the OWNER and a Subcontractor or Subcontractors, or (3) between any person or entities other than the OWNER and CONTRACTOR. The ENGINEER shall, however, be entitled to performance and enforcement of obligations under the CONTRACT DOCUMENTS intended to facilitate performance of the ENGINEERS duties."

#### ARTICLE 11. COST OF THE WORK; CASH ALLOWANCES; UNIT PRICE WORK

Delete Article 11 of the General Conditions in its entirety and replace with the following:

"A. The unit price of an item of Unit Price work shall be subject to reevaluation and adjustment under the following conditions:

(1) If the total extended bid price [Estimated Quantity times the Bid Unit Price] of a particular item of Unit Price Work amounts to 5 percent or more of the Original Contract Price and the variation in the quantity of the particular item of Unit Price Work performed by CONTRACTOR differs by more than 15 percent from the estimated quantity of such item indicated in the Agreement;  
and

(2) If there is no corresponding adjustment with respect to any other item of work; and

(3) If CONTRACTOR believes that CONTRACTOR has incurred additional expense as a result thereof, CONTRACTOR may make a claim for an adjustment in the Contract Price in accordance with Article 11- if the parties are unable to agree as to the effect of any such variations in the quantity of Unit Price Work performed. If OWNER believes that the quantity variation entitles OWNER to an adjustment in the unit price, OWNER shall be entitled to an adjustment in the unit price in an amount determined by the ENGINEER. ENGINEER shall not be liable in connection with any determination relating to adjustments which is rendered in good faith."

## ARTICLE 12. CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

### SC-12.06

Add the following new paragraphs after paragraph 12.06 of the General Conditions:

"12.07 Liquidated Damages:

A. If the CONTRACTOR shall neglect, fail or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the OWNER, then the CONTRACTOR does hereby agree, as a part consideration for the awarding of this Contract, to pay to the OWNER the amount specified in the Contract, not as a penalty but as liquidated damages for such breach of contract as hereinafter set forth, for each and every calendar day that the Contract shall be in default after the time stipulated in the Contract for completing the work. Such damages may be retained from time to time by the OWNER from progress payments or any amounts owing to the CONTRACTOR, or otherwise collected.

B. The said amount is fixed and agreed upon by and between the CONTRACTOR and the OWNER because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the OWNER would in such event sustain, and said amount is agreed to be the amount of damages which the OWNER would sustain and said amount shall be retained from time to time by the OWNER from current periodical estimates.

C. It is further agreed that time is of the essence of each and every portion of this Contract and of the specifications wherein as definite and certain length of times is fixed for the performance of any act whatsoever; and where under the Contract an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall be of the essence of this Contract. Provided that the CONTRACTOR shall not be charged with liquidated damages of any excess cost when the OWNER determines that the CONTRACTOR is without fault and the CONTRACTOR'S reasons for the time extension are acceptable to the OWNER; Provided, further, that the CONTRACTOR shall not be charged with liquidated damages or any excess cost when the delay in completion of the work is due:

1) to any preference, priority or allocation order duly issued by the Government;

2) to unforeseeable cause beyond the control and without the fault or negligence of the CONTRACTOR, including, but not restricted to, acts of God, or of the public enemy, acts of the OWNER, acts of another CONTRACTOR in the performance of a contract with the OWNER, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and severe weather; and

3) to any delays of subcontractors or suppliers occasioned by any of the causes specified in subsections C(1) and C(2) above;

D. Provided, further, that the CONTRACTOR shall, within ten (10) days from the beginning of such delay, unless the OWNER shall grant a further period of time prior to the date of final settlement of the Contract, notify the OWNER, in writing, of the causes of the delay, who shall ascertain the facts and extent of the delay and notify the CONTRACTOR within a reasonable time of its decision in the matter."

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

##### SC-13.07

Delete paragraph 3.07A of the General Conditions and insert the following in its place:

"A. If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or 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, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions: (i) correct such defective work, or, if it has been rejected by OWNER, remove it from the site and replace it with work that is not defective, and (ii) satisfactorily correct or remove and replace any damage to other work or the work of others therefrom. If CONTRACTOR does not begin the repairs ten (10) days of receipt of written notification and promptly comply with the terms of OWNER's written instructions, or in an emergency when delay would cause serious risk, loss or damage, OWNER may have the defective work corrected or the rejected work removed and replaced, and all claims, costs, losses and damages caused by or resulting from such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by CONTRACTOR."

##### SC-13.09

Revise paragraph 13.09A of the General Conditions

A. Delete the word "seven" and replace it with the word "ten" so that it reads "after ten days written notice to CONTRACTOR."

#### ARTICLE 14. PAYMENTS TO CONTRACTOR AND COMPLETION

##### SC-14.02

Delete paragraph 14.02A.3 and insert the following in its place:

"3. Retainage with respect to progress payments will be five percent or, if stipulated, the maximum allowed by law."

Add Paragraph 4. to read as follows:

"4. The CONTRACTOR shall submit Weekly Payroll Records Report and Statement of

Compliance verifying compliance with the Minimum Prevailing Wage Law, MGL ch. 149, Sections 26-27H. "These Statements of Compliance shall be submitted as a condition of payment for work performed during the period the reports apply."

#### SC-14.03

Delete paragraph 14.03A in its entirety and insert the following in its place:

"A CONTRACTOR warrants and guarantees that title to all work, material and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER no later than at the time of Application for Payment free and clear of all liens. CONTRACTOR shall provide written transfer of title and a certified paid invoice provided by the supplier."

### ARTICLE 15. SUSPENSION OF WORK AND TERMINATION

#### SC-15.02

Add a new paragraph immediately after paragraph 15.02 AA of the General Conditions which is to read as follows:

"5. If the Work to be done under this Contract shall be abandoned, or if this Contract or any part thereof shall be sublet, without the previous written consent of OWNER, or if the contract or any claim thereunder shall be assigned by CONTRACTOR otherwise than as herein specified;"

### ARTICLE 17. MISCELLANEOUS

#### SC-17.06, 17.07, 17.08, 17.09

Add the following new paragraphs after paragraph 17.05 of the General Conditions:

"17.06 Assignment:

A. The CONTRACTOR shall not assign the whole or any part of this Contract or any moneys due or to become due hereunder until thirty (30) days prior notice in writing has been given to the OWNER of the intention to assign, which notice shall state the identity and address of the prospective assignee. No assignment shall be made without the OWNER's prior written consent. Such consent shall not be unreasonably withheld. In case the CONTRACTOR assigns all or any part of the moneys due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any moneys due or to become due to the CONTRACTOR shall be subject to prior claims of all persons, firms and corporations of services rendered or materials supplied for the performance of the work called for in this Contract."

#### 17.7 Liability

It is understood and agreed that members of the OWNER or the ENGINEER' or any agent or employees of the OWNER signing this Agreement shall not be personally liable hereunder for any action incurred in connection with this Agreement.

#### 17.8 State Statutes and Regulations

See Superseding Changes To General & Supplementary Conditions 12/29/04 for further modifications of the General Conditions due to state statutes and regulations.

#### 17.9 Severability

If any provision of this Agreement shall be invalid or unenforceable to any extent or in any application, then the remainder of this Agreement and of such terms and conditions, except to such extent or in such application, shall not be affected thereby, and each and every term and condition of this Agreement shall be valid and enforced to the fullest extent and in the broadest application permitted by law."

END OF SECTION



**STATE STATUTES AND REGULATIONS  
COMMONWEALTH OF MASSACHUSETTS**

A. REVISIONS TO GENERAL CONDITIONS

1. Definitions
2. Subsurface Conditions Found Different
3. Subcontracting
4. Permits
5. Contractor Records
6. Massachusetts Sales and Use Tax I
7. Clarifications and Interpretations
8. Change of Contract Price
9. Payments
10. Suspension of Work and Termination
11. Labor Classification and Minimum Wage Rates

B. OTHER REGULATORY REQUIREMENTS

1. Working Hours
2. DEP Community Sound Level Criteria

ATTACHMENT A – Wage Rates

ATTACHMENT B

Excerpts from Chapter 149 and Chapter 30 of the Massachusetts General Law

ATTACHMENT C - (not used on this project)

Special Provisions for Minority/Women Business Enterprises and the Commonwealth of Massachusetts Supplemental Equal Employment Opportunity Anti-Discrimination and Affirmative Action Program.

ATTACHMENT D--

Change Orders

A. REVISIONS TO GENERAL CONDITIONS:

1. Definitions

The term "AWARDING AUTHORITY," as used herein, shall be considered to be synonymous with the term "OWNER," described in definition 1.01 A.30.

Delete definition 1.01 A.43 entitled "Substantial Completion" in the General Conditions in its entirety and insert the following in its place:

"Substantial Completion shall be interpreted in accordance with Massachusetts General Law Chapter 30, Section 39G or -39K as appropriate."

2. Subsurface Conditions Found Different

Add the following sentence to the end of paragraph 4.03A of the General Conditions:

"...to do so. Adjustments resulting from subsurface or latent physical conditions will be in accordance with Massachusetts General Law Chapter 30, Section 39N."

3. Subcontracting

Add the following language at the end of paragraph 6.06F of the General Conditions:

"Except as required otherwise by Massachusetts General Law Chapter 149, Section 44F, for Work governed by Chapter 149, sections 44A through 44H."

4. Permits

Delete paragraph 6.08A of the General Conditions in its entirety and insert the following in its place:

"A. The AWARDING AUTHORITY shall be responsible for identifying and obtaining all federal, state, and local permits required by the nature and location of construction, including but not limited to railroad permits, building construction permits, and permits for street and highway cuts and openings. CONTRACTOR shall be responsible for obtaining all permits required of his equipment, work force, or particular operations (such as blasting) in the performance of the Work and not otherwise specified to be obtained by the AWARDING AUTHORITY. These permit fees shall be paid by CONTRACTOR. 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."

5. Contractor Records

Add a new paragraph immediately after paragraph 6.09C of the General Conditions, which is to read as follows:

"D. The CONTRACTOR shall comply with all applicable provisions Chapter 30, Section 39R of the Massachusetts General Laws Regarding, CONTRACTOR'S records."

6. Massachusetts Sales and Use Tax

Add the following paragraph after paragraph 6.10A of the General Conditions:

"B. The material and supplies to be used by the CONTRACTOR in the Work of this Contract are exempt from the Sales and Use Tax of the Commonwealth of Massachusetts. The AWARDING AUTHORITY tax exemption certificate number will be furnished to the CONTRACTOR."

7. Clarifications and Interpretations

Add the following language at the end of paragraph 9.04A of the General Conditions:

"The ENGINEER'S interpretation will be made in accordance with the requirements of Massachusetts General Law Chapter 30, Section 39P."

8. Change of Contract Price

Delete paragraphs 11.01, 11.02, and 12.01 of the General Conditions, having to do with Change of Contract Price. Changes in contract price will be governed by the section called "Change Orders" in Attachment D, Section XXX and Article 11 in the Supplementary Conditions.

9. Payments

Delete paragraph 12.028.1 of the General Conditions, in its entirety and insert the following in its place:

"1. Progress Payments will be made in accordance with the Massachusetts General Law Chapter 30, Section 39G or 39K, as applicable."

Add the following new paragraph following paragraph 14.02C.1 of the General Conditions:

"2. The CONTRACTOR shall make payments to Subcontractors in accordance with the requirements of Massachusetts General Law Chapter 30, Section 39F."

Delete paragraph 14.07B of the General Conditions in its entirety and insert the following in its place:

"1. If, on the basis of the ENGINEER's observation of the Work during construction and final inspection and, upon the ENGINEER's review of the final Application for Payment and accompanying documentation, the ENGINEER is satisfied that the Work has been completed and that the CONTRACTOR's other obligations under the Contract Documents have been fulfilled, the ENGINEER will indicate in writing his recommendation of payment and present the Application to the AWARDING AUTHORITY for payment. Thereupon the ENGINEER will give written notice to the AWARDING AUTHORITY and the CONTRACTOR that the Work is acceptable subject to the provisions of paragraph 14.15. Otherwise, the ENGINEER will return the Application to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment. In such case the CONTRACTOR shall make the

necessary corrections and resubmit the Application. If the Application and accompanying documentation are appropriate as to form and substance, the AWARDING AUTHORITY shall in accordance with the applicable Massachusetts General Law, pay the CONTRACTOR the amount recommended by the ENGINEER."

10. Suspension of Work and Termination

Delete paragraph 15.01A of the General Conditions in its entirety and insert the following in its place:

"A. The AWARDING AUTHORITY may order, at any time and without cause, the CONTRACTOR to suspend or delay the Work in accordance with Massachusetts General Law Chapter 30, Section 39-0."

11. Labor Classifications and Minimum Wage Rates

Add the following paragraphs under the heading "Wage Rates" after paragraph 17.10 of the Supplementary Conditions:

"17.11 Wage Rates

- A. Minimum wage rates as determined by the Commissioner of the Department of Labor and Industries under the provisions of Massachusetts General Laws Chapter 149, Sections 26-270 apply to this project. A copy of the wage schedule is included in the front end of the specifications under Federal Minimum Wage Rates. If, after the Notice of Award, it becomes necessary to employ any person in a trade or occupation not classified in the wage determinations, such person shall be paid at not less than such rates as shall be determined by the Commissioner. Such approved minimum rate shall be retro- active to the time of the initial employment of such person in such trade or occupation. The CONTRACTOR shall notify the AWARDING AUTHORITY of its intention to employ persons in trades or occupations not classified in the wage determinations as soon as possible in order to allow sufficient time for the AWARDING AUTHORITY to obtain approved rates for such trades or occupations.
- B. The schedule of wages referred to above are minimum rates only, and the AWARDING AUTHORITY will not consider any claims for additional compensation made by CONTRACTOR because of payment by the CONTRACTOR of any wage rate in excess of the applicable rate contained in the Contract.
- C. The said schedule of wages shall continue to be the minimum rates to be paid during the life of this Agreement and a legible copy of said schedule shall be kept posted in a conspicuous place at the site of the Work.
- D. CONTRACTOR and subcontractors shall submit a copy of weekly payroll records to the AWARDING AUTHORITY and the AWARDING AUTHORITY shall retain the records of a minimum of three years."

B. OTHER REGULATORY REQUIREMENTS:

1. Working Hours

No laborer, workman, mechanic, foreman, or inspector, working within the Commonwealth, in the employ of the CONTRACTOR, subcontractor, or other person doing or contracting to do the whole or a part of the work contemplated by this contract, shall be required or permitted to work more than eight hours in any one day or more than forty-eight hours in any one week, or more than six days in any one week, except in cases of emergency.

2. DEP Community sound Level Criteria

The Community Sound Level Criteria as established by the Commonwealth of Massachusetts Department of Environmental Protection (DEP) must be conformed to prior to the AWARDING AUTHORITY's acceptance of the structure. The following sound level criteria must be met at the construction site:

- A. The increase in the broad band noise level shall not be in excess of ten (10) dB(A) above ambient at the station boundary. The ambient level is defined as the A-weighted noise level that is exceeded ninety (90) percent of the time measured during the period in question.
- B. The primary noise source(s) shall not produce a puretone condition. Puretone is any given octave band center frequency that exceeds the two adjacent center frequencies by three (3) or more decibels.

END OF SECTION

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**SUPERSEDING CHANGES TO  
GENERAL AND SUPPLEMENTARY CONDITIONS**

1. GENERAL CONDITIONS

2.06A - insert at end: Said conference shall be scheduled and arranged by the Contractor. I

4.01B - delete

4.06G - delete

5.07B - delete

6.17E - restore the word "timely" in the first line. Delete the word "only" from the 5" line. Where "only" has been deleted, insert "to determine their general conformance with the contract documents, in accordance with good and accepted engineering practices, and".

8.02A - delete "to whom contractor makes no reasonable objection".

9.02A - Insert, after "Work" in the 6" line, "While construction is active at the project, said visits and inspections will take place at least once per week."

12.06 - delete subparts A and B, and replace with the following: "The Contractor hereby agrees that the Contractor shall have no claim for damages of any kind against the Owner or the Engineer on account of any delay in the commencement of the Work and/or any delay in, or suspension of any portion of the Work, whether such delay is caused by the Owner, the Engineer, or otherwise. The Contractor acknowledges that the Contractor's sole remedy for any such delay and/or suspension will be an extension of time as provided in these general conditions.

No claims shall be allowed on account of the failure of the Engineer to furnish Drawings, specifications or instructions or to return Shop Drawings or Samples until the expiration of the applicable time period referenced in Mass. Gen. L. c. 30, §39P, and not then unless such claim be reasonable.

No extension of time shall be granted because of seasonable or abnormal variations in temperature, humidity or precipitation, which conditions shall be wholly at the risk of the Contract, whether occurring within the time originally scheduled for completion, or within any period of extension granted. There shall be no increase in the Contract Sum on account of any additional costs or operations or conditions resulting therefrom.

14.02C - change "Ten" to "Twenty-One"

14.07A(3) - delete the first three lines through the word "Owner,". In the third line, after Contractor, substitute "shall" for "may". In the fourth line, after the word "full" insert "on behalf of both Contractor and all of its Subcontractors,".

14.09A(1) - delete -

15.03B - add after "termination" ", with respect to this project or any other project of the Contractor."

Add "15.03C. If this Contract is terminated by Owner with or without cause, and regardless of whether said termination is rightful or wrongful, in no event shall the Contractor be paid a sum which, together with prior payments to Contractor, exceeds the sum payable to Contractor under the Agreement (Section 00520), as adjusted by any agreed change orders.

## II. SUPPLEMENTARY CONDITIONS

### Article V - Bonds and Insurance

Employer's liability coverage must be \$2 million per accident, \$2 million disease limits, and \$2 million per employee disease limits.

General liability insurance limits must be \$5 million aggregate, \$2 million dollars' products/completed operations aggregate; \$2 million personal injury and advertising; and \$2 million per occurrence.

The contractual liability insurance coverage must have limits corresponding to the foregoing. At 5.04A.6, the following changes should be made to paragraph I of the indemnity clause: four lines from the bottom, the parenthesis should be removed from the word "CAUSED" and the word "CAUSED" should be changed to lower-case (caused). Also, in the last line of said clause, insert the word "for" after the word "anyone."

At SC-5.04C 1 - insert the following sentence at the end: "The Contractor's excess liability insurance coverage must follow from with its underlying liability coverages."

SC-6.20A - insert the word "defend" after the word "shall" in the first line.

SC-14.02A.3 - insert the following sentence at the end: "Retainage for the entire project will be withheld until substantial completion of the entire project, at which time retainage shall be accounted for, subject to all of the other terms and conditions of payment at the time of substantial completion.

Add the following Article SC-18.

### SC-I 8 Arbitration - J

18.1 Controversies and Claims Subject to Arbitration. Any Claim arising out of or related to the Contract, or the breach thereof, except claims relating to aesthetic effect, shall be settled by arbitration, subject to the provisions of Subparagraph 18.7. Arbitration will be conducted in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association and judgment upon the award rendered by the Arbitrator or Arbitrators may be entered in any Court having jurisdiction thereof. In any such arbitration in which the amount stated in the demand is \$100,000 or less, a single arbitrator shall be appointed in accordance with the procedures set forth in the American Arbitration Association Construction Industry Arbitration Rules. In any such arbitration in which the amount stated in the demand is in excess of \$100,000, a panel of three arbitrators shall be appointed in accordance with the procedures set forth in the American Arbitration



Association Construction Industry Arbitration Rules. The parties may agree to use any arbitration service. In the absence of such agreement, the American Arbitration Association shall be utilized.

18.2 Rules For Arbitration. If the neutral arbitrator is appointed by the American Arbitration Association, the said Association shall administer the arbitration and its Construction Industry Arbitration Rules shall govern all aspects of the proceeding including the enforcement of any award. If the neutral arbitrator is not appointed by the American Arbitration Association, then the panel of arbitrators shall act as the administrator of the arbitration but the Construction Industry Arbitration Rules of the Association shall nonetheless govern all aspects of the proceeding, including the enforcement of any award. The arbitration panel shall have all the powers and duties conferred on the Association pursuant to said rules.

In addition, the following rules shall govern the selection of arbitrators and the proceedings:

18.2.1 Neither party may appoint as arbitrator an employee or an owner of that party, nor the parent, spouse or child of an employee or owner of that party.

18.2.2 After the neutral arbitrator has been appointed, neither party may engage in ex parte communication with the arbitrator appointed by that party.

18.2.3 Contract Performance During Arbitration. During arbitration proceedings, the Owner and Contractor shall otherwise continue their performances hereunder.

18.3 When a written decision of the Engineer states that the decision is final, any demand for arbitration of the matter covered by such decision must be made within two months after substantial completion of the project, as determined by the Engineer in accordance with the provisions hereof. The failure to demand arbitration within said two month period will result in the Engineer's decision becoming final and binding upon the Owner and the Contractor.

18.4 A Demand for arbitration shall be made with the time limits specified in Subparagraph 18.3, and in no event shall be made after the date when the institution of legal or equitable proceedings based on such Claim would be barred by the applicable statute of limitations.

18.5 Claims and Timely Assertion of Claims. A party who files a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded. When a party fails to include a claim through oversight, inadvertence or excusable neglect, or when a Claim has matured or been acquired subsequently, the arbitrator or arbitrators may permit amendment.

18.6 Judgment on Final Award. The award rendered by the arbitrator or arbitrators shall be final, and the judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

18.7 Notwithstanding any provision contained in this Paragraph 18 or elsewhere in the Contract Documents, the Owner reserves the following right in connection with claims and disputes between the Owner and Contractor:

1. the right to institute the legal action against the Contractor in any court of competent jurisdiction in-lieu of demanding arbitration pursuant to this paragraph 18, in which case the dispute or disputes which are the subject of such action shall be decided by such court, and not by arbitration.

2. the right to obtain from any court of competent jurisdiction a stay of any arbitration instituted by the Contractor, provided that the application for such stay is made before the appointment of the neutral arbitrator in such arbitration, in which case the dispute or disputes which are the subject of such arbitration shall be decided by such court, and not by arbitration;

3. the right to require the Contractor to join as a party in any arbitration between the Owner and Architect relating to the Project in which case the Contractor agrees to be bound by that decision of the arbitrator arbitrators in such arbitration.

In case the Owner elects to proceed in accordance with 18.7.1 or 18.7.2 above, the word "litigation", shall be deemed to replace the word "arbitration" wherever the latter word appears in the Contract Documents.

#### SC-19 MBE and WBE participation

The Contractor shall comply with the provision of G.L.c. 7 40N, and any associated regulations effective during the time of the project, relative to the participation of minority and women-owned businesses in connection with the project. At present, the current participation goals are 7.4% MBE and 4% WBE.

END OF SECTION

## EQUAL OPPORTUNITY REQUIREMENTS

### 1. EQUAL EMPLOYMENT OPPORTUNITY

A. Equal Employment Plan: The Contractor and each Subcontractor shall implement an effective affirmative action plan to assure equal employment opportunity throughout the performance of work on this project. Do not discriminate against any employee or applicant for employment because of race, color, sex, religion, age, or national origin. Affirmative action plan shall include, but not be limited to, the following:

1. Employment, upgrading, demotion, or transfer.
2. Recruitment or recruitment advertising.
3. Layoff or termination.
4. Rates of pay or other forms of compensation.
5. Selection for training, including apprenticeship.

B. Rules and Regulations: The Contractor and each Subcontractor shall comply with all applicable local, state and federal laws and regulations regarding equal employment opportunity and with the provisions of the following:

1.. Governors "Executive Order No. 74", dated July 20, 1970, entitled the "Governor's Code of Fair Practices", as amended by the Governor's Executive Order No. 116, dated May 1, 1975.

2. The Fair Employment Practices Law of the Commonwealth, Chapter 1518 of the General Laws of Massachusetts, as amended.

3. The rules and regulations of the Massachusetts Commission Against Discrimination as in force at the date of the Contract.

4. The rules, regulations and relevant orders of the United States Secretary of Labor, the Commonwealth of Massachusetts Department of Labor and Industries, and other authorities having jurisdiction as in force at the date of the Contract.

5. Governor's 'Executive Order No. 237'.

C. Employment Advertisements: State in all solicitations or advertisements for employees that all qualified applicants will receive consideration for employment without regard to race, color, sex, religion, age, or national origin.

D. Referral Notices: Direct special effort toward the recruitment of minority workers through the unions and through referral agencies representing the minority community.

E. Advising Labor Unions: Send to each labor union or representative of workers with which the Contractor has a collective bargaining agreement or other contract or understanding, a notice advising the labor union or workers' representative of the Contractor's equal employment opportunity commitment and post copies of these notices in conspicuous places available to employees and applicants for employment.

F. Posting: Post copies of equal opportunity employment notices in conspicuous places available to employees and applicants for employment and post notices setting forth the provisions of this non-discrimination equal employment opportunity clause.

G. Manning Table: Assume and be responsible for the affirmative duty of achieving the range of minority employment and women work force participation set forth in a manning table for the entire project. Submit a manning table at the request of the Owner and obtain Owners approval prior to the Award of Contract.

H. Percentage Participation: Both Contractor and Sub-contractor shall comply with requirements of Minority and Women Business percentage of Contract percentage participation requirements specified in the Minority and Women Business Enterprise Set Aside Requirements Section.

END OF SECTION

**MINORITY AND WOMEN BUSINESS  
ENTERPRISE SET ASIDE REQUIREMENTS**

1. GENERAL

A. All provisions of the Contract Documents shall be subject to all applicable provisions of law, including, without limitation, Federal, State, and Local statutes and ordinances regarding setting aside a portion of the Contract for qualified Minority and Women Business Enterprises. The Contractor shall recognize that other duties and obligations are required by laws, statutes, and ordinances which may not be provided herein, but must be considered and made a part of this Contract. In case of a conflict between the Contract Documents and applicable laws, statutes, and ordinances, the provisions of law, statutes, and ordinances shall *govern*.

2. MINORITY AND WOMEN OWNED BUSINESS ENTERPRISE SET ASIDE REQUIREMENTS

A. Requirements For minority and women business enterprise set aside requirements, provided to the Architect by the Awarding Authority Follow. The Architect does not warrant or guarantee the completeness or accuracy of this information, and every bidder and contractor shall be responsible for ascertaining the MWBE set aside requirements in the area where the work will be performed.

1. Bidders shall agree to contract with minority and women owned businesses as certified by the State Office of Minority and Women Business Assistance [SOMWBA]. "the amount of participation which shall be reserved for such enterprises shall not be less than fifteen percent [15%] of the total contract amount including accepted alternates, of which at least ten percent [10%] shall be reserved for minority business enterprises and five percent [5%] shall be reserved for womenowned business enterprises.

2. The Contractor and each Subcontractor shall furnish to the Awarding Authority, within fifteen days after completion of its portion of the work, a certified 'Statement of Compliance' certifying compliance with minority and women business enterprise set aside requirements. Submit the 'Statement of Compliance' in a form acceptable to the Awarding Authority.

3. See Massachusetts Executive Order 237 as amended.

END OF SECTION

MINORITY AND WOMEN BUSINESS ENTERPRISE SET ASIDE REQUIREMENTS

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CHARLES D. BAKER  
Governor

KARYN E. POLITO  
Lt. Governor

THE COMMONWEALTH OF MASSACHUSETTS  
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT  
DEPARTMENT OF LABOR STANDARDS

Prevailing Wage Rates

As determined by the Director under the provisions of the  
Massachusetts General Laws, Chapter 149, Sections 26 to 27H

RONALD L. WALKER, II  
Secretary

WILLIAM D MCKINNEY  
Director

**Awarding Authority:** Town of Arlington  
**Contract Number:** 16-14 **City/Town:** ARLINGTON  
**Description of Work:** Magnolia Park Project includes but not limited to new playground, equipment and surfacing, pathway construction, landscaping, utility improvements including new drainage, fencing and basketball court  
**Job Location:** Thorndike Street

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Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the "Wage Request Number" on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule from the Department of Labor Standards ("DLS") if it has not opened bids or selected a contractor within 90 days of the date of issuance of the wage schedule. For CM AT RISK projects (bid pursuant to G.L. c.149A), the earlier of: (a) the execution date of the GMP Amendment, or (b) the bid for the first construction scope of work must be within 90-days of the wage schedule issuance date.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project as required by M.G.L. c. 149, § 27. The wage schedule shall be made a part of the contract awarded for the project. The wage schedule must be posted in a conspicuous place at the work site for the life of the project in accordance with M.G.L. c. 149 § 27. The wages listed on the wage schedule must be paid to employees performing construction work on the project whether they are employed by the prime contractor, a filed sub-bidder, or any sub-contractor.
- All apprentices working on the project are required to be registered with the Massachusetts Division of Apprentice Standards (DAS). Apprentice must keep his/her apprentice identification card on his/her person during all work hours on the project. An apprentice registered with DAS may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **If an apprentice rate is not listed on the prevailing wage schedule for the trade in which an apprentice is registered with the DAS, the apprentice must be paid the journeyworker's rate for the trade.**
- The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule. Awarding authorities are required to request these updates no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor. For multi-year CM AT RISK projects, awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. Contractors are required to obtain the wage schedules from awarding authorities, and to pay no less than these rates to covered workers. The annual update requirement is not applicable to 27F "rental of equipment" contracts.
- Every contractor or subcontractor which performs construction work on the project is required to submit weekly payroll reports and a Statement of Compliance directly to the awarding authority by mail or email and keep them on file for three years. Each weekly payroll report must contain: the employee's name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. A sample of a payroll reporting form may be obtained at <http://www.mass.gov/dols/pw>.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may report the violation to the Fair Labor Division of the office of the Attorney General at (617) 727-3465.
- Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and criminal penalties.

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**Issue Date:** 03/22/2016

**Wage Request Number:** 20160322-030

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
<b>Construction</b>						
(2 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2015	\$32.75	\$10.41	\$10.08	\$0.00	\$53.24
	06/01/2016	\$33.25	\$10.41	\$10.08	\$0.00	\$53.74
	08/01/2016	\$33.25	\$10.91	\$10.08	\$0.00	\$54.24
	12/01/2016	\$33.25	\$10.91	\$10.89	\$0.00	\$55.05
(3 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2015	\$32.82	\$10.41	\$10.08	\$0.00	\$53.31
	06/01/2016	\$33.32	\$10.41	\$10.08	\$0.00	\$53.81
	08/01/2016	\$33.32	\$10.91	\$10.08	\$0.00	\$54.31
	12/01/2016	\$33.32	\$10.91	\$10.89	\$0.00	\$55.12
(4 & 5 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2015	\$32.94	\$10.41	\$10.08	\$0.00	\$53.43
	06/01/2016	\$33.44	\$10.41	\$10.08	\$0.00	\$53.93
	08/01/2016	\$33.44	\$10.91	\$10.08	\$0.00	\$54.43
	12/01/2016	\$33.44	\$10.91	\$10.89	\$0.00	\$55.24
ADS/SUBMERSIBLE PILOT <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2015	\$88.29	\$9.80	\$19.23	\$0.00	\$117.32
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2015	\$36.10	\$7.45	\$13.55	\$0.00	\$57.10
	06/01/2016	\$36.85	\$7.45	\$13.55	\$0.00	\$57.85
	12/01/2016	\$37.85	\$7.45	\$13.55	\$0.00	\$58.85
For apprentice rates see "Apprentice- LABORER"						
ASBESTOS REMOVER - PIPE / MECH. EQUIPT. <i>HEAT &amp; FROST INSULATORS LOCAL 6 (BOSTON)</i>	12/01/2015	\$34.38	\$10.40	\$5.95	\$0.00	\$50.73
ASPHALT RAKER <i>LABORERS - ZONE 1</i>	12/01/2015	\$35.60	\$7.45	\$13.55	\$0.00	\$56.60
	06/01/2016	\$36.35	\$7.45	\$13.55	\$0.00	\$57.35
	12/01/2016	\$37.35	\$7.45	\$13.55	\$0.00	\$58.35
For apprentice rates see "Apprentice- LABORER"						
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2015	\$43.73	\$10.00	\$14.90	\$0.00	\$68.63
	06/01/2016	\$44.48	\$10.00	\$14.90	\$0.00	\$69.38
	12/01/2016	\$45.73	\$10.00	\$14.90	\$0.00	\$70.63
	06/01/2017	\$46.73	\$10.00	\$14.90	\$0.00	\$71.63
	12/01/2017	\$47.73	\$10.00	\$14.90	\$0.00	\$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2015	\$43.73	\$10.00	\$14.90	\$0.00	\$68.63
	06/01/2016	\$44.48	\$10.00	\$14.90	\$0.00	\$69.38
	12/01/2016	\$45.73	\$10.00	\$14.90	\$0.00	\$70.63
	06/01/2017	\$46.73	\$10.00	\$14.90	\$0.00	\$71.63
	12/01/2017	\$47.73	\$10.00	\$14.90	\$0.00	\$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BARCO-TYPE JUMPING TAMPER <i>LABORERS - ZONE 1</i>	12/01/2015	\$35.60	\$7.45	\$13.55	\$0.00	\$56.60
	06/01/2016	\$36.35	\$7.45	\$13.55	\$0.00	\$57.35
	12/01/2016	\$37.35	\$7.45	\$13.55	\$0.00	\$58.35
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER <i>LABORERS - ZONE 1</i>	12/01/2015	\$36.10	\$7.45	\$13.55	\$0.00	\$57.10
	06/01/2016	\$36.85	\$7.45	\$13.55	\$0.00	\$57.85
	12/01/2016	\$37.85	\$7.45	\$13.55	\$0.00	\$58.85
For apprentice rates see "Apprentice- LABORER"						



Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
BOILER MAKER	01/01/2016	\$41.62	\$6.97	\$16.21	\$0.00	\$64.80
BOILERMAKERS LOCAL 29	01/01/2017	\$42.92	\$6.97	\$16.21	\$0.00	\$66.10

**Apprentice - BOILERMAKER - Local 29**

**Effective Date - 01/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	\$27.05	\$6.97	\$10.54	\$0.00	\$44.56
2	65	\$27.05	\$6.97	\$10.54	\$0.00	\$44.56
3	70	\$29.13	\$6.97	\$11.35	\$0.00	\$47.45
4	75	\$31.22	\$6.97	\$12.16	\$0.00	\$50.35
5	80	\$33.30	\$6.97	\$12.97	\$0.00	\$53.24
6	85	\$35.38	\$6.97	\$13.78	\$0.00	\$56.13
7	90	\$37.46	\$6.97	\$14.59	\$0.00	\$59.02
8	95	\$39.54	\$6.97	\$15.40	\$0.00	\$61.91

**Effective Date - 01/01/2017**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	\$27.90	\$6.97	\$10.54	\$0.00	\$45.41
2	65	\$27.90	\$6.97	\$10.54	\$0.00	\$45.41
3	70	\$30.04	\$6.97	\$11.35	\$0.00	\$48.36
4	75	\$32.19	\$6.97	\$12.16	\$0.00	\$51.32
5	80	\$34.34	\$6.97	\$12.97	\$0.00	\$54.28
6	85	\$36.48	\$6.97	\$13.78	\$0.00	\$57.23
7	90	\$38.63	\$6.97	\$14.59	\$0.00	\$60.19
8	95	\$40.77	\$6.97	\$15.40	\$0.00	\$63.14

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING)	02/01/2016	\$49.86	\$10.18	\$19.14	\$0.00	\$79.18
BRICKLAYERS LOCAL 3 (BOSTON)	08/01/2016	\$50.76	\$10.18	\$19.22	\$0.00	\$80.16
	02/01/2017	\$51.33	\$10.18	\$19.22	\$0.00	\$80.73

Classification Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

**Apprentice - BRICK/PLASTER/CEMENT MASON - Local 3 Boston**

**Effective Date - 02/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.93	\$10.18	\$19.14	\$0.00	\$54.25
2	60	\$29.92	\$10.18	\$19.14	\$0.00	\$59.24
3	70	\$34.90	\$10.18	\$19.14	\$0.00	\$64.22
4	80	\$39.89	\$10.18	\$19.14	\$0.00	\$69.21
5	90	\$44.87	\$10.18	\$19.14	\$0.00	\$74.19

**Effective Date - 08/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.38	\$10.18	\$19.22	\$0.00	\$54.78
2	60	\$30.46	\$10.18	\$19.22	\$0.00	\$59.86
3	70	\$35.53	\$10.18	\$19.22	\$0.00	\$64.93
4	80	\$40.61	\$10.18	\$19.22	\$0.00	\$70.01
5	90	\$45.68	\$10.18	\$19.22	\$0.00	\$75.08

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

BULLDOZER/GRADER/SCRAPER OPERATING ENGINEERS LOCAL 4	12/01/2015	\$43.31	\$10.00	\$14.90	\$0.00	\$68.21
	06/01/2016	\$44.06	\$10.00	\$14.90	\$0.00	\$68.96
	12/01/2016	\$45.29	\$10.00	\$14.90	\$0.00	\$70.19
	06/01/2017	\$46.28	\$10.00	\$14.90	\$0.00	\$71.18
	12/01/2017	\$47.27	\$10.00	\$14.90	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

CAISSON & UNDERPINNING BOTTOM MAN LABORERS - FOUNDATION AND MARINE	12/01/2015	\$36.45	\$7.45	\$13.75	\$0.00	\$57.65
	06/01/2016	\$37.20	\$7.45	\$13.75	\$0.00	\$58.40
	12/01/2016	\$38.20	\$7.45	\$13.75	\$0.00	\$59.40

For apprentice rates see "Apprentice- LABORER"

CAISSON & UNDERPINNING LABORER LABORERS - FOUNDATION AND MARINE	12/01/2015	\$35.30	\$7.45	\$13.75	\$0.00	\$56.50
	06/01/2016	\$36.05	\$7.45	\$13.75	\$0.00	\$57.25
	12/01/2016	\$37.05	\$7.45	\$13.75	\$0.00	\$58.25

For apprentice rates see "Apprentice- LABORER"

CAISSON & UNDERPINNING TOP MAN LABORERS - FOUNDATION AND MARINE	12/01/2015	\$35.30	\$7.45	\$13.75	\$0.00	\$56.50
	06/01/2016	\$36.05	\$7.45	\$13.75	\$0.00	\$57.25
	12/01/2016	\$37.05	\$7.45	\$13.75	\$0.00	\$58.25

For apprentice rates see "Apprentice- LABORER"

CARBIDE CORE DRILL OPERATOR LABORERS - ZONE 1	12/01/2015	\$35.60	\$7.45	\$13.55	\$0.00	\$56.60
	06/01/2016	\$36.35	\$7.45	\$13.55	\$0.00	\$57.35
	12/01/2016	\$37.35	\$7.45	\$13.55	\$0.00	\$58.35

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CARPENTER	03/01/2016	\$37.10	\$9.80	\$16.82	\$0.00	\$63.72
CARPENTERS - ZONE 2 (Eastern Massachusetts)	09/01/2016	\$38.08	\$9.80	\$16.82	\$0.00	\$64.70
	03/01/2017	\$39.05	\$9.80	\$16.82	\$0.00	\$65.67
	09/01/2017	\$40.06	\$9.80	\$16.82	\$0.00	\$66.68
	03/01/2018	\$41.06	\$9.80	\$16.82	\$0.00	\$67.68
	09/01/2018	\$42.10	\$9.80	\$16.82	\$0.00	\$68.72
	03/01/2019	\$43.13	\$9.80	\$16.82	\$0.00	\$69.75

**Apprentice - CARPENTER - Zone 2 Eastern MA**

**Effective Date - 03/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$18.55	\$9.80	\$1.63	\$0.00	\$29.98
2	60	\$22.26	\$9.80	\$1.63	\$0.00	\$33.69
3	70	\$25.97	\$9.80	\$11.93	\$0.00	\$47.70
4	75	\$27.83	\$9.80	\$11.93	\$0.00	\$49.56
5	80	\$29.68	\$9.80	\$13.56	\$0.00	\$53.04
6	80	\$29.68	\$9.80	\$13.56	\$0.00	\$53.04
7	90	\$33.39	\$9.80	\$15.19	\$0.00	\$58.38
8	90	\$33.39	\$9.80	\$15.19	\$0.00	\$58.38

**Effective Date - 09/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.04	\$9.80	\$1.63	\$0.00	\$30.47
2	60	\$22.85	\$9.80	\$1.63	\$0.00	\$34.28
3	70	\$26.66	\$9.80	\$11.93	\$0.00	\$48.39
4	75	\$28.56	\$9.80	\$11.93	\$0.00	\$50.29
5	80	\$30.46	\$9.80	\$13.56	\$0.00	\$53.82
6	80	\$30.46	\$9.80	\$13.56	\$0.00	\$53.82
7	90	\$34.27	\$9.80	\$15.19	\$0.00	\$59.26
8	90	\$34.27	\$9.80	\$15.19	\$0.00	\$59.26

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

CEMENT MASONRY/PLASTERING	01/01/2016	\$46.44	\$10.90	\$18.71	\$1.30	\$77.35
BRICKLAYERS LOCAL 3 (BOSTON)						

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - CEMENT MASONRY/PLASTERING - Eastern Mass (Boston)**

**Effective Date - 01/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$23.22	\$10.90	\$12.21	\$0.00	\$46.33
2	60	\$27.86	\$10.90	\$13.71	\$1.30	\$53.77
3	65	\$30.19	\$10.90	\$14.71	\$1.30	\$57.10
4	70	\$32.51	\$10.90	\$15.71	\$1.30	\$60.42
5	75	\$34.83	\$10.90	\$16.71	\$1.30	\$63.74
6	80	\$37.15	\$10.90	\$17.71	\$1.30	\$67.06
7	90	\$41.80	\$10.90	\$18.71	\$1.30	\$72.71

**Notes:**

Steps 3,4 are 500 hrs. All other steps are 1,000 hrs.

**Apprentice to Journeyworker Ratio:1:3**

CHAIN SAW OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2015	\$35.60	\$7.45	\$13.55	\$0.00	\$56.60
	06/01/2016	\$36.35	\$7.45	\$13.55	\$0.00	\$57.35
	12/01/2016	\$37.35	\$7.45	\$13.55	\$0.00	\$58.35
For apprentice rates see "Apprentice- LABORER"						
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2015	\$44.73	\$10.00	\$14.90	\$0.00	\$69.63
	06/01/2016	\$45.48	\$10.00	\$14.90	\$0.00	\$70.38
	12/01/2016	\$46.73	\$10.00	\$14.90	\$0.00	\$71.63
	06/01/2017	\$47.73	\$10.00	\$14.90	\$0.00	\$72.63
	12/01/2017	\$48.73	\$10.00	\$14.90	\$0.00	\$73.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
COMPRESSOR OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2015	\$30.13	\$10.00	\$14.90	\$0.00	\$55.03
	06/01/2016	\$30.65	\$10.00	\$14.90	\$0.00	\$55.55
	12/01/2016	\$31.52	\$10.00	\$14.90	\$0.00	\$56.42
	06/01/2017	\$32.21	\$10.00	\$14.90	\$0.00	\$57.11
	12/01/2017	\$32.90	\$10.00	\$14.90	\$0.00	\$57.80
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DELEADER (BRIDGE) <i>PAINTERS LOCAL 35 - ZONE 2</i>	01/01/2016	\$49.51	\$7.85	\$16.10	\$0.00	\$73.46
	07/01/2016	\$50.46	\$7.85	\$16.10	\$0.00	\$74.41
	01/01/2017	\$51.41	\$7.85	\$16.10	\$0.00	\$75.36

**Classification**

**Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate**

**Apprentice - PAINTER Local 35 - BRIDGES/TANKS**

**Effective Date - 01/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.76	\$7.85	\$0.00	\$0.00	\$32.61
2	55	\$27.23	\$7.85	\$3.66	\$0.00	\$38.74
3	60	\$29.71	\$7.85	\$3.99	\$0.00	\$41.55
4	65	\$32.18	\$7.85	\$4.32	\$0.00	\$44.35
5	70	\$34.66	\$7.85	\$14.11	\$0.00	\$56.62
6	75	\$37.13	\$7.85	\$14.44	\$0.00	\$59.42
7	80	\$39.61	\$7.85	\$14.77	\$0.00	\$62.23
8	90	\$44.56	\$7.85	\$15.44	\$0.00	\$67.85

**Effective Date - 07/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.23	\$7.85	\$0.00	\$0.00	\$33.08
2	55	\$27.75	\$7.85	\$3.66	\$0.00	\$39.26
3	60	\$30.28	\$7.85	\$3.99	\$0.00	\$42.12
4	65	\$32.80	\$7.85	\$4.32	\$0.00	\$44.97
5	70	\$35.32	\$7.85	\$14.11	\$0.00	\$57.28
6	75	\$37.85	\$7.85	\$14.44	\$0.00	\$60.14
7	80	\$40.37	\$7.85	\$14.77	\$0.00	\$62.99
8	90	\$45.41	\$7.85	\$15.44	\$0.00	\$68.70

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

DEMO: ADZEMAN LABORERS - ZONE 1	12/01/2015	\$35.50	\$7.45	\$13.55	\$0.00	\$56.50
For apprentice rates see "Apprentice- LABORER"						
DEMO: BACKHOE/LOADER/HAMMER OPERATOR LABORERS - ZONE 1	12/01/2015	\$36.50	\$7.45	\$13.55	\$0.00	\$57.50
For apprentice rates see "Apprentice- LABORER"						
DEMO: BURNERS LABORERS - ZONE 1	12/01/2015	\$36.25	\$7.45	\$13.55	\$0.00	\$57.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: CONCRETE CUTTER/SAWYER LABORERS - ZONE 1	12/01/2015	\$36.50	\$7.45	\$13.55	\$0.00	\$57.50
For apprentice rates see "Apprentice- LABORER"						
DEMO: JACKHAMMER OPERATOR LABORERS - ZONE 1	12/01/2015	\$36.25	\$7.45	\$13.55	\$0.00	\$57.25
For apprentice rates see "Apprentice- LABORER"						
DEMO: WRECKING LABORER LABORERS - ZONE 1	12/01/2015	\$35.50	\$7.45	\$13.55	\$0.00	\$56.50
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DIRECTIONAL DRILL MACHINE OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2015	\$43.31	\$10.00	\$14.90	\$0.00	\$68.21
	06/01/2016	\$44.06	\$10.00	\$14.90	\$0.00	\$68.96
	12/01/2016	\$45.29	\$10.00	\$14.90	\$0.00	\$70.19
	06/01/2017	\$46.28	\$10.00	\$14.90	\$0.00	\$71.18
	12/01/2017	\$47.27	\$10.00	\$14.90	\$0.00	\$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2015	\$58.86	\$9.80	\$19.23	\$0.00	\$87.89
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2015	\$42.04	\$9.80	\$19.23	\$0.00	\$71.07
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2015	\$63.06	\$9.80	\$19.23	\$0.00	\$92.09
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER/SLURRY (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2015	\$88.23	\$9.80	\$19.23	\$0.00	\$117.26
For apprentice rates see "Apprentice- PILE DRIVER"						
DRAWBRIDGE OPERATOR (Construction) <i>ELECTRICIANS LOCAL 103</i>	03/01/2016	\$46.17	\$13.00	\$16.39	\$0.00	\$75.56
For apprentice rates see "Apprentice- ELECTRICIAN"						
ELECTRICIAN <i>ELECTRICIANS LOCAL 103</i>	03/01/2016	\$46.17	\$13.00	\$16.39	\$0.00	\$75.56

**Apprentice - ELECTRICIAN - Local 103**

**Effective Date - 03/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$18.47	\$13.00	\$0.55	\$0.00	\$32.02
2	40	\$18.47	\$13.00	\$0.55	\$0.00	\$32.02
3	45	\$20.78	\$13.00	\$12.34	\$0.00	\$46.12
4	45	\$20.78	\$13.00	\$12.34	\$0.00	\$46.12
5	50	\$23.09	\$13.00	\$12.71	\$0.00	\$48.80
6	55	\$25.39	\$13.00	\$13.07	\$0.00	\$51.46
7	60	\$27.70	\$13.00	\$13.44	\$0.00	\$54.14
8	65	\$30.01	\$13.00	\$13.81	\$0.00	\$56.82
9	70	\$32.32	\$13.00	\$14.18	\$0.00	\$59.50
10	75	\$34.63	\$13.00	\$14.55	\$0.00	\$62.18

**Notes :**

App Prior 1/1/03; 30/35/40/45/50/55/65/70/75/80

**Apprentice to Journeyworker Ratio:2:3\*\*\***

ELEVATOR CONSTRUCTOR <i>ELEVATOR CONSTRUCTORS LOCAL 4</i>	01/01/2016	\$54.53	\$14.43	\$14.96	\$0.00	\$83.92
	01/01/2017	\$55.86	\$15.28	\$15.71	\$0.00	\$86.85

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - ELEVATOR CONSTRUCTOR - Local 4**

**Effective Date - 01/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$27.27	\$14.43	\$0.00	\$0.00	\$41.70
2	55	\$29.99	\$14.43	\$14.96	\$0.00	\$59.38
3	65	\$35.44	\$14.43	\$14.96	\$0.00	\$64.83
4	70	\$38.17	\$14.43	\$14.96	\$0.00	\$67.56
5	80	\$43.62	\$14.43	\$14.96	\$0.00	\$73.01

**Effective Date - 01/01/2017**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$27.93	\$15.28	\$0.00	\$0.00	\$43.21
2	55	\$30.72	\$15.28	\$15.71	\$0.00	\$61.71
3	65	\$36.31	\$15.28	\$15.71	\$0.00	\$67.30
4	70	\$39.10	\$15.28	\$15.71	\$0.00	\$70.09
5	80	\$44.69	\$15.28	\$15.71	\$0.00	\$75.68

**Notes:**

Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

**Apprentice to Journeyworker Ratio:1:1**

ELEVATOR CONSTRUCTOR HELPER <i>ELEVATOR CONSTRUCTORS LOCAL 4</i>	01/01/2016	\$38.17	\$14.43	\$14.96	\$0.00	\$67.56
	01/01/2017	\$39.10	\$15.28	\$15.71	\$0.00	\$70.09
For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"						
FENCE & GUARD RAIL ERECTOR <i>LABORERS - ZONE 1</i>	12/01/2015	\$35.60	\$7.45	\$13.55	\$0.00	\$56.60
	06/01/2016	\$36.35	\$7.45	\$13.55	\$0.00	\$57.35
	12/01/2016	\$37.35	\$7.45	\$13.55	\$0.00	\$58.35
For apprentice rates see "Apprentice- LABORER"						
FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	11/01/2015	\$40.49	\$10.00	\$14.55	\$0.00	\$65.04
	05/01/2016	\$41.38	\$10.00	\$14.55	\$0.00	\$65.93
	11/01/2016	\$41.97	\$10.00	\$14.55	\$0.00	\$66.52
	05/01/2017	\$42.85	\$10.00	\$14.55	\$0.00	\$67.40
	11/01/2017	\$43.58	\$10.00	\$14.55	\$0.00	\$68.13
	05/01/2018	\$44.29	\$10.00	\$14.55	\$0.00	\$68.84
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	11/01/2015	\$41.93	\$10.00	\$14.55	\$0.00	\$66.48
	05/01/2016	\$42.82	\$10.00	\$14.55	\$0.00	\$67.37
	11/01/2016	\$43.42	\$10.00	\$14.55	\$0.00	\$67.97
	05/01/2017	\$44.31	\$10.00	\$14.55	\$0.00	\$68.86
	11/01/2017	\$45.04	\$10.00	\$14.55	\$0.00	\$69.59
	05/01/2018	\$45.76	\$10.00	\$14.55	\$0.00	\$70.31
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIELD ENG. ROD PERSON-BLDG,SITE,HVY/HWY <i>OPERATING ENGINEERS LOCAL 4</i>	11/01/2015	\$21.71	\$10.00	\$14.55	\$0.00	\$46.26
	05/01/2016	\$22.23	\$10.00	\$14.55	\$0.00	\$46.78
	11/01/2016	\$22.58	\$10.00	\$14.55	\$0.00	\$47.13
	05/01/2017	\$23.11	\$10.00	\$14.55	\$0.00	\$47.66
	11/01/2017	\$23.53	\$10.00	\$14.55	\$0.00	\$48.08
	05/01/2018	\$23.96	\$10.00	\$14.55	\$0.00	\$48.51
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIRE ALARM INSTALLER <i>ELECTRICIANS LOCAL 103</i>	03/01/2016	\$46.17	\$13.00	\$16.39	\$0.00	\$75.56
For apprentice rates see "Apprentice- ELECTRICIAN"						
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING <i>ELECTRICIANS LOCAL 103</i>	03/01/2016	\$34.63	\$13.00	\$14.55	\$0.00	\$62.18
For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"						
FIREMAN (ASST. ENGINEER) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2015	\$36.34	\$10.00	\$14.90	\$0.00	\$61.24
	06/01/2016	\$36.96	\$10.00	\$14.90	\$0.00	\$61.86
	12/01/2016	\$38.00	\$10.00	\$14.90	\$0.00	\$62.90
	06/01/2017	\$38.84	\$10.00	\$14.90	\$0.00	\$63.74
	12/01/2017	\$39.67	\$10.00	\$14.90	\$0.00	\$64.57
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FLAGGER & SIGNALER <i>LABORERS - ZONE 1</i>	12/01/2015	\$20.50	\$7.45	\$13.55	\$0.00	\$41.50
	06/01/2016	\$20.50	\$7.45	\$13.55	\$0.00	\$41.50
	12/01/2016	\$20.50	\$7.45	\$13.55	\$0.00	\$41.50
For apprentice rates see "Apprentice- LABORER"						
FLOORCOVERER <i>FLOORCOVERERS LOCAL 2168 ZONE 1</i>	03/01/2016	\$42.13	\$9.80	\$17.62	\$0.00	\$69.55

**Apprentice - FLOORCOVERER - Local 2168 Zone 1**

Effective Date - 03/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.07	\$9.80	\$1.79	\$0.00	\$32.66
2	55	\$23.17	\$9.80	\$1.79	\$0.00	\$34.76
3	60	\$25.28	\$9.80	\$12.25	\$0.00	\$47.33
4	65	\$27.38	\$9.80	\$12.25	\$0.00	\$49.43
5	70	\$29.49	\$9.80	\$14.04	\$0.00	\$53.33
6	75	\$31.60	\$9.80	\$14.04	\$0.00	\$55.44
7	80	\$33.70	\$9.80	\$15.83	\$0.00	\$59.33
8	85	\$35.81	\$9.80	\$15.83	\$0.00	\$61.44

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**



Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FORK LIFT/CHERRY PICKER <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2015	\$43.73	\$10.00	\$14.90	\$0.00	\$68.63
	06/01/2016	\$44.48	\$10.00	\$14.90	\$0.00	\$69.38
	12/01/2016	\$45.73	\$10.00	\$14.90	\$0.00	\$70.63
	06/01/2017	\$46.73	\$10.00	\$14.90	\$0.00	\$71.63
	12/01/2017	\$47.73	\$10.00	\$14.90	\$0.00	\$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GENERATOR/LIGHTING PLANT/HEATERS <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2015	\$30.13	\$10.00	\$14.90	\$0.00	\$55.03
	06/01/2016	\$30.65	\$10.00	\$14.90	\$0.00	\$55.55
	12/01/2016	\$31.52	\$10.00	\$14.90	\$0.00	\$56.42
	06/01/2017	\$32.21	\$10.00	\$14.90	\$0.00	\$57.11
	12/01/2017	\$32.90	\$10.00	\$14.90	\$0.00	\$57.80
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) <i>GLAZIERS LOCAL 35 (ZONE 2)</i>	01/01/2016	\$39.01	\$7.85	\$16.10	\$0.00	\$62.96
	07/01/2016	\$39.96	\$7.85	\$16.10	\$0.00	\$63.91
	01/01/2017	\$40.91	\$7.85	\$16.10	\$0.00	\$64.86

**Apprentice - GLAZIER - Local 35 Zone 2**

**Effective Date - 01/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.51	\$7.85	\$0.00	\$0.00	\$27.36
2	55	\$21.46	\$7.85	\$3.66	\$0.00	\$32.97
3	60	\$23.41	\$7.85	\$3.99	\$0.00	\$35.25
4	65	\$25.36	\$7.85	\$4.32	\$0.00	\$37.53
5	70	\$27.31	\$7.85	\$14.11	\$0.00	\$49.27
6	75	\$29.26	\$7.85	\$14.44	\$0.00	\$51.55
7	80	\$31.21	\$7.85	\$14.77	\$0.00	\$53.83
8	90	\$35.11	\$7.85	\$15.44	\$0.00	\$58.40

**Effective Date - 07/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.98	\$7.85	\$0.00	\$0.00	\$27.83
2	55	\$21.98	\$7.85	\$3.66	\$0.00	\$33.49
3	60	\$23.98	\$7.85	\$3.99	\$0.00	\$35.82
4	65	\$25.97	\$7.85	\$4.32	\$0.00	\$38.14
5	70	\$27.97	\$7.85	\$14.11	\$0.00	\$49.93
6	75	\$29.97	\$7.85	\$14.44	\$0.00	\$52.26
7	80	\$31.97	\$7.85	\$14.77	\$0.00	\$54.59
8	90	\$35.96	\$7.85	\$15.44	\$0.00	\$59.25

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HOISTING ENGINEER/CRANES/GRADALLS OPERATING ENGINEERS LOCAL 4	12/01/2015	\$43.73	\$10.00	\$14.90	\$0.00	\$68.63
	06/01/2016	\$44.48	\$10.00	\$14.90	\$0.00	\$69.38
	12/01/2016	\$45.73	\$10.00	\$14.90	\$0.00	\$70.63
	06/01/2017	\$46.73	\$10.00	\$14.90	\$0.00	\$71.63
	12/01/2017	\$47.73	\$10.00	\$14.90	\$0.00	\$72.63

**Apprentice - OPERATING ENGINEERS - Local 4**

**Effective Date - 12/01/2015**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$24.05	\$10.00	\$0.00	\$0.00	\$34.05
2	60	\$26.24	\$10.00	\$14.90	\$0.00	\$51.14
3	65	\$28.42	\$10.00	\$14.90	\$0.00	\$53.32
4	70	\$30.61	\$10.00	\$14.90	\$0.00	\$55.51
5	75	\$32.80	\$10.00	\$14.90	\$0.00	\$57.70
6	80	\$34.98	\$10.00	\$14.90	\$0.00	\$59.88
7	85	\$37.17	\$10.00	\$14.90	\$0.00	\$62.07
8	90	\$39.36	\$10.00	\$14.90	\$0.00	\$64.26

**Effective Date - 06/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$24.46	\$10.00	\$0.00	\$0.00	\$34.46
2	60	\$26.69	\$10.00	\$14.90	\$0.00	\$51.59
3	65	\$28.91	\$10.00	\$14.90	\$0.00	\$53.81
4	70	\$31.14	\$10.00	\$14.90	\$0.00	\$56.04
5	75	\$33.36	\$10.00	\$14.90	\$0.00	\$58.26
6	80	\$35.58	\$10.00	\$14.90	\$0.00	\$60.48
7	85	\$37.81	\$10.00	\$14.90	\$0.00	\$62.71
8	90	\$40.03	\$10.00	\$14.90	\$0.00	\$64.93

**Notes:**

**Apprentice to Journeyworker Ratio:1:6**

HVAC (DUCTWORK) SHEETMETAL WORKERS LOCAL 17 - A	02/01/2016	\$43.31	\$10.70	\$21.95	\$2.28	\$78.24
	08/01/2016	\$44.46	\$10.70	\$21.95	\$2.28	\$79.39
	02/01/2017	\$45.56	\$10.70	\$21.95	\$2.28	\$80.49
	08/01/2017	\$46.66	\$10.70	\$21.95	\$2.28	\$81.59
	02/01/2018	\$47.81	\$10.70	\$21.95	\$2.28	\$82.74

For apprentice rates see "Apprentice- SHEET METAL WORKER"

HVAC (ELECTRICAL CONTROLS) ELECTRICIANS LOCAL 103	03/01/2016	\$46.17	\$13.00	\$16.39	\$0.00	\$75.56
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For apprentice rates see "Apprentice- ELECTRICIAN"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
HVAC (TESTING AND BALANCING - AIR) <i>SHEETMETAL WORKERS LOCAL 17 - A</i>	02/01/2016	\$43.31	\$10.70	\$21.95	\$2.28	\$78.24
	08/01/2016	\$44.46	\$10.70	\$21.95	\$2.28	\$79.39
	02/01/2017	\$45.56	\$10.70	\$21.95	\$2.28	\$80.49
	08/01/2017	\$46.66	\$10.70	\$21.95	\$2.28	\$81.59
	02/01/2018	\$47.81	\$10.70	\$21.95	\$2.28	\$82.74
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (TESTING AND BALANCING - WATER) <i>PIPEFITTERS LOCAL 537</i>	03/01/2016	\$49.19	\$9.70	\$18.14	\$0.00	\$77.03
	09/01/2016	\$50.19	\$9.70	\$18.14	\$0.00	\$78.03
	03/01/2017	\$51.19	\$9.70	\$18.14	\$0.00	\$79.03
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HVAC MECHANIC <i>PIPEFITTERS LOCAL 537</i>	03/01/2016	\$49.19	\$9.70	\$18.14	\$0.00	\$77.03
	09/01/2016	\$50.19	\$9.70	\$18.14	\$0.00	\$78.03
	03/01/2017	\$51.19	\$9.70	\$18.14	\$0.00	\$79.03
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS <i>LABORERS - ZONE 1</i>	12/01/2015	\$36.10	\$7.45	\$13.55	\$0.00	\$57.10
	06/01/2016	\$36.85	\$7.45	\$13.55	\$0.00	\$57.85
	12/01/2016	\$37.85	\$7.45	\$13.55	\$0.00	\$58.85
For apprentice rates see "Apprentice- LABORER"						
INSULATOR (PIPES & TANKS) <i>HEAT &amp; FROST INSULATORS LOCAL 6 (BOSTON)</i>	09/01/2015	\$43.81	\$11.50	\$13.80	\$0.00	\$69.11
	09/01/2016	\$45.81	\$11.50	\$13.80	\$0.00	\$71.11
	09/01/2017	\$47.81	\$11.50	\$13.80	\$0.00	\$73.11
	09/01/2018	\$50.06	\$11.50	\$13.80	\$0.00	\$75.36
	09/01/2019	\$52.56	\$11.50	\$13.80	\$0.00	\$77.86

**Apprentice - ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Boston**

Effective Date - 09/01/2015

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.91	\$11.50	\$10.05	\$0.00	\$43.46
2	60	\$26.29	\$11.50	\$10.80	\$0.00	\$48.59
3	70	\$30.67	\$11.50	\$11.55	\$0.00	\$53.72
4	80	\$35.05	\$11.50	\$12.30	\$0.00	\$58.85

Effective Date - 09/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.91	\$11.50	\$10.05	\$0.00	\$44.46
2	60	\$27.49	\$11.50	\$10.80	\$0.00	\$49.79
3	70	\$32.07	\$11.50	\$11.55	\$0.00	\$55.12
4	80	\$36.65	\$11.50	\$12.30	\$0.00	\$60.45

**Notes:**

Steps are 1 year

**Apprentice to Journeyworker Ratio:1:4**

IRONWORKER/WELDER <i>IRONWORKERS LOCAL 7 (BOSTON AREA)</i>	03/16/2016	\$43.40	\$7.80	\$20.85	\$0.00	\$72.05
	09/16/2016	\$44.05	\$7.80	\$20.85	\$0.00	\$72.70
	03/16/2017	\$44.65	\$7.80	\$20.85	\$0.00	\$73.30

**Classification**

**Effective Date   Base Wage   Health   Pension   Supplemental Unemployment   Total Rate**

**Apprentice - IRONWORKER - Local 7 Boston**

**Effective Date - 03/16/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$26.04	\$7.80	\$20.85	\$0.00	\$54.69
2	70	\$30.38	\$7.80	\$20.85	\$0.00	\$59.03
3	75	\$32.55	\$7.80	\$20.85	\$0.00	\$61.20
4	80	\$34.72	\$7.80	\$20.85	\$0.00	\$63.37
5	85	\$36.89	\$7.80	\$20.85	\$0.00	\$65.54
6	90	\$39.06	\$7.80	\$20.85	\$0.00	\$67.71

**Effective Date - 09/16/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$26.43	\$7.80	\$20.85	\$0.00	\$55.08
2	70	\$30.84	\$7.80	\$20.85	\$0.00	\$59.49
3	75	\$33.04	\$7.80	\$20.85	\$0.00	\$61.69
4	80	\$35.24	\$7.80	\$20.85	\$0.00	\$63.89
5	85	\$37.44	\$7.80	\$20.85	\$0.00	\$66.09
6	90	\$39.65	\$7.80	\$20.85	\$0.00	\$68.30

**Notes:**

**\*\* Structural 1:6; Ornamental 1:4**

**Apprentice to Journeyworker Ratio:\*\***

<b>JACKHAMMER &amp; PAVING BREAKER OPERATOR</b> <i>LABORERS - ZONE 1</i>	12/01/2015	\$35.60	\$7.45	\$13.55	\$0.00	\$56.60
	06/01/2016	\$36.35	\$7.45	\$13.55	\$0.00	\$57.35
	12/01/2016	\$37.35	\$7.45	\$13.55	\$0.00	\$58.35
For apprentice rates see "Apprentice- LABORER"						
<b>LABORER</b> <i>LABORERS - ZONE 1</i>	12/01/2015	\$35.35	\$7.45	\$13.55	\$0.00	\$56.35
	06/01/2016	\$36.10	\$7.45	\$13.55	\$0.00	\$57.10
	12/01/2016	\$37.10	\$7.45	\$13.55	\$0.00	\$58.10

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - LABORER - Zone 1**

**Effective Date - 12/01/2015**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$21.21	\$7.45	\$13.55	\$0.00	\$42.21
2	70	\$24.75	\$7.45	\$13.55	\$0.00	\$45.75
3	80	\$28.28	\$7.45	\$13.55	\$0.00	\$49.28
4	90	\$31.82	\$7.45	\$13.55	\$0.00	\$52.82

**Effective Date - 06/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$21.66	\$7.45	\$13.55	\$0.00	\$42.66
2	70	\$25.27	\$7.45	\$13.55	\$0.00	\$46.27
3	80	\$28.88	\$7.45	\$13.55	\$0.00	\$49.88
4	90	\$32.49	\$7.45	\$13.55	\$0.00	\$53.49

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

LABORER: CARPENTER TENDER <i>LABORERS - ZONE 1</i>	12/01/2015	\$35.35	\$7.45	\$13.55	\$0.00	\$56.35
	06/01/2016	\$36.10	\$7.45	\$13.55	\$0.00	\$57.10
	12/01/2016	\$37.10	\$7.45	\$13.55	\$0.00	\$58.10
For apprentice rates see "Apprentice- LABORER"						
LABORER: CEMENT FINISHER TENDER <i>LABORERS - ZONE 1</i>	12/01/2015	\$35.35	\$7.45	\$13.55	\$0.00	\$56.35
	06/01/2016	\$36.10	\$7.45	\$13.55	\$0.00	\$57.10
	12/01/2016	\$37.10	\$7.45	\$13.55	\$0.00	\$58.10
For apprentice rates see "Apprentice- LABORER"						
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER <i>LABORERS - ZONE 1</i>	12/01/2015	\$35.50	\$7.45	\$13.55	\$0.00	\$56.50
	For apprentice rates see "Apprentice- LABORER"					
	LABORER: MASON TENDER <i>LABORERS - ZONE 1</i>					
LABORER: MASON TENDER <i>LABORERS - ZONE 1</i>	12/01/2015	\$35.60	\$7.45	\$13.55	\$0.00	\$56.60
	06/01/2016	\$36.35	\$7.45	\$13.55	\$0.00	\$57.35
	12/01/2016	\$37.35	\$7.45	\$13.55	\$0.00	\$58.35
For apprentice rates see "Apprentice- LABORER"						
LABORER: MULTI-TRADE TENDER <i>LABORERS - ZONE 1</i>	12/01/2015	\$35.35	\$7.45	\$13.55	\$0.00	\$56.35
	06/01/2016	\$36.10	\$7.45	\$13.55	\$0.00	\$57.10
	12/01/2016	\$37.10	\$7.45	\$13.55	\$0.00	\$58.10
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER <i>LABORERS - ZONE 1</i>	12/01/2015	\$35.35	\$7.45	\$13.55	\$0.00	\$56.35
	06/01/2016	\$36.10	\$7.45	\$13.55	\$0.00	\$57.10
	12/01/2016	\$37.10	\$7.45	\$13.55	\$0.00	\$58.10
This classification applies to all tree work associated with the removal of standing trees, and trimming and removal of branches and limbs when the work is not done for a utility company for the purpose of operation, maintenance or repair of utility company equipment. For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2015	\$35.60	\$7.45	\$13.55	\$0.00	\$56.60
	06/01/2016	\$36.35	\$7.45	\$13.55	\$0.00	\$57.35
	12/01/2016	\$37.35	\$7.45	\$13.55	\$0.00	\$58.35
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
MARBLE & TILE FINISHERS BRICKLAYERS LOCAL 3 - MARBLE & TILE	02/01/2016	\$38.08	\$10.18	\$17.70	\$0.00	\$65.96
	08/01/2016	\$38.78	\$10.18	\$17.78	\$0.00	\$66.74
	02/01/2017	\$39.24	\$10.18	\$17.78	\$0.00	\$67.20

**Apprentice - MARBLE & TILE FINISHER - Local 3 Marble & Tile**

**Effective Date - 02/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.04	\$10.18	\$17.70	\$0.00	\$46.92
2	60	\$22.85	\$10.18	\$17.70	\$0.00	\$50.73
3	70	\$26.66	\$10.18	\$17.70	\$0.00	\$54.54
4	80	\$30.46	\$10.18	\$17.70	\$0.00	\$58.34
5	90	\$34.27	\$10.18	\$17.70	\$0.00	\$62.15

**Effective Date - 08/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.39	\$10.18	\$17.78	\$0.00	\$47.35
2	60	\$23.27	\$10.18	\$17.78	\$0.00	\$51.23
3	70	\$27.15	\$10.18	\$17.78	\$0.00	\$55.11
4	80	\$31.02	\$10.18	\$17.78	\$0.00	\$58.98
5	90	\$34.90	\$10.18	\$17.78	\$0.00	\$62.86

**Notes:**

**Apprentice to Journeyworker Ratio:1:3**

MARBLE MASONS, TILELAYERS & TERRAZZO MECH BRICKLAYERS LOCAL 3 - MARBLE & TILE	02/01/2016	\$49.90	\$10.18	\$19.14	\$0.00	\$79.22
	08/01/2016	\$50.80	\$10.18	\$19.22	\$0.00	\$80.20
	02/01/2017	\$51.37	\$10.18	\$19.22	\$0.00	\$80.77

Classification Effective Date Base Wage Health Pension Supplemental Unemployment Total Rate

**Apprentice - MARBLE-TILE-TERRAZZO MECHANIC - Local 3 Marble & Tile**

Effective Date - 02/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.95	\$10.18	\$19.14	\$0.00	\$54.27
2	60	\$29.94	\$10.18	\$19.14	\$0.00	\$59.26
3	70	\$34.93	\$10.18	\$19.14	\$0.00	\$64.25
4	80	\$39.92	\$10.18	\$19.14	\$0.00	\$69.24
5	90	\$44.91	\$10.18	\$19.14	\$0.00	\$74.23

Effective Date - 08/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.40	\$10.18	\$19.22	\$0.00	\$54.80
2	60	\$30.48	\$10.18	\$19.22	\$0.00	\$59.88
3	70	\$35.56	\$10.18	\$19.22	\$0.00	\$64.96
4	80	\$40.64	\$10.18	\$19.22	\$0.00	\$70.04
5	90	\$45.72	\$10.18	\$19.22	\$0.00	\$75.12

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

MECH. SWEEPER OPERATOR (ON CONST. SITES) OPERATING ENGINEERS LOCAL 4	12/01/2015	\$43.31	\$10.00	\$14.90	\$0.00	\$68.21
	06/01/2016	\$44.06	\$10.00	\$14.90	\$0.00	\$68.96
	12/01/2016	\$45.29	\$10.00	\$14.90	\$0.00	\$70.19
	06/01/2017	\$46.28	\$10.00	\$14.90	\$0.00	\$71.18
	12/01/2017	\$47.27	\$10.00	\$14.90	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MECHANICS MAINTENANCE OPERATING ENGINEERS LOCAL 4	12/01/2015	\$43.31	\$10.00	\$14.90	\$0.00	\$68.21
	06/01/2016	\$44.06	\$10.00	\$14.90	\$0.00	\$68.96
	12/01/2016	\$45.29	\$10.00	\$14.90	\$0.00	\$70.19
	06/01/2017	\$46.28	\$10.00	\$14.90	\$0.00	\$71.18
	12/01/2017	\$47.27	\$10.00	\$14.90	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MILLWRIGHT (Zone 1) MILLWRIGHTS LOCAL 1121 - Zone 1	04/01/2015	\$37.64	\$9.80	\$16.21	\$0.00	\$63.65
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Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
<b>Apprentice - MILLWRIGHT - Local 1121 Zone 1</b>						
<b>Effective Date - 04/01/2015</b>						
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$20.70	\$9.80	\$4.48	\$0.00	\$34.98
2	65	\$24.47	\$9.80	\$13.36	\$0.00	\$47.63
3	75	\$28.23	\$9.80	\$14.18	\$0.00	\$52.21
4	85	\$31.99	\$9.80	\$14.99	\$0.00	\$56.78
<b>Notes:</b>						
Steps are 2,000 hours						
<b>Apprentice to Journeyworker Ratio:1:5</b>						
MORTAR MIXER LABORERS - ZONE 1	12/01/2015	\$35.60	\$7.45	\$13.55	\$0.00	\$56.60
	06/01/2016	\$36.35	\$7.45	\$13.55	\$0.00	\$57.35
	12/01/2016	\$37.35	\$7.45	\$13.55	\$0.00	\$58.35
For apprentice rates see "Apprentice- LABORER"						
OILER (OTHER THAN TRUCK CRANES,GRADALLS) OPERATING ENGINEERS LOCAL 4	12/01/2015	\$22.27	\$10.00	\$14.90	\$0.00	\$47.17
	06/01/2016	\$22.66	\$10.00	\$14.90	\$0.00	\$47.56
	12/01/2016	\$23.31	\$10.00	\$14.90	\$0.00	\$48.21
	06/01/2017	\$23.82	\$10.00	\$14.90	\$0.00	\$48.72
	12/01/2017	\$24.34	\$10.00	\$14.90	\$0.00	\$49.24
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OILER (TRUCK CRANES, GRADALLS) OPERATING ENGINEERS LOCAL 4	12/01/2015	\$26.08	\$10.00	\$14.90	\$0.00	\$50.98
	06/01/2016	\$26.54	\$10.00	\$14.90	\$0.00	\$51.44
	12/01/2016	\$27.29	\$10.00	\$14.90	\$0.00	\$52.19
	06/01/2017	\$27.89	\$10.00	\$14.90	\$0.00	\$52.79
	12/01/2017	\$28.50	\$10.00	\$14.90	\$0.00	\$53.40
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OTHER POWER DRIVEN EQUIPMENT - CLASS II OPERATING ENGINEERS LOCAL 4	12/01/2015	\$43.31	\$10.00	\$14.90	\$0.00	\$68.21
	06/01/2016	\$44.06	\$10.00	\$14.90	\$0.00	\$68.96
	12/01/2016	\$45.29	\$10.00	\$14.90	\$0.00	\$70.19
	06/01/2017	\$46.28	\$10.00	\$14.90	\$0.00	\$71.18
	12/01/2017	\$47.27	\$10.00	\$14.90	\$0.00	\$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PAINTER (BRIDGES/TANKS) PAINTERS LOCAL 35 - ZONE 2	01/01/2016	\$49.51	\$7.85	\$16.10	\$0.00	\$73.46
	07/01/2016	\$50.46	\$7.85	\$16.10	\$0.00	\$74.41
	01/01/2017	\$51.41	\$7.85	\$16.10	\$0.00	\$75.36



**Classification**

**Effective Date   Base Wage   Health   Pension   Supplemental Unemployment   Total Rate**

**Apprentice - PAINTER Local 35 - BRIDGES/TANKS**

**Effective Date - 01/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.76	\$7.85	\$0.00	\$0.00	\$32.61
2	55	\$27.23	\$7.85	\$3.66	\$0.00	\$38.74
3	60	\$29.71	\$7.85	\$3.99	\$0.00	\$41.55
4	65	\$32.18	\$7.85	\$4.32	\$0.00	\$44.35
5	70	\$34.66	\$7.85	\$14.11	\$0.00	\$56.62
6	75	\$37.13	\$7.85	\$14.44	\$0.00	\$59.42
7	80	\$39.61	\$7.85	\$14.77	\$0.00	\$62.23
8	90	\$44.56	\$7.85	\$15.44	\$0.00	\$67.85

**Effective Date - 07/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$25.23	\$7.85	\$0.00	\$0.00	\$33.08
2	55	\$27.75	\$7.85	\$3.66	\$0.00	\$39.26
3	60	\$30.28	\$7.85	\$3.99	\$0.00	\$42.12
4	65	\$32.80	\$7.85	\$4.32	\$0.00	\$44.97
5	70	\$35.32	\$7.85	\$14.11	\$0.00	\$57.28
6	75	\$37.85	\$7.85	\$14.44	\$0.00	\$60.14
7	80	\$40.37	\$7.85	\$14.77	\$0.00	\$62.99
8	90	\$45.41	\$7.85	\$15.44	\$0.00	\$68.70

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER (SPRAY OR SANDBLAST, NEW) *	01/01/2016	\$40.41	\$7.85	\$16.10	\$0.00	\$64.36
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used. PAINTERS LOCAL 35 - ZONE 2	07/01/2016	\$41.36	\$7.85	\$16.10	\$0.00	\$65.31
	01/01/2017	\$42.31	\$7.85	\$16.10	\$0.00	\$66.26

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - New**

**Effective Date - 01/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.21	\$7.85	\$0.00	\$0.00	\$28.06
2	55	\$22.23	\$7.85	\$3.66	\$0.00	\$33.74
3	60	\$24.25	\$7.85	\$3.99	\$0.00	\$36.09
4	65	\$26.27	\$7.85	\$4.32	\$0.00	\$38.44
5	70	\$28.29	\$7.85	\$14.11	\$0.00	\$50.25
6	75	\$30.31	\$7.85	\$14.44	\$0.00	\$52.60
7	80	\$32.33	\$7.85	\$14.77	\$0.00	\$54.95
8	90	\$36.37	\$7.85	\$15.44	\$0.00	\$59.66

**Effective Date - 07/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.68	\$7.85	\$0.00	\$0.00	\$28.53
2	55	\$22.75	\$7.85	\$3.66	\$0.00	\$34.26
3	60	\$24.82	\$7.85	\$3.99	\$0.00	\$36.66
4	65	\$26.88	\$7.85	\$4.32	\$0.00	\$39.05
5	70	\$28.95	\$7.85	\$14.11	\$0.00	\$50.91
6	75	\$31.02	\$7.85	\$14.44	\$0.00	\$53.31
7	80	\$33.09	\$7.85	\$14.77	\$0.00	\$55.71
8	90	\$37.22	\$7.85	\$15.44	\$0.00	\$60.51

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER (SPRAY OR SANDBLAST, REPAINT)	01/01/2016	\$38.47	\$7.85	\$16.10	\$0.00	\$62.42
PAINTERS LOCAL 35 - ZONE 2	07/01/2016	\$39.42	\$7.85	\$16.10	\$0.00	\$63.37
	01/01/2017	\$40.37	\$7.85	\$16.10	\$0.00	\$64.32

**Apprentice - PAINTER Local 35 Zone 2 - Spray/Sandblast - Repaint**

**Effective Date - 01/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.24	\$7.85	\$0.00	\$0.00	\$27.09
2	55	\$21.16	\$7.85	\$3.66	\$0.00	\$32.67
3	60	\$23.08	\$7.85	\$3.99	\$0.00	\$34.92
4	65	\$25.01	\$7.85	\$4.32	\$0.00	\$37.18
5	70	\$26.93	\$7.85	\$14.11	\$0.00	\$48.89
6	75	\$28.85	\$7.85	\$14.44	\$0.00	\$51.14
7	80	\$30.78	\$7.85	\$14.77	\$0.00	\$53.40
8	90	\$34.62	\$7.85	\$15.44	\$0.00	\$57.91

**Effective Date - 07/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.71	\$7.85	\$0.00	\$0.00	\$27.56
2	55	\$21.68	\$7.85	\$3.66	\$0.00	\$33.19
3	60	\$23.65	\$7.85	\$3.99	\$0.00	\$35.49
4	65	\$25.62	\$7.85	\$4.32	\$0.00	\$37.79
5	70	\$27.59	\$7.85	\$14.11	\$0.00	\$49.55
6	75	\$29.57	\$7.85	\$14.44	\$0.00	\$51.86
7	80	\$31.54	\$7.85	\$14.77	\$0.00	\$54.16
8	90	\$35.48	\$7.85	\$15.44	\$0.00	\$58.77

**Notes:**  
Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER (TRAFFIC MARKINGS)	12/01/2015	\$35.35	\$7.45	\$13.55	\$0.00	\$56.35
LABORERS - ZONE 1	06/01/2016	\$36.10	\$7.45	\$13.55	\$0.00	\$57.10
	12/01/2016	\$37.10	\$7.45	\$13.55	\$0.00	\$58.10
For Apprentice rates see "Apprentice- LABORER"						
PAINTER / TAPER (BRUSH, NEW) *	01/01/2016	\$39.01	\$7.85	\$16.10	\$0.00	\$62.96
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used. PAINTERS LOCAL 35 - ZONE 2	07/01/2016	\$39.96	\$7.85	\$16.10	\$0.00	\$63.91
	01/01/2017	\$40.91	\$7.85	\$16.10	\$0.00	\$64.86

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - PAINTER - Local 35 Zone 2 - BRUSH NEW**

**Effective Date - 01/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.51	\$7.85	\$0.00	\$0.00	\$27.36
2	55	\$21.46	\$7.85	\$3.66	\$0.00	\$32.97
3	60	\$23.41	\$7.85	\$3.99	\$0.00	\$35.25
4	65	\$25.36	\$7.85	\$4.32	\$0.00	\$37.53
5	70	\$27.31	\$7.85	\$14.11	\$0.00	\$49.27
6	75	\$29.26	\$7.85	\$14.44	\$0.00	\$51.55
7	80	\$31.21	\$7.85	\$14.77	\$0.00	\$53.83
8	90	\$35.11	\$7.85	\$15.44	\$0.00	\$58.40

**Effective Date - 07/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.98	\$7.85	\$0.00	\$0.00	\$27.83
2	55	\$21.98	\$7.85	\$3.66	\$0.00	\$33.49
3	60	\$23.98	\$7.85	\$3.99	\$0.00	\$35.82
4	65	\$25.97	\$7.85	\$4.32	\$0.00	\$38.14
5	70	\$27.97	\$7.85	\$14.11	\$0.00	\$49.93
6	75	\$29.97	\$7.85	\$14.44	\$0.00	\$52.26
7	80	\$31.97	\$7.85	\$14.77	\$0.00	\$54.59
8	90	\$35.96	\$7.85	\$15.44	\$0.00	\$59.25

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PAINTER / TAPER (BRUSH, REPAINT)	01/01/2016	\$37.07	\$7.85	\$16.10	\$0.00	\$61.02
PAINTERS LOCAL 35 - ZONE 2	07/01/2016	\$38.02	\$7.85	\$16.10	\$0.00	\$61.97
	01/01/2017	\$38.97	\$7.85	\$16.10	\$0.00	\$62.92

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - PAINTER Local 35 Zone 2 - BRUSH REPAINT**

**Effective Date - 01/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$18.54	\$7.85	\$0.00	\$0.00	\$26.39
2	55	\$20.39	\$7.85	\$3.66	\$0.00	\$31.90
3	60	\$22.24	\$7.85	\$3.99	\$0.00	\$34.08
4	65	\$24.10	\$7.85	\$4.32	\$0.00	\$36.27
5	70	\$25.95	\$7.85	\$14.11	\$0.00	\$47.91
6	75	\$27.80	\$7.85	\$14.44	\$0.00	\$50.09
7	80	\$29.66	\$7.85	\$14.77	\$0.00	\$52.28
8	90	\$33.36	\$7.85	\$15.44	\$0.00	\$56.65

**Effective Date - 07/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.01	\$7.85	\$0.00	\$0.00	\$26.86
2	55	\$20.91	\$7.85	\$3.66	\$0.00	\$32.42
3	60	\$22.81	\$7.85	\$3.99	\$0.00	\$34.65
4	65	\$24.71	\$7.85	\$4.32	\$0.00	\$36.88
5	70	\$26.61	\$7.85	\$14.11	\$0.00	\$48.57
6	75	\$28.52	\$7.85	\$14.44	\$0.00	\$50.81
7	80	\$30.42	\$7.85	\$14.77	\$0.00	\$53.04
8	90	\$34.22	\$7.85	\$15.44	\$0.00	\$57.51

**Notes:**

Steps are 750 hrs.

**Apprentice to Journeyworker Ratio:1:1**

PANEL & PICKUP TRUCKS DRIVER <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2015	\$32.58	\$10.41	\$10.08	\$0.00	\$53.07
	06/01/2016	\$33.08	\$10.41	\$10.08	\$0.00	\$53.57
	08/01/2016	\$33.08	\$10.91	\$10.08	\$0.00	\$54.07
	12/01/2016	\$33.08	\$10.91	\$10.89	\$0.00	\$54.88
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK) <i>PILE DRIVER LOCAL 56 (ZONE 1)</i> For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2015	\$42.04	\$9.80	\$19.23	\$0.00	\$71.07
PILE DRIVER <i>PILE DRIVER LOCAL 56 (ZONE 1)</i>	08/01/2015	\$42.04	\$9.80	\$19.23	\$0.00	\$71.07

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - PILE DRIVER - Local 56 Zone 1**

**Effective Date - 08/01/2015**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.02	\$9.80	\$19.23	\$0.00	\$50.05
2	60	\$25.22	\$9.80	\$19.23	\$0.00	\$54.25
3	70	\$29.43	\$9.80	\$19.23	\$0.00	\$58.46
4	75	\$31.53	\$9.80	\$19.23	\$0.00	\$60.56
5	80	\$33.63	\$9.80	\$19.23	\$0.00	\$62.66
6	80	\$33.63	\$9.80	\$19.23	\$0.00	\$62.66
7	90	\$37.84	\$9.80	\$19.23	\$0.00	\$66.87
8	90	\$37.84	\$9.80	\$19.23	\$0.00	\$66.87

**Notes:**

**Apprentice to Journeyworker Ratio:1:3**

PIPEFITTER & STEAMFITTER PIPEFITTERS LOCAL 537	03/01/2016	\$49.19	\$9.70	\$18.14	\$0.00	\$77.03
	09/01/2016	\$50.19	\$9.70	\$18.14	\$0.00	\$78.03
	03/01/2017	\$51.19	\$9.70	\$18.14	\$0.00	\$79.03

**Apprentice - PIPEFITTER - Local 537**

**Effective Date - 03/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$19.68	\$9.70	\$7.50	\$0.00	\$36.88
2	45	\$22.14	\$9.70	\$18.14	\$0.00	\$49.98
3	60	\$29.51	\$9.70	\$18.14	\$0.00	\$57.35
4	70	\$34.43	\$9.70	\$18.14	\$0.00	\$62.27
5	80	\$39.35	\$9.70	\$18.14	\$0.00	\$67.19

**Effective Date - 09/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$20.08	\$9.70	\$7.50	\$0.00	\$37.28
2	45	\$22.59	\$9.70	\$18.14	\$0.00	\$50.43
3	60	\$30.11	\$9.70	\$18.14	\$0.00	\$57.95
4	70	\$35.13	\$9.70	\$18.14	\$0.00	\$62.97
5	80	\$40.15	\$9.70	\$18.14	\$0.00	\$67.99

**Notes:**

**\*\* 1:3; 3:15; 1:10 thereafter / Steps are 1 yr.**

**Refrig/AC Mechanic \*\*1:1;1:2;2:4;3:6;4:8;5:10;6:12;7:14;8:17;9:20;10:23(Max)**

**Apprentice to Journeyworker Ratio:\*\***

PIPELAYER LABORERS - ZONE 1	12/01/2015	\$35.60	\$7.45	\$13.55	\$0.00	\$56.60
	06/01/2016	\$36.35	\$7.45	\$13.55	\$0.00	\$57.35
	12/01/2016	\$37.35	\$7.45	\$13.55	\$0.00	\$58.35

For apprentice rates see "Apprentice-LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PLUMBERS & GASFITTERS	03/01/2016	\$51.36	\$11.07	\$15.14	\$0.00	\$77.57
PLUMBERS & GASFITTERS LOCAL 12	09/01/2016	\$52.41	\$11.07	\$15.14	\$0.00	\$78.62
	03/01/2017	\$53.41	\$11.07	\$15.14	\$0.00	\$79.62

**Apprentice - PLUMBER/GASFITTER - Local 12**

Effective Date - 03/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$17.98	\$11.07	\$5.63	\$0.00	\$34.68
2	40	\$20.54	\$11.07	\$6.37	\$0.00	\$37.98
3	55	\$28.25	\$11.07	\$8.56	\$0.00	\$47.88
4	65	\$33.38	\$11.07	\$10.03	\$0.00	\$54.48
5	75	\$38.52	\$11.07	\$11.48	\$0.00	\$61.07

Effective Date - 09/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$18.34	\$11.07	\$5.63	\$0.00	\$35.04
2	40	\$20.96	\$11.07	\$6.36	\$0.00	\$38.39
3	55	\$28.83	\$11.07	\$8.55	\$0.00	\$48.45
4	65	\$34.07	\$11.07	\$10.02	\$0.00	\$55.16
5	75	\$39.31	\$11.07	\$11.48	\$0.00	\$61.86

**Notes:**

\*\* 1:2; 2:6; 3:10; 4:14; 5:19/Steps are 1 yr  
Step4 with lic\$57.78 Step5 with lic\$64.37

**Apprentice to Journeyworker Ratio:\*\***

PNEUMATIC CONTROLS (TEMP.)	03/01/2016	\$49.19	\$9.70	\$18.14	\$0.00	\$77.03
PIPEFITTERS LOCAL 537	09/01/2016	\$50.19	\$9.70	\$18.14	\$0.00	\$78.03
	03/01/2017	\$51.19	\$9.70	\$18.14	\$0.00	\$79.03

For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"

PNEUMATIC DRILL/TOOL OPERATOR	12/01/2015	\$35.60	\$7.45	\$13.55	\$0.00	\$56.60
LABORERS - ZONE 1	06/01/2016	\$36.35	\$7.45	\$13.55	\$0.00	\$57.35
	12/01/2016	\$37.35	\$7.45	\$13.55	\$0.00	\$58.35

For apprentice rates see "Apprentice- LABORER"

POWDERMAN & BLASTER	12/01/2015	\$36.35	\$7.45	\$13.55	\$0.00	\$57.35
LABORERS - ZONE 1	06/01/2016	\$37.10	\$7.45	\$13.55	\$0.00	\$58.10
	12/01/2016	\$38.10	\$7.45	\$13.55	\$0.00	\$59.10

For apprentice rates see "Apprentice- LABORER"

POWER SHOVEL/DERRICK/TRENCHING MACHINE	12/01/2015	\$43.73	\$10.00	\$14.90	\$0.00	\$68.63
OPERATING ENGINEERS LOCAL 4	06/01/2016	\$44.48	\$10.00	\$14.90	\$0.00	\$69.38
	12/01/2016	\$45.73	\$10.00	\$14.90	\$0.00	\$70.63
	06/01/2017	\$46.73	\$10.00	\$14.90	\$0.00	\$71.63
	12/01/2017	\$47.73	\$10.00	\$14.90	\$0.00	\$72.63

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PUMP OPERATOR (CONCRETE) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2015	\$43.73	\$10.00	\$14.90	\$0.00	\$68.63
	06/01/2016	\$44.48	\$10.00	\$14.90	\$0.00	\$69.38
	12/01/2016	\$45.73	\$10.00	\$14.90	\$0.00	\$70.63
	06/01/2017	\$46.73	\$10.00	\$14.90	\$0.00	\$71.63
	12/01/2017	\$47.73	\$10.00	\$14.90	\$0.00	\$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2015	\$30.13	\$10.00	\$14.90	\$0.00	\$55.03
	06/01/2016	\$30.65	\$10.00	\$14.90	\$0.00	\$55.55
	12/01/2016	\$31.52	\$10.00	\$14.90	\$0.00	\$56.42
	06/01/2017	\$32.21	\$10.00	\$14.90	\$0.00	\$57.11
	12/01/2017	\$32.90	\$10.00	\$14.90	\$0.00	\$57.80
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY MIX CONCRETE DRIVERS after 4/30/10 (Drivers Hired After 4/30/2010) <i>TEAMSTERS LOCAL 25c</i>	07/01/2015	\$27.88	\$7.98	\$8.92	\$0.00	\$44.78
	05/01/2016	\$28.03	\$7.98	\$9.31	\$0.00	\$45.32
	07/01/2016	\$28.03	\$8.23	\$9.31	\$0.00	\$45.57
	05/01/2017	\$28.18	\$8.23	\$9.72	\$0.00	\$46.13
	07/01/2017	\$28.18	\$8.48	\$9.72	\$0.00	\$46.38
READY-MIX CONCRETE DRIVER <i>TEAMSTERS LOCAL 25c</i>	07/01/2015	\$29.18	\$7.98	\$8.92	\$0.00	\$46.08
	05/01/2016	\$29.33	\$7.98	\$9.31	\$0.00	\$46.62
	07/01/2016	\$29.33	\$8.23	\$9.31	\$0.00	\$46.87
	05/01/2017	\$29.48	\$8.23	\$9.72	\$0.00	\$47.43
	07/01/2017	\$29.48	\$8.48	\$9.72	\$0.00	\$47.68
RECLAIMERS <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2015	\$43.31	\$10.00	\$14.90	\$0.00	\$68.21
	06/01/2016	\$44.06	\$10.00	\$14.90	\$0.00	\$68.96
	12/01/2016	\$45.29	\$10.00	\$14.90	\$0.00	\$70.19
	06/01/2017	\$46.28	\$10.00	\$14.90	\$0.00	\$71.18
	12/01/2017	\$47.27	\$10.00	\$14.90	\$0.00	\$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
RESIDENTIAL WOOD FRAME (All Other Work) <i>CARPENTERS -ZONE 2 (Residential Wood)</i>	04/01/2011	\$24.24	\$8.67	\$15.51	\$0.00	\$48.42
RESIDENTIAL WOOD FRAME CARPENTER **	05/01/2011	\$24.24	\$6.34	\$6.23	\$0.00	\$36.81

\*\* The Residential Wood Frame Carpenter classification applies only to the construction of new, wood frame residences that do not exceed four stories including the basement. *CARPENTERS -ZONE 2 (Residential Wood)*

As of 9/1/09 Carpentry work on wood-frame residential WEATHERIZATION projects shall be paid the RESIDENTIAL WOOD FRAME CARPENTER rate.



<b>Classification</b>	<b>Effective Date</b>	<b>Base Wage</b>	<b>Health</b>	<b>Pension</b>	<b>Supplemental Unemployment</b>	<b>Total Rate</b>
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**Apprentice - CARPENTER (Residential Wood Frame) - Zone 2**

**Effective Date - 05/01/2011**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$14.54	\$6.34	\$0.00	\$0.00	\$20.88
2	60	\$14.54	\$6.34	\$6.23	\$0.00	\$27.11
3	65	\$15.76	\$6.34	\$6.23	\$0.00	\$28.33
4	70	\$16.97	\$6.34	\$6.23	\$0.00	\$29.54
5	75	\$18.18	\$6.34	\$6.23	\$0.00	\$30.75
6	80	\$19.39	\$6.34	\$6.23	\$0.00	\$31.96
7	85	\$20.60	\$6.34	\$6.23	\$0.00	\$33.17
8	90	\$21.82	\$6.34	\$6.23	\$0.00	\$34.39

**Notes:**

**Apprentice to Journeyworker Ratio:1:5**

RIDE-ON MOTORIZED BUGGY OPERATOR LABORERS - ZONE 1	12/01/2015	\$35.60	\$7.45	\$13.55	\$0.00	\$56.60
	06/01/2016	\$36.35	\$7.45	\$13.55	\$0.00	\$57.35
	12/01/2016	\$37.35	\$7.45	\$13.55	\$0.00	\$58.35

For apprentice rates see "Apprentice- LABORER"

ROLLER/SPREADER/MULCHING MACHINE OPERATING ENGINEERS LOCAL 4	12/01/2015	\$43.31	\$10.00	\$14.90	\$0.00	\$68.21
	06/01/2016	\$44.06	\$10.00	\$14.90	\$0.00	\$68.96
	12/01/2016	\$45.29	\$10.00	\$14.90	\$0.00	\$70.19
	06/01/2017	\$46.28	\$10.00	\$14.90	\$0.00	\$71.18
	12/01/2017	\$47.27	\$10.00	\$14.90	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

ROOFER (Inc.Roofing Waterproofing &Roofing Damproofing) ROOFERS LOCAL 33	02/01/2016	\$40.11	\$11.00	\$12.90	\$0.00	\$64.01
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**Apprentice - ROOFER - Local 33**

**Effective Date - 02/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$20.06	\$11.00	\$3.39	\$0.00	\$34.45
2	60	\$24.07	\$11.00	\$12.90	\$0.00	\$47.97
3	65	\$26.07	\$11.00	\$12.90	\$0.00	\$49.97
4	75	\$30.08	\$11.00	\$12.90	\$0.00	\$53.98
5	85	\$34.09	\$11.00	\$12.90	\$0.00	\$57.99

**Notes: \*\* 1:5, 2:6-10, the 1:10; Reroofing: 1:4, then 1:1**  
Step 1 is 2000 hrs.; Steps 2-5 are 1000 hrs.

**Apprentice to Journeyworker Ratio:\*\***

ROOFER SLATE / TILE / PRECAST CONCRETE ROOFERS LOCAL 33	02/01/2016	\$40.36	\$11.00	\$12.90	\$0.00	\$64.26
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For apprentice rates see "Apprentice- ROOFER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
SHEETMETAL WORKER	02/01/2016	\$43.31	\$10.70	\$21.95	\$2.28	\$78.24
SHEETMETAL WORKERS LOCAL 17 - A	08/01/2016	\$44.46	\$10.70	\$21.95	\$2.28	\$79.39
	02/01/2017	\$45.56	\$10.70	\$21.95	\$2.28	\$80.49
	08/01/2017	\$46.66	\$10.70	\$21.95	\$2.28	\$81.59
	02/01/2018	\$47.81	\$10.70	\$21.95	\$2.28	\$82.74

**Apprentice - SHEET METAL WORKER - Local 17-A**

Effective Date - 02/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$17.32	\$10.70	\$4.90	\$0.00	\$32.92
2	40	\$17.32	\$10.70	\$4.90	\$0.00	\$32.92
3	45	\$19.49	\$10.70	\$9.79	\$1.20	\$41.18
4	45	\$19.49	\$10.70	\$9.79	\$1.20	\$41.18
5	50	\$21.66	\$10.70	\$10.65	\$1.29	\$44.30
6	50	\$21.66	\$10.70	\$10.90	\$1.30	\$44.56
7	60	\$25.99	\$10.70	\$12.37	\$1.47	\$50.53
8	65	\$28.15	\$10.70	\$13.24	\$1.56	\$53.65
9	75	\$32.48	\$10.70	\$14.97	\$1.74	\$59.89
10	85	\$36.81	\$10.70	\$16.18	\$1.91	\$65.60

Effective Date - 08/01/2016

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$17.78	\$10.70	\$4.90	\$0.00	\$33.38
2	40	\$17.78	\$10.70	\$4.90	\$0.00	\$33.38
3	45	\$20.01	\$10.70	\$9.79	\$1.22	\$41.72
4	45	\$20.01	\$10.70	\$9.79	\$1.22	\$41.72
5	50	\$22.23	\$10.70	\$10.65	\$1.31	\$44.89
6	50	\$22.23	\$10.70	\$10.90	\$1.31	\$45.14
7	60	\$26.68	\$10.70	\$12.37	\$1.49	\$51.24
8	65	\$28.90	\$10.70	\$13.24	\$1.59	\$54.43
9	75	\$33.35	\$10.70	\$14.97	\$1.77	\$60.79
10	85	\$37.79	\$10.70	\$16.18	\$1.94	\$66.61

**Notes:**

Steps are 6 mos.

**Apprentice to Journeyworker Ratio:1:4**

SIGN ERECTOR	06/01/2013	\$25.81	\$7.07	\$7.05	\$0.00	\$39.93
PAINTERS LOCAL 35 - ZONE 2						

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - SIGN ERECTOR - Local 35 Zone 2**

**Effective Date - 06/01/2013**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$12.91	\$7.07	\$0.00	\$0.00	\$19.98
2	55	\$14.20	\$7.07	\$2.45	\$0.00	\$23.72
3	60	\$15.49	\$7.07	\$2.45	\$0.00	\$25.01
4	65	\$16.78	\$7.07	\$2.45	\$0.00	\$26.30
5	70	\$18.07	\$7.07	\$7.05	\$0.00	\$32.19
6	75	\$19.36	\$7.07	\$7.05	\$0.00	\$33.48
7	80	\$20.65	\$7.07	\$7.05	\$0.00	\$34.77
8	85	\$21.94	\$7.07	\$7.05	\$0.00	\$36.06
9	90	\$23.23	\$7.07	\$7.05	\$0.00	\$37.35

**Notes:**

Steps are 4 mos.

**Apprentice to Journeyworker Ratio:1:1**

SPECIALIZED EARTH MOVING EQUIP < 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2015	\$33.04	\$10.41	\$10.08	\$0.00	\$53.53
	06/01/2016	\$33.54	\$10.41	\$10.08	\$0.00	\$54.03
	08/01/2016	\$33.54	\$10.91	\$10.08	\$0.00	\$54.53
	12/01/2016	\$33.54	\$10.91	\$10.89	\$0.00	\$55.34
SPECIALIZED EARTH MOVING EQUIP > 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2015	\$33.33	\$10.41	\$10.08	\$0.00	\$53.82
	06/01/2016	\$33.83	\$10.41	\$10.08	\$0.00	\$54.32
	08/01/2016	\$33.83	\$10.91	\$10.08	\$0.00	\$54.82
	12/01/2016	\$33.83	\$10.91	\$10.89	\$0.00	\$55.63
SPRINKLER FITTER <i>SPRINKLER FITTERS LOCAL 550 - (Section A) Zone 1</i>	03/01/2016	\$54.43	\$8.67	\$16.80	\$0.00	\$79.90
	10/01/2016	\$55.53	\$8.67	\$16.80	\$0.00	\$81.00
	03/01/2017	\$56.53	\$8.67	\$16.80	\$0.00	\$82.00

**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - SPRINKLER FITTER - Local 550 (Section A) Zone 1**

**Effective Date - 03/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$19.05	\$8.67	\$8.55	\$0.00	\$36.27
2	40	\$21.77	\$8.67	\$8.55	\$0.00	\$38.99
3	45	\$24.49	\$8.67	\$8.55	\$0.00	\$41.71
4	50	\$27.22	\$8.67	\$8.55	\$0.00	\$44.44
5	55	\$29.94	\$8.67	\$8.55	\$0.00	\$47.16
6	60	\$32.66	\$8.67	\$8.55	\$0.00	\$49.88
7	65	\$35.38	\$8.67	\$8.55	\$0.00	\$52.60
8	70	\$38.10	\$8.67	\$8.55	\$0.00	\$55.32
9	75	\$40.82	\$8.67	\$8.55	\$0.00	\$58.04
10	80	\$43.54	\$8.67	\$8.55	\$0.00	\$60.76

**Effective Date - 10/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	\$19.44	\$8.67	\$8.55	\$0.00	\$36.66
2	40	\$22.21	\$8.67	\$8.55	\$0.00	\$39.43
3	45	\$24.99	\$8.67	\$8.55	\$0.00	\$42.21
4	50	\$27.77	\$8.67	\$8.55	\$0.00	\$44.99
5	55	\$30.54	\$8.67	\$8.55	\$0.00	\$47.76
6	60	\$33.32	\$8.67	\$8.55	\$0.00	\$50.54
7	65	\$36.09	\$8.67	\$8.55	\$0.00	\$53.31
8	70	\$38.87	\$8.67	\$8.55	\$0.00	\$56.09
9	75	\$41.65	\$8.67	\$8.55	\$0.00	\$58.87
10	80	\$44.42	\$8.67	\$8.55	\$0.00	\$61.64

**Notes:** Apprentice entered prior 9/30/10:  
40/45/50/55/60/65/70/75/80/85  
Steps are 850 hours

**Apprentice to Journeyworker Ratio:1:3**

STEAM BOILER OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2015	\$43.31	\$10.00	\$14.90	\$0.00	\$68.21
	06/01/2016	\$44.06	\$10.00	\$14.90	\$0.00	\$68.96
	12/01/2016	\$45.29	\$10.00	\$14.90	\$0.00	\$70.19
	06/01/2017	\$46.28	\$10.00	\$14.90	\$0.00	\$71.18
	12/01/2017	\$47.27	\$10.00	\$14.90	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2015	\$43.31	\$10.00	\$14.90	\$0.00	\$68.21
	06/01/2016	\$44.06	\$10.00	\$14.90	\$0.00	\$68.96
	12/01/2016	\$45.29	\$10.00	\$14.90	\$0.00	\$70.19
	06/01/2017	\$46.28	\$10.00	\$14.90	\$0.00	\$71.18
	12/01/2017	\$47.27	\$10.00	\$14.90	\$0.00	\$72.17

For apprentice rates see "Apprentice- OPERATING ENGINEERS"

TELECOMMUNICATION TECHNICIAN <i>ELECTRICIANS LOCAL 103</i>	03/01/2016	\$34.63	\$13.00	\$14.55	\$0.00	\$62.18
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**Classification**

**Effective Date    Base Wage    Health    Pension    Supplemental Unemployment    Total Rate**

**Apprentice - TELECOMMUNICATION TECHNICIAN - Local 103**

**Effective Date - 03/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$13.85	\$13.00	\$0.42	\$0.00	\$27.27
2	40	\$13.85	\$13.00	\$0.42	\$0.00	\$27.27
3	45	\$15.58	\$13.00	\$11.52	\$0.00	\$40.10
4	45	\$15.58	\$13.00	\$11.52	\$0.00	\$40.10
5	50	\$17.32	\$13.00	\$11.79	\$0.00	\$42.11
6	55	\$19.05	\$13.00	\$12.06	\$0.00	\$44.11
7	60	\$20.78	\$13.00	\$12.34	\$0.00	\$46.12
8	65	\$22.51	\$13.00	\$12.62	\$0.00	\$48.13
9	70	\$24.24	\$13.00	\$12.90	\$0.00	\$50.14
10	75	\$25.97	\$13.00	\$13.17	\$0.00	\$52.14

**Notes:**

**Apprentice to Journeyworker Ratio:1:1**

TERRAZZO FINISHERS	02/01/2016	\$48.80	\$10.18	\$19.14	\$0.00	\$78.12
BRICKLAYERS LOCAL 3 - MARBLE & TILE	08/01/2016	\$49.70	\$10.18	\$19.22	\$0.00	\$79.10
	02/01/2017	\$50.27	\$10.18	\$19.22	\$0.00	\$79.67

**Apprentice - TERRAZZO FINISHER - Local 3 Marble & Tile**

**Effective Date - 02/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.40	\$10.18	\$19.14	\$0.00	\$53.72
2	60	\$29.28	\$10.18	\$19.14	\$0.00	\$58.60
3	70	\$34.16	\$10.18	\$19.14	\$0.00	\$63.48
4	80	\$39.04	\$10.18	\$19.14	\$0.00	\$68.36
5	90	\$43.92	\$10.18	\$19.14	\$0.00	\$73.24

**Effective Date - 08/01/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.85	\$10.18	\$19.22	\$0.00	\$54.25
2	60	\$29.82	\$10.18	\$19.22	\$0.00	\$59.22
3	70	\$34.79	\$10.18	\$19.22	\$0.00	\$64.19
4	80	\$39.76	\$10.18	\$19.22	\$0.00	\$69.16
5	90	\$44.73	\$10.18	\$19.22	\$0.00	\$74.13

**Notes:**

**Apprentice to Journeyworker Ratio:1:3**

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TEST BORING DRILLER <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2015	\$36.70	\$7.45	\$13.75	\$0.00	\$57.90
	06/01/2016	\$37.45	\$7.45	\$13.75	\$0.00	\$58.65
	12/01/2016	\$38.45	\$7.45	\$13.75	\$0.00	\$59.65
For apprentice rates see "Apprentice- LABORER"						
TEST BORING DRILLER HELPER <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2015	\$35.42	\$7.45	\$13.75	\$0.00	\$56.62
	06/01/2016	\$36.17	\$7.45	\$13.75	\$0.00	\$57.37
	12/01/2016	\$37.17	\$7.45	\$13.75	\$0.00	\$58.37
For apprentice rates see "Apprentice- LABORER"						
TEST BORING LABORER <i>LABORERS - FOUNDATION AND MARINE</i>	12/01/2015	\$35.30	\$7.45	\$13.75	\$0.00	\$56.50
	06/01/2016	\$36.05	\$7.45	\$13.75	\$0.00	\$57.25
	12/01/2016	\$37.05	\$7.45	\$13.75	\$0.00	\$58.25
For apprentice rates see "Apprentice- LABORER"						
TRACTORS/PORTABLE STEAM GENERATORS <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2015	\$43.31	\$10.00	\$14.90	\$0.00	\$68.21
	06/01/2016	\$44.06	\$10.00	\$14.90	\$0.00	\$68.96
	12/01/2016	\$45.29	\$10.00	\$14.90	\$0.00	\$70.19
	06/01/2017	\$46.28	\$10.00	\$14.90	\$0.00	\$71.18
	12/01/2017	\$47.27	\$10.00	\$14.90	\$0.00	\$72.17
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TRAILERS FOR EARTH MOVING EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2015	\$33.62	\$10.41	\$10.08	\$0.00	\$54.11
	06/01/2016	\$34.12	\$10.41	\$10.08	\$0.00	\$54.61
	08/01/2016	\$34.12	\$10.91	\$10.08	\$0.00	\$55.11
	12/01/2016	\$34.12	\$10.91	\$10.89	\$0.00	\$55.92
TUNNEL WORK - COMPRESSED AIR <i>LABORERS (COMPRESSED AIR)</i>	12/01/2015	\$47.58	\$7.45	\$14.15	\$0.00	\$69.18
	06/01/2016	\$48.33	\$7.45	\$14.15	\$0.00	\$69.93
	12/01/2016	\$49.33	\$7.45	\$14.15	\$0.00	\$70.93
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) <i>LABORERS (COMPRESSED AIR)</i>	12/01/2015	\$49.58	\$7.45	\$14.15	\$0.00	\$71.18
	06/01/2016	\$50.33	\$7.45	\$14.15	\$0.00	\$71.93
	12/01/2016	\$51.33	\$7.45	\$14.15	\$0.00	\$72.93
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR <i>LABORERS (FREE AIR TUNNEL)</i>	12/01/2015	\$39.65	\$7.45	\$14.15	\$0.00	\$61.25
	06/01/2016	\$40.40	\$7.45	\$14.15	\$0.00	\$62.00
	12/01/2016	\$41.40	\$7.45	\$14.15	\$0.00	\$63.00
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR (HAZ. WASTE) <i>LABORERS (FREE AIR TUNNEL)</i>	12/01/2015	\$41.65	\$7.45	\$14.15	\$0.00	\$63.25
	06/01/2016	\$42.40	\$7.45	\$14.15	\$0.00	\$64.00
	12/01/2016	\$43.40	\$7.45	\$14.15	\$0.00	\$65.00
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE A</i>	12/01/2015	\$33.04	\$10.41	\$10.08	\$0.00	\$53.53
	06/01/2016	\$33.54	\$10.41	\$10.08	\$0.00	\$54.03
	08/01/2016	\$33.54	\$10.91	\$10.08	\$0.00	\$54.53
	12/01/2016	\$33.54	\$10.91	\$10.89	\$0.00	\$55.34
WAGON DRILL OPERATOR <i>LABORERS - ZONE 1</i>	12/01/2015	\$35.60	\$7.45	\$13.55	\$0.00	\$56.60
	06/01/2016	\$36.35	\$7.45	\$13.55	\$0.00	\$57.35
	12/01/2016	\$37.35	\$7.45	\$13.55	\$0.00	\$58.35
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
WASTE WATER PUMP OPERATOR <i>OPERATING ENGINEERS LOCAL 4</i>	12/01/2015	\$43.73	\$10.00	\$14.90	\$0.00	\$68.63
	06/01/2016	\$44.48	\$10.00	\$14.90	\$0.00	\$69.38
	12/01/2016	\$45.73	\$10.00	\$14.90	\$0.00	\$70.63
	06/01/2017	\$46.73	\$10.00	\$14.90	\$0.00	\$71.63
	12/01/2017	\$47.73	\$10.00	\$14.90	\$0.00	\$72.63
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
WATER METER INSTALLER <i>PLUMBERS &amp; GASFITTERS LOCAL 12</i>	03/01/2016	\$51.36	\$11.07	\$15.14	\$0.00	\$77.57
	09/01/2016	\$52.41	\$11.07	\$15.14	\$0.00	\$78.62
	03/01/2017	\$53.41	\$11.07	\$15.14	\$0.00	\$79.62
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						
<b>Outside Electrical - East</b>						
CABLE TECHNICIAN (Power Zone) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2015	\$26.11	\$7.25	\$1.78	\$0.00	\$35.14
	08/28/2016	\$26.61	\$7.50	\$1.80	\$0.00	\$35.91
	09/03/2017	\$27.14	\$7.75	\$1.81	\$0.00	\$36.70
For apprentice rates see "Apprentice- LINEMAN"						
CABLEMAN (Underground Ducts & Cables) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2015	\$36.98	\$7.25	\$8.12	\$0.00	\$52.35
	08/28/2016	\$37.70	\$7.50	\$8.87	\$0.00	\$54.07
	09/03/2017	\$38.45	\$7.75	\$9.53	\$0.00	\$55.73
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN CDL <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2015	\$30.46	\$7.25	\$8.34	\$0.00	\$46.05
	08/28/2016	\$31.05	\$7.50	\$8.89	\$0.00	\$47.44
	09/03/2017	\$31.66	\$7.75	\$9.44	\$0.00	\$48.85
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN -Inexperienced (<2000 Hrs) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2015	\$23.93	\$7.25	\$1.72	\$0.00	\$32.90
	08/28/2016	\$24.39	\$7.50	\$1.73	\$0.00	\$33.62
	09/03/2017	\$24.88	\$7.75	\$1.75	\$0.00	\$34.38
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class A CDL) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2015	\$36.98	\$7.25	\$12.29	\$0.00	\$56.52
	08/28/2016	\$37.70	\$7.50	\$12.95	\$0.00	\$58.15
	09/03/2017	\$38.45	\$7.75	\$13.61	\$0.00	\$59.81
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class B CDL) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2015	\$32.63	\$7.25	\$9.05	\$0.00	\$48.93
	08/28/2016	\$33.26	\$7.50	\$9.63	\$0.00	\$50.39
	09/03/2017	\$33.92	\$7.75	\$10.21	\$0.00	\$51.88
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2015	\$23.93	\$7.25	\$1.72	\$0.00	\$32.90
	08/28/2016	\$24.39	\$7.50	\$1.73	\$0.00	\$33.62
	09/03/2017	\$24.88	\$7.75	\$1.75	\$0.00	\$34.38
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN -Inexperienced (<2000 Hrs.) <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2015	\$19.58	\$7.25	\$1.59	\$0.00	\$28.42
	08/28/2016	\$19.96	\$7.50	\$1.60	\$0.00	\$29.06
	09/03/2017	\$20.35	\$7.75	\$1.61	\$0.00	\$29.71
For apprentice rates see "Apprentice- LINEMAN"						
JOURNEYMAN LINEMAN <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	08/30/2015	\$43.51	\$7.25	\$15.06	\$0.00	\$65.82
	08/28/2016	\$44.35	\$7.50	\$15.83	\$0.00	\$67.68
	09/03/2017	\$45.23	\$7.75	\$16.61	\$0.00	\$69.59

<b>Classification</b>	<b>Effective Date</b>	<b>Base Wage</b>	<b>Health</b>	<b>Pension</b>	<b>Supplemental Unemployment</b>	<b>Total Rate</b>
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**Apprentice - LINEMAN (Outside Electrical) - East Local 104**

**Effective Date - 08/30/2015**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$26.11	\$7.25	\$3.28	\$0.00	\$36.64
2	65	\$28.28	\$7.25	\$3.35	\$0.00	\$38.88
3	70	\$30.46	\$7.25	\$3.41	\$0.00	\$41.12
4	75	\$32.63	\$7.25	\$4.98	\$0.00	\$44.86
5	80	\$34.81	\$7.25	\$5.04	\$0.00	\$47.10
6	85	\$36.98	\$7.25	\$5.11	\$0.00	\$49.34
7	90	\$39.16	\$7.25	\$7.17	\$0.00	\$53.58

**Effective Date - 08/28/2016**

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$26.61	\$7.50	\$3.30	\$0.00	\$37.41
2	65	\$28.83	\$7.50	\$3.36	\$0.00	\$39.69
3	70	\$31.05	\$7.50	\$3.43	\$0.00	\$41.98
4	75	\$33.26	\$7.50	\$5.00	\$0.00	\$45.76
5	80	\$35.48	\$7.50	\$5.06	\$0.00	\$48.04
6	85	\$37.70	\$7.50	\$5.13	\$0.00	\$50.33
7	90	\$39.92	\$7.50	\$7.20	\$0.00	\$54.62

**Notes:**

**Apprentice to Journeyworker Ratio:1:2**

<b>TELEDATA CABLE SPLICER</b> <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	01/01/2016	\$28.98	\$4.25	\$3.12	\$0.00	\$36.35
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<b>TELEDATA LINEMAN/EQUIPMENT OPERATOR</b> <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	01/01/2016	\$27.31	\$4.25	\$3.07	\$0.00	\$34.63
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<b>TELEDATA WIREMAN/INSTALLER/TECHNICIAN</b> <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	01/01/2016	\$27.31	\$4.25	\$3.07	\$0.00	\$34.63
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<b>TREE TRIMMER</b> <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	01/31/2016	\$18.51	\$3.55	\$0.00	\$0.00	\$22.06
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This classification applies only to tree work done: (a) for a utility company, R.E.A. cooperative, or railroad or coal mining company, and (b) for the purpose of operating, maintaining, or repairing the utility company's equipment, and (c) by a person who is using hand or mechanical cutting methods and is not on the ground. This classification does not apply to wholesale tree removal.

<b>TREE TRIMMER GROUNDMAN</b> <i>OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104</i>	01/31/2016	\$16.32	\$3.55	\$0.00	\$0.00	\$19.87
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This classification applies only to tree work done: (a) for a utility company, R.E.A. cooperative, or railroad or coal mining company, and (b) for the purpose of operating, maintaining, or repairing the utility company's equipment, and (c) by a person who is using hand or mechanical cutting methods and is on the ground. This classification does not apply to wholesale tree removal.



**Classification**

**Effective Date   Base Wage   Health   Pension   Supplemental  
Unemployment   Total Rate**

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**Additional Apprentice Information:**

Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre-determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c. 149, ss. 26-27D. Apprentice ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c. 23, ss. 11E-11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c. 23, ss. 11E-11L.

All steps are six months (1000 hours.)

Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified.

\*\* Multiple ratios are listed in the comment field.

\*\*\* APP to JM; 1:1, 2:2, 2:3, 3:4, 4:4, 4:5, 4:6, 5:7, 6:7, 6:8, 6:9, 7:10, 8:10, 8:11, 8:12, 9:13, 10:13, 10:14, etc.

\*\*\*\* APP to JM; 1:1, 1:2, 2:3, 2:4, 3:5, 4:6, 4:7, 5:8, 6:9, 6:10, 7:11, 8:12, 8:13, 9:14, 10:15, 10:16, etc.

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**BY-LAWS OF THE TOWN OF ARLINGTON**  
**TITLE 1**  
**ARTICLE 16: CONSTRUCTION PROJECTS**

ART. 15, A.T.M. 4/22/96

**Section 1. Women Work Force Participation**

Any Town board or official in charge of a construction or reconstruction project is required to include in the contract documents the following:

ART. 17, A.T.M. 4/28/99

- A. The contractor shall maintain as a goal on this project a not less than five percent ratio of women work force to total project hours in both the general contract and individual filed sub-bid contract, if applicable. The preceding sentence shall be included in all construction contracts whether entered into the Town pursuant to the provisions of M.G.L. c.149 or M.G.L. c.30 §.39M, et seq., provided however, that if entered into under Chapter 30 same shall not be deemed to apply where the projected bid price as determined by the Director of Public Works is not likely to exceed \$200,000.
- B. A Labor Scheduling Table which will be used as a tool for achieving a range of women work force participation for the entire project in both the general contract and each individual filed sub-bid contract.

**Section 2. Equal Opportunity Goal Compliance**

Any Town board or official in charge of a construction or reconstruction project is required to include in the contract documents the following:

ART. 16 A.T.M. 4/24/96; ART. 17, A.T.M. 4/28/99

- A. Before starting work, the contractors (includes general contractor, for itself and its subcontractors, as well as all filed sub-bid contractors, if applicable) will submit plans for achievement of the equal opportunity goals of the contract. All contractors will be required to make a good faith effort to achieve these goals. The plan will indicate if the contractors expect to achieve the requirements during the first quarter. If there are reasons why the contractors do not expect to achieve the requirements during the first quarter year of the contract construction phase, then the contractors shall provide a plan calculated to address, to the extent reasonably possible, these obstacles to a good faith effort to achieve such goals.
- B. Not more than ten days following the end of each work quarter, the contractors will report on the achievement of the goals, detailing the good faith efforts that have been made and will continue to be made and any other appropriate efforts not yet undertaken.
- C. All reports will be signed by an officer or principal of the company who has the authority to contractually obligate the company.

**Section 3. Recruitment and Training**

ART. 53 ATM 5/19/97

Any board, officer, committee, or other agency of the Town, which acts on behalf of the Town in making or supervising any contract, in an amount exceeding the sum of \$100,000 for the purchase of goods or services or for the construction, renovation, or repair of buildings or other improvement of real estate, may make arrangements with contractors and other interested agencies for special programs of recruitment and training in connection with the work to be performed on such contract, with the objective of promoting equal employment opportunity for members of minority groups protected by the fair employment

laws of the Commonwealth and the United States. Any board, officer, committee or other Town agency may expend Town funds in carrying them out provided that appropriations specifically designed for such purposes have been voted by the Town Meeting.  
ART. 32, ATM 5/14/03

**Section 4. LEED**

It is the intent of the Town to reduce the life-cycle operating costs and increase the environmental efficiency of Town buildings, by adopting the goal that all construction of new Town buildings and major renovations and additions to existing Town buildings meet or exceed a Silver Certification based on the most current criteria of the Leadership in Energy and Environmental Design (LEED) Green Building Rating System promulgated by the United States Green Building Council, or comparable scoring system. The Town shall include a minimum of LEED Silver Certification, or equivalent level in comparable building scoring system, as a required element in requests for proposal or bids it issues soliciting architectural design services for construction, major renovation, and addition to its buildings, unless the Permanent Town Building Committee makes the finding that such certification is not in keeping with the use or purpose of the building or is otherwise inappropriate. No building project shall be deemed complete until LEED Silver Certification or greater, or equivalent, has been confirmed, unless the PTBC makes the finding that such certification is not in keeping with the use or purpose of the building or is otherwise inappropriate.  
ART. 18, ATM 4/00, ART. 32 ATM 5/14/03

[http://www.town.arlington.ma.us/Public\\_Documents/ArlingtonMA\\_TownBylaws/title1#article16](http://www.town.arlington.ma.us/Public_Documents/ArlingtonMA_TownBylaws/title1#article16)

END OF SECTION

## INSURANCE REQUIREMENTS

### 1. GENERAL

A. This section specifies the Owner's requirements for insurance and relates to the General Conditions of the Contract for Construction and Supplementary Conditions of the Contract for Construction.

B. Provisions of the General Conditions of the Contract for Construction and Supplementary General Conditions of the Contract for Construction, which are not modified by the following insurance Requirements, remain in full effect.

### 2. INSURANCE REQUIREMENTS

A. Insurance Limits: The insurance required should be written for not less than the limits of liability required by law or the following limits, whichever is greater: State and federal Workmen's Compensation Statutory Benefits required by union contract as required.

#### GENERAL LIABILITY\*

General Liability- Bodily Injury and Property Damage Each Occurrence	\$1,000,000.00
General Liability — Bodily Injury and Property Damage Aggregate	\$2,000,000.00

General Liability shall include coverage for the following:

- Comprehensive form
- Premise/Operations Liability
- Explosion, Collapse and Underground (XCU). Products/Completed Operations (aggregate limit \$2,000,000.00) Contractual Liability
- Independent Contractors Broad
- Form Property Damage
- Personal Injury Including Libel and Slander Coverage Broad
- Form CGL Endorsement

#### AUTOMOBILE LIABILITY\*\*

Comp. Automobile Liability** Bodily Injury and Property Damage Per Accident	\$1,000,000.00
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\*\*Provide coverage for All Owned, Non-Owned, and Hired vehicles.

#### EXCESS LIABILITY – Umbrella Form

Each occurrence	\$5,000,000.00
Aggregate	\$5,000,000.00

B. Exclusions: The Owner's property insurance shall not cover tools, equipment, shoring, staging, forms, temporary buildings or other equipment owned or rented by the Contractor, its Subcontractors, or any Worker.

C. Named Insured: Each Insurance policy certificate of insurance provided by the Contractor shall name the Town of Arlington as an additional insured. Each insurance policy and certificate of insurance provided by the Contractor shall contain a provision that the Owner shall be notified of cancellation or restrictive amendment at least thirty (30) days prior to the effective date of such cancellation or amendment.

D. Insurance Certificates: Submit insurance certificates for the Owner's review and approval prior to commencement of the work. The Contractor and all subcontractors who are required to provide insurance under the Contract shall provide accurate and bona fide "Certificates of insurance "issued by a responsible agent of the insurance company.

1. Certificate Content: Such "Certificates of Insurance" shall clearly indicate the insurance coverage. Each "Certificate of Insurance" shall be accompanied by a sworn and duly notarized statement from the responsible agent of the insurance company issuing the certificate clearly stating that all insurance specified and required by the Contract Documents is provided and in force, and also a clear statement of all exceptions and deviations, if any, from the Contract Document issuance requirements.

2. Responsibility: The insurance agent issuing and authorizing the "Certificate of Insurance" shall be responsible and liable for the accuracy and validity of the "Certificate of Insurance". Each insured party shall certify by sworn and duly notarized statement that the "Certificate of Insurance" issued for them are bona fide.

3. Disclaimers Prohibited: "Certificates of Insurance" shall not contain any disclaimers such as: "This Certificate is issued as a matter of information only and confers no right upon the certificate holder. This Certificate does not amend, extend, or alter the coverage afforded by the policies listed below." Disclaimers are not acceptable.

4. Certificates of Insurance Can Be Relied Upon: Parties receiving "Certificates of insurance" shall be entitled to rely upon the "Certificates of insurance" and shall have the right to claim the benefits and protection provided by the insurance as it applies to them.

5. Alternate to "Certificates of Insurance": Instead of providing the "Certificates of Insurance" and the sworn statements required above, the insured may provide bona fide and accurate copies of all insurance policies and riders accompanied by a sworn and duly notarized statement from the insured that the policies, riders, and documents submitted are bona fide and valid, and that parties receiving the insurance documents may rely on the documents as satisfaction of the Contract insurance requirements.

E. The Contractor shall provide "builder's risk" insurance as described in the General Conditions of the Contract for Construction and with limits equal to the full insurable completed value of the building under construction. The "Builder's Risk" insurance shall include "all risk" insurance for physical loss and damage including theft, vandalism, and malicious mischief. The "Builder's Risk" insurance shall be amended to delete any and all endorsements relating to cancellation of the policy due to partial occupancy by the Owner.

1. Builder's Risk Deductible Amount: \$1,000,000.00

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. All of the Contract Documents, including the conditions and general requirements of the Contract, Division 0 and applicable parts of Division 1, apply to the work under this Section.
- B. The Contractor shall carefully examine all the Contract Documents for requirements that affect the work of this Section. The exact scope of this Section cannot be determined without a thorough review of all specification sections and other Contract Documents.

1.2 DESCRIPTION OF WORK

- A. Definition: The work of the Contract can be summarized through reference of the Contract Documents. Work under this Contract includes coordination of all the work of the Contract Documents.

- 1. The scope of work of the Base Bid includes improvements to the existing Magnolia Park in the Town of Arlington, Massachusetts. The project includes a new playground with play equipment and engineered wood fiber safety surfacing. The project also includes new pathway construction, shrub and tree plantings, and site furnishings including benches and picnic tables. Utility improvements include new drain lines and area drains for the garden and park. The project also includes a new half-basketball court and a community garden with fencing, raised garden beds and a water source. Bidders shall include all labor, equipment and materials to complete all work described in the Drawings and Specifications including installation of specific play equipment and surfacing materials. The project includes site preparation; drainage improvements; construction of play areas (playstructures ,swings and surfacing); fencing; pavement & curb installation; installation of park amenities; lawn seeding; tree installation; pruning existing trees and miscellaneous repairs and improvements indicated in the Drawings and Specifications.

- B. Schedule: Scheduling of all work under these Contract Documents should abide by local ordinances or requirements established by the Commonwealth.

- 1. Hours of work: Monday through Friday, 7:30 A.M. to 5:00 P.M.

- 2. Work for the project may start on or about May 1, 2016 and must be Substantially Complete by September 12, 2013 with Final Completion by September 30, 2016 except turfgrass & planting maintenance. Refer to Section 32 93 00 for planting maintenance and 32 92 00 for turfgrass maintenance requirements.

- C. Tax Exemption: The Owner is exempt from payment of sales tax on materials and products permanently incorporated into the work under the Contract. Provide the Owner's tax exemption certificate number on all invoices and provide two copies of each invoice to the Owner for record.

END OF SECTION

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## **01 23 00 ALTERNATES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. All of the Contract Documents, including the conditions and general requirements of the Contract, Division O and applicable parts of Division 1, apply to the work under this Section.
- B. The Contractor shall carefully examine all the Contract Documents for requirements that affect the work of this Section. The exact scope of this Section cannot be determined without a thorough review of all specification sections and other Contract Documents.

#### **1.2 SUMMARY**

- A. The Schedule of Alternates included in this Section lists all the Alternates that appear in the Contract Documents, and the Specification Sections which are affected by each Alternate.
- B. For each of the Alternates scheduled at the end of this Section, bidders shall state the amount in the proposal to be added to or deducted from the Contract Sum for the work.
- C. Consult the individual Specification Sections and the Drawings for detailed requirements of each Alternate.

#### **1.3 GENERAL INSTRUCTIONS**

- A. Each Bidder shall be held fully responsible for examining the scope of the Alternates generally defined herein and for recognizing any modifications to his work caused by any Alternate.
- B. The Bid Alternate Price shall be complete cost, including overhead, profit, bonds, insurance, transportation, and all other costs connected with, or incidental to, the work described.
- C. Alternates listed below in the Schedule of Alternates are listed in order. The Contract will be awarded on the basis of the Base Bid only, or the Base Bid plus any number of Alternates strictly added in order.

#### **1.4 ALTERNATES**

- A. Definition: "Alternates" are alternate products, materials, equipment, systems, methods, units of work, or major elements of the construction, which may, at the Authority's option and under the terms established by the Contract or Agreement, be selected for the work in lieu of the corresponding requirements of the Contract Documents or in addition to the work of the Base Bid as noted.
- B. Alternate Requirements: A Schedule of Alternates is included at the end of this Section. Each Alternate is defined using abbreviated language, recognizing that the Contract Documents define the requirements. Coordinate related work to ensure that work affected by each Alternate is complete and properly interfaced with work of each selected Alternate.
- C. Provide written proposals for each Alternate on the Bid Form for the Authority's consideration. Each proposal amount shall include the entire cost of the Alternate portion of the work, including overhead, profit, and other costs including cost of interfacing and coordinating the Alternate with related and adjacent work.

#### **1.5 SCHEDULE OF ALTERNATES**

- A. DEDUCT Alternate #1 – Remove Site Furnishings
1. Work:
    - a. DEDUCT the two (2) trash receptacles, five (5) park benches, and three (3) picnic tables from the Base Bid. Deduct the installation of these elements and the concrete pads associated with them. Also DEDUCT the installation of the one (1) bicycle rack to be supplied by Owner, and the concrete pad associated with it.
  2. Refer to the following Specification sections for the work of DEDUCT Alternate #1:
    - a. 12 93 00 Site Furnishings
    - b. 03 30 00 Cast-In-Place Concrete
- B. ADD Alternate #1 – Walkway at Meadow Area
1. Work:
    - a. ADD the bituminous concrete walkway at the Meadow Area as per Drawings.
    - b. ADD seeding at this walkway to patch in to existing lawn.
  2. Refer to the following Specification Sections for the work of ADD Alternate #1:
    - a. 32 92 00 Lawns
- C. ADD Alternate #2 – Boulders at Stormwater Area
1. Work:
    - a. ADD landscape boulders at stormwater area as per Drawings.
  2. Refer to the following Specification sections for the work of ADD Alternate #2:
    - a. 32 30 00 Site improvements
- D. ADD Alternate #3 – Electric Supply and Outlet
1. Work:
    - a. ADD electric supply and outlet at picnic table by Community Garden as per Drawings.
  2. Refer to the following Specification sections for the work of ADD Alternate #3:
    - a. 33 00 00 Utilities
- E. ADD Alternate #4 – Site Furniture
1. Work:
    - a. ADD two (2) picnic tables at Community Garden area with concrete pad as per Drawings.

2. Refer to the following Specification sections for the work of ADD Alternate #4:
  - a. 12 93 00 Site Furnishings
  - b. Concrete
  
- F. ADD Alternate #5 – Steel Edging at Bituminous Concrete Walks
  1. Work:
    - a. ADD steel edging at all bituminous concrete walks as per Drawings. Concrete curb at bituminous concrete walk at Playground to remain.
  2. Refer to the following Specification sections for the work of ADD Alternate #5:
    - a. --
  
- G. ADD Alternate #6 – Planting at Meadow Area
  1. Work:
    - a. ADD all planting at Meadow area, including trees and Meadow Seed Mix as per Drawings.
  2. Refer to the following Specification sections for the work of ADD Alternate #6:
    - a. 32 92 00
    - b. 32 93 00 Plants and Planting
  
- H. ADD Alternate #7 – Birdhouse Poles and Salvage Existing Trees for Stump Steppers
  1. Work:
    - a. ADD eight (8) birdhouse poles and foundations. Birdhouse poles to be salvaged from existing playground swingset as per Drawings. Installation as per Drawings.
    - b. Salvage three (3) existing trees and cut into fourteen (14) log segments for stump steppers and two (2) log balance beams as per Drawings.
  2. Refer to the following Specification sections for the work of ADD Alternate #7:
    - a. 03 30 00 Cast-In-Place Concrete

END OF SECTION

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PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The work to be performed under this Section shall include the compilation and submittal of all required shop drawings, manufacturer's cuts, specifications, and certifications of all materials and equipment for the Landscape Architect's approval. Actual product samples may also be required as stipulated in the technical specifications sections.

PART 2 - SUBMITTALS

2.1 REQUIREMENTS

- A. References are made throughout the Specifications and Drawings where submittals are required. All finishes, colors, and patterns are to be reviewed and approved by submittal or field sample.
- B. Where the Contractor's intention is to furnish the materials or equipment as specified, a list of all such elements, by Specification section, shall accompany the submittals so that the entire submittal is complete for the project.

PART 3 - EXECUTION

- 3.1. All submittals shall be submitted within four (4) weeks after the award of the contract, and may be made and distributed digitally with the approval of the Owner via email or File Transfer Protocol (FTP) site. Alternatively, submittals may be made in hard copy form; at least four (4) copies (Contractor, Owner's Rep, Landscape Architect, and Other Town Department) shall be provided so that a manual can be prepared for office and field reference.
- 3.2. Submit all required product or material samples concurrent with the materials/equipment information manuals described above. Each submittal shall reference its appropriate specification section, part and paragraph.

END OF SECTION

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## **01 41 00 PERMITS**

### **PART 1 - GENERAL**

#### **1.1 GENERAL REQUIREMENTS**

- A. The conditions and general requirements of the Contract, Division 0 and applicable parts of Division 1, apply to the work under this Section.
- B. The Contractor shall perform the work in accordance with the Contract Documents, including the attached permits/order of conditions, and any applicable municipal requirements.

#### **1.2 SCOPE OF WORK**

- A. The Contractor shall be responsible for obtaining all permits required to complete the work of this contract, to provide all coordination and furnish all bonds, assurances and required warranties. As applicable, the Contractor shall be responsible for any/all fees associated with the securing of permits necessary for the execution of the work of this contract.

#### **1.3 PERMITS BY CONTRACTOR**

- A. The Contractor shall prepare permit applications and obtain all applicable and needed permits after the contract is awarded, bearing all expenses.

#### **1.4 DIGSAFE**

- A. Contact Digsafe seventy-two (72) hours prior to initiating work at telephone #1-888- 344-7233.

### **PART 2 - MATERIALS**

- 2.1 All materials and equipment shall conform to permit requirements and the Town of Arlington's standards for utilities, excavation, backfill, patching, and surveying or other work unless otherwise stated in these specifications. Coordinate as necessary with the appropriate Town official and/or private utility.

### **PART 3 - EXECUTION**

- 3.1. Execute all work per permit requirements. All plumbing work to be approved by Town Inspectors.

### **PART 4 - GUARANTEE**

- 4.1. Guarantee all work per permit requirements.

**END OF SECTION**

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## **01 57 00 ENVIRONMENTAL PROTECTION**

### **PART 1 - GENERAL**

#### **1.1 GENERAL REQUIREMENTS**

- A. The conditions and general requirements of the Contract, Division 0 and applicable parts of Division 1, apply to the work under this Section.
- B. All references to products by manufacturer, trade name or performance Specifications bearing the connotation "or Approved Equal" shall be as determined by the Landscape Architect and the Town, per MGL c. 30 s. 39M, part b, criteria 1.

#### **1.2 SCOPE OF WORK**

- A. The work covered by this section of the specifications consists of furnishing all labor, materials, tools and equipment and performing all work required for the prevention of environmental pollution during and as a result of construction operations under this contract.
  - 1. Implementation
  - 2. Area of Construction Activity
  - 3. Protection of Water Resources
  - 4. Protecting and Minimizing Exposed Areas
  - 5. Location of Storage Areas
  - 6. Protection of Landscape
  - 7. Specific Measures for Tree Protection
  - 8. Clearing and Grubbing
  - 9. Discharge of Dewatering Operations
  - 10. Dust Control
  - 11. Separation and Replacement of Topsoil
  - 12. Baled Hay or Straw
  - 13. Silt Fence
  - 14. Noise Control

#### **1.3 NOTIFICATION**

- A. The Landscape Architect or Owner's Representative will notify the Contractor in writing of any non-compliance with the foregoing provisions. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails to act promptly, the Landscape Architect or Owner's Representative may order stoppage of all or part of the work until satisfactory corrective action has been taken. No claim for an extension of time or for excess costs or

damage incurred by the Contractor as a result of time lost due to any stop work orders shall be made unless it was later determined that the Contractor was in compliance.

## PART 2 - MATERIALS - NOT USED

## PART 3 - EXECUTION

### 3.1. IMPLEMENTATION

- A. Prior to commencement of work, the Contractor shall meet with the Landscape Architect and Owner's Representative to develop mutual understandings relative to compliance of the environmental protection program.
- B. The Contractor shall submit for approval details and literature fully describing environmental protection methods to be employed in carrying out construction activities.

### 3.2. AREA OF CONSTRUCTION ACTIVITY

- A. Insofar as possible, the Contractor shall confine his construction activities to those areas defined by the Contract Drawings and Specifications. All land resources within the project boundaries and outside the limits of permanent work performed under this contract shall be preserved in their present condition or be restored to a condition, after completion of construction, at least equal to that which existed prior to work under this contract. The Contractor shall keep the active vehicular access to the site clear of debris, equipment and vehicles at all times for Fire Department access.

### 3.3. PROTECTION OF WATER RESOURCES

- A. The Contractor shall not pollute streams, lakes or reservoirs with fuels, oils, bitumens, calcium chloride, acids, solvents, or other harmful materials. The Contractor shall also prevent the transport of soil, dirt, and salt to surface streams, wetlands, and/or catch basins. It is the Contractor's responsibility to comply with all applicable Federal, State, County and Municipal laws regarding pollution of rivers and streams.
- B. Special measures should be taken to insure against spillage of any pollutants into public waters, and run-off of demolition site sediments into stormwater collection systems. Measures shall include placement of silt sacks around catchbasins and along temporary construction fencing, and where so indicated on the Drawings.

### 3.4. PROTECTING AND MINIMIZING EXPOSED AREAS

- A. The Contractor shall limit the area of land which is exposed and free from vegetation during construction. In areas where the period of exposure will be greater than two (2) months, temporary vegetation, mulching or other protective measures shall be provided as specified.
- B. The Contractor shall take account of the conditions of the soil where temporary cover crop will be used to insure that materials used for temporary vegetation are adaptive to the sediment control. Materials to be used for temporary vegetation shall be approved by the Landscape Architect and Owner's Representative.

### 3.5. LOCATION OF STORAGE AREAS

- A. The location of the Contractor's storage areas for equipment and/or materials shall be placed upon cleared portions of the job site or areas to be cleared as a part of this project as per the Drawings. Deviations from these drawings shall require written approval of the

Landscape Architect and Owner's Representative. Plans showing storage facilities for equipment and materials shall be submitted for approval of the Landscape Architect and Owner's Representative.

- B. No excavated materials or materials used in backfill operations shall be deposited within a minimum distance of one hundred (100) feet of any watercourse or any drainage facility. Adequate measures for erosion and sediment control such as the placement of baled hay or straw around the downstream perimeter of stockpiles shall be employed to protect any downstream areas from siltation.
- C. There shall be no storage of equipment or materials in areas designated on the Drawings as within a wetlands buffer zone.

### 3.6. PROTECTION OF LANDSCAPE

- A. The Contractor shall not deface, injure, or destroy trees or shrubs nor remove or cut them without written authority from the Owner. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorages unless specifically authorized by the Landscape Architect or Owner's Representative. Excavating machinery and cranes shall be of suitable type and be operated with care to prevent injury to trees which are not to be removed, particularly overhanging branches and limbs. The Contractor shall, in any event, be responsible for any damage resulting from such use.
- B. Branches, limbs, and roots shall not be cut except by permission of the Landscape Architect or Owner's Representative. All cutting shall be smoothly and neatly done without splitting or crushing. When there is unavoidable injury to branches, limbs and trunks of trees, the injured portions shall be neatly trimmed and covered with an application of grafting wax or tree healing paint as directed.
- C. Where, in the opinion of the Landscape Architect or Owner's Representative or as indicated on the Drawings, trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment or by his blasting or other operations, the Contractor shall protect such trees by placing protective measures as shown on the drawings. Any trees or landscape feature scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition at the expense of the Contractor. The Landscape Architect or Owner's Representative will decide what method of restoration shall be used, and whether damaged trees shall be treated and healed or removed and disposed of.
- D. Cultivated hedges, shrubs, and plants which could be injured by the Contractor's operations shall be protected by suitable means or shall be dug up, balled and temporarily replanted and maintained. After construction operations have been substantially completed, they shall be replanted in their original positions and cared for until growth is re-established. If cultivated hedges, shrubs, and plants are injured to such a degree as to affect their growth or diminish their beauty or usefulness, they shall be replaced by items of a kind and quality at least equal to that existing at the start of the work.

### 3.7. SPECIFIC MEASURES FOR TREE PROTECTION

- A. All existing trees not specifically indicated for removal or transplanting on the Drawings shall be protected as identified below.
- B. Tree protection fencing shall be installed and maintained throughout the period of

construction as shown on the Drawings.

1. The limits of tree protection fencing shall be installed AT THE DRIP LINE of trees wherever feasible, or at the maximum extent practicable where not feasible.
  2. Prior to commencing any demolition or removals, the Contractor shall lay out all paving and demolition required within the drip lines of all trees, and shall establish in the field with the Landscape Architect and the Owner's Representative the extents and limits of tree protection fencing to be installed.
  3. If, after demolition is complete, tree protection fencing can be expanded to cover a greater area, the Contractor shall revise the fencing line as directed by the Landscape Architect or Owner's Representative.
  4. Areas within tree protection fencing shall be protected from disturbance, excavation, and compaction.
- C. ALL EXCAVATIONS and ALL REMOVALS within the drip lines of existing trees (NOT limited to areas within tree protection fencing) shall be HAND WORK or AIR SPADE only. Cut no roots without the express permission of Landscape Architect or Owner's Representative.
- D. DO NOT REMOVE any existing drainage fabric, soil separator fabric, or other geotextiles without the prior approval of the Landscape Architect or Owner's Representative to avoid damage to feeder roots which often intertwine with the fabric. Where necessary, Contractor shall cut fabric and leave areas entangled by roots in place in the ground.

### 3.8. CLEARING AND GRUBBING

- A. The Contractor shall clear and grub only on the Owner's land or the Owner's easements, and only the area required for demolition operations, as approved by the Landscape Architect or Owner's Representative.

### 3.9. DISCHARGE OF DEWATERING OPERATIONS

- A. Any water that is pumped and discharged from a trench and/or excavation as part of the Contractor's water handling shall be filtered by an approved method prior to its discharge into a receiving water or drainage system.
- B. Under no circumstances shall the Contractor discharge water to any areas designated as wetlands.
- C. The pumped water shall be filtered through baled hay, a vegetative filter strip or a vegetated channel to trap sediment occurring as a result of the construction operations. The vegetated channel shall be constructed such that the discharge flow rate shall not exceed a velocity of more than 1 foot per second. Accumulated sediment shall be cleared from the channel periodically.
- D. Contaminated dewatering effluent shall be handled, and if necessary, disposed of in accordance with applicable regulations and permits. Any required monitoring and analysis of the effluent shall be performed by the Contractor and the laboratory results shall be submitted to the Landscape Architect and Owner's Representative.

- E. Water pumped or drained from excavations, water courses, or other structures encountered in the work shall be disposed of in strict compliance with pertinent federal, state and local environmental regulations. Any damage caused by or resulting from dewatering operations shall be the sole responsibility of the Contractor.

### 3.10. DUST CONTROL

- A. During the progress of the work, the Contractor shall conduct his operations and maintain the area of his activities, including sweeping and sprinkling of streets as necessary, to minimize creation and dispersion of dust. If the Landscape Architect or Owner's Representative decides it is necessary to use calcium chloride for more effective dust control, the Contractor shall furnish and spread the material, as directed.

### 3.11. SEPARATION AND REPLACEMENT OF TOPSOIL

- A. Topsoil approved by the Owner and Landscape Architect for reuse shall be carefully removed from areas where excavations are to be made, and separately stored to be used again as directed. The topsoil shall be stored in an area acceptable to the Landscape Architect or Owner's Representative and adequate measures shall be employed to prevent erosion of said material.
- B. Topsoil proposed for reuse shall be tested in accordance with 32 90 00, Plants and Planting.

### 3.12. BALED HAY OR STRAW

- A. To trap sediment and to prevent sediment from clogging drainage systems, baled hay or straw shall be used where shown on the Drawings. Care shall be taken to keep the bales from breaking apart. The bales should be securely staked to prevent overturning, flotation, or displacement. All deposited sediment shall be removed periodically.

### 3.13. SILT FENCE

- A. Where so indicated on the Drawings and/or where directed by the Landscape Architect or Owner's Representative, the Contractor shall erect and maintain a temporary silt fence. The silt fence shall be used specifically to contain sediment from runoff water and to minimize environmental damage caused by construction.

### 3.14. NOISE CONTROL

- A. The Contractor shall adhere to the Town of Arlington ordinances for Noise Control throughout the construction period. Noise control will be enforced by the Town of Arlington.
- B. No construction shall occur between 7pm-7am Monday through Saturday, or any time on Sunday. Any exemption to prohibited construction hours must be authorized by a Town of Arlington representative.
- C. Contractor shall not permit engine idling on the job site.

END OF SECTION

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## 02 41 00 SITE PREPARATION AND DEMOLITION

### PART 1 - GENERAL

#### 1.1 GENERAL REQUIREMENTS

- A. The conditions and general requirements of the Contract, Division 0, and applicable parts of Division 1 apply to the Work under this Section.
- B. The Contractor shall, prior to any removal of rubbish or debris from the site, furnish written evidence satisfactory to the Owner's Representative that he has an approved dumping location for debris and/or spoil from his removals and excavation activities.
- C. On-site cleaning of materials for the purpose of salvage on the site shall not be permitted.
- D. The Contractor shall secure all necessary permits from the Town of Arlington before starting this project.
- E. The Town of Arlington shall have the right of first refusal on all removed materials, at the direction of the Town's Project Manager. All materials refused by the Town shall become the property of the Contractor.
- F. For all earthwork, excavation, and removals within the driplines of protected trees (not limited to areas within designated tree protection fencing), the Landscape Architect must be present on the site or have specifically waived that obligation in writing to the Contractor to ensure tree protection measures are being observed. Provide 48 hours' notice prior to commencement of all such work.

#### 1.2 WORK INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING

- A. Provide all labor, equipment, implements and materials required to furnish, install, construct and perform all Site Preparation work complete, as shown on the Drawings and as specified herein.
- B. Work includes, but is not limited to the following:
  - 1. Temporarily shut off any utilities to the affected areas of the project site.
  - 2. Removal of existing benches, tables, edging, mulch, sports structures, safety surfacing and any and all associated footings, etc., as designated on Drawings;
  - 3. Removal and stockpile of subgrade material and all topsoil as required by the Construction Documents;
  - 4. Removal of shrub(s), stump(s), lawn, other vegetation, and topsoil where indicated on the Drawings. Remove root structures over 1/4-inch diameter within 5-feet of the stump;
  - 5. Sawcutting (where required) and removal of indicated sections of existing bituminous concrete pavement, and concrete pad / paving, as indicated on the Drawings;
  - 6. Removal and disposal of indicated play equipment, swings, and all footings;
  - 7. Removal and disposal of wood fiber safety surfaces, sand safety surface, and associated subbases where subbase removal is required for grade or existing subbase does not meet specifications for new subbase;
  - 8. Materials not indicated to be reused or protected, and not desired by the Town of Arlington maintenance department, shall be removed legally off-site. Provide for proper disposal of all removals off-site, including documentation of approved dumping location as described in 1.01.B;

9. Protect existing trees, walls, curbing, concrete edges, catch basins, paving, utility poles, fences, railings, utilities, and buildings not indicated to be removed on the Drawings;
10. Protect the existing sidewalk within the public right-of-way;
11. Protect the public right-of-way from the entry of erosion and construction debris;
12. Any other necessary preparations for installation of improvements.

### 1.3 REFERENCES

- A. Examine all other Sections of the Specifications and all Drawings for the relationship of the work under this Section and the work of the other trades. Cooperate with all trades and all departments of Town of Arlington and coordinate all work under this Section.
- B. The following related items are included under the Sections listed below:
  1. Section 21 61 09 - Earthwork
  2. Section 33 00 00 - Utilities

### 1.4 LAWS, ORDINANCES, PERMITS AND FEES

The Contractor shall:

- A. Give necessary notices, obtain all permits and pay all governmental fees and other costs in connection with this work, file all necessary plans, prepare documents and obtain all necessary approvals.
- B. Obtain all required certificates of inspection for this work and deliver it to the Landscape Architect before request for acceptance and final payment for the work.
- C. Include in the work, without extra cost to the Owner, any labor, materials, services, apparatus, drawings (in addition to contract drawings and documents) in order to comply with all applicable laws, ordinances, rules and regulations, whether or not shown on the drawing and/or specified. The disturbed areas shall be secured with chain link construction fence and fence shall be maintained at all times while site is under construction.
- D. Provide all safety controls during construction including temporary walkways, fencing, barricades, etc. at no additional cost to the Owner.
- E. Completely remove from the project area all demolished materials, except as designated for stockpiling for re-use, and dispose of all materials off the site.
- F. Disposal of the materials shall be done in such a manner that there shall be no accumulation of any demolished material which may, in the opinion of the Owner's Representative, the Fire Department or any other public agency having jurisdiction, constitute a hazard.
- G. Comply with all Federal, State, and Local Codes for all utility work.

### 1.5 DEFINITIONS

The following related items are included herein and shall mean:

- A. S.S.H.B. - Standard Specifications for Highways and Bridges, the Commonwealth of



Massachusetts, Department of Public Works, latest edition.

- B. A.S.T.M. - American Society for Testing and Materials.
- C. A.A.S.H.T.O. - American Association of State Highway and Transportation Officials.

#### 1.6 SITE CONDITIONS

- A. The Contractor shall visit and accept the site as he finds it and shall inform himself of the character and the type of structures to be removed. The Owner assumes no responsibility for the condition of the site. Damage to the site (whether by reason of fire, theft, or other happenings) shall be at the risk of the Contractor from and after the date of Contract execution and no such damage or loss shall relieve the Contractor from any obligation under the Contract.
- B. Environmental Requirements: Contractor shall not work on or with soils when they are overly dry, wet, or frozen. Field Test: Form soil in palm of hand; if soil retains shape and crumbles upon touching, then it may be worked (if it will not retain its shape, it is too dry; if it does not crumble, it is too wet). Landscape Architect shall be final authority on condition of soil.

#### 1.7 PROTECTION

- A. NO ACCESS to the Job Site shall be allowed on or through abutting private properties. Access shall be along the public right-of-ways.
- B. All rules and regulations governing the respective utilities shall be observed in executing all work under this Section. All work shall be executed in such a manner as to prevent any damage to existing streets, curbs, paving, service utility lines and structures, drainage lines and structures, and adjoining property. Monuments and benchmarks shall be carefully maintained and, if disturbed or destroyed, replaced as directed.
- C. The Contractor shall assume full responsibility for damages caused by his Subcontractor's equipment and personnel to the existing grounds as well as adjoining private property. The Contractor shall obtain approval for subsurface construction from DIGSAFE (1-888-344-7233 / 1-888-DIG-SAFE) and all necessary parties and the Town of Arlington before proceeding within the Contract limits.
- D. The work of this Section shall be performed in such a manner as to cause no interference with access by the Subcontractors or other Contractors to all portions of the site as is necessary for the normal conduct of their work.
- E. The Contractor shall take adequate precautions to protect all walks, roads, streets, curbs, pavements, trees and planting, on or off the premises, and shall repair and replace or otherwise make good, as directed by the Owner's Representative, any damage so caused.
- F. Trees that are damaged during construction shall be removed by the Contractor at their expense if instructed to do so by the Landscape Architect, and the Contractor shall pay the Town of Arlington for each damaged and removed tree based on the following schedule:
  - 1. \$1,500. per tree for 2" through 6" caliper
  - 2. \$3,000. per tree for over 6", through 12" caliper
  - 3. \$6,000. per tree for over 12", through 18" caliper
  - 4. \$12,000. per tree for over 18" caliper.

## 1.8 SPECIAL PROTECTION FOR MAINTAINING STREETS AND PUBLIC WAYS

- A. Do not close or obstruct streets, or sidewalks within the public right-of-way, without a permit. Do not place or store material in streets, alleyways or sidewalks.
- B. Conduct operations with minimum interference to street.
- C. Furnish, erect and maintain fences, planking, bracing, shoring, sheathing, lights, barricades, warning signs, and guards as necessary for the protection of streets, sidewalks, and adjoining property.
- D. Completely remove all protection when the work is completed or when ordered in writing to do so by the Owner.

## 1.9 UTILITIES

- A. All work shall be performed in accordance with Federal, State and Local Codes.
- B. Discontinuance or Interruption
  - 1. Before starting demolition, the Contractor shall be solely responsible for making all necessary arrangements and for performing any necessary work involved in connection with the discontinuance or interruption of all public and private utilities or services under the jurisdiction of the utility companies or corporations, and the Owner. These include gas, electricity, steam, refrigeration, low tension system, telephone, internet access, television, police signal, fire alarm, water, sanitary sewer, storm drainage, and without limiting the generality of the foregoing, including any system or systems which will be affected by the work to be performed under this Contract.
- C. Protection
  - 1. Preserve in operating condition all active utilities including overhead any wires, traversing the project site, which are to remain. Should any damage occur to a utility which is to remain as a result, in the judgment of the Owner's Representative, of this operation, the Contractor shall at his own expense, repair all damage to any such utility to the satisfaction of the affected utility operator and the Owner.
    - a. Cleaning of Catch Basins and Storm Water Line
  - 2. Contractor shall clean all existing catch basins and their storm water lines on site, removing accumulated silt in the basin and clearing all pipes connecting to the street or to other drainage structures in order to provide sufficiently positive and continuous drainage to existing system.

## PART 2 – NOT USED

## PART 3 - EXECUTION

### 3.1.REMOVALS

- A. All holes and trenches resulting from removals shall be backfilled as appropriate with gravel borrow and compacted as specified in Section 31 00 00 - Earthwork -Excavation, Filling and Grading.
- B. Tree, stump, and shrub removal: In areas where the finish condition shall be lawn or planting

bed, the existing stump shall be ground and roots over 1/4 inch in diameter within 5 feet of the stump shall be removed, all to a minimum of 24 inches below new finish grade. In areas where the finish condition shall be pavement, the stump and roots shall be completely removed.

- C. Tree Protection: All removals and earthwork within ten feet of tree trunks shall be handwork only.

### 3.2. DUST CONTROL

- A. Wet down thoroughly all work during excavation to prevent spread of dust. Make all arrangements and pay for all water and necessary connections therefore.

### 3.3. CLEAN-UP

- A. Remove from the project site all materials and debris resulting from the work of excavation. Storage of such materials on the project site will not be permitted. The project site shall be safe, clean and holes filled and compacted with clean fill upon completion of the excavation and site clearance work.

END OF SECTION

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## **03 30 00      CAST-IN-PLACE CONCRETE**

### **PART 1 - GENERAL**

#### **1.1 GENERAL REQUIREMENTS**

- A. The conditions of the Contract apply to the work under this Section.
- B. The Contractor shall prior to any removal of surplus fill, excavated material, or debris from the site, furnish written evidence satisfactory to the Owner or Owner's representative that he has an approved dumping location for debris and/or spoil from his/her excavation activities.

#### **1.2 WORK INCLUDED.**

- A. Provide all labor, equipment, implements and materials required to furnish, install, construct and perform cast-in-place concrete as shown on the Drawings and as specified herein.
- B. To be included:
  - 1. Concrete for concrete pads, flush concrete curbs, and for all footings for picnic tables, benches, play equipment, bicycle rack and basketball hoop.
- C. Examine all other Sections of the Specifications and all Drawings for the relationship of the work under this Section and the work of other trades. Cooperate with all trades and all departments of the Town of Arlington and coordinate all work under this Section therewith.
- D. The following related items are included under the Sections listed below.
  - 1. Section 02 41 00 - Site Preparation and Demolition
  - 2. Section 11 68 00 - Play Equipment and Structures
  - 3. Section 12 93 00 - Site Furnishings
  - 4. Section 21 61 09 - Earthwork
  - 5. Section 32 10 00 - Bases, Ballasts, and Paving

#### **1.3 SUBMITTALS**

- A. All manufacturers' product literature.
- B. Test reports for concrete. Compression tests at 7 days and one at 28 days and slump test. One test is to be done for every 10 cubic yards of concrete.

#### **1.4 LAWS, ORDINANCES, PERMITS AND FEES**

The Contractor shall:

- A. Give necessary notices, obtain all permits and pay all governmental taxes, fees and other costs in connection with this work, file all necessary plans, prepare documents and obtain all necessary approvals.

- B. Obtain all required certificates of inspection for this work and deliver same to the Landscape Architect before request for acceptance and final payment for the work.
- C. Include in the work, without extra cost to the Owner, any labor, materials, services, apparatus, drawings (in addition to contract drawings and documents) in order to comply with all applicable laws, ordinances, rules and regulations of the Town of Arlington and the Commonwealth of Massachusetts, whether or not shown on the Drawings and/or specified.

#### 1.5 DEFINITIONS

- A. The following related items are included herein and shall mean:
  - 1. S.S.H.B. - Standard Specifications for Highways and Bridges, the Commonwealth of Massachusetts, Department of Public Works, latest edition
  - 2. A.S.T.M. - American Society for Testing and Materials
  - 3. A.A.S.H.T.O. - American Association of State Highway and Transportation Officials

#### 1.6 SUBSURFACE INFORMATION

- A. The Owner and Landscape Architect assume no responsibility for the Contractor's failure to make his own site investigation and makes no representation regarding the character of the soil or subsurface conditions which may be encountered during the performance of the work.

#### 1.7 FINISHED GRADES

- A. The words "finished grades" as used herein mean the required final grade elevations indicated on the Drawings. Where not otherwise indicated, site areas shall be given uniform slopes between points, for which finished grades are shown, or between such points and existing grade except that vertical curves or roundings shall be provided at abrupt changes in slope.

#### 1.8 GRADES AND ELEVATIONS

- A. The Drawings indicate, in general, the alignment and finished grade elevations. The Landscape Architect, however, may make such adjustments in grades and alignment as are found necessary in order to avoid interference and to adapt the grading to other special conditions encountered.

#### 1.9 WORK IN THE PUBLIC WAYS

- A. Notify the appropriate municipal officials at least seven calendar days in advance of commencing any work in the public ways to obtain all required permission to perform this work. Perform all work in the public ways in a manner required by the municipal authorities. Should there be any conflict between requirements specified in the Contract Documents and those of the Town of Arlington, the municipal requirements shall govern.
- B. Do not close or obstruct any streets or sidewalks unless and until they have been discontinued by the appropriate municipal authority or unless and until he shall have first secured all necessary and required permits. No materials whatsoever shall be placed or stored in the streets. Conduct all operations to interfere as little as possible with the use ordinarily made of roads, driveways, sidewalks, or other facilities near enough to the work to be affected thereby.

### PART 2 - PRODUCTS

## 2.1 General

- A. Cast-in-place concrete shall be Class D, air-entrained concrete conforming to the requirements and applicable provisions of Section 701 of the S.S.H.B. Minimum 28- day compressive strength shall be 4,000 psi. Concrete shall be air-entrained 5% minimum with a two (2") to four (4") inch maximum slump.

## 2.2 Form Materials

- A. Forms of Exposed Finished Concrete: Unless otherwise indicated, construct form work for exposed concrete surfaces with plywood, metal, metal-framed plywood faced or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practical sizes to minimize number of joints and to conform to the joint system shown on Drawings. Provide form material with sufficient thickness to withstand pressure of newly placed concrete without bow or deflection.
- B. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood," Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.
- C. Form for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finish structure with plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.
- D. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain or adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

## 2.3 Reinforcing Materials

- A. Reinforcing Bars: ASTM A615, Grade 60.
- B. Welded Wire Fabric (WWF): ASTM A185, welded steel wire fabric.
- C. Supports for Reinforcement: Provide supports for reinforcement including bolsters, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI recommendations, unless otherwise acceptable.

## 2.4 Cement

- A. Cement shall be Portland Cement Type 1, free from water-soluble salts or alkalis which will cause efflorescence on exposed surfaces. Portland Cement shall comply with Standard Specifications of the ASTM-C150 Type I or II.
- B. Cement shall be stored in a weather-tight structure and in such a manner as to prevent deterioration or intrusion of foreign matter. It shall be easily accessible for proper inspection and identification of each shipment. Cement that has hardened or partially set shall not be used.

## 2.5 Aggregate

- A. Fine aggregate for all concrete shall consist of washed inert natural sand conforming to ASTM-C330.

## 2.6 Water

- A. Water for concrete shall be clean, potable, and free from deleterious substances.
- B. When subjected to the mortar strength test described in ASTM-C87 the strength at 28 days of mortar specimens made with the water under examination and normal Portland Cement shall be at least 100% of the strength of similar specimens made with distilled water.

## 2.7 Related Materials

- A. Grout: Non-shrink, non-metallic grout. Provide one of the following (or approved equal):
  - 1. Five Star Grout": U.S. Grout Company.
  - 2. "Masterflow 713": Master Builders.
- B. Chemical Hardener (chHD-Fn): Colorless aqueous solution containing a blend of magnesium fluosilicate and zinc fluosilicate combined with a wetting agent, containing not less than 2 lbs. of fluosilicates per gal.
- C. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- D. Moisture-Retaining Cover: One of the following, complying with ASTM C171.
- E. Waterproof paper.
- F. Polyethylene film.
- G. Polyethylene-coated burlap.
- H. Filler strips for expansion joints where used with caulking or sealants shall be cork type, non-extruding, self-expanding filler strips, AASHTO M-153-111, ASTM D1752, III, as manufactured by Celotex Corporation, W.R. Meadows, Inc., W.R. Grace and Company, or equal. Where no sealant is required strips may be non-extruding bituminous type in accordance with ASTM D1751.
- I. Admixtures
  - 1. Admixtures causing accelerated setting of the cement in concrete shall not be used.
  - 2. In general, all concrete shall not contain additives, but an admixture may be employed therein (to improve workability, durability, etc.) subject to prior test and/or approved by the Landscape Architect in writing.
  - 3. Water-reducing and air-entraining agents shall be used in concrete in strict accordance with the manufacturer's printed instructions. Agents shall be stored safe from adverse temperature in accordance with manufacturer's printed instructions. Total air entrained in freshly mixed concrete shall be 5.0% plus or minus 1.0% of volume of concrete with required strengths maintained.
  - 4. Water-reducing agent: "Sonotard WR" by Sonneborn Building Products, "WRDA" by W.H. Grace Company, "Pozzolith 100" by Master Builders Company, or equal. Water reducing agent must be by same manufacturer as air-entraining agent.
  - 5. Air-entraining Agent: "Darex" by W.R. Grace Company, "Aerolith" by Sonneborn Building Products, "MB-VR" by Master Builders Company, "Sealtight Air Entraining Agent" by W.R. Meadows, or equal.
  - 6. No other admixtures may be used without Landscape Architect's approval.

## 2.8 Slump Limits:

Proportion and design mixes to result in concrete slump at point of placement as follows:



- A. Ramps and sloping surfaces: Not more than 3".
- B. Reinforcing wall systems: Not less than 1" and not more than 3".
- C. Other concrete: Not less than 1" and not more than 4".

## 2.9 Curing Compounds

- A. All curing compounds shall conform to requirements of ASTM Designation C-309, Type I, clear and C-156, No materials containing wax or saponifiable materials will be permitted.
- B. Curing compound in areas that will be exposed to view in the finished work, or to receive a painted finish, and areas to receive a concrete topping or ceramic tile mortar beds, seamless composition flooring, synthetic athletic surfacing, or other similar finishes, shall contain a fugitive dye, and shall be of a type that will become brittle and easily removable after about 3 weeks to allow dust-proofing treatment specified here in after.
- C. Curing compound shall be Master Builders "Master Seal", Symons "Cure and Seal", Sonneborn "Kure-N-Seal", "CS-309" by W.R. Meadows or equal, conforming to ASTM 309, Type 1 and 2.

## 2.10 Proportioning and Design of Mixes

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to Landscape Architect for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing unless otherwise acceptable to Landscape Architect.
- B. Submit written reports to Landscape Architect of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by the Landscape Architect.
- C. Adjustments to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to Owner and as accepted by Landscape Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Landscape Architect before using in work.

## 2.11 Concrete Mix

- A. Job-Site Mixing: Mix materials for concrete in appropriate drum type batch machine mixer. For mixers of one cu. yd., or smaller capacity, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released. For mixers of capacity larger than one cu. yd., increase minimum 1-1/2 minutes of mixing time by 15 seconds for each additional cu. yd. or fraction thereof.
- B. Provide batch ticket for each batch discharged and use in work indicating project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.
- C. Ready-Mix Concrete: Comply with requirements of ASTM C94, and as herein specified.
- D. Addition of water to the batch will not be permitted.

- E. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C94 may be required.
- F. When air temperature is between 85 Deg. F (30 deg. C) and 90 Deg. F (32 deg. C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 Deg. F. (32 deg. C), reduce mixing and delivery time to 60 minutes.

## PART 3 - EXECUTION

### 3.1. Formwork

- A. Forms shall conform to the lines, dimensions and shapes of concrete shown providing for openings, recesses, keys, slots, beam pockets and projections as required.
- B. Make forms clean and free of foreign material before placing concrete.
- C. Do not use earth cuts as forms for vertical surfaces, unless approved by the Landscape Architect.
- D. Design of Formwork
  - 1. Comply with ACI 301, Chapter 4, Paragraph 4.2. Formwork drawings shall bear the seal of licensed professional engineer.
  - 2. Form rods and tie wires of exterior surfaces shall slope down from the inside to outside of forms.
  - 3. Provide forms so that no discernible imperfection is in evidence in finished concrete surfaces due to deformation, bulging, jointing, or leakage of forms.

### 3.2. Mixing Concrete

- A. Ready Mix Concrete
  - 1. Comply with ASTM C94.
  - 2. Add mixing water only at the site.
  - 3. Discharge the concrete completely at the site within 1-1/2 hours after the introduction of the cement to the aggregates. In hot weather reduce this time limit so that no stiffening of the concrete shall occur until after it has been placed.
  - 4. Begin the mixing operation within thirty minutes after the cement has been intermingled with the aggregates.
- B. Batch Mixing at Site
  - 1. Comply with ACI 301, Chapter 7, Paragraph 7.2.
  - 2. Excessive mixing requiring the addition of water to preserve the required consistency will not be permitted. Mix concrete to a consistency which can be readily placed without segregation.
  - 3. Where admixtures are specified, equip mixers with a device for measuring and dispensing the admixture.

- C. Hand-Mixed Concrete: When hand-mixed concrete is allowed and approved for certain parts of the work, mix on watertight platforms. Proportion cement, sand and aggregate loose by volume, carefully measured. Thoroughly mix sand and cement together dry until the mixture is a uniform color. Add the aggregate and turn the mass over until the mixture is uniform and homogeneous. Add water by sprinkling and turn the mass over until it is uniformly mixed and of the required consistency.

### 3.3.Placing Concrete

- A. Preparation Before Placing: Conform to ACI 310, Chapter 8, Paragraph 8.1.
- B. Conveying
  - 1. Comply with ACI 301, Chapter 8, Paragraph 8.2.
  - 2. Provide a spout or downpipe and elephant trunk or other appropriate method to prevent concrete from falling freely through a height greater than 3 feet.
- C. Depositing: Comply with ACI 301, Chapter 8, Paragraph 8.3.

### 3.4.Curing

- A. Comply with ACI 301, Chapter 12. Moist cure (continuous free water and cover with burlap) for first five (5) days after casting. Protect against temperatures under 40 deg. F. in first five days.

### 3.5 Form Removal

- A. Do not remove forms until the concrete has thoroughly hardened and has attained sufficient strength to support its own weight and construction live loads to be placed thereon, without damage to the structure. In general, do not disturb forms for framing until the concrete has attained at least 40% of design strength for side forms and 80% of design strength for bottom forms. Remove no forms for 24 hours after placing concrete. Protect concrete walks from pedestrian traffic for a period of 3 days after placing. Damp cure as per standards above. Be responsible for proper form removal and replace any work damage due to inadequate maintenance or improper or premature form removal.
- B. Where use of metal form ties extending to within less than 1-1/2 in. of the face of permanently exposed concrete has been unavoidable, cut off such ties at least 1-1/2 in. deep in the concrete but not less than 72 hours after concrete has been cast. Remove forms by methods which will not spall the concrete or cause any injury whatsoever. Hammering or prying against concrete will not be permitted.

### 3.6 Finishing

- A. General Requirements for Flatwork:
  - 1. Strike off top surfaces of finished fill and monolithic slabs true and level within a tolerance of 1/8 in. in 10 ft. and measured with a 10 ft. straightedge placed in any direction at any location.
  - 2. Set edge forms and intermediate screed strips accurately and sufficiently rigid to support screeds and so that proper surface elevations and concrete thickness are achieved allowing for dead load deflection and camber of formwork. Take measurements and control tolerances by the use of transit instrument.
  - 3. Upon completion of leveling, remove screed and fill spaces with concrete.

4. Concrete shall have a medium broom finish of parallel marks. Brooming shall be at right angles to the axis of walk or as shown on the Drawings.
  5. Joints and edges shall be tooled or otherwise finished as shown on the Drawings.
- B. Field Quality Control
1. Sampling and testing for quality control during placement of concrete may include the following, as directed by the Landscape Architect.
- C. Sampling Fresh Concrete: ASTM C172, except modified for slump to comply with ASTM C94.
- D. Slump: ASTM C143, one test for each concrete load at point of discharge; and one test for each set of compressive strength test specimens.
- E. Air Content: ASTM C173, volumetric method for lightweight or normal weight concrete; one for each set of compressive strength test specimens.
- F. Concrete Temperature: Test hourly when air temperature is 40 deg. F (4 deg. C) and below, and when 80 deg. F (27 deg. C) and above; and each time a set of compression test specimens made.
- G. Compression Test Specimen: ASTM C31; one set of 6 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
- H. Compressive Strength Tests: ASTM C39; one set for each 100 cu. yds. or fraction thereof, of each concrete class placed in any one day or for each 5,000 sq. ft. of surface area placed; 1 specimen tested at 7 days, 2 specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
- I. When total quantity of a given class of concrete is less than 50 cu. yds., strength test may be waived by Landscape Architect if, in his/her judgment, adequate evidence of satisfactory strength is provided.
- J. When strength of field-cured cylinders is less than 85% of companion laboratory- cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
- K. Strength level of concrete will be considered satisfactory if average of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive by more than 500 psi.
- L. Test results will be reported in writing to Landscape Architect and Contractor on same day that tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day test.
- M. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Landscape Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as directed. Contractor shall pay for such tests conducted, and any other additional testing as may

be required, when unacceptable concrete is verified.

### 3.7 Protection of Concrete

- A. Under no circumstances shall the Contractor pour and leave the fresh concrete open to vandalism, while it is setting up. Damaged concrete shall be subject to rejection by the Owner or Landscape Architect.

END OF SECTION

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## 11 68 00 PLAY EQUIPMENT AND STRUCTURES

### PART 1 - GENERAL

#### 1.1 GENERAL REQUIREMENTS

- A. The conditions of the Contract and Division 1 General Requirements apply to the Work under this Section.
- B. All references to products by manufacturer, trade name or performance Specifications bearing the connotation "or Approved Equal" shall be as determined by the Landscape Architect and the Town of Arlington, per MGL c. 30 s. 39M, part B, criteria 1.
  - 1. NOTE: Proposed alternate manufacturers of Play Equipment should be submitted for consideration regarding conformance to the specifications prior to Bid Submission. Alternative manufacturers, if submitted after Bid Submission and found, in the judgment of the Landscape Architect and the Town, not to be in substantial compliance with the specifications, shall not be considered as grounds for an amendment to the Contract Price due to price differences.

#### 1.2 WORK INCLUDED

- A. Provide all labor, equipment, implements and materials required to furnish, install, construct and perform all site improvements complete as shown on the Drawings and specified herein.
- B. To be included, but not limited to the following:
  - 1. Playhouse;
  - 2. Spinning Play Equipment;
  - 3. Cloverleaf Spring Riding Toy;
  - 4. Motion Spring Riding Toy;
  - 5. Two-Person riding toy;
  - 6. Sand Digger;
  - 7. Sand Table;
  - 8. Swing;
  - 9. Platform Play Structure;
  - 10. Rope Climbing Structure.

#### 1.3 REFERENCES

- A. Examine all other Sections of the Specifications and all Drawings for the relationship of the work under this Section and the work of other trades. Cooperate with all trades and all departments of the Town of Arlington and coordinate all Work under this Section therewith.

B. The following related items are included under the Sections listed below:

1. Section 02 41 00 - Site Preparation and Demolition
2. Section 03 30 00 - Cast In Place Concrete
3. Section 31 00 00 - Earthwork
4. Section 32 10 00 - Bases, Ballasts, and Paving

#### 1.4 SUBMITTALS

A. Shop Drawings and Samples

1. Provide complete Shop Drawings and/or samples and catalog cuts for all items called for on the Drawings and as specified and in accordance with applicable requirements under Division 01.
2. After installation, provide a copy of the inspection certificate from a Certified Playground Safety Inspector confirming that the play equipment is in compliance with the latest editions of ASTM F-1487 and the CPSC Public Playground Safety Handbook, and all other applicable standards and regulations.

#### 1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

1. Deliver materials in manufacturer's original unopened and undamaged packages with labels legible and intact.
2. Store materials in unopened packages in a manner to prevent damage from the environment and construction operations.
3. Handle in accordance with manufacturer's instructions.

### PART 2 - PRODUCT

#### 2.1 PLAY EQUIPMENT

A. The play equipment for this park is as follows:

A. Playhouse – Berliner Selfabrik: Berliner Single Trii Structure – Model # USP01130 with slide or approved equal. Color: Post: RAL 6018 Yellow Green; Top Ball Cap: RAL 9006 White Aluminum; Ropes: Green; HDPE: Green.

B. Spinning Play Equipment – Berliner Selfabrik: O-Tannebaum 2.5 with rubber platform base or approved equal. Color: post: RAL 6018 Yellow Green; Top Ball Cap: RAL 9006 White Aluminum; Ropes: Green.

C. Cloverleaf Spring Riding Toy - Henderson Recreation Equipment Limited: Lucky Clover Motion Toy – Model # SA-MT209 or approved equal. Color: Tan/Green.

D. Single Bird Spring Riding Toy – Henderson Recreational Equipment Limited: Freestanding Bird Spring Riding Toy – Model number: SA-MT007 or approved equal.



Color: Brown/Tan.

- E. Two-Person Riding Toy – Henderson Recreation Equipment Limited: Retro Rocker Model SA-MT223 or approved equal. Color: Lime.
- F. Sand Digger – salvaged and reused from existing playground.
- G. Sand Table – Play Ventures, Inc. PlayWood Plus: Mud Pie Table or approved equal. Material – natural wood.
- H. Swing – Henderson Recreational Equipment Limited: Henderson Triple Bay Arch Swings or approved equal with 3 belt seats, 2 bucket seats, and 1 accessible seat with 6 swing mats – Color: Posts: Lime; Seats: Black.
- I. Platform Play Structure – Henderson Recreational Equipment Limited: Henderson Play Structure with periscope panel, steering wheel panel, X&O Panel, Cobra Climber 5', Stepping Stones 4' with Rails, Tower Climber 6', P4 Split Deck, P4 Square Deck, Infill Panel 8", Infill Panel 8" Split Deck, Spiral Slide 6', Play Counter, Transfer Station 4' – Model # PF14199r1 or approved equal. Color: Posts: Lime; Railings: Silver; Sheet Plastic: Tan/Green; Roto-Moulded Plastic: Tan.
- J. Rope Climbing Structure – Berliner Selfabrik: Berliner Pentagode S. Single Post Climber with top tensioning and double-strand anchoring cables. Model # USP01911-1 or approved equal. Color: Post: RAL 6018 Yellow Green; Top Ball: RAL 9006 White Aluminum; Foundation Point: RAL 6018 Yellow Green; Ropes: External bracing cables: Silver; Central Mast Ropes: Green.

## 2.2 CAST IN PLACE CONCRETE

- A. Concrete for the footings will be cast in place concrete as specified in Section 03 3000 of the Specifications. Top of concrete footing shall be twelve (12) inches minimum below finished grade and shall be deeper as required by the manufacturer's installation instructions.

## 2.3 MAINTENANCE KIT

- A. The Contractor shall provide the Town of Arlington with the standard maintenance kit for each play equipment including extra hardware and one (1) gallon of graffiti removal / cleaning solutions as recommended by the manufacturer, as well as manuals that include all installation and maintenance instruction provided by the manufacturer.

## PART 3 - EXECUTION

- 3.1. The Contractor shall assemble the specified equipment under the supervision of an approved Supervisor according to the manufacturer's instructions, the contract drawings and these Specifications.
- 3.2. The Contractor shall locate the structures to the lines and grades specified in the

drawings in these Specifications and according to the specifications of the manufacturer of the equipment. Adjust all equipment according to site gradients; no sloping platforms, tracks, or members intended to be horizontal shall be accepted.

- 3.3. The excavation for the footings shall be done as specified in Section 31 0000 of these Specifications and according to the manufacturer's instructions found in Appendix A of these Specifications.
- 3.4. The equipment shall be located and brought to the heights as shown in the drawings and as recommended by the manufacturer with vertical and horizontal members set plumb and then braced to be held in place.
- 3.5. The concrete shall be poured around the supporting pieces of the equipment to the grades shown. The concrete shall be poured and cured according to Section 03 3000 of these Specifications. Slope tops of footings to drain.
- 3.6. After the specified cure period of the concrete has passed the bracing may be removed.
- 3.7. The fills and surfaces shall then be placed and brought to the grades shown in the Contract Drawings and in accordance with Section 31 0000 of these Specifications.
- 3.8. The Contractor shall refer to Appendix A of these Specifications for additional information on the play equipment.

#### PART 4 – GUARANTEE

- 4.1 All operating parts and structural elements of the play equipment shall be guaranteed against failure or defect during normal use and operation for the entire warranty period as established by the manufacturer.
- 4.2 Any defective elements shall be replaced in part or whole by the Contractor at no cost to the Owner.
- 4.3 The Contractor and the manufacturer shall hold the Owner and Engineer harmless from any and all damages or liability resulting from negligent acts and omissions on the part of the Contractor or manufacturer, or resulting from defective parts, or improperly assembled equipment. Contractor shall provide secure storage for all equipment on job site.
- 4.4 The Contractor is responsible for securing a Certified Playground Safety Inspector to ensure compliance with the latest editions of ASTM F-1487 and the CPSC Public Playground Safety Handbook, and all other applicable standards and regulations. A certificate of compliance shall be issued to the Owner prior to final inspection.

END OF SECTION

B. The following related items are included under the Sections listed below:

1. Section 02 41 00 - Site Preparation and Demolition
2. Section 03 30 00 - Cast In Place Concrete
3. Section 31 00 00 - Earthwork
4. Section 32 10 00 - Bases, Ballasts, and Paving

#### 1.4 SUBMITTALS

A. Shop Drawings and Samples

1. Provide complete Shop Drawings and/or samples and catalog cuts for all items called for on the Drawings and as specified and in accordance with applicable requirements under Division 01.
2. After installation, provide a copy of the inspection certificate from a Certified Playground Safety Inspector confirming that the play equipment is in compliance with the latest editions of ASTM F-1487 and the CPSC Public Playground Safety Handbook, and all other applicable standards and regulations.

#### 1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

1. Deliver materials in manufacturer's original unopened and undamaged packages with labels legible and intact.
2. Store materials in unopened packages in a manner to prevent damage from the environment and construction operations.
3. Handle in accordance with manufacturer's instructions.

### PART 2 - PRODUCT

#### 2.1 PLAY EQUIPMENT

A. The play equipment for this park is as follows:

A. Playhouse – Berliner Selfabrik: Berliner Single Trii Structure – Model # USP01130 with slide or approved equal. Color: Post: RAL 6018 Yellow Green; Top Ball Cap: RAL 9006 White Aluminum; Ropes: Green; HDPE: Green.

B. Spinning Play Equipment – Berliner Selfabrik: O-Tannebaum 2.5 or approved equal. Color: post: RAL 6018 Yellow Green; Top Ball Cap: RAL 9006 White Aluminum; Ropes: Green.

C. Cloverleaf Spring Riding Toy - Henderson Recreation Equipment Limited: Lucky Clover Motion Toy – Model # SA-MT209 or approved equal. Color: Tan/Green.

D. Bird Spring Riding Toy – Henderson Recreational Equipment Limited: Freestanding Bird Spring Riding Toy – Model number: SA-MT007 or approved equal.

Color: Brown/Tan.

- E. Two-Person Riding Toy – Henderson Recreation Equipment Limited: Retro Rocker Model SA-MT223 or approved equal. Color: Lime.
- F. Sand Digger – salvaged and reused from existing playground.
- G. Sand Table – Play Ventures, Inc. PlayWood Plus: Mud Pie Table or approved equal. Material – natural wood.
- H. Swing – Henderson Recreational Equipment Limited: Henderson Triple Bay Arch Swings or approved equal with 3 belt seats, 2 bucket seats, and 1 accessible seat with 6 swing mats – Color: Posts: Lime; Seats: Black.
- I. Platform Play Structure – Henderson Recreational Equipment Limited: Henderson Play Structure with periscope panel, steering wheel panel, X&O Panel, Cobra Climber 5', Stepping Stones 4' with Rails, Tower Climber 6', P4 Split Deck, P4 Square Deck, Infill Panel 8", Infill Panel 8" Split Deck, Spiral Slide 6', Play Counter, Transfer Station 4' – Model # PF14199r1 or approved equal. Color: Posts: Lime; Railings: Silver; Sheet Plastic: Tan/Green; Roto-Moulded Plastic: Tan.
- J. Rope Climbing Structure – Berliner Selfabrik: Berliner Pentagode S – Model # Pentagode S or approved equal. Color: Post: RAL 6018 Yellow Green; Top Ball: RAL 9006 White Aluminum; Foundation Point: RAL 6018 Yellow Green; Ropes: External bracing cables: Silver; Central Mast Ropes: Green.

## 2.2 CAST IN PLACE CONCRETE

- A. Concrete for the footings will be cast in place concrete as specified in Section 03 3000 of the Specifications. Top of concrete footing shall be twelve (12) inches minimum below finished grade and shall be deeper as required by the manufacturer's installation instructions.

## 2.3 MAINTENANCE KIT

- A. The Contractor shall provide the Town of Arlington with the standard maintenance kit for each play equipment including extra hardware and one (1) gallon of graffiti removal / cleaning solutions as recommended by the manufacturer, as well as manuals that include all installation and maintenance instruction provided by the manufacturer.

## PART 3 - EXECUTION

- 3.1. The Contractor shall assemble the specified equipment under the supervision of an approved Supervisor according to the manufacturer's instructions, the contract drawings and these Specifications.
- 3.2. The Contractor shall locate the structures to the lines and grades specified in the drawings in these Specifications and according to the specifications of the manufacturer of

## **SECTION 12 93 00 – SITE FURNISHINGS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. See Appendix for specific manufacturer instructions and details. This section includes:
  - 1. Bench
  - 2. Picnic Table
  - 3. ADA Picnic Table
  - 4. Litter Receptacle
  - 5. Basketball Hoop
  - 6. Color Coating for Half-Basketball Court
  - 7. 3-Bay Compost Bin
  - 8. Garden Storage Shed
  
- B. Related Requirements:
  - 1. Division 03 Section "Cast-In-Place-Concrete"
  - 2. Division 32 Section "Unit Paving"
  - 3. Appendix

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  
- B. Submit color and finish sample for bike racks and litter receptacles.

#### **1.3 QUALITY ASSURANCE**

- A. Source Limitations: Obtain site furnishings from specified sources. Submit manufacturer's product literature to Landscape Architect for approval.
  
- B. Installer qualifications:
  - 1. Site furniture to be installed by manufacturer's Certified Installer whose work has resulted in construction of at least five similar installations, with a record of successful in-service performance for at least three years.

#### **1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Protect all site furniture during storage and construction against rain, snow or ground water, and against soilage or contamination from earth and other materials.

### **PART 2 - PRODUCTS**

#### **2.1 BENCH**

- A. Products: Subject to compliance with requirements, provide the following:
  - 1. Bench to be by DuMor, model number 57-60 PL or approved equal.
  - 2. Color of metal to be BLACK

3. Color of plastic timber to be REDWOOD.
4. Material: metal frame and plastic timber slats.
5. Table to be surface mounted per manufacturer's instructions onto concrete base.

## 2.2 STANDARD PICNIC TABLE

- A. Products: Subject to compliance with requirements, provide the following:
1. Table to be by DuMor, model number 100 Series PL or approved equal.
  2. Color of metal to be BLACK.
  3. Color of plastic timber to be REDWOOD.
  4. Material: metal frame and plastic timber slats.
  5. Table to be surface mounted with S2 surface mount per manufacturer's instructions.

## 2.3 ADA Picnic Table

- A. Products: Subject to compliance with requirements, provide the following:
1. Table to be by DuMor, model number 100-68-1 PL or approved equal.
  2. Color of metal to be BLACK.
  3. Color of plastic timber to be REDWOOD.
  4. Material: metal frame and plastic timber slats.
  5. Table to be surface mounted with S2 surface mount per manufacturer's instructions, or embedded with S1 embedment mount per manufacturer's instructions, see Drawings.

## 2.4 LITTER RECEPTACLE

- A. Products: Subject to compliance with requirements, provide the following:
1. Trash receptacle to be by Custom Fabrications, model number CFTR-003-02 or approved equal.
  2. Metal to be powder coated. Color to be BLACK.
  3. All hardware to be supplied by manufacturer and shall be tamper resistant and stainless steel.

## 2.5 BASKETBALL HOOP

- A. Adjustable basketball hoop
1. Manufacturer: ProDunk Hoops
  2. Product: ProDunk Diamond Basketball System with Rust Armor Protection or approved equal.
  3. Backboard size: 72" x 42" x ½"
  4. Pole size: 12" x 8"
  5. Installation: anchor system on concrete footing as per manufacturer's instructions and provided anchor bolts and hardware.

## 2.6 COLOR COATING FOR BASKETBALL COURT

- A. 100% Acrylic Recreational Coating for asphalt play area
1. Product: Latexite Acrylic Color System or approved equal.

2. Color: To be selected from manufacturer's full range

2.7 3-BAY COMPOST BIN

- A. Products: Subject to compliance requirements, provide the following:
1. Wood and wire three-compartment bin. See Appendix for instructions and details.
  2. Material: pressure-treated wood, mesh hardware cloth, corrugated fiberglass
  3. Installation: as per Appendix – unit rests on ground.

2.8 GARDEN STORAGE SHED

- A. Products: Subject to compliance requirements, provide the following:
1. Garden shed to be Outdoor Living Today (1-888-658-1658) Garden Chalet 4'x2' – model # GC42 or approved equal.
  2. Material: Western red cedar 4'x2' garden shed
  3. Installation: as per Appendix – unit is anchored on concrete slab.

PART 3 - EXECUTION

3.1. EXAMINATION

- A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.

3.2. INSTALLATION, GENERAL

- A. Install site furnishings as per manufacturer's recommendations and details shown in these documents. Complete field assembly of site furnishings where required.
- B. Do not install any materials with chips, cracks, discolorations and other defects that would cause visible discoloration on the finished work.
- C. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.
- D. Stake out all locations of site furniture for approval by Landscape Architect prior to installation and anchoring.
- E. Install site furnishings level, plumb, true, and securely anchored or positioned at locations indicated on Drawings.

END OF SECTION

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## SECTION 31 00 00 - EARTHWORK

### PART 1. GENERAL

#### 1.1 CONDITIONS AND REQUIREMENTS

- A. Refer to the Geotechnical Report in the Appendix for more information.
- B. Examine all Drawings and all other sections of the specifications for requirements therein affecting the work of this trade.
- C. The following classifications of excavation will apply in this Section:

General Excavation: Consists of the removal and disposal of pavements and other obstructions visible on ground surface; underground structures and utilities indicated to be demolished and removed; removal of any overburden soil; and removal of all other materials encountered that are not classified as rock excavation.

#### 1.2 SCOPE OF WORK

- A. Without limiting the generality thereof, furnish all labor and materials to complete all earthwork within the limits of work as shown on the contract plans and/or herein specified including, but not necessarily limited to:
  - 1. Excavation and backfilling to provide access to all work areas.
  - 2. Excavation and stockpiling of materials suitable for reuse at an approved on-site location.
  - 3. Excavation and legal off-site disposal of unsuitable or excess materials, including existing fill materials, peat or other organic soils, boulders, excess topsoil, blasted rock material and overburden soils.
  - 4. Soil excavation, fill, backfill, refill and subgrade preparation as indicated or required, using specified materials.
  - 5. Soil structure excavation, placement of bedding and backfilling of utility trenches.
  - 6. Finishing and placing specified materials as required.
  - 7. Excavation and backfilling all footings and foundations including retaining walls.
  - 8. Preparation of subgrade for structures, slabs, pavements and landscaping.
  - 9. Furnishing and installing any sheeting, shoring and bracing for excavations as required by Federal, State and Local laws, regulations and ordinances.

10. Removal of unsuitable materials from beneath proposed structures and pavement areas, as necessary.
  11. Furnishing and placing subbase and base courses and accessories paved areas, sidewalks or other structures.
  12. Furnishing and placing rip rap, various gradations of Crushed Stone and related materials in areas designated on the plan.
  13. Removal of, boulders, concrete, masonry and rubble as required for foundations and site excavation to the lines and grades indicated on the drawings.
  14. Rough and fine grading including compaction of existing materials, backfills and refills, rip rap and Crushed Stone.
  15. Dewatering, pumping, bailing and control of all groundwater and surface water for all work under this Contract.
  16. Subbase and base course for the sidewalks and pavements shall be furnished, placed and rough graded by the contractor.
  17. Removal and disposal of debris materials.
- B. Special Conditions for Site Preparation and Earthwork Operation: The Contractor shall take note of any ordinances put forth by the Town **of Arlington**, which may limit construction hours; and shall adhere to these ordinances, and shall pay particular attention to the Special Permit requirements of the Arlington Planning Board and the Order of Conditions of the Arlington Conservation Commission and the Massachusetts Department of Environmental Protection both of which are included in the contract documents.
- C. Definition: The term Geotechnical Engineer as used in this specification shall mean a competent inspector, qualified by experience and training, working under the supervision of a Registered Professional Engineer.

### 1.3 SUBMITTALS

- A. Within 10 days after award of the contract, the Contractor shall submit to the Owner, with his bid package, a schedule detailing the sequence, and time of completion of all phases of work under this section.
- B. At least 2 weeks in advance of on-site or imported (off-site) fill use, the Contractor shall submit the following laboratory test data to the Geotechnical Engineer for each type of soil/gravel material to be used as compacted fill.
  1. Moisture and Density Relationship: ASTM D1557,

2. Mechanical Analysis: AASHTO T-88; and,
  3. Plasticity Index: ASTM D 4318.
- C. Submit the name of each material supplier and specific type and source of each material. Any change in source or soil type throughout the job requires approval of the Owner and the geotechnical engineer.

#### 1.4 RELATED WORK IN OTHER SECTIONS

#### 1.5 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM) latest edition.
1. ASTM D 698 - Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN.m/m<sup>3</sup>))
  2. ASTM D 1556 - Density and Unit Weight of Soil In Place by the Sand-Cone Method
  3. ASTM D 1557 - Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 Kn.m/m<sup>3</sup>))
  4. ASTM D 2167 - Density and Unit Weight of Soil In Place by the Rubber Balloon Method
  5. ASTM D 2216 - Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures
  6. ASTM D 2487 - Classification of Soils for Engineering Purposes
  7. ASTM D 2922 - Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth)
  8. ASTM D 3017 - Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
  9. ASTM D 4318 - Liquid Limit, Plastic Limit, and Plasticity Index of Soils
  10. ASTM D 5195 - Density of Soil and Rock In-Place at Depths below the Surface by Nuclear Methods
  11. ASTM D 136 Method for Sieve Analysis of Fine and Coarse Aggregates
  12. ASTM D 5220 - Test Method for Water Content of Soil and Rock in-Place by Neutron Depth Probe Method
  13. ASTM D422 – Method for Particle Size Analysis of Soils

- B. American Association of State Highway and Transportation Officials (AASHTO) latest edition T 88 Particle Size Analysis of Soils

#### 1.6 SAMPLES AND TESTING

- A. Submit 50-lb sample of each type of on-site and off-site fill material that is to be used at site for Independent Testing Laboratory or submit gradation and compaction curve test results, and certification of aggregate material that is to be used to Independent Testing Laboratory for review.
- B. Submit name of each material supplier and specific type and source of each material. Change in source throughout project requires approval of Owner or Owner's Representative.
- C. If fabrics or geogrids are to be used, design shall be submitted for approval to the Owner or Owner's Representative.

#### 1.7 COORDINATION

- A. The work of this Section shall be coordinated with that of other trades affecting, or affected by, this work, as necessary to assure the steady progress of all work of the Contract.
- B. Prior to the start of earthwork, the Contractor shall arrange an on-site meeting with the Owner or Owner's Representative and Geotechnical Engineer for the purpose of establishing Contractor's schedule of operations and scheduling inspection procedures and requirements.
- C. As construction proceeds, the Contractor shall be responsible for notifying the Owner or Owner's Representative prior to start of earthwork operations requiring inspection and/or testing.

#### 1.8 INFORMATION

- A. It is hereby understood that the Contractor has carefully examined the site and all conditions affecting work under this Section. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions.
- B. Plans, surveys, measurements and dimensions, under which the work is to be performed are believed to be correct to the best of the Owner or Owner's Representative's knowledge, but the Contractor shall have examined them for himself

during the bidding period, as no allowance will be made for any errors or inaccuracies that may be found herein.

- C. Information on the Drawings, Reference Drawings, and in the Specifications relating to subsurface conditions, natural phenomena, and existing utilities and structures is from the best sources presently available. Such information is furnished only for the information and convenience of the Contractor, and the accuracy or completeness of this information is not guaranteed.

#### 1.9 EXISTING CONDITIONS

- A. The Contractor shall become thoroughly familiar with the site, consult records and drawings of adjacent structures and of existing utilities and their correction, and note all conditions which may influence the work of this Section.
- B. By submitting a bid, the Contractor affirms that he has carefully examined the site and all conditions affecting work under this Section. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions.
- C. The Contractor may, at his own expense, conduct additional subsurface testing as required for his own information after approval by the Owner or Owner's Representative.

#### 1.10 SUBSURFACE CONDITIONS AND SPECIAL SITE CONSIDERATIONS

- A. Test pits have been made by qualified Contractors prior to this Contract. This information shall be made available to bidders as specified under other Sections. The final results of these subsurface explorations and recommendations for work were prepared by Geotechnical Services, Inc. (GSI), consulting geotechnical engineers, and are hereby attached to this specification for information only. Procedures for dewatering, areas to receive special fill and other methods and procedures specified herein shall be supplemented by this information. For purposes of this specification, this information will be referred to as the report. Where procedures within the report vary from procedures as specified herein, this specification shall override.
- B. The Contractor shall visit the site prior to submitting a bid to become familiar with the extent of the work to be done under this Contract. The Contractor shall be responsible for determining the quantities of earth materials necessary to complete the work under this Section.
- C. Site Information - data on indicated subsurface conditions are not representations or warrants of continuity of such conditions between subsurface explorations. It is

expressly understood that the Owner or Owner's Representative will not be responsible for interpretations or conclusions drawn there from by the Contractor. Data is made available for the convenience of the Contractor. Neither the Owner or Owner's Representative, nor the Geotechnical Engineer assumes responsibility for accuracy of the data other than at the particular locations and at the time the explorations were made.

#### 1.11 QUALITY ASSURANCE

- A. Independent Testing Laboratory, selected and paid by Owner, shall be retained to perform construction testing on site based on following:
  - 1. In cut areas, not less than 1 compaction test for every 2,500 sq. ft. In fill areas, same rate of testing for each 6 to 12-in. lift, measured loose.
- B. If compaction requirements are not complied with at any time during construction process, remove and recompact deficient areas until proper compaction is obtained at no additional expense to the Owner.
- C. Following tests shall be performed as part of construction testing requirements on each type of on-site or imported soil material used as compacted fill:
  - 1. Moisture and Density Relationship: ASTM D 1557
  - 2. Mechanical Analysis: AASHTO T 88 or ASTM D 422
  - 3. Plasticity Index: ASTM D 4318
- D. Field density tests for in-place materials shall be performed as part of construction testing requirements according to one of following standards:
  - 1. Sand-Cone Method: ASTM D 1556
  - 2. Balloon Method: ASTM D 2167
  - 3. Nuclear Method: ASTM D-2922 (Method B-Direct Transmission) and ASTM D-5195
- E. Independent Testing Laboratory shall prepare test reports that indicate test location, elevation data, and test results. The Owner or Owner's Representative and Contractor shall be provided with copies of reports within 48 hours of time that test was performed. In event that test performed fails to meet Specifications, Owner or Owner's Representative and Contractor shall be notified immediately by Independent Testing Laboratory.
- F. Costs related to retesting due to failures shall be paid for by Contractor at no additional expense to the Owner. The Owner or Owner's Representative reserves right to employ

Independent Testing Laboratory and to direct testing that is deemed necessary. Contractor shall provide free access to site for testing activities.

#### 1.12 PERMITS, CODES AND SAFETY REQUIREMENTS

- A. All work shall conform to the Drawings and Specifications and shall comply with applicable codes and regulations.
- B. Comply with the rules, regulations, laws and ordinances of the City of Arlington, appropriate agencies of the Commonwealth of Massachusetts and all other authorities having jurisdiction and shall pay particular attention to the Special Permit requirements of the City of Arlington Planning Board and the Order of Conditions of the City of Arlington Conservation Commission and the Massachusetts Department of Environmental Protection both of which are included in the contract documents.. Coordinate all work done within Town and State rights of way with the appropriate agencies. Provide all required traffic control and safety measures, including uniformed police officers per town and State requirements. All labor, materials, equipment and services necessary to make the work comply with such requirements shall be provided without additional cost to the Owner.
- C. Comply with the provisions of the Manual of Accident Prevention in Construction of the Associated General Contractors of America, Inc. and the requirements of the Occupational Safety and Health Administration (OSHA), United States Department of Labor.
- D. The Contractor shall procure and pay for all permits and licenses required for the complete work specified herein and shown on the Drawings.
- E. The Contractor shall not close or obstruct any street, sidewalk, or passageway unless authorized in writing by the Owner or Owner's Representative. The Contractor shall so conduct his operations as to interfere as little as possible with the use ordinarily made of roads, driveways, sidewalks or other facilities near enough to the work to be affected hereby. The Contractor shall comply with the time limits established by the terms for trucking onto and off of the site.
- F. Any apparent conflict between the Drawings and Specifications and the applicable codes and regulations shall be referred to the Owner or Owner's Representative in writing, for resolution before the work is started.

#### 1.13 LAYOUTS AND GRADES

- A. All line and grade work not presently established at the site shall be laid out by a survey team under the supervision of a Registered Land Surveyor or Professional Engineer employed by the Contractor in accordance with Drawings and Specifications. The Contractor shall establish permanent bench marks and replace as directed any which are destroyed or disturbed.
- B. The words "finished grades" as used herein shall mean final grade elevations indicated on the Drawings. Spot elevations shall govern over proposed contours. Where not otherwise indicated, project site areas outside of the building shall be given uniform slopes between points for which finished grades are indicated or between such points and existing established grades.
- C. The word "subgrade" as used herein, means the required surface of subsoil, borrow fill or compacted fill. This surface is immediately beneath the site improvements, fill materials as dimensioned on the Drawings, or other proposed surface material.

#### 1.14 DISPOSITION OF EXISTING UTILITIES

- A. Active utilities existing on the site and work areas shall be carefully protected from damage and relocated or removed as required by the work. When an active utility line is exposed during construction, its location and elevation shall be plotted on the record drawings as described in this Section and both the Owner or Owner's Representative and Utility Owner notified in writing.
- B. Inactive or abandoned utilities encountered during construction operations shall be removed if within the building area or grouted, plugged or capped. The location of such utilities shall be noted on the record drawings and reported in writing to the Owner or Owner's Representative.
- C. The Contractor shall notify "Dig Safe" and local utility companies prior to the start of construction. The "Dig Safe" number shall be submitted by the Contractor in writing to the Owner or Owner's Representative prior to construction.

#### 1.15 SHORING, SHEETING, AND BRACING

- A. Provide shoring, sheeting, and/or bracing at excavations, as required, to assure complete safety against collapse of earth at sides of excavations.
- B. If, at any place, sufficient or proper supports have not been provided, additional supports shall be placed at the expense of the Contractor. Care shall be taken to prevent voids



outside of the sheeting, but if voids are formed, they shall be immediately filled and rammed.

- C. All sheeting and bracing not ordered left in place shall be carefully removed in such a manner as not to endanger the construction of other structures, utilities or property whether public or private. All voids left after withdrawal of sheeting shall be immediately refilled with sand and rammed with tools especially adapted to that purpose or otherwise compacted as directed to achieve the required density.
- D. The portion of sheeting driven below mid-diameter of any pipe, shall not be withdrawn and under no circumstances shall any sheeting be cut off at a level lower than one foot above the top of pipe.
- E. Shoring or sheeting shall not constitute a condition for which an increase may be made in the contract price with the exception that if the Owner or Owner's Representative directs in writing that certain shoring or sheeting shall be left in place, the contract price will be adjusted in accordance with General Conditions.
- F. Excavation support systems shall be designed to support the earth pressures, hydrostatic pressures, surcharge loads and other forces from existing site conditions, stored material and construction equipment.
- G. Shoring and bracing of trenches and other excavations shall, at a minimum, be in accordance with the latest requirements of the Occupational Safety and Health Administration (OSHA) regulations (29 CFR Part 1926).
- H. If required, shoring and sheeting shall be designed by a Professional Engineer Registered in the Commonwealth of Massachusetts hired by and paid for by the Contractor. The design shall be submitted 14 days prior to construction for review.

#### 1.16 DRAINAGE

- A. The Contractor shall control the grading in areas under construction on the site so that the surface of the ground will properly slope to prevent accumulation of water in excavated areas and adjacent properties.
- B. The Contractor shall excavate interceptor swales and ditches where shown on the Drawings and as otherwise necessary prior to the start of major earthmoving operations to insure minimal erosion and to keep areas as free from surface water as possible.
- C. Should surface, rain or ground water be encountered during the operations, the Contractor shall furnish and operate pumps or other equipment, and provide all necessary piping to keep all excavations clear of water at all times and shall be

responsible for any damage to work or adjacent properties for such water. All piping exposed above surface for this use, shall be properly covered to allow foot traffic and vehicles to pass without obstruction.

- D. Presence of ground water in soil will not constitute a condition for which an increase in the contract price may be made. Under no circumstances place concrete fill, soil fill, lay piping or install appurtenances in excavation containing free water. Keep utility trenches free of water until pipe joint material has hardened and backfilled to prevent flotation.

#### 1.17 FROST PROTECTION

- A. Do not excavate to full indicated depth when freezing temperatures may be expected, unless work can be completed to subgrade or piping can be installed and backfilled the same day. Protect the excavation from frost if placing of concrete or piping is delayed.
- B. The Contractor shall keep the operations under this Contract clear and free of accumulation of snow within the limits of Contract Lines as required to carry out the work.
- C. No work shall be installed on frozen ground.

#### 1.18 DISTURBANCE OF EXCAVATED AND FILLED AREAS DURING CONSTRUCTION

- A. The Contractor shall take the necessary steps to avoid disturbance of subgrade and underlying natural soils/compacted fill during excavation and filling operations. Methods of excavation and filling operations shall be revised as necessary to avoid disturbance of the subgrade and underlying natural soils/compacted fill, including restricting the use of certain types of construction equipment and their movement over sensitive or unstable materials. The Contractor shall coordinate with the Owner or Owner's Representative to modify his operations as necessary to minimize disturbance and protect bearing soils.
- B. All excavated or filled areas disturbed during construction, all loose or saturated soil, and other areas that will not meet compaction requirements as specified herein shall be removed and replaced with compacted Aggregate Base Coarse or Crushed Stone. Fill that cannot be compacted within 48 hours because of excess moisture shall be removed and replaced with compacted Aggregate Base Coarse or Crushed Stone. Costs of removal of disturbed material and replacement with Aggregate Base Coarse or Crushed Stone shall be borne by the Contractor.
- C. If requested by the Owner or Owner's Representative, the Contractor shall place a six inch layer of Crushed Stone or concrete mudmat over natural underlying soil to stabilize

areas disturbed during construction. The placement of Crushed Stone layer or mudmat as well as material costs shall be borne by the Contractor.

- D. Material that is not within  $\pm 3\%$  optimum moisture for compaction as determined by the Modified Proctor Test of the particular material in place as determined by the Owner or Owner's Representative and is disturbed by the Contractor during construction operations so that proper compaction cannot be reached shall be construed as unstable bearing materials. This material shall be removed and replaced with Crushed Stone or Aggregate Base Coarse as directed by the Owner or Owner's Representative at no additional cost to the Owner.

#### 1.19 PROTECTION OF BEARING SUBGRADES

- A. The Contractor shall be required to maintain stable, dewatered, and frost free subgrades for foundations, pavement areas, utility trenches, and other areas as directed by the Owner or Owner's Representative.
- B. The Contractor shall take precautions to reduce subgrade disturbance. Such precautions may include diverting storm water runoff away from construction areas, reducing traffic in sensitive areas, thermal protection during cold weather periods, and maintaining an effective dewatering operation.
- C. Soils exhibiting weaving/instability or which become frozen, as determined by the Owner or Owner's Representative, shall be over-excavated (removed) to competent bearing material and replaced with compacted Aggregate Base Coarse or lean concrete at no additional cost to the Owner.

#### 1.20 DEWATERING

- A. The Contractor shall be required to implement ground water control measures to maintain the ground water level a minimum of one foot below all final excavation levels or to propose alternative methods for placement of fill over existing undisturbed material with ground water at or near the surface in such a manner that the existing materials will not be disturbed. The Contractor will be required to implement ground water control measures adequate to maintain the excavation sufficiently dry to allow efficient use of normal excavation equipment and to provide a borrow material suitable for placement and compaction as specified or as directed by the Owner or Owner's Representative.
- B. Not less than 14 days prior to the scheduled start of work, the Contractor shall submit his proposed method of dewatering and maintaining dry conditions, to the Owner or Owner's

Representative for review and approval. The Contractor is responsible for correcting any disturbance of natural bearing soils or damage to structures caused by an inadequate dewatering system or by interruption of the continuous operation of the system as specified.

- C. The Contractor shall make the entire excavation for this work in-the-dry. The water level is to be maintained continuously at least one foot below bottom of excavation for the length of time to complete the work. The Contractor shall place all fill materials and proposed improvements in-the-dry.
- D. The Contractor shall, at all times during construction, provide and maintain proper equipment and facilities to remove promptly and dispose of properly, all water entering excavations and keep such excavations dry so as to obtain a satisfactory undisturbed bottom of excavation or subgrade condition. Dewatering shall be in operation until the fill or the proposed surface condition has been completed to such extent that it will not be floated or otherwise damaged by allowing water levels to return to natural elevations.
- E. In excavations below the ground water level, it is expected that dewatering trenches or deep sumps will be required for predrainage of the soils prior to final excavation, and for maintaining the lowered groundwater level until construction has been completed to such an extent that floating, slumping or damage to excavations or materials placed does not occur. Monitoring of adjacent ground water levels by observation wells or other satisfactory means may be required.
- F. The Contractor shall discharge all pumped water away from the work area, and in accordance with all applicable local codes and laws and shall pay particular attention to the Special Permit requirements of the City of Arlington Planning Board and the Order of Conditions of the City of Arlington Conservation Commission and the Massachusetts Department of Environmental Protection both of which are included in the contract documents.. Requirements specified herein for Erosion and Siltation Control shall be met during this process.
- G. All fill material shall be placed and compacted in-the-dry. The Contractor shall dewater excavated areas as required to perform the work and in such a manner as to preserve the undisturbed state of the natural inorganic or other subgrade soils.
- H. The Contractor shall verify that the construction and/or operation of his dewatering system will not adversely affect any well, pond, stream structure, utility, etc., on or adjacent to the area being dewatered.

- I. The Contractor may manage construction dewatering effluent on site provided that the on-site discharge of the effluent does not result in off-site surface runoff or damage to on-site construction, and the on-site discharge does not spread any sedimentation and/or increase levels of sedimentation in any portion of the site or off-site.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Fill material shall be obtained from required on-site cuts to the extent suitable material is available and off-site to the extent suitable material is not available from on-site cuts.
- B. On-site material for use in compacted fill shall be natural inorganic granular soil taken from areas of cut after removal of pavement, topsoil, subsoil or other unsuitable materials.
- C. Fill materials shall be well-graded within specified gradation limits. Gradation of backfill materials shall be determined in accordance with ASTM D-422.
- D. The Contractor may elect to mobilize a crushing plant to the site in order to manufacture engineered fill, subject to the criteria specified herein. The resulting material shall be referred to herein as "recycled on-site engineered fill".
- E. Crushed Stone: Crushed Stone processed from a stone quarry, washed, graded, free of organic, angular "interlocking" material, capable of supporting vehicular traffic. Gradation is as follows:

1. 1/2" Crushed Stone

<u>U. S. SIEVE NO.</u>	<u>% PASSING BY WEIGHT</u>
1"	100
1/2"	85-100
3/8"	15-45
#4	0-15
#8	0-5

2. 3/4" Crushed Stone

<u>U. S. SIEVE NO.</u>	<u>% PASSING BY WEIGHT</u>
1"	100
3/4"	90-100
1/2"	10-50
3/8"	0-20

#4

0-5

3. 1 1/2" to 2" Double Washed Crushed Stone for Drainage

<u>U. S. SIEVE NO.</u>	<u>% PASSING BY WEIGHT</u>
2"	100
1 1/2"	95-100
1"	35-70
3/4"	0-25
1/2"	0-8
No. 200	0-5

The double washed crushed stone shall be free of fines, silt, clay or stone dust material. The Engineer shall be the sole judge as to the suitability of the material.

- F. Aggregate Base Coarse: Well-graded, hard, durable, natural sand and gravel, free from ice and snow, roots, sod, rubbish, and other deleterious or organic matter. Material shall conform to the following gradation requirements:

<u>U.S. Sieve Size</u>	<u>Percent Finer by Weight</u>
3 in.	100
No. 4	30 – 80
No. 40	10 – 50
No. 200	0 – 10

- G. Dense Graded Crushed Stone shall consist of inert angular material derived from a stone quarry that is hard, durable stone and stone screenings, free from loam and clay, surface coatings, and plastic materials. Gradation shall conform to M2.01.7 and the following:

<u>Sieve No.</u>	<u>% Passing by Weight</u>
2"	100
1-1/2"	70-100
3/4"	50-85
#4	30-55
#50	8-24

H. Ordinary (Common) Fill: Well-graded, natural, inorganic soil approved by the Owner or Owner's Representative and meeting the following requirements:

1. It shall have less than 3% organic matter, free from weak or compressible materials, of frozen materials, and of stones larger than eight inches in dimension. It shall not contain granite block, concrete, masonry rubble, roots, stumps or other similar materials.
2. It shall be of such nature and character that it can be compacted to the specified densities.
3. It shall have a minimum dry density of not less than 100 pounds per cubic foot.
4. Material from excavations on the site may be used as Ordinary Fill if it meets the above requirements.

I. Material which is classified as "unsuitable" shall be material having at least one of the following properties:

1. Material with a maximum unit dry weight per cubic foot less than 90 lbs., as determined by ASTM D1557.
2. Material containing greater than 2% organic matter by weight, topsoil, organic silt, peat, construction debris, roots and stumps.
3. Material which has a Liquid Limit greater than 55 when tested in accordance with ASTM D 4318.
4. Soil which is allowed to become frozen, saturated, or unstable because of the contractor's failure to employ appropriate dewatering, excavation methods, or weather protection is not deemed unsuitable soil but rather represents a condition in which the subgrade was not adequately protected.

J. Granular Fill: Well-graded, hard, durable, natural sand and gravel, free from ice and snow, roots, sod, rubbish, or organic matter. Material shall conform to the following gradation requirements:

<u>U.S. SIEVE NO.</u>	<u>% PASSING BY WEIGHT</u>
4"	100
#4	60-90
#200	0-10

- K. Bedding Material - Sand Borrow (MassDOT M1.04.1): Shall consist of inert material that is hard, durable stone and coarse sand, free from loam and clay, surface coatings, and material. Material shall conform to the following gradation requirements:

<u>U.S. SIEVE NO.</u>	<u>% PASSING BY WEIGHT</u>
1/2"	100
3/8"	85 - 100
#4	60 - 100
#16	35 - 80
#50	10 - 55
#200	0 - 10

- L. Riprap: Riprap shall be sound, durable rock which is angular in shape and shall meet the gradations specifications of Modified Rockfill (MassDOT M2.02.4)

## 2.2 GEOTEXTILES

- A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. Grab Tensile Strength: 157 lbf ; ASTM D 4632.
3. Sewn Seam Strength: 142 lbf ; ASTM D 4632.
4. Tear Strength: 56 lbf ; ASTM D 4533.
5. Puncture Strength: 56 lbf ; ASTM D 4833.
6. Apparent Opening Size: No. 40 sieve, maximum; ASTM D 4751.
7. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

- B. 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:

1. Survivability: Class 2; AASHTO M 288.
2. Grab Tensile Strength: 247 lbf ; ASTM D 4632.
3. Sewn Seam Strength: 222 lbf ; ASTM D 4632.



4. Tear Strength: 90 lbf ; ASTM D 4533.
5. Puncture Strength: 90 lbf; ASTM D 4833.
6. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
7. Permittivity: 0.02 per second, minimum; ASTM D 4491.
8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

## PART 3 EXECUTION

### 3.1. GENERAL EXCAVATION

- A. Excavate all materials encountered to allow construction of the proposed building and structures, utilities and site work as shown on the Drawings and as hereinafter specified.
- B. Excavate to levels shown for footings and structures, as required to provide working clearance and to allow adequate inspection and to subgrades outside of buildings and structures as specified herein and as shown on Drawings.
- C. In planted areas, remove ledge, boulders and other obstructions to a depth of at least two feet below finished grade or as indicated in the Planting section of this specification.
- D. Remove from the site and legally dispose of all debris and other excavated material not needed for, or suitable for, fill except as otherwise specified herein. Remove all materials subject to rot or attack by termites.
- E. In general, the Contractor will be permitted to use machine excavation to the bottom of fill under concrete slabs on grade. The final three inches under footings and foundations shall be excavated using a straight blade bucket. If the final three inches cannot be satisfactorily excavated using a straight blade bucket without disturbing subgrades, the Contractor shall use alternative methods, including hand excavations. Alternative methods shall be subject to approval by the Owner or Owner's Representative.
- F. Unanticipated Soil Conditions:
  1. If unsuitable bearing materials are encountered at the specified subgrade depths, the Contractor shall notify the Owner or Owner's Representative and request, in writing, authorization to remove and replace the unsuitable materials prior to the work.
  2. Once authorization is given, the Contractor shall carry excavation deeper and replace the excavated material with compacted fill or concrete as directed by the Owner or Owner's Representative. Soil subgrades which are unstable due to inadequate construction dewatering or excessive subgrade disturbance are not deemed unsuitable soils.

3. Removal of such material and its replacement as directed will be paid for an extra compensation in quantity approved by the Owner or Owner's Representative. Only changes in the work authorized in advance by the Owner or Owner's Representative in writing shall constitute an adjustment in the Contract Price.
4. Fill soil that is not within  $\pm 3\%$  optimum moisture for compaction of the particular material in place as determined by the Owner or Owner's Representative and is disturbed by the Contractor during construction operations so that proper compaction cannot be reached shall not be construed as unsuitable bearing materials. This material shall be removed and replaced with lean concrete or Aggregate Base Coarse as directed by the Owner or Owner's Representative at no additional cost to the Owner.
  4. The Contractor shall follow a construction procedure which permits visual identification of firm natural ground.

G. Excessive Excavation: If any part of the general or trench excavation is carried, through error, beyond the depth and the dimensions indicated on the Drawings or called for in the Specifications, the Contractor at his own expense, shall furnish and install compacted Aggregate Base Coarse, concrete, or take other remedial measures as directed by the Owner or Owner's Representative to bring fill material up to the required level.

### 3.2. TRENCH EXCAVATION

- A. Excavate as necessary for all footings, structures, pipes, storm and sanitary drainage, electrical, gas, water, related structures and appurtenances, and for any other trenching necessary to complete the work. Unless otherwise indicated, provide separate trench for each utility.
- B. Definitions:
  1. "Trench excavation" shall be defined as an excavation in which the bottom width does not exceed seven feet and the width does not exceed twice the depth or where footings are excavated by backhoe. Refer to Drawings for any special trenching conditions for utilities, structures, etc.
  2. The words "invert" or "invert elevation" as used herein mean the elevation at the inside bottom of pipe or channel.
  3. The words "bottom of the pipe" as used herein mean the elevation at the base of the pipe at its outer surface.

- C. In general, machine excavation of trenches will be permitted with the exception of preparation of pipe beds which will be hand work. Excavate by hand or machine methods at least six inches below the bottom of all utilities.
- D. Trench excavation shall include the removal of all materials encountered. During excavation, materials determined to be suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. All excavated materials not required or unsuitable for backfill shall be removed and legally disposed of from the site. The banks of trenches shall be cut as near vertical as practicable to the extent allowed by OSHA.
- E. It is called to the attention of the Contractor that there are utilities and other underground pipes along the course of the work. Information shown on the Drawings as to their location is from best available sources but no guarantee is inherent or to be assumed that such information is accurate or complete. The Contractor shall exercise special care during his operations to avoid injury to underground utilities and structures. When necessary, the Contractor shall cooperate with, and consult with the appropriate representatives in order to avoid damage to the structures. The Contractor shall, at his own expense, preserve and protect from injury all property either public or private along and adjacent to the line of work, and be responsible for and repair any and all damage and injury thereto, arising out of or in consequence of any act or omission of the Contractor. All existing pipes shall be supported in place or otherwise protected from injury, or shall be restored to at least as good condition as that in which they were found immediately prior to start of work.
- F. The Contractor shall provide, at his own expense, suitable bridges over trenches where required for accommodation and safety of the traveling public and as necessary to satisfy the required permits and codes.
- G. Trenches shall be excavated to the necessary width and depth for proper laying of pipe or other utility and shall have vertical sides or slopes as required by codes. Minimum width of trenches shall provide clearance between the sides of the trench and the outside face of the utility. Maximum trench sizes are as shown on the Drawings or as specified herein. The depth of the trench shall be six inches below the bottom of the pipe barrel or respective utility. If the existing soil is found not suitable, the Owner or Owner's Representative may approve removal and replacement of material. Costs for removal and replacement materials will be based on Unit Prices.
- H. Coordinate all utility and trench backfilling with the trades involved.

### 3.3. PROOF-ROLLING

- A. Contractor shall be required to proof roll foundation and pavement subgrades prior to foundation construction or the placement and compaction of fill materials.
- B. Proof rolling of foundation subgrades shall include at least ten passes of a small vibratory plate compactor for trench excavations or six passes of a heavy vibratory roller for open areas.
- C. Proof rolling of pavement subgrades shall include four passes of a heavy vibratory roller.
- D. If groundwater is located within one foot of foundation or pavement subgrade, proof rolling may be eliminated. However, the Contractor shall demonstrate care during excavation so as to minimize subgrade disturbance.
- E. Proof rolling shall be visually observed by the Geotechnical Engineer. Foundation construction or replacement of fill materials shall not commence until the Owner or Owner's Representative has witnessed subgrade conditions and proof rolling operations.
- F. Soils which exhibit weaving or instability during the proof rolling operations as determined by the Owner or Owner's Representative shall be removed and replaced with compacted Aggregate Base Coarse or lean concrete at no additional cost to the Owner.

### 3.4. FILLING AND GRADING

- A. Samples and Testing:
  - 1. All fill materials, and their placement shall be subject to quality control testing. All testing shall be paid for by the Owner except that the Contractor will bear cost of testing materials which fail to conform to Specifications. Test results and laboratory recommendations will be available to Contractor. All sieve analyses for conformance of on-site and off-site fill materials to be used in the work shall be done by means of a mechanical wet sieve analysis and in accordance with ASTM D-422.
  - 2. The Owner or Owner's Representative will retain a Geotechnical Engineer to provide personnel, qualified by training and experience, to be at the site to observe preparation for the placement of compacted fills, to observe excavation and dewatering required for the work, and to observe earthwork operations and report on the conformity of operations with these Specifications. All service and approvals given by the Geotechnical Engineer shall not relieve the Contractor of his responsibility for performing the work in accordance with these Specifications. The

Contractor agrees to accept as final the results of field and laboratory tests performed by the above representatives. As stated hereinbefore, the Owner or Owner's Representative reserves the right to modify or waive Geotechnical Engineer's services.

3. Excavated material taken directly from on-site cuts that will meet these Specifications may be used as Ordinary Fill or Aggregate Base Coarse provided the Contractor obtains written approval from the Owner or Owner's Representative. No such fill material shall be put in place until approved for use by the Owner or Owner's Representative in writing.
4. Field density tests will be made by the Geotechnical Engineer in accordance with the Method of Test for ASTM Designation D1556 or D2922, to determine the adequacy of compaction; the location and frequency of such field tests shall be at the Geotechnical Engineer's discretion.
5. The Contractor shall notify the Owner or Owner's Representative when an area is ready for compaction testing. This notification shall be 48 hours in advance of placing or final compaction so that the Geotechnical Engineer has adequate time to take compaction tests.
6. The Owner or Owner's Representative shall have the right to observe the installation of all controlled compacted fills.
7. Testing of materials as delivered may be made from time to time. Materials in question may not be used, pending test results. Tests of compacted materials will be made regularly. Remove rejected materials and replace with new, whether in stockpiles or in place.
8. Cooperate with the Geotechnical Engineer in obtaining field samples of in-place materials after compaction. Furnish incidental field labor in connection with these tests. The Contractor will be informed by the Geotechnical Engineer of areas of unsatisfactory density which may require improvement by removal and replacement, or by scarifying, aerating, sprinkling (as needed), and recompaction prior to the placement of the new lift. No additional compensation shall be paid for work required to achieve proper compaction.
9. The Geotechnical Engineer's presence does not include supervision or direction of the actual work by the Contractor, his employees, or agents. Neither the presence of the Geotechnical Engineer nor any observations and testing performed by him shall excuse the Contractor from defects discovered in his work.

10. In no case will frozen material be allowed for use in fill, backfill, or rough grading material.
  11. Stones or rock fragments larger than four inches in their greatest dimension shall not be permitted within the top six inches of subgrade of any fills or embankments.
- B. Placing, Spreading and Compacting Fill Material:
1. Fill materials are to be placed as designated herein and as indicated on the Contract Drawings.
    - a. Crushed Stone shall be placed as follows and compacted as specified herein:
      - 1) Under and around utility structures and around perimeter foundation drains as specified in the drawings.
      - 2) For construction of check dams and siltation sumps. (use ½", 1 1/2" or 5" stone as detailed and specified).
      - 3) Where otherwise shown on Drawings or as directed by the Owner or Owner's Representative.
    - b. Aggregate Base Coarse shall be placed as follows and compacted in lifts to a minimum of 95% maximum dry density per the Modified Proctor Test (ASTM D 1557) as specified herein: (Refer to table specified herein for compaction methods and lift requirements.)
      - 1) Wherever Aggregate Base Coarse is called for or shown on the Drawings.
    - c. Ordinary Fill shall be placed as follows and compacted as specified herein:
      - 1) In general fill areas such as lawn or in parking islands except where Aggregate Base Coarse is shown.
      - 2) Wherever Ordinary Fill is called for and as specified hereinbefore.
      - 3) Wherever Aggregate Base Coarse, Crushed Stone, Granular Fill, Floor Slab Base Course Soil, or Topsoil is not required herein or on the Drawings.
    - e. Topsoil shall be stockpiled as shown on the Drawings and utilized on the site as specified.
  2. The fill material shall be placed in uniform horizontal layers and compacted as specified herein.
    - a. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to obtain uniformity of material in each layer. So far as practicable,

each layer of material shall extend the entire length and width of the area being filled plus two additional feet horizontally along each side for every one foot of fill required.

3. All fill material shall be placed and compacted in-the-dry. The Contractor shall dewater excavated areas as required to perform the work, and in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils. In freezing weather, a layer of fill shall not be left in an uncompacted state at the close of a day's operation. Prior to terminating operations for the day, the final layer of fill, after compaction, shall be rolled with a smooth-wheeled roller to eliminate ridges of soil left by tractors, trucks and compaction equipment.
  4. The Contractor shall not place a layer of compacted fill on soil that was permitted to freeze prior to compaction or on snow or ice. Removal of these unsatisfactory materials will be required as directed by the Owner or Owner's Representative.
  5. When the moisture content of the fill material is below optimal moisture necessary for compaction as specified herein, water shall be added until the moisture content is as specified.
  6. When the moisture content of the fill material is above the optimal moisture necessary for compaction as specified herein, the fill material shall be aerated by blending, mixing, or other satisfactory methods until the moisture content is as specified.
  7. After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to the specified density. Compaction shall be continuous over the entire area and the equipment shall make sufficient passes to ensure that the desired density is obtained. A minimum of four coverages with acceptable compaction equipment described hereinafter is a requirement. These coverages are to be provided as systematic compactive effort; incidental coverages due to construction vehicle traffic through the area will not be included.
- C. Aggregate Base Coarse: All fills within the building area shall be made with Aggregate Base Coarse as defined herein and shown on the Footing Zone of Influence detail included herein. No excavated on-site material will be acceptable as Aggregate Base Coarse unless specifically approved by testing as specified herein.
- D. Backfilling of Trenches, Structures and Foundations:

1. Areas to be backfilled shall be free of construction debris, refuse, compressible or decayable materials and standing water. Do not place fill when temperature is below 30 degrees F and when fill materials or layers below it are frozen unless specifically approved by the Owner or Owner's Representative.
2. Requirement of description, placement, compaction and spreading of fill materials as specified herein shall be applicable to backfilling operations.
3. Gravel Borrow shall be used as Backfill under and around manholes and other utility structures. Excavated material may be used if approved by the Owner or Owner's Representative.
4. Backfilling of foundations, structures and retaining walls shall not commence until construction finish grade has been approved, forms removed, and the excavation cleaned of trash and debris. Backfill shall not be placed against walls until they are braced or have cured sufficiently to develop the strength necessary to withstand, without damage, the pressure that will result from backfilling and compacting operations. If fill is required on both sides of a wall, it shall be brought up simultaneously and evenly on both sides. Avoid damage to the walls and to damp-proofing and waterproofing and other work in place. Allow seven days from the date of application of waterproofing before backfilling. Stones larger than four inches maximum dimension shall not be permitted in the upper six inches of fill or horizontally within 12 inches of walls.
5. Do not commence backfilling operations of utility trenches until all piping, conduits, etc. have been installed, tested and approved and the locations of all pipe and appurtenances have been recorded. Backfill carefully by hand around pipe to depth of one foot above top of pipe using material specified on the drawings, and tamping firmly in layers not exceeding six inch layers, compacting by hand rammers or mechanical tampers. When a manufacturer of utility line materials suggests backfill materials and methods other than those specified herein, such requirements shall govern providing the finished work equals or exceeds the result obtained by the materials and methods specified herein. Water mains shall be hand backfilled to a minimum cover of 18 inches before mechanical equipment can be used to backfill trench.
6. Sand Bedding will be required below all pipe unless otherwise shown on the Drawings or specified herein.



7. Utilities shall not be laid directly on ledge, boulders or other hard material. This material shall be removed as specified herein within trench limits, and within vertical planes one foot outside of structure walls. Backfill will be with the specified fill placed in eight inch lifts and thoroughly compacted. If hand guided compaction equipment is used, fill shall be placed in six inch lifts. All rock excavation shall be considered unsuitable for backfill around utilities. Ordinary fill may be used as backfill in areas as specified herein.
8. Coordinate all utility and trench backfilling with the trades involved.

E. Compaction Requirements:

1. The following table lists minimum compactive efforts which are required for all fill materials. Compaction of each lift shall be completed before placement of the next lift is started. The compaction equipment shall make an equal number of transverse and longitudinal coverages of each lift. Allow the Geotechnical Engineer sufficient time to make necessary observations and tests. The degree of compaction for fill placed in various areas shall be as follows:

<u>Areas</u>	<u>Minimum Degree of Compaction*</u>
1. Backfill below pavements	95%
2. Backfill deeper than 5 feet below pavements	92%
3. Pavement base courses	95%
4. Sidewalk and related area base courses	95%
5. Below pavement and sidewalk base courses	95%
6. Trench backfill outside of building and pavement areas	90%
7. Trench backfill inside of building and beneath pavement	95%
8. All fill outside building and pavement bearing zones	90%
9. All fill in slope areas at or steeper than 10 horizontal to 1 vertical	92%
10. Free draining sand gravel	Tamp into place with hand

fill around subdrains.

operated flat plat vibratory  
compactor to 95%

11. Rock fill and choke layer fill

Compacted with min 8  
passes of 50,000 pound  
vibratory steel drum roller

\*Percent of maximum dry density of the material at optimum moisture content as determined by methods or tests for ASTM designation D 1557.

F. All fill to be placed "in-the-dry" with the exception specified hereinafter. If, in the opinion of the Owner or Owner's Representative, the Contractor has followed a logical sequence of construction procedures, has employed the proper and necessary equipment, and has otherwise conducted himself in a workmanlike manner, but still cannot effectively dewater the excavation, the Owner or Owner's Representative may permit the Contractor to place a first lift of Gravel or Crushed Stone fill "in-the-wet". Fill placed in-the-wet must meet the gradation and placement requirements specified herein below. The quantity of fill placed in-the-wet must be no greater than deemed necessary by the Owner or Owner's Representative and must be limited to the lowermost lift.

Moisture Control:

1. Variation of moisture content in fill and backfill materials shall be limited to Optimum Moisture (-3% to +3%). Moisture content shall be as uniformly distributed as practicable within each lift, and shall be adjusted as necessary to obtain the specified compaction.
2. Material which does not contain sufficient moisture to be compacted to the specified densities shall be moisture conditioned by sprinkling, discing, windrowing, or other method approved by the Geotechnical Engineer.
3. Material conditioned by sprinkling shall have water added before compaction. Uniformly apply water to surface of subgrade or layer of soil material to obtain sufficient moisture content. The Contractor shall maintain sufficient hoses and/or water distributing equipment at the site for this purpose.
4. Material containing excess moisture shall be dried to required Optimum Moisture before it is placed and compacted. Excessively moist soils shall be removed and replaced and shall be scarified by use of plows, discs, or other approved methods, and air-dried to meet the above requirements.

5. Materials which are within the moisture requirements specified above, but which display pronounced elasticity or deformation under the action of earthmoving and compaction equipment, shall be reduced to Optimum Moisture Content, or below, to secure stability.
6. In the event of sudden downpours or other inclement weather, exposed subgrades and fills which, in the opinion of the Owner or Owner's Representative become inundated or excessively moistened shall have excess water removed and soil dried as specified above.

### 3.5. ROUGH GRADING

- A. Rough grading shall include the shaping, trimming, rolling and finishing the surface of the sub-base, shoulders, and earth slopes, and the preparation of the sub-base for loam, seeding and paved surfaces. The grading of shoulders and sloped areas may be done by machine methods. Up to two inches in 100 inches tolerance will be permitted on slopes and one inch in 100 inches on lawn areas provided the slopes are uniform in appearance and without abrupt changes. All ruts shall be eliminated. Grading of subgrades for paved areas shall be finished at the required depth below and parallel to the proposed surface within 3/8 inch in 100 inches tolerance.
- B. If, during the progress of rough grading work, water pipe, sewer conduit, drain, or other construction is damaged due to operations under this Contract, the Contractor shall repair all such damage at no additional cost to the Owner and restore damaged areas to their original condition.
- C. Do all other cutting, filling and rough grading to the lines and grades indicated on the Drawings. Grade evenly to within the dimensions required for finished grades shown on the Drawings. No stone larger than three inches in largest dimension shall be placed in upper 12 inches of fill.
- D. Grades shall be brought below finished grades in accordance with the various depths specified herein below:
  1. Under slabs-on-grade, as specified herein and as shown on the Drawings.
  2. Under paved areas, bottom of sub base course as shown on Drawings.
  3. Under seeded areas, six inches.
- E. No rubbish of any description shall be allowed to enter fill material. Such material shall be removed from the site.

- F. Complete the grading operations after the building has been finished, the utilities installed, site improvements constructed, and all materials, rubbish and debris removed from the site. Leave subgrade for lawns clean at required grades. There must be sufficient grade staking to allow for verification of correct lines and grades.

### 3.6. DEFICIENCY OF FILL MATERIAL

- A. Provide additional fill material from offsite sources as required to complete the work if a sufficient quantity of suitable material is not available from the required excavation on the project site.

### 3.7. SURPLUS FILL MATERIAL

- A. Surplus fill which is not required to fulfill the requirements of the Contract shall be removed from the site and legally disposed of.

### 3.8. DUST AND EROSION CONTROL

- A. The Contractor shall take all necessary measures and provide equipment and/or materials to minimize dust from rising and blowing across the site and also to control surface water throughout the operation so that it does not run onto paved ways without being filtered. In addition, the Contractor shall control all dust created by construction operations and movement of construction vehicles, both on the site and on paved ways. Provide additional Crushed Stone where necessary to provide traps or pads for construction vehicles carrying sediment. Provide temporary swales and interceptor ditches to control surface runoff water where necessary.
- B. Provide dust control off-site due to work under this Contract by watering, sweeping and other methods, as required by the Town Engineer.

### 3.9. RESTORATION OF SITE ITEMS

- A. Wherever streets, lawns or other items within the Contract Limit Lines have been excavated in fulfilling the work required under the Contract, the Contractor shall furnish and install all material at no cost to the Owner to bring finish surface level with the existing adjacent conditions. All work shall be installed to match the existing conditions.

### 3.10. REMOVAL OF EROSION CONTROL MEASURES

- A. Remove temporary drainage swales, check dams, siltation sumps, hay bales, siltation fencing and other temporary drainage, erosion and siltation control measures when

permanent drainage control measures have been installed and grass is established in drainage areas leading to siltation sumps. Contractor shall excavate and remove all sediments from siltation sumps prior to backfilling the sumps. Remove erosion control measures when approved by the Owner or Owner's Representative.

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## **31 13 00 TREE PRUNING**

### **PART 1 - GENERAL**

#### **1.1 GENERAL REQUIREMENTS**

- A. The conditions and general requirements of the Contract, Division 0 and applicable parts of Division 1, apply to the work under this Section.
- B. Under this Section, the Contractor shall furnish all labor, materials, equipment and transportation required to complete all aspects of the work in accordance with all local, state and federal regulations in force at the time of this Contract and in accordance with the various Items specified herein.
- C. The work of this Section consists of all tree pruning and removal work and related Items as specified herein and includes, but is not limited to:
  - 1. Crown Cleaning;
  - 2. Crown Raising;
  - 3. Crown Reduction;
  - 4. Crown Thinning;
  - 5. Crown Training;
- D. All work in this section shall be performed by a Massachusetts Certified Arborist. (See 1.02, Qualification of Arborist, below.)
- E. All trees to be pruned or removed are located on the site. All trees indicated shall be inspected by the Arborist and Landscape Architect before work is to be done. In addition to trees indicated for removal on the Drawings, trees should be removed for the following reasons: dead trees, hazardous trees, or trees in serious decline, as determined by a certified Arborist. If the Arborist discovers tree(s) which have not been marked for removal and are intended for pruning, but whose condition is such that removal is warranted, whether due to death, disease, decay, damage, or structural weakness, such tree(s) shall not be pruned and the Arborist shall immediately report these findings in writing to the Owner and await the Owner's direction before proceeding with work on the particular tree(s) in question.
- F. The intent of this portion of the Contract is to identify trees that should be removed while pruning all remaining trees on the site to provide safety, protection of property, clearance of roadways, walks, buildings and luminaries, and to improve the overall structure of the trees.
- G. The Contractor is required to review and inspect the site regarding trees to be removed (as indicated on the Drawings) prior to bid proposal in order to form his/her own assumptions as to the ultimate cost of the work.

#### **1.2 QUALIFICATION OF ARBORIST**

- A. Work on this section of the Contract shall be limited to individuals, partnerships and corporations who are actively engaged in the field of Arboriculture, and who demonstrate

competence, experience and financial capability to carry out the terms of this project. Subcontractors must derive a majority of their income from arboricultural work. The Owner may require proof of these qualifications.

- B. Unless otherwise approved by the Owner, all work shall be conducted by qualified and trained personnel under the direct supervision of a Massachusetts Certified Arborist, in good standing. A Massachusetts Certified Arborist must be on site at all times during any pruning operations. The Contractor shall be required to provide proof of certification.
- C. Any subcontractor hired by the General Contractor to perform any portion of the work shall meet all qualifications herein and be acceptable to the Owner.

### 1.3 SPECIAL REQUIREMENTS

- A. Dutch elm disease wood (if any) shall be disposed of in accordance with provisions of General Laws, Chapter 87, Section 5, and Chapter 132, Section 8 and 11 as amended; and in accordance with any additional local regulations. All wood shall be removed from the site and be properly disposed of in accordance with state and local regulations.
- B. No burning is permitted on the project site.

### 1.4 STANDARDS AND DEFINITIONS

- A. Pruning and Removals shall conform to the following:
  - 1. American National Standards Institute (ANSI): Standard A300-2001 Standard Practices for Tree Care Operations – Tree, Shrub and Other Woody Plant Maintenance.
  - 2. American National Standards Institute (ANSI): Standard Z-133.1.-2001 Safety Requirements for Tree Care Operations – Pruning, Trimming, Repairing, Maintaining, and Removing Trees, and Cutting Brush.
  - 3. All other applicable Occupational Safety and Health Administration (OSHA) standards, and state and local regulations.
- B. American National Standards Institute- (ANSI) is the private, non-profit organization that administers the safety and maintenance regulations for the Tree Care Industry.
- C. Crown Cleaning- The removal of dead, diseased, obstructing, split, and/or broken branches that are 2 inches in diameter or greater. Limbs that are susceptible to failure from dense or heavy foliar masses should be thinned.
- D. Crown Raising- The removal of lower tree branches to allow safe movement of vehicles and pedestrians under the canopy of the tree. Limbs above sidewalks shall be no lower than 10 feet from the ground. Limbs over the road shall be no lower than 16 feet from the ground.
- E. Crown Reduction- The technique used to reduce the overall mass of the tree by thinning out the top and sides or just removing individual limbs of the tree. Reduction pruning is commonly associated with pruning away from buildings, structures, signs, lights and other overhead obstructions.
- F. Crown Thinning- The selective removal of branches to increase light penetration and air movement. No more than 25% of the trees living branches shall be removed.



- G. Crown Training- A pruning process that utilizes all the major pruning types to promote a strong central leader and strong scaffold branches on recently planted trees.
- H. D.B.H.- Diameter at breast height. The location on a tree 4.5 feet above ground where the diameter of the tree is measured.
- I. Massachusetts Certified Arborist- (MCA) An individual who is listed by the Massachusetts Arborist Association as a MCA who has passed a comprehensive exam and maintained their certification through the accumulation of continuing education credits.
- J. Occupational Safety & Health Administration- (OSHA) is the Federal agency responsible for insuring worker safety.
- K. Owner- the individual or designated representative responsible insuring the requirements of this Contract are adhered to.
- L. Street tree- Any tree planted and maintained within the public right of way under the jurisdiction of the Town of Arlington.

#### 1.5 EXAMINATION OF SITE AND DOCUMENTS

- A. The Contractor shall be responsible for having a clear understanding of the existing conditions of the site before submitting a bid for this Contract and shall be responsible for fully carrying out the work of the Contract, regardless of actual site conditions encountered.

#### 1.6 ORDER OF WORK

- A. Before any work is started, the Contractor shall attend a conference with the Owner and the Landscape Architect. The Contractor shall provide a list of trees that should be removed as per the Drawings or for the following reasons: dead trees, hazardous trees, or trees in serious decline. All trees to remain shall be pruned to provide safety, protection of property, clearance of roadways, walk, buildings and luminaries, and to improve the overall structure of the tree. The type of pruning to be performed includes but is not limited to crown cleaning, crown raising, crown reduction, crown thinning, and crown training. At this conference the Owner will also establish the order of precedence for carrying out the work.
- B. Based on the conference, the Contractor shall submit a schedule of work for the Owner's review and approval prior to beginning work. Any changes to this schedule must be approved by the Owner. Unless otherwise authorized by the Owner, failure of the Contractor to comply with the approved pruning and removal schedule shall be sufficient cause to give notice that the Contractor is in default of the Contract and will result in its termination. Unless otherwise authorized by the Owner, the Contractor must complete ALL pruning work within 40 business days from the notice to proceed.

#### 1.7 CHANGES IN THE WORK

- A. The Owner reserves the rights to change, add, or delete areas or quantities to be pruned or removed as deemed to be in the Town's best interest.
- B. No claim for extra compensation or extension of time will be allowed on account of actual conditions inconsistent with those assumed.

- C. Any alterations or modifications of the work performed under this contract shall be made only by written agreement between the Contractor and the Owner. No claims for extra work or materials shall be allowed unless covered by written agreement.

## 1.8 PROTECTION OF VEGETATION TO BE PRESERVED

- A. The Contractor shall protect all existing trees, shrubs and lawns designated to remain for the length of the construction period. The placement of tree protection devices shall be as per the Drawings.
- B. Damage no plant to remain by burning, by pumping of water, by cutting of live roots or branches, or by any other means. No plants to be saved shall be used for crane stays, guys or their fastenings. Vehicles shall not be parked within the dripline of trees to remain, or wherever damage may result to trees to be saved. Construction material shall not be stored beneath trees to be saved.
- C. The Contractor shall be liable for any damage to any tree, shrub or lawn to remain, and shall immediately report to the Owner for appraisal of any damage and for determination of corrective treatment of compensation to the Owner.
- D. The Contractor shall compensate the Owner for damages by installing replacement tree(s) of the size and species approved by the Town, and of sufficient quantity such as the sum of the DBH inches for replacement trees equals the total DBH inches of the damaged tree(s). Damaged shrubs shall be replaced with shrub(s) of the same size, species, and quantity, unless determined otherwise by the Owner.
- E. Damaged shrubs or lawns shall be restored or replaced to match existing to remain to the satisfaction of the Owner, at no cost to the Owner.

## PART 2 - MATERIALS

### 2.1 EQUIPMENT AND MATERIALS

- A. Equipment necessary for this Contract shall be properly maintained and in good operating condition to the City's satisfaction. The Contractor shall promptly remove and replace any equipment which the Owner deems to be in unsatisfactory repair or condition or otherwise unsuitable.
- B. At the discretion of the Owner, if the equipment failures, breakdowns or other related problems occur that are jeopardizing the meeting of deadlines established in the written schedule provided by the Contractor, the Contract will be terminated.
- C. Vehicles shall display prominently the Contractor's name, address, and telephone number on both doors.
- D. Aerial lift equipment may be required for pruning and removal work unless otherwise approved by the Owner. Such equipment shall have a minimal working height of fifty-five (55) feet, and shall include an articulated upper boom, insulated lower boom, a ten to fifteen (10-15) cubic yard enclosed hydraulic dump body, pintlehook and attachments for a towed chipper, or approved equal.
- E. A chipper, meeting all OSHA requirements, shall be used which will process material up to twelve (12) inches in diameter.
- F. A crane or log loader shall be used on site to remove logs too large to be chipped.

## 2.2 PERSONNEL

- A. The Contractor shall submit each employee's name and title prior to the commencement of work. The Contractor shall provide a list of all Massachusetts Certified Arborists who will be working on this contract. This list shall include the names of those individuals and their certification number. The Contractor shall advise the Owner of any changes in the roster assigned to this contract.
- B. Each worker shall be experienced and highly qualified with necessary tree work skills to successfully complete this contract, including the ability and training to perform aerial rescue. Said skill shall also include worker safety and ability to be in compliance with current OSHA and ANSI Z-133.1 Standards.

## PART 3 - EXECUTION

### 3.1. DESCRIPTION OF WORK

- A. Each tree to be pruned shall be serviced according to the following types of pruning, as needed: Crown Cleaning, Crown Raising, Crown Reduction, Crown Thinning and Crown Training.
- B. The Contractor shall adhere to the specifications and provide suitable facilities for inspecting the work. Failure of the Owner to immediately reject unsatisfactory work or to notify the Contractor of deviations from the Specifications shall not relieve the Contractor of responsibility to correct or remedy unsatisfactory work.
- C. The Contractor shall only work on trees designated by the Owner. No compensation will be made for work performed on any other trees.
- D. If the Contractor discovers tree(s) which have been marked for pruning, but whose condition is such that removal is warranted, whether due to death, disease, decay, or structural weakness, such tree(s) shall not be pruned and the Contractor shall report these findings to the Owner, in writing, within 24 hours, and await the Owner's direction before proceeding with work on the particular tree(s) in question.
- E. Tree removal is generally described as the removal of individual trees that have been found to be dead, hazardous, and/ or otherwise marked for removal by the Owner.

### 3.2. USE AND CARE OF THE SITE

- A. The Contractor shall leave the work site at the end of each working period in a condition satisfactory to the Owner.
- B. Pavements shall be swept and lawns or other surfaces raked or otherwise cleaned of all material related to the work operation. Degree of clean up required will be described by
- C. the Owner at the Pre-construction Conference and will be based upon the character of the work area.
- D. All trimmings or any other form of debris shall be collected, chipped, hauled and disposed of properly in accordance with all applicable laws at the Contractor's expense.
- E. No overnight parking of equipment will be allowed

### 3.3. PRUNING PROCEDURES AND QUALITY CONTROL

- A. All pruning shall be performed in manner which maintains the natural aesthetic characteristics of the species and variety of trees. No topping or dehorning of trees or stubbing back of branches shall be permitted. All cuts shall be made to a lateral branch a minimum of one third (1/3) the size of the branch being removed, unless otherwise instructed by the Owner.
- B. The use of climbing spurs or spiked shoes shall not be permitted for pruning trees and their use will result in immediate cancellation of the Contract. They are only permitted during tree removal operations and emergency aerial rescue operations.
- C. All cuts shall be made sufficiently close to the parent stem so that wound closure can be readily started under normal conditions. Cuts shall never be made through the branch collar. Slab cuts, rip cuts and all other cuts that do not meet the most current edition of the ANSI A300 pruning standard will result in cancellation of the Contract.
- D. Luminaries and proper elevation over street and sidewalk surfaces to at least the following minimum specifications:
  - 1. Sidewalk/Paths – All branches shall be pruned to allow a minimum ten (10) foot clearance over sidewalks and paths, including proposed new paths.
  - 2. Luminaries – Any and all branches extending directly below a street light, limiting the light reaching the street or path shall be removed and all branches shall be cut back to afford a minimum four (4) foot clearance.
  - 3. Street/Roads – All branches shall be pruned to allow a minimum sixteen (16) foot clearance over street surface.
- E. All limbs over two inches in diameter to be removed shall be precut to prevent splitting. Any branches that would injure the tree or other objects by falling shall be lowered to the ground by proper rigging and rope procedures.
- F. Remove one of two crossed or rubbing branches where practical so the removal will not leave large holes in the general outline of the tree.
- G. On trees known to be diseased, tools are to be disinfected with alcohol after each cut between trees and where there is known to be a danger of transmitting the disease on tools.
- H. Lateral branches as well as occasional water sprouts may be retained. Complete removal of secondary laterals and water sprouts resulting in the stripping of major limbs, will not be permitted.

### 3.4. SAFETY

- A. All equipment to be used and all work to be performed must be in full compliance with all standards as promulgated by OSHA at the time of bidding, including, but not limited to those regulations concerning noise levels, protective devices and operator safety.
- B. The Contractor shall be solely responsible for pedestrian and vehicular safety and control within the work site and shall protect the public and its property from injury or damage that could be caused by the progress of the work. To this end the Contractor shall post all work areas.

The Contractor must also provide police details if required and/ or erect and maintain protective devices acceptable to the Town Arborist, including but not limited to barricades, lights and warning signs.

- C. Any practice employed by the Contractor that is obviously hazardous, as determined by the Town Arborist, shall be immediately discontinued.

### 3.5.FINAL ACCEPTANCE

- A. Upon completion of the work the Contractor shall notify the Owner in writing and request that a final inspection for acceptance be made.

END OF SECTION

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## **32 10 00 BASES, BALLASTS & PAVING**

### PART 1 - GENERAL

#### 1.1 GENERAL REQUIREMENTS

- A. The conditions of the Contract, including Division 00 and Division 01, apply to the work under this Section.

#### 1.2 WORK INCLUDED

- A. Provide all labor, equipment, implements and materials required to furnish, install, construct and perform all paving operations complete as shown on drawings and specified herein.
- B. Work includes, but is not limited to the following:
  - 1. Concrete Paving;
  - 2. Bituminous Concrete Paving;
  - 3. Acrylic Resurfacer;
  - 4. Acrylic Color Coating for Basketball Court Surface;
  - 5. Rubber Wearing Tiles for Under Swings;
  - 6. Wood Fiber Safety Surface;
  - 7. Sand for Sandbox;

#### 1.3 REFERENCES

- A. Examine all other sections of the Specifications and all Drawings for the relationship of the work under this Section and the work of other trades. Cooperate with all trades and all departments of the Town of Arlington and coordinate all work under this Section.
- B. The following related items are included under the Sections list below
  - 1. Section 11 68 00 - Play Equipment
  - 2. Section 31 00 00 - Excavation, Filling & Grading
  - 3. Section 32 93 00 - Planting
  - 4. Section 32 40 00 - Site Furnishings
  - 5. Section 32 31 29 - Fencing
  - 6. Section 03 30 00 - Cast in Place Concrete

#### 1.4 DEFINITIONS

- A. The following related items are included herein and shall mean:
  - 1. S.S.H.B. - Standard Specifications for Highways and Bridges, the Commonwealth of Massachusetts, Department of Public Works, latest edition.
  - 2. A.S.T.M. - American Society for Testing and Materials.
  - 3. A.A.S.H.T.O. - American Association of State Highway and Transportation Officials.
  - 4. ADA: Americans with Disabilities Act and its current regulations.

#### 1.5 JOB CONDITIONS

- A. Start of work under this Section shall constitute acceptance of the foundation conditions to which this work is to be applied. Any defects in work resulting from such conditions shall be

corrected under this Section, at no extra cost to the Owner.

- B. Maintain sub-base in satisfactory condition and properly drained until surface improvement is placed.

#### 1.6 SUBMITTALS

- A. All Manufacturer's product literature, including asphalt and concrete mix analysis
- B. Acrylic color coating color chart for basketball court.

### PART 2 - PRODUCTS

#### 2.1 CONCRETE PAVEMENT

- A. Concrete Paving materials shall be in accordance with Section 03 30 00, Cast-In- Place Concrete.

#### 2.2 BITUMINOUS CONCRETE PAVEMENT

- A. Pavement: Shall be bituminous concrete Class 1-1 conforming to the Standard Specifications. The bituminous concrete shall be laid in two (2) courses with a minimum finished pavement depth after rolling of 3 1/2".
- B. Base Course: see Drawings.
- C. Wearing Course: see Drawings.

#### 2.3 ACRYLIC RESURFACER

- A. Acrylic resurfacer shall be Acrylic Resurfacer by Plexipave, a division of California Products Corporation, Andover, MA; NovaPlay Base Coat, by Nova Sports USA, Milford, MA; Dynaflex® Acrylic Resurfacer, by Neyra Industries, Inc., Cincinnati, OH; and/or equal as approved by the Landscape Architect.
- B. Sand shall be clean, dry sand with 100% passing through a #80 mesh sieve.
- C. Portland Cement.
- D. Water shall be clean and potable.

#### 2.4 ACRYLIC COLOR COATING FOR BASKETBALL COURT

- A. The coating shall be a 100% acrylic emulsion type containing no alkyds, butadiene styrene, or vinyls, and shall be thinned with water only. The coating shall also be suitable for application by brush, spray, or roller. Coating shall be Acrylotex® by Plexipave, a division of California Paint Products, Andover, MA; NovaPlay, by Nova
- B. Sports USA, Milford, MA; Dynaflex® Color Coat by Neyra Industries, Inc., Cincinnati, OH; and/or equal as approved by the Landscape Architect.
- C. Line paint shall be Hi-Hide Plexicolor® by Plexipave; Novatex by Nova Sports; Permaline by Neyra Industries, and/or approved equal by Landscape Architect.
- D. The coating shall be suitable for use over all types of bituminous and concrete surfaces. When applied over emulsified asphalt, it shall not cause lifting, crazing, peeling, or other damage to the base.
- E. Color coat colors shall be approved by the Landscape Architect.



## 2.5 RESILIENT RUBBER SAFETY SURFACE TILES FOR SWING WEARING PADS

- A. Resilient Rubber Safety Surface Tiles shall be a single layer rubber tile playground surfacing system with a factory-molded surface composed of high-quality, 100% post-consumer SBR (Styrene Butadiene Rubber) tire rubber and EPDM colored granules bound together by a wear and weather resistant polyurethane and a 3 mm top wear layer with tapered, conical support legs, Ultra-Tile by Surface America Inc. or Approved Equal.
- B. The system shall be designed, manufactured and installed to meet the following criteria:
  - 1. Shock Attenuation (ASTM F1292) –for 4', 6', and 8' fall heights or as otherwise required by the installed condition.
    - a. Gmax - Less than 200.
    - b. Head Injury Criteria - Less than 1000.
  - 2. Flammability (ASTM D2859) - Pass.
  - 3. Tensile Strength (ASTM D412) - 180 lbs/in<sup>2</sup> min.
  - 4. Water Permeability Rate: 0.034 cm/sec.
  - 5. Accessibility: Comply with requirements of ASTM F1951-08 - Pass.
  - 6. Lead Content: (US EPA Method 3052: 1996) - Pass.
  - 7. Void Volume: 42% minimum for tiles 2-1/2". 50% minimum for tiles 4-1/4".
  - 8. Coefficient of Thermal Expansion: .0011 in/ft/<sup>0</sup>F.
  - 9. Wear Surface Density: 70 lbs/cu ft min.
  - 10. Abrasion Testing (ASTM D3389): Less than 0.010" lost or less than 1 g lost.
  - 11. Elongation At Break (ASTM D412): 70% min.

## 2.6 WOOD FIBER SAFETY SURFACE

- A. Play surface shall be handicapped-accessible processed wood fiber conforming to ADA standards. Material used will consist only of recently harvested North American hardwoods including Oak, Maple, Ash, Poplar, Hickory, Beech, Birch and Locust. All woods shall have been debarked and shall be free of soil, leaves, twig materials and other contaminants, which hasten decomposition. The moisture content shall be between 25% and 55% by weight. No chemical treatment or additives are allowed. Positively no recycled wood from pallets or waste wood is permitted due to the possibility of contamination and the risk or poor surface stability.
- B. The density of the material shall be from 18 lbs. per cubic foot to 23 lbs. per cubic foot. Wood fiber resilient surfacing shall be randomly sized approximately ten times longer than wide. The materials shall meet the gradation requirements of ASTM C136.
- C. No chemicals or additives shall be present in the surface material.
- D. Contractor shall provide a sieve analysis that the surface material meets the following gradation requirements: Sieve Size Percent Passing by Weight -- 3/4" 100%; 3/8" 60-90%; No. 4 30-50%; No. 10 10-20%; No. 60 0-5%; No. 200 0-1% (ASTM C 136).

- E. The filter fabric shall be 100% continuous filament polyester nonwoven needle- punched geotextile fabric. The fabric must meet the following requirements: Fabric weight 4.2 oz/yd (ASTM D-3776); Mullen Burst Strength 210 psi (ASTM D-3786); Water flow rate 140 gpm/ft (ASTM D-4491). Fabric must meet grade 1114 data for minimum physical properties or equal.
- F. Drainage Stone is specified in Section 21 61 09, Earthwork.

## 2.7 SAND FOR SANDBOX

- A. Sand shall be Quikrete brand or equal.
- B. Sand to be graded, washed, dried, and screened specifically for children's play.

## PART 3 - EXECUTION

### 3.1. CONCRETE PAVING

- A. See Section 03 30 00, Cast-in-Place Concrete.

### 3.2. BITUMINOUS CONCRETE PAVING

- A. Grades: All grades in pavement areas shall be established and maintained to a tolerance of 1/4" in 10'-0".
- B. Apply in two courses and as per Drawings. Installation to comply with all standard and specifications set forth in the Massachusetts Highway Department Standard Specifications for Highways and Bridges.

### 3.3. ACRYLIC RESURFACER FOR BASKETBALL COURT

- A. No portions of the installation process shall be conducted during rainfall, or when rainfall is imminent. The air temperature must be at least 50 °F and rising. Do not apply when surface temperature is above 140°F.
- B. Apply one (1) coat of acrylic resurfacer under areas that are to receive color coating. Apply two (2) coats on all existing and new bituminous concrete that is not to receive color coating. Dilution with water and sand (or Portland cement, depending on manufacturer) is required.
- C. Contractor shall follow printed manufacturer's instructions for application including, but not limited to, dilution ratio of water to sand or Portland cement, gradation of sand, surface preparation and installation of acrylic resurfacer.

### 3.4. ACRYLIC COLOR COATING

- A. No portions of the installation process shall be conducted during rainfall, or when rainfall is imminent. The air temperature must be at least 50 °F and rising. Do not apply when surface temperature is above 140°F.
- B. Landscape architect to approve colors before ordering. Apply color coat in colors as noted on the Drawings. Graphics to be laid out in the field for approval by the Landscape Architect.
- C. Edges of painted areas shall be smooth, regular, and accurately laid out.
- D. All acrylic paint shall be applied as per manufacturer's recommendations. Apply three (3) coats of all final paint colors for all graphics shown on the Drawings. Final paint color shall be solid color fully saturated without holidays, voids, or areas of acrylic resurfacer showing through.

- E. Contractor must adequately protect newly painted and resurfaced areas to deter vandalism of the painted surfaces until paint has completely dried and cured. Any and all defacement, vandalism, or damage to the painted surface during the drying or curing period shall be completely repaired by the Contractor without additional cost to the Owner.
- F. Contractor shall provide a written five (5) year performance guarantee from date of installation. The manufacturer shall provide a written guarantee for three (3) years from date of installation against decay and biochemical degradation calling for replacement of defective materials during the guarantee period. Contractor shall install system so as to comply with manufacturers' warranty requirements.
- G. Install material per manufacturer's specifications.

### 3.5. RESILIENT RUBBER SAFETY SURFACE TILES FOR SWING WEARING PADS

- A. Comply with the instructions and recommendations of the playground swing manufacturer.
- B. Site Verification of Conditions: Verify that substrate conditions are suitable for installation of the playground surfacing system. Do not proceed with installation until unsuitable conditions are corrected.
- C. Install tiles through full adhesion of tiles side-to-side and directly to the substrates using an easy-to-use one-part polyurethane adhesive supplied and recommended by the manufacturer.
  1. Follow the site layout instructions to prepare the site area for installation. The tiles, accessories and substrates must be dry before, during and 24 hours after the application of adhesive. .
  2. Using a 1/8" square-notched trowel, apply the adhesive slightly wider than the tile being placed.
  3. Place tile into fresh adhesive bed following pre-established lines.
  4. Allow 24 hours for adhesive to cure before installing adjacent surfaces.
- D. When working beneath the play structure, it will be necessary to occasionally notch out portions of tiles so that the tiles will properly fit around the posts supporting the play equipment. Cut tile so that the cutout is approximately 1/4" larger in all dimensions than the support it will surround, to prevent binding of the tile around the support. Voids between the equipment supports and tile cuts should be filled in with silicone sealant or a permanently elastic urethane sealant/adhesive.
- E. Install tiles before poured-in-place surfacing. Bond poured-in-place surface to rubber tiles using manufacturer's recommended adhesive/solvent.

### 3.6. WOOD FIBER SAFETY SURFACE

- A. Contractor shall provide copies of testing procedures and results, performed by an independent testing source, which demonstrate compliance with the CPSC and ASTM guidelines.
- B. When installed, the surface system shall be handicapped-accessible with the most recent version of ADA.
- C. Contractor shall provide a written five (5) year performance guarantee from date of installation. The manufacturer shall provide a written guarantee for three (3) years from date

of installation against decay and biochemical degradation calling for replacement of defective materials during the guarantee period. Contractor shall install system so as to comply with manufacturers' warranty requirements.

#### D. Installation

1. The area shall be brought to elevations shown on drawings and be well- compacted, especially in any areas where additional fill has been brought in.
2. Cover sub-grade with filter fabric, overlapping all seams a minimum of twelve inches (12"). It will be necessary to slit the filter fabric to fit around the footings of the equipment; where possible, overlap all slits with next piece of fabric.
3. Bring in drainage stone as specified. Back-dump the stone onto the filter fabric and spread using hand labor, being careful not to damage the fabric.
4. Cover the stone with the other layer of filter fabric. Overlap all seams a minimum of 12". Slit to fit around footings as necessary; keep the cuts as short as possible and, where practical, overlapped with the next strip of fabric.
5. Spread wood chips/fiber using a Bobcat or small front end loader. Operator must be careful not to travel on the filter fabric or turn sharply on the wood chips. Hand labor shall also be used to spread the chips to finish grade directly around the equipment. To allow for natural compaction, additional material shall be supplied, and all of it shall be installed at this time.
6. Surface shall be harrowed or raked until it has a smooth finish.

#### 3.7. SAND FOR SANDBOX

- A. Fill sandbox as per Drawings within 3 inches of top of sandbox edge.
- B. Rake smooth.

#### 3.8. GRADE STAKES

- A. Install and maintain grade stakes, as directed. All subgrades must be approved before base course construction.

#### 3.9. FINISH GRADES

- A. The words "finish grades" as used herein mean the required final grade elevations.

END OF SECTION

## **32 16 00 CURBS**

### PART 1 - GENERAL

#### 1.1 GENERAL REQUIREMENTS

- A. The conditions of the Contract, including Division 00 and Division 01, apply to the work under this Section.
- B. All references to products by manufacturer, trade name or Performance Specifications bearing the connotation "or approved equal" shall be as determined by the Landscape Architect and the Town of Arlington.

#### 1.2 WORK INCLUDED

- A. Provide all labor, equipment, implements and materials required to furnish, install, construct and perform all site improvements complete as shown on the Drawings and specified herein. This includes, but is not limited to the following:
  - 1. Cast in Place Flush Curb.

#### 1.3 REFERENCES

- A. Examine all other Sections of the Specifications and all Drawings for the relationship of the work under this Section and the work of other trades. Cooperate with all trades and all departments of the Town of Arlington and coordinate all work under this Section therewith.
- B. The following related items are included under the Sections listed below:
  - 1. Section 02 41 00 - Site Preparation and Demolition
  - 2. Section 32 13 13 - Cast in Place Portland Cement Concrete

#### 1.4 SUBMITTALS

- A. Provide complete Shop Drawings, manufacturer's literature and/or samples for all items called for on the Drawings and as specified and in accordance with applicable requirements under Division 01.

#### 1.5 DEFINITIONS

- A. The following items are included herein and shall mean:
  - 1. S.S.H.B. - Standard Specifications for Highway and Bridges, the Commonwealth of Massachusetts, Department of Public Works, latest edition.
  - 2. A.S.T.M. - American Society for Testing and Materials. The following standard specifications are applicable to the associated items as listed.
  - 3. AAB: Architectural Access Board.
  - 4. ADA: Americans with Disabilities Act and its current regulations.
  - 5. CPSC: Consumer Product Safety Council.

### PART 2 - PRODUCT

#### 2.1 CAST INPLACE FLUSH CONCRETE EDGE

- A. See 03 30 00 C.I.P. Concrete.

PART 3 - EXECUTION

3.1. CAST IN PLACE FLUSH CONCRETE CURB

- A. See 03 30 00 C.I.P. Concrete.

END OF SECTION

## **32 30 00 SITE IMPROVEMENTS**

### PART 1 - GENERAL

#### 1.1 GENERAL REQUIREMENTS

- A. The conditions of the Contract, including Division 00 and Division 01, apply to the work under this Section.
- B. All references to products by manufacturer, trade name or performance Specifications bearing the connotation "or approved equal" shall be as determined by the Landscape Architect and the City.

#### 1.2 WORK INCLUDED

- A. Provide all labor, equipment, implements and materials required to furnish, install, construct and perform all site improvements complete as shown on the Drawings and specified herein. This includes, but is not limited to the following:
  - 1. Boulders
  - 2. Riverstone
  - 3. Granite Blocks provided by Town of Arlington

#### 1.3 REFERENCES

- A. Examine all other Sections of the Specifications and all Drawings for the relationship of the work under this Section and the work of other trades. Cooperate with all trades and all departments of the Town of Arlington and coordinate all work under this Section therewith.
- B. The following related items are included under the Sections listed below:
  - 1. Section 02 41 00 - Site Preparation and Demolition
  - 2. Section 32 13 13 - Cast in Place Portland Cement Concrete

#### 1.4 SUBMITTALS

- A. Provide complete Shop Drawings, manufacturer's literature and/or samples for all items called for on the Drawings and as specified and in accordance with applicable requirements under Division 01.

#### 1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's original unopened and undamaged packages with labels legible and intact.
- B. Store materials in unopened packages in a manner to prevent damage from the environment and construction operations.
- C. Handle in accordance with manufacturer's instructions.

#### 1.6 DEFINITIONS

- A. The following items are included herein and shall mean:

1. S.S.H.B. - Standard Specifications for Highway and Bridges, the Commonwealth of Massachusetts, Department of Public Works, latest edition.
2. A.S.T.M. - American Society for Testing and Materials. The following standard specifications are applicable to the associated items as listed.
3. AAB: Architectural Access Board.
4. ADA: Americans with Disabilities Act and its current regulations.
5. CPSC: Consumer Product Safety Council.

## PART 2 - PRODUCT

### 2.1 BOULDERS

- A. Boulders shall be naturally weathered and rounded with no sharp edges.
- B. Boulders shall vary in size with a minimum size of approximately 18" (Ht.) X 24" (Length).

### 2.2 RIVERSTONE

- A. Two-thirds (2/3) of the Riverstone Mulch shall be composed of rounded River Jax 1-3" and one-third (1/3) of the Riverstone Mulch shall be composed of rounded River Jax 3" – 6" (Powell Stone and Gravel 978-533-1346) or approved equal.

### 2.3 GRANITE BLOCKS

- A. Eleven (11) Rectangular Granite Blocks and five (5) Curved Granite Blocks are tagged at the Town of Arlington Department of Public Works Yard and are to be moved by the Contractor and placed on site as directed by the Landscape Architect. Any sharp edges of these existing blocks are to be knocked-off by the Contractor prior to project completion.

## PART 3 - EXECUTION

### 3.1. BOULDERS

- A. Landscape Architect to place boulders in field.
- B. Install per detail on Drawings.

### 3.2. RIVERSTONE

- A. Install as shown on Drawings and as supervised by Landscape architect

### 3.3. GRANITE BLOCKS

- A. Landscape Architect to place boulders in field.
- B. Install per detail on Drawings.

END OF SECTION



## **32 31 29 FENCING**

### **PART 1 - GENERAL**

#### **1.1 GENERAL REQUIREMENTS**

- A. The conditions of the Contract, including Division 00 and Division 01, apply to the work under this Section.
- B. All references to products by manufacturer, trade name or performance Specifications bearing the connotation "or approved equal" shall be as determined by the Landscape Architect and the City.

#### **1.2 WORK INCLUDED**

- A. Provide all labor, equipment, implements and materials required to furnish, install, construct and perform all site improvements complete as shown on the Drawings and specified herein.
- B. To be included, but not limited to the following:
  - 1. 4' High Black Permafused Chain Link Fence & Gates

#### **1.3 REFERENCES**

- A. Examine all other Sections of the Specifications and all Drawings for the relationship of the work under this Section and the work of other trades. Cooperate with all trades and all departments of the Town of Arlington and coordinate all work under this Section therewith.
- B. The following related items are included under the Sections listed below:
  - 1. Section 31 00 00 - Excavation, Filling, and Grading
  - 2. Section 32 40 00 - Site Furnishings and Precast Concrete Curb
  - 3. Section 32 93 00 – Planting

#### **1.4 SUBMITTALS**

- A. Shop Drawings of all Fences and Gates
- B. All Manufacturer's product literature
- C. Sample permafused chain link fabric

#### **1.5 SHOP DRAWINGS AND SAMPLES**

- A. Provide complete Shop Drawings and/or samples and catalog cuts for all items called for on the Drawings and as specified and in accordance with applicable requirements under Division 01.

#### **1.6 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Deliver materials in manufacturer's original unopened and undamaged packages with labels legible and intact.
- B. Store materials in unopened packages in a manner to prevent damage from the environment and construction operations.
- C. Handle in accordance with manufacturer's instructions.

## 1.7 DEFINITIONS

- A. The following items are included herein and shall mean:
  - 1. S.S.H.B. - Standard Specifications for Highway and Bridges, the Commonwealth of Massachusetts, Department of Public Works, latest edition.
  - 2. A.S.T.M. - American Society for Testing and Materials. The following standard specifications are applicable to the associated items as listed.
    - a. A36 ...Steel
    - b. A153...Zinc Coating (hot-dip) on hardware
    - c. A307 ...Carbon Steel bolts 66000 psi tensile
  - 3. AAB: Architectural Access Board.
  - 4. ADA: Americans with Disabilities Act and its current regulations.
  - 5. AWS: American Welding Society.
  - 6. CPSC: Consumer Product Safety Council.
  - 7. SSPS: Steel Structures Painting Council.

## PART 2 - PRODUCT

### 2.1 4' HIGH BLACK PERMAFUSED CHAIN LINK FENCE & GATE

- A. Steel Framework:
  - 1. The steel material used to manufacture fence pipes shall be cold-formed, circular, ASTM A-120 Schedule 40 pipe, zinc-coated. All structural shapes shall be galvanized by the hot-dip process conforming to ASTM A 123.
  - 2. The manufactured framework shall be subjected to a complete thermal stratification coating process (multi-stage, high-temperature, multi-layer) including, at a minimum, a six-stage pretreatment/wash with zinc phosphate, an electrostatic spray application of an epoxy base, and a separate electrostatic spray application of a polyester finish.
  - 3. The material used for the base coat shall be a zinc-rich, gray color thermosetting epoxy; the minimum thickness of the base coat shall be two (2) mils. The material used for the finish coat shall be a thermosetting, no-mar TGIC polyester powder; the minimum thickness of the finish coat shall be two (2) mils. The stratification-coated pipe shall demonstrate the ability to endure a salt-spray resistance test in accordance

- with ASTM 8117 without loss of adhesion for a minimum exposure time of 3500 hours. Additionally, the coated pipe shall demonstrate the ability to withstand exposure in a weather-ometer apparatus for 1000 hours without failure in accordance with ASTM D1499 and to show satisfactory adhesion when subjected to the crosshatch test, Method B, in ASTM D3359. The polyester finish coat shall not crack, blister, or split open under normal use.
4. The finish coat color for all framework shall be black.
  5. Post, rail, and bracing sizes shall be as indicated in the drawings.
  6. Rails to be furnished in manufacturers' standard lengths of approximately 21'-0" with outside sleeve type coupling, at least 6" long for each joint. One coupling in each five shall have an expansion spring. Provide means for attaching rail securely to each corner, pull, and end post. Rail shall form continuous brace from end to end of each run of fence.

B. Fence Fabric:

1. The material for chain link fence fabric shall be manufactured from 6 gauge steel core wire, hot-dipped galvanized to Type I, AISI Specifications, and shall be mesh of a size indicated by the drawings made from a medium high carbon quality steel wire. The tensile strength shall be 80,000 PSI unless otherwise noted.
  2. The coating color shall be class 668-28, thermally fused wire - black.
  3. Selvage Edges: Top and bottom of fabric shall have knuckled selvage, both sides.
  4. Accessories: All of the following fittings and fasteners shall be manufactured of stainless steel unless otherwise specified below, and shall all be galvanized and polyester-coated through the same process required for the framework (see above); the color shall match the framework.
    - a. Post Tops shall be manufactured of pressed steel or malleable iron, designated as a weather-tight closure cap (for tubular posts). Provide one (1) cap for each post. Where top rail is used, provide tops to permit passage of top rail.
    - b. Stretcher Bars shall be one-piece lengths equal to the full height of fabric with a minimum cross-section of 3/16" by 3/4". Provide one (1) stretcher bar for each end post and two (2) for each corner and pull post. Tension bands and brace bands, if utilized, shall be 7/8" by 12 gauge, beveled, galvanized, sized to fit pipe sizes, and furnished with galvanized fasteners.
    - c. Stretcher Bar Bands shall be manufactured of heavy pressed steel or malleable iron of 1/8" by 3/4" minimum cross-section and be of sufficient size to secure stretcher bars to end, corner, and pull posts.
    - d. Rail Clamps shall be standard clamps (boulevard clamps) furnished complete with fasteners with ASTM designation A 153.
    - e. Ties for fastening fabric to posts, rails, and braces shall use minimum 9-gauge galvanized, annealed steel wire ties – aluminum not accepted. Color shall be black.
  5. Modifications to the above which are standard manufacturers' practice will be permitted if strength and security are maintained.
- C. Gates shall be ADA compliant, latchable and capable of being locked by a padlock. Gate, latch and closing mechanism to be approved by Landscape Architect and Owner.

## PART 3 - EXECUTION

### 3.1. 4' HIGH BLACK PERMAFUSED CHAIN LINK FENCE & GATE POSTS

- A. Posts shall be placed straight and true. See drawings.
- B. Posts shall be a maximum distance of 10'-0" on center.
- C. Fence Erection
  1. Rails: Rail shall form a continuous brace from end to end of each fence run. Couplings shall be located a maximum of 12" from line posts.
  2. Brace Assemblies: Install braces so posts are plumb when diagonal rod is under proper tension.
  3. Fabric: Leave approximately 1-1/2" between finish grade and bottom selvage. Pull fabric taut and tie to posts and rails. Install fabric on street side of fence and anchor to framework so that fabric remains in tension after pulling force is released.
  4. Stretcher Bars: Thread through fabric and secure to posts with approved fasteners spaced not over 12" O.C.
  5. Steel Ties: Steel ties shall be placed 12" O.C. and securely fastened.
  6. Fasteners: Install nuts for tension band and hardware bolts on side of fence opposite fabric side.

END OF SECTION

## SECTION 32 80 00 - IRRIGATION SYSTEM

### PART 1 GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 DESCRIPTION OF WORK

- A. This is a Design/Build Specification: The Contractor is responsible for the design and engineering of the garden irrigation system including sizing all piping, calculating system hydraulics, testing, and all other work required for a complete operable system and for providing the specified guarantees. Design and install irrigation system in compliance with ASIC Standards.
- B. The irrigation system shall be designed starting from the existing waterline servicing the gardens as indicated on the plans.
- C. On-Site Conditions
  - 1. Inspection of the Site: The Contractor shall acquaint himself with all on-site conditions. Should utilities not shown on the Drawings be found during excavations, the Contractor shall promptly notify the Owner for instruction as to further action. Failure to do so will make the Contractor liable for any and all damage thereto arising from his operations subsequent to discovery of such utilities not shown on the Drawings.
  - 2. Protection of Property: The Contractor shall be responsible for the preservation and protection of all site conditions to remain from damage due to this work. In the event damage does occur, all damage shall be completely repaired to its original condition at no additional cost to the Owner.
  - 3. Trenching: All trenching or other work under the leaf canopy of any and all trees shall be done by hand or by other methods so that no branches, and minimal root systems are damaged in any way.
    - a. Trenching through areas designated as Protected Habitat Areas shall be staked out and the layout approved by the Architect prior to beginning any trench work.
    - b. Trenching around existing plant material shall be done by hand so as to minimize root disturbance.
    - c. Buildings, walks, walls, and other property shall be protected from damage. Open ditches left exposed shall be flagged and barricaded by the Contractor by approved means. The Contractor shall restore disturbed areas to their original condition.
  - 4. Protection and Repair of Underground Utilities: The Contractor shall be responsible for requesting the proper utility company to stake the exact location of any underground lines including but not limited to electric, gas, telephone service, water, and cable.

- a. The Contractor shall take whatever precautions are necessary to protect these underground lines from damage. In the event damage does occur, all damage shall be completely repaired to its original condition, at no additional cost to the Owner.

1.3 RELATED WORK

- A. Carefully examine all of the Contract Documents for requirements which affect the work of this Section. Other specification sections which directly relate to the work of this section include, but are not limited to the following:

- 1. Section 31 20 00, EARTH MOVING; Establishment of subgrade elevations.
- 3. Section 32 92 00, LAWNS AND GRASSES; Lawns and grasses.
- 3. Section 32 93 00, TREES, PLANTS AND GROUND COVERS
- 4. Section 03 30 00, CAST-IN-PLACE CONCRETE; Concrete for thrust blocks and valve box collars.

1.4 REFERENCES

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

- 1. American National Standards Institute (ANSI):

B16.26	Cast Copper Alloy Fittings for Flared Copper Tubes
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- 2. American Society of Irrigation Consultants (ASIC):

Standards	Minimum Standards for Landscape Irrigation
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- 3. American Society for Testing and Materials (ASTM):

B 88	Seamless Copper Water Tube
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D 1785	Poly (Vinyl Chloride)(PVC) Plastic Pipe, Schedules 40, 80, and 120
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D 2239	Polyethylene (PE) Plastic Pipe (SLPR - PR) Based On Controlled Diameter.
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D 2241	Poly(Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR)
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D 2464	Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
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D 2466	Poly (Vinyl Chloride)(PVC) Plastic Pipe Fittings, Schedule 40
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### 1.5 SUBMITTALS

- A. Submit a complete materials list indicating name of manufacturer, with model numbers of proposed irrigation system equipment and accessories.
- B. Submit piping diagram showing sizes and zone valves in relationship to existing system, planting material and hard surficial site elements.
- C. After completion of installation, furnish complete as-built drawings showing locations of all sprinkler heads, valves, drains, and piping to scale, with dimensions where required or necessary.

### 1.6 LAWS, CODES, AND ORDINANCES

- A. Irrigation system shall be installed in accordance with the latest laws, ordinances, rules, and regulations of all local, state, and federal authorities having jurisdiction.

### 1.7 WARRANTY

- A. The Contractor will be held strictly responsible for all parts of his work. If failure in the irrigation system or appurtenances develop within one (1) year from the date of final approval and acceptance of the work, the Contractor will be required to replace all faulty materials at his full expense.
- B. Labor and materials to fulfill the requirements of this warranty shall be furnished by the Contractor at no additional cost to the Owner. All labor shall include premium time to correct any faulty material or workmanship.

### 1.8 QUALITY ASSURANCE

- A. All applicable ANSI, AWWA, and ASTM Standards and Specifications, and all applicable building codes and other public agencies having jurisdiction upon the work.
- B. Protection of Existing Plants and Site Conditions: The Contractor shall take necessary precautions to protect site conditions to remain. Should damages be incurred, this Contractor shall repair the damage to its original condition at his own expense. Any disruption, destruction, or disturbance of any existing plant, tree, shrub, or turf, or any structure shall be completely restored to the satisfaction of the Owner, solely at the Contractor's expense.
- C. Permits and Fees: Obtain all permits and pay required fees to any governmental agency having jurisdiction over the work. Inspection required by local ordinances during the course of construction shall be arranged as required. On completion of the work, satisfactory evidence shall be furnished to Architect to show that all work has been installed in accordance with the ordinances and code requirements.

- D. The Contractor shall provide full coverage in all irrigated areas and shall be responsible for additional heads and components as required, installed at his own cost.
- E. On-Site Observation: At any time during the installation of the irrigation system by the Contractor, the Owner or Architect may visit the site to observe work underway. Upon request, the Contractor shall be required to uncover specified work as directed by the Owner or Architect without compensation. Should the material, workmanship or method of installation not meet the standards specified herein, the Contractor shall replace the work at his own expense.
- F. Workmanship: All work shall be installed by skilled personnel, proficient in the trades required, in a neat, orderly, and responsible manner with recognized standards of workmanship. The Contractor shall have had considerable experience and demonstrated ability in the installation of sprinkler irrigation systems of this type.

## PART 2 PRODUCTS

### 2.1 PIPE AND FITTINGS

- A. Polyvinyl chloride (PVC) plastic pipe shall be continuously and permanently marked with the following information: Manufacturer's name, pipe size, type of pipe and material, SDR number, ASTM number, and the NSF (National Sanitation Foundation) seal.
- B. Main Lines
  - 1. Pipe 4 in. diameter and less shall be Schedule 40 polyvinyl chloride (PVC) plastic pipe 1120 or 1220, NSF approved, conforming to ASTM D 1785.
  - 2. Pipe larger than 4 in. diameter shall be polyvinyl chloride (PVC) plastic pipe, SDR 21, 1120 or 1220, conforming to ASTM D 2241, with a minimum pressure rating of 200 psi.
  - 3. Plastic pipe fittings shall be polyvinyl chloride (PVC) molded fittings manufactured of the same material as the pipe and shall be suitable for solvent weld or slip joint ringtite seal (Schedule 40) conforming to ASTM D 2466, or threaded connections (Schedule 80) conforming to ASTM D 2464.
  - 4. Slipfitting socket taper shall be sized so that a dry unsoftened pipe end conforming to these specifications can be inserted no more than halfway into the socket. Plastic saddle and flange fittings shall not be used. Only Schedule 80 pipe may be threaded.
- C. Lateral Lines
  - 1. Pipe 2 in. diameter and less shall be polyethylene (PE) pipe, SDR 9, Class 160, Type III, Grade 3, Class C conforming to ASTM D 2239, with a minimum pressure rating (PR) of 160 psi.
  - 2. Polyethylene pipe fittings shall be insert PVC or nylon type fitting



recommended by pipe manufacturer. Fittings shall conform to NSF Standards, supplied by Harvard, Liverpool, NY, or approved equal. Joints 1-1/4 in. and greater shall be double clamped with stainless steel clamps.

D. Sleeves

1. For Water Lines: Schedule 40 PVC or Schedule 40 galvanized steel pipe.
2. Sleeve size shall be at least twice the diameter of the pipe line.

E. Adapters

1. All adapters shall be provided as required by the manufacturer, and are required to construct the proposed system.

2.2 WARNING AND DETECTOR TAPE

A. Detector tape for identification of irrigation main locations shall be manufactured by Reef Industries, Inc., Houston, TX 77275-0218, or approved equal. Detector tape shall consist of a solid aluminum foil core running the full length and width of the tape and encased in a protective, high visibility, color coded inert plastic jacket.

1. Color of tape shall be "Safety Precaution Blue."
2. Tape shall be imprinted with the following legend: "Caution Buried Irrigation Line Below".

2.3 GATE VALVE AND BOX

- A. Gate valves 2 in. and smaller shall be cast iron body, bronze mounted with non-rising stem and working pressure rating of 200 psi.
- B. Gate valves larger than 2 in. shall be mechanical joint or flanged cast iron with non-rising stem and working pressure rating of 200 psi.
- C. Gate valves for above grade or pit use shall be supplied with wheel handles.
- D. Gate valve for underground use shall be supplied with 2 in. square operating nut.
- E. Each gate valve shall have a valve box.
1. Valve box shall be impact resistant cyclac plastic with locking cover. Cover color shall be green.

2.4 DRAIN VALVE AND BOX

- A. Drain valves shall be all bronze construction manual angle valves installed at low points in system.
- B. Each drain valve shall have a valve box.
1. Valve box shall be impact resistant cyclac plastic with locking cover. Cover

color shall be green.

## 2.5 QUICK COUPLING VALVES

- A. Quick coupling valves shall be 1 in. heavy duty brass construction one-piece body design, with locking rubber cover. Furnish to the Owner the following additional items: three hollow coupler keys and three swivel hose ell adapters.
  - 1. For use on systems using non-potable water, locking rubber cover shall have molded-in warnings of "DO NOT DRINK" in English and Spanish

## 2.6 BACKFLOW PREVENTER

- A. Backflow preventer shall be required at all cross-connections between irrigation system and potable water.
- B. Backflow preventer, based upon prevailing local codes, shall be of the following type:
  - 1. Double check valve backflow preventer

## PART 3 EXECUTION

### 3.1 GENERAL

- A. Coordinate all installation/repair work with landscape planting work, especially fine grading, and soil preparation for planting areas per Section 32 92 00, LAWNS AND GRASSES.
- B. Excavation required for the installation of the irrigation system shall conform to ASTM F 690.

### 3.2 PIPE, CONTROL VALVE, AND CONTROL WIRE INSTALLATION

- A. Plastic pipe shall be delivered to the site in manufacturer's packaging, stacked in such a manner as to provide adequate protection from compression and deformation of the pipe ends. Pipe shall be protected from exposure to direct sunlight.
- B. Pipe interior shall be thoroughly cleaned of all dirt or foreign matter before lowering pipe into trenches. Pipe interiors shall be kept clean during pipe installation by plugs or other approved methods. Piping shall not be installed in water or mud. Ends of pipe shall be securely closed when work is not in progress to prevent water and foreign matter from entering the lines.
- C. PVC pipe shall be cut with a hand saw or hack saw with the assistance of a square in sawing vise, or other manner to ensure a square cut. Burrs at cut ends shall be removed prior to installation so that a smooth unobstructed flow will be obtained.

- D. Installation of plastic pipe shall conform strictly to manufacturer's recommendations and to ASTM F 690.
  - 1. Metallic fittings shall not be supported by PVC pipe. Metallic fittings shall be supported by a concrete block or cradle.
  - 2. When damaged, plastic pipe shall be replaced by cutting out entire damaged area and replacing with same Schedule, Class, and type of pipe, or heavier, at no additional cost. Plastic pipe shall be thoroughly dry when this replacement is made.
- E. Snake pipe in trench from side to side to allow for expansion and contraction.
- F. Threaded Joints for Plastic Pipes:
  - 1. Use Teflon tape on the threaded PVC fittings except where Marlex fittings are used.
  - 2. Use strap-type friction wrench only: Do not use metal-jawed wrench.
  - 3. When connection is plastic to metal, male adapters shall be used. Male adapter shall be hand tightened, plus one turn with a strap wrench. Joint compound shall be Teflon tape or equal upon approval.
- G. Threaded Joints for Galvanized Steel Pipes:
  - 1. Factory-made nipples shall be used wherever possible. Field-cut threads in pipes will be permitted only where absolutely necessary and approved by Architect; when field threading, cut threads accurately on axis with sharp dies.
  - 2. Use pipe joint compound or Teflon tape to male threads only.
- H. Joints for Polyethylene Pipes:
  - 1. Double-clamp all connections 1-1/4 in. diameter and greater.
  - 2. Make all connections between polyethylene pipes and metal valves or pipes with threaded fittings using male adapters.
- I. Connections between plastic pipe and metal valves or steel pipe shall be made with threaded fittings using plastic toe nipples or shall be made with adapters and a nonhardening pipe compound applied to male threads.
- J. Solvent weld joints shall be made according to manufacturer's instructions. Joints shall be tight and inseparable. Joints shall be allowed to cure 24 hours at temperatures over 40°F. before testing.
  - 1. Solvent shall be compatible with plastic material of heads, pipe, and fittings.

### 3.3 GATE VALVES

- A. Install isolation and branch gate valves directly on main as required.
- B. Where gate valves isolate branch mains of a smaller size, size valve to largest main and add reducing fittings downstream of valves.

- C. Install valve and valve box to finish grade as indicated on the Drawings.

#### 3.4 TESTING AND COMPLETION

- A. Irrigation system shall be tested for leakage prior to backfilling of piping. Leakage test shall be at 100 psi pressure at furthest point of system being tested for a minimum period of one hour. System is acceptable if no leakage or loss of pressure occurs.
- B. When the irrigation system is completed, perform a coverage test in the presence of the Architect to determine if the coverage of water for all areas is completely adequate. All valves, and the alignment and coverage of all sprinkler heads shall be adjusted, prior to final inspection, for required coverage. Correct inadequacies of coverage as directed by Architect.
- C. Instruct Owner's designated personnel in proper operation of irrigation system, including programming controller; valves; adjustment of sprinkler heads.

#### 3.5 BACKFILL AND COMPACTING

- A. After system is operating and required tests and inspections have been made, backfill excavations and trenches with clean soil, free of debris.
- B. Backfill for all trenches, regardless of the type of pipe covered, shall be compacted to minimum 95% density under pavements, 85% under planted areas.
- C. Dress off all areas to finish grades.

#### 3.6 PRESSURE SETTING

- A. Prior to final inspection Contractor shall adjust each remote control valve to an agreed operating pressure by installing temporary pressure gauge on schrader valve and making necessary adjustments while valve is operating.

END OF SECTION

## **32 91 13 SOIL PREPARATION**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Planting soils specified by composition of the mixes.
- B. Related Requirements:
  - 1. Section 32 92 00 Lawns. For placing planting soils for lawns.
  - 2. Section 32 93 00 Plants and Planting. For placing planting soils for trees, shrubs and perennials.
  - 3. Division 01 Section "Summary" for requirements relating to diesel engine emissions for construction vehicles and equipment.
  - 4. Division 01 Section "Environmental Protections" for requirements relating to construction waste recycling.

#### **1.2 DEFINITIONS**

- A. Imported Soil: Soil that is transported to Project site for use.
- B. Manufactured Soil: Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.
- C. Planting Soil: Existing, on-site soil, imported soil or manufactured soil that has been modified, as specified, with soil amendments and fertilizers to produce a soil mixture best for plant growth.
- D. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- E. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.
- F. Imported Soil: Soil that is transported to the project site for use.

#### **1.3 PRE-INSTALLATION MEETINGS**

- A. Pre-installation Conference: Conduct conference at project site.

#### **1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Samples for Verification: For each bulk-supplied material, a 1-gal. volume of each in sealed containers labeled with content, source, and date obtained. Each sample shall be typical of the lot of material to be furnished; provide an accurate representation of composition, color, and texture.

- C. Installer Qualifications:
  - 1. An installer with at least five years experience who has completed unit paver installations similar in material, design, and extent to that indicated for this project and whose work has resulted in construction with a record of successful in-service performance.
  - 2. Submit installer qualifications per Division 01.

#### 1.5 IMPORTED SOIL AND COMPOST TESTING

- A. Provide soil test results and recommendations for all imported topsoil, manufactured planning soil and compost per Testing Requirements article.
- B. Provide soil test and recommendations for each 500 CY of imported topsoil.

#### 1.6 TESTING REQUIREMENTS

- A. General: Perform tests on soil samples according to requirements in this article.
- B. Physical Testing:
  - 1. Soil Texture: Soil-particle, size-distribution analysis by one of the following methods according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods":
    - a. Sieving Method: Report sand-gradation percentages for very coarse, coarse, medium, fine, and very fine sand; and fragment-gradation (gravel) percentages for fine, medium, and coarse fragments; according to USDA sand and fragment sizes.
    - b. Hydrometer Method: Report percentages of sand, silt, and clay.
  - 2. Total Porosity: Calculate using particle density and bulk density according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
  - 3. Water Retention: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
  - 4. CEC: Analysis by sodium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."
  - 5. Metals Hazardous to Human Health: Test for presence and quantities of RCRA metals including aluminum, arsenic, barium, copper, cadmium, chromium, cobalt, lead, lithium, and vanadium. If RCRA metals are present, include recommendations for corrective action.
  - 6. Phytotoxicity: Test for plant-available concentrations of phytotoxic minerals including aluminum, arsenic, barium, cadmium, chlorides, chromium, cobalt, copper, lead, lithium, mercury, nickel, selenium, silver, sodium, strontium, tin, titanium, vanadium, and zinc.
- C. Fertility Testing: Soil-fertility analysis according to standard laboratory protocol of , including the following:
  - 1. Percentage of organic matter.
  - 2. CEC, calcium percent of CEC, and magnesium percent of CEC.
  - 3. Soil reaction (acidity/alkalinity pH value).
  - 4. Buffered acidity or alkalinity.
  - 5. Nitrogen ppm.
  - 6. Phosphorous ppm.
  - 7. Potassium ppm.

8. Manganese ppm.
9. Manganese-availability ppm.
10. Zinc ppm.
11. Zinc availability ppm.
12. Copper ppm.
13. Sodium ppm.
14. Soluble-salts ppm.
15. Presence and quantities of problem materials including salts and metals cited in the Standard protocol. If such problem materials are present, provide additional recommendations for corrective action.
16. Other deleterious materials, including their characteristics and content of each.

D. Organic-Matter Content: Analysis using loss-by-ignition method according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.
- B. Bulk Materials:
  1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
  2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
  3. Do not move or handle materials when they are wet or frozen.
  4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- D. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- E. Store liquids in tightly closed containers protected from freezing.

## 1.8 PROJECT CONDITIONS

- A. Cold Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Regional Materials: Imported soil manufactured planting soil and soil amendments and fertilizers shall be manufactured within 500 miles of Project site from materials that

have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

## 2.2 TOPSOIL

- A. Imported, naturally formed soil from off-site sources and consisting of sandy loam or loam soil according to USDA textures.
- B. Sources: Take imported, unamended soil from sources that are naturally well-drained sites where topsoil occurs at least 4 inches deep, not from agricultural land, bogs, or marshes; and that do not contain undesirable organisms; disease-causing plant pathogens; or obnoxious weeds and invasive plants including, but not limited to, quackgrass, Jonsongrass, posion ivy, nutsedge, nimblewill, Canda thistle, bindweed, bentgrass, wild garlic, ground ivy, peremmiial sorrel, and bromegrass.
- C. Additional Properties of Imported topsoil before Amending: Soil reaction of pH 6 to 7 and miminum of 2 percent organic-matter content, friable, and with sufficient structure to give good tilth and aeration.

## 2.3 PLANTING SOILS SPECIFIED BY COMPOSITION

- A. General: Soil amendments, fertilizers, and rates of application specified in this article are guidelines that may need revision based on testing laboratory's recommendations after preconstruction soil analyses are performed.
  - 1. Planting-Soil Type - Tree Planting: If additional planting soil is required beyond existing stockpiled topsoil: Blend existing, on-site surface soil with the following soil amendments and fertilizers in the following quantities to produce planting soil.
    - a. Mix one third (1/3) existing on-site surface soil with one third (1/3) imported topsoil and one third (1/3) compost by volume with additional amendments and fertilizer per soil test recommendations.
  - 2. Planting-Soil Type - Shrub Planting for placement in continuous planting soil beds: If additional planting soil is required beyond existing stockpiled topsoil:
    - a. Mix two thirds (2/3) imported topsoil and one third (1/3) compost by volume with additional amendments and fertilizer per soil test recommendations.
  - 3. Planting-Soil Type - Seeded or Sodded Lawn Planting for placement on subgrade at final elevation before placement of planting soil: If additional planting soil is required beyond existing stockpiled topsoil:
    - a. Mix three quarters (3/4) topsoil and one quarter (1/4) compost by volume with additional amendments per soil test recommendations.
  - 4. Planting-Soil Type: Garden Planting: If additional planting soil is required beyond existing stockpiled topsoil:
    - a. Place (1/2) imported topsoil and (1/2) compost for garden beds.

## 2.4 ORGANIC SOIL AMENDMENTS



- A. Compost: Well-composted, stable, and weed-free organic matter produced by composting feedstock, and bearing USCC's "Seal of Testing Assurance," and as follows:
  - 1. Reaction: pH of 5.5 to 8 .
  - 2. Soluble-Salt Concentration: Less than 4 dS/m.
  - 3. Moisture Content: 35 to 55 percent by weight.
  - 4. Carbon:Nitrogen Ratio: less than 25:1
  - 5. Organic-Matter Content: 30 to 40 percent of dry weight.
  - 6. Particle Size: Minimum of 98 percent passing through a 2-inch sieve.

## 2.5 FERTILIZERS

- A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
  - 1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
  - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.
- B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
  - 1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
  - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.
- C. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Place planting soil and fertilizers according to requirements in other Specification Sections.
- B. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in planting soil.

### 3.2 PREPARATION OF UNAMENDED, ON-SITE SOIL BEFORE AMENDING

- A. Excavation: Excavate soil from designated area(s) and stockpile until amended.
- B. Unacceptable Materials: Clean soil of concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar,

roofing compound, acid, and other extraneous materials that are harmful to plant growth.

- C. Unsuitable Materials: Clean soil to contain a maximum of 8 percent by dry weight of stones, roots, plants, sod, clay lumps, and pockets of coarse sand.
- D. Screening: Pass un-amended soil through a 2-inch sieve to remove large materials.

### 3.3 PLACING AND MIXING PLANTING SOIL OVER EXPOSED SUBGRADE

- A. General: Apply and mix un-amended soil with amendments on-site to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- B. Subgrade Preparation: Till subgrade to a minimum depth of 6 inches. Remove stones larger than 2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
- C. Mixing: Spread un-amended soil to total depth of 8 inches, but not less than required to meet finish grades after mixing with amendments and natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.
  - 1. Amendments: Apply soil amendments and fertilizer, if required, evenly on surface, and thoroughly blend them with un-amended soil to produce planting soil.
    - a. Mix lime and sulfur with dry soil before mixing fertilizer.
    - b. Mix fertilizer with planting soil no more than seven days before planting.
  - 2. Lifts: Apply and mix unamended soil and amendments in lifts not exceeding 8 inches in loose depth for material compacted by compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- D. Compaction: Compact each blended lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698 and tested in-place.
- E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

### 3.4 PLACING MANUFACTURED PLANTING SOIL OVER EXPOSED SUBGRADE

- A. General: Apply manufactured soil on-site in its final, blended condition. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- B. Subgrade Preparation: Till subgrade to a minimum depth of 6 inches. Remove stones larger than 2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
- C. Application: Spread planting soil to total depth of 8 inches, but not less than required to meet finish grades after natural settlement. Do not spread if soil or subgrade is

frozen, muddy, or excessively wet. Place drainage geotextile over compacted base course, overlapping ends and edges at least 12 inches.

1. Lifts: Apply planting soil in lifts not exceeding 8 inches in loose depth for material compacted by compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- D. Compaction: Compact each lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698.
- E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

### 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform the following tests and inspections:
1. Compaction: Test planting-soil compaction after placing each lift and at completion using a densitometer or soil-compaction meter calibrated to a reference test value based on laboratory testing according to ASTM D 698. Space tests at no less than one for each 2000 sq. ft. of in-place soil or part thereof.
- C. Soil will be considered defective if it does not pass tests and inspections.
- D. Label each sample and test report with the date, location keyed to a site plan or other location system, visible conditions when and where sample was taken, and sampling depth.

### 3.6 PROTECTION

- A. Protection Zone: Identify protection zones according to Section 015639 "Temporary Tree and Plant Protection."
- B. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:
1. Storage of construction materials, debris, or excavated material.
  2. Parking vehicles or equipment.
  3. Vehicle traffic.
  4. Foot traffic.
  5. Erection of sheds or structures.
  6. Impoundment of water.
  7. Excavation or other digging unless otherwise indicated.
  8. Dispose of excess subsoil and unsuitable materials on-site where directed by Owner.

END OF SECTION

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## **SECTION 32 92 00 - LAWNS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Lawn Seeding.
- B. Related Requirements:
  - 1. Section 32 91 13 "Soil Preparation"
  - 2. Section 32 93 00 "Plants and Planting"
  - 3. Division 01 Section "Summary" for requirements relating to diesel engine emissions for construction vehicles and equipment.

#### **1.2 DEFINITIONS**

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 32 91 13 "Soil Preparation".
- C. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

#### **1.3 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at Project site.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Certification of grass seed: From seed vendor for each grass-seed monostand or mixture, stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
  - 1. Certification of seed mixture for SEED TYPE 1 – LAWN.
  - 2. Certification of seed mixture for SEED TYPE 2 – MEADOW.
- B. Product certificates: For fertilizers, from manufacturer.

#### **1.5 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of turf during a calendar year. Submit before expiration of required maintenance periods.

#### **1.6 QUALITY ASSURANCE**

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful turf establishment.
  - 1. Experience: Five years' experience in turf installation in addition to requirements in Section 01 40 00 "Quality Requirements."
  - 2. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.
- B. Bulk Materials:
  - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
  - 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
  - 3. Accompany each delivery of bulk materials with appropriate certificates.

#### 1.8 FIELD CONDITIONS

- A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of planting completion.
  - 1. Spring Planting: April 15 – May 30
  - 2. Fall Planting: September 15 – October 15
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

#### 1.9 ACCEPTANCE AND WARRANTY

- A. An inspection of work completed shall be conducted by the Landscape Architect and Owner's Representative for the purpose of initial acceptance. Any outstanding items revealed on inspection and identified on the punch list shall be corrected within two (2) weeks. Initial acceptance shall be withheld until those items are completed. Acceptance can be on partially completed work. Warranty, for a period of one year, shall begin after landscape inspection and initial acceptance.
- B. Warrant in writing that all lawns, placed on this Project will remain alive and be in healthy vigorous condition for a period of one year after completion and initial acceptance of entire project.
- C. During the warranty period replace, in accordance with the drawings and specifications, all lawns that are in an unhealthy or unsightly condition, or more than 25% dead.

- D. Final Inspection and Acceptance: An inspection will be conducted with the Landscape Contractor, Landscape Architect and Owner at the end of the one year warranty period for purposes of Final Acceptance.
- E. Warranty shall not include damage or loss of plants due to vandalism, fire, severe winds, extreme cold, or negligence on the Owner's part.
- F. Owner's maintenance shall begin upon initial acceptance of plant material.

## PART 2 - PRODUCTS

### 2.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Rules for Testing Seeds" for purity and germination tolerances.
  - 1. Seed Type 1 – LAWN: Contractor's Lakeview Conservation Mix ERNMX-116 or approved equal. Ernst Seeds (1-800-873-3321)
  - 2. Seed Type 2 – MEADOW: Low-Growing Wildflower & Grass Mix ERNMX-156 or approved equal. Ernst Seeds (1-800-873-3321). For hydroseeding of Meadow see Section 3-3 H.
- B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
  - 1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight. Final application rate per soil test recommendations.

### 2.2 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
- B. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings.

### 2.3 PESTICIDES

- A. General: Pesticide, registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.
  - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
  - 2. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
  - 3. Uniformly moisten excessively dry soil that is not workable or which is dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

### 3.2 PREPARATION

- A. Protect structures; utilities; sidewalks; pavements; and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

### 3.3 SEEDING

- A. Limit of seeding shall be shown on the Drawings. All areas on the plan shall be loamed and seeded only after written approval of the finished grading or as directed by the Landscape Architect. All seeded areas are to be hydroseeded. The actual planting of seed shall be done, however, only during periods within this season which are normal for such work as determined by weather conditions and the accepted practice in this locality. The Contractor may plant seed under unseasonable conditions at the Contractor's responsibility and without additional compensation, but subject to Landscape Architect's approval as to time and methods.
- B. Planting may be done between August 15, 2016 and October 15, 2016, or between April 15, 2017 and June 15, 2017.
- C. Soil additives shall be spread and thoroughly incorporated into the loam and upper 1 inch of the underlying subsoil by harrowing or other methods approved by the Landscape Architect. The following soil additives shall be incorporated:
  - 1. Ground limestone as required by soil analysis to achieve a pH of 6.0 to 6.5.
  - 2. Fertilizer as required by soil analysis.
  - 3. Superphosphate at the rate of 20 lbs. per 1,000 sq. ft.
  - 4. Humus as required by soil analysis.
- D. Seeding of lawns shall be done only by experienced workmen under the supervision of a qualified foreman. Seeding shall consist of soil preparation, rolling, hydroseeding, weeding, fertilization, watering and otherwise providing all labor and materials necessary to secure the establishment of acceptable turf.



- E. The soil on which the seed is spread shall be reasonably moist and shall be watered, if directed by the Landscape Architect. The seeded areas shall be watered evenly and at a rate of 5 gallons per square yard, unless otherwise directed by the Architect.
- F. Contractor shall place and maintain barriers around hydroseeded areas to keep people off during the first sixty (60) days.
- G. The application of grass seed, fertilizer, limestone, and a suitable wood fiber or other mulch shall be accomplished in one operation for hydroseeding.
- H. Hydroseeding of Meadow Seed Mix shall occur in two batches. Use 1/3 of hydromulch mixture with all of Meadow Seed in first application. Follow up with the remaining 2/3 of hydromulch mixture in second application.

### 3.4 TURF MAINTENANCE

- A. General: Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.
  - 1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
  - 2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
  - 3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.
- B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches.
  - 1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
  - 2. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.
- C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than one-third of grass height. Remove no more than one-third of grass-leaf growth in initial or subsequent mowings.

### 3.5 SATISFACTORY TURF

- A. Turf installations shall meet the following criteria as determined by Architect:
  - 1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface

irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.

- B. Use specified materials to reestablish turf that does not comply with requirements, and continue maintenance until turf is satisfactory.

### 3.6 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off Owner's property.
- C. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.
- D. Remove nondegradable erosion-control measures after grass establishment period.

### 3.7 MAINTENANCE SERVICE

- A. Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in "Turf Maintenance" Article. Begin maintenance immediately after each area is planted and continue until acceptable turf is established, but for not less than the following periods:
  - 1. Seeded Turf: 60 days from date of planting completion or until building completion and initial acceptance, whichever is longer.
    - a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.

END OF SECTION

## **SECTION 32 93 00 – PLANTS AND PLANTING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Deciduous and evergreen tree and shrub planting
  - 2. Maintenance
- B. Related sections include:
  - 1. Section 32 91 13 “Soil Preparation”
  - 2. Section 32 92 00 “Lawns”

#### **1.2 SUBMITTALS**

- A. Submit a list of all nurseries that will supply plants.
- B. Qualification Data: For qualified landscape Installer.
- C. Soil Samples and Soil Test Reports: See 32 91 13 “Soil Preparation”
- D. Plant Photographs: Submit color photographs of representative specimens of each type of tree on the plant list. Photos shall be 3”x5” taken from an angle that depicts the size and condition of the typical plant to be furnished. A scale rod or other measuring device shall be included in the photograph. Label each photograph with the plant name, size and name of growing nursery.
- E. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of exterior plants during a calendar year. Submit before expiration of required maintenance periods.

#### **1.3 QUALITY ASSURANCE**

- A. Installer Qualifications: Installer shall have not less than 5 years documented successful experience in landscape installations and be a member of the Landscape Contractors Association. Installer shall submit evidence of qualifications including photographs, locations and references of owners for review by the Landscape Architect and the Owners Representative.
- B. Plant material observation: Landscape Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size and quality. Landscape Architect retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
  - 1. Notify Landscape Architect two weeks in advance of plant observation / tagging schedule.

2. Notify Landscape Architect of sources of planting materials seven days in advance of delivery to site.
- C. The contractor shall maintain continuously a competent supervisor, satisfactory to the Owner's Representative, with authority to act in all matter pertaining to this work.
- D. Conference: Before any work is started a conference shall be held between the Contractor, the Owner's Representative and the Landscape Architect concerning the work under this contract.
- E. Provide quality, size, genus, species, and variety of exterior plants indicated, complying with applicable requirements in ANSI Z60.1, "American Standard for Nursery Stock."
- F. It is the Landscape Contractor's responsibility to coordinate and cooperate with the other Contractors to enable work to proceed rapidly and efficiently. Coordinate with all adjacent Contractors' work including all paving, lawn, electrical, etc.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver exterior plants freshly dug.
- B. Do not prune trees and shrubs before delivery except as approved by Landscape Architect. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of exterior plants during delivery.
- C. Deliver exterior plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set exterior plants and trees in shade, protect from weather and mechanical damage, and keep roots moist. Plants shall not be stored on site longer than 1 week.

#### 1.5 PROJECT CONDITIONS

- A. Plant material should be installed within the following dates: March 1 – June 1 or September 1 – November 15, or as approved by the Landscape Architect. Plant material may not be dug after May 15.
  1. If the plants are installed outside of the designated planting season, the contractor is responsible for providing an additional 9 month warranty.
- B. Weather limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.
- C. Coordination with Meadow Area: Plant trees, shrubs and other plants after finish grades are established and before planting meadow areas unless otherwise indicated.
  1. When planting trees, shrubs and other plants after planting meadow areas, and promptly repair damage caused by planting operations.

## 1.6 MAINTENANCE SERVICE

- A. Initial Planting Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until completion of building construction and initial acceptance.
- B. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

## 1.7 ACCEPTANCE AND WARRANTY

- A. An inspection of work completed shall be conducted by the Landscape Architect and Owner's Representative for the purpose of initial acceptance. Any outstanding items revealed on inspection and identified on the punch list shall be corrected with two weeks. Initial acceptance shall be withheld until those items are completed. Acceptance can be on partially completed work. Warranty, for a period of one year, shall begin after landscape inspection and initial acceptance.
- B. Warrant in writing that all plant material, including groundcovers, placed on this Project will remain alive and be in healthy vigorous condition for a period of 1 year after completion and initial acceptance of entire project.
- C. During the warranty period replace, in accordance with the drawings and specifications, all plants that are in an unhealthy or unsightly condition, or more than 25% dead. Warrant all replacement trees for an additional one year period.
- D. Final Inspection and Acceptance: An inspection will be conducted with the Landscape Contractor, Landscape Architect and Owner at the end of the one year warranty period for purposes of Final Acceptance.
- E. Warranty shall not include damage or loss of plants due to vandalism, fire, severe winds, extreme cold, or negligence on the Owner's part.
- F. Owner's maintenance shall begin upon initial acceptance of plant material.

## PART 2 - PRODUCTS

### 2.1 TREE MATERIAL

- A. Root balls shall comply with ANSI 260.1 standards and shall meet sizes laid out in the ANSI 260.1 standards as well as being intact and undamaged when they arrive on the site. Trees that have deteriorated root balls will not be accepted.
- B. If formal arrangements or consecutive order of trees shown, select stock for uniform height and spread, and number label to assure symmetry in planting.

## 2.2 SHADE TREES

- A. Shade Trees: Single-stem trees with straight trunk, well-balanced crown, and intact leader, of height and caliper indicated, complying with ANSI Z60. 1 for type of trees required.
  - 1. Provide balled and burlapped trees.
  - 2. All trees shall have their north side marked in the nursery prior to digging. Set trees in the hole with the marker facing north.

## 2.3 EVERGREENS

- A. Form and Size: Normal-quality, well-balanced, unsheared evergreens, of type, height, spread, and shape required.

## 2.4 TOPSOIL AND PLANT MIX: See Section 32 91 13 Soil Preparation.

## 2.5 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight. Organic matter to be "Leaf Gro Compost" or approved equal.

## 2.6 FERTILIZER

- A. All fertilizers shall be uniform in composition, free flowing and suitable for application with approved equipment. Applications shall be determined by soil test recommendations.
- B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium.
- C. Slow-Release Fertilizer: Granular or pellet fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium.
- D. Planting tablets: Tightly compressed chip type, long lasting, slow release, commercial grade planting fertilizer in tablet form.

## 2.7 MULCHES

- A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of shredded hardwood. Natural color only.

## 2.8 STAKES AND GUYS

- A. Upright and Guy Stakes: Rough-sawn, sound, new hardwood or pressure-preservative-treated softwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch by length indicated, pointed at one end.
- B. Guys and Tie Wires: No. 12 gauge galvanized wire.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, and lawns and existing exterior plants from damage caused by planting operations.
- B. Lay out plants at locations directed by Landscape Architect. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

### 3.2 TREE PIT EXCAVATION

- A. Tree Pits: Excavate circular pits with sides sloped inward, as shown on the Drawings. Trim base leaving center area raised slightly to support root ball and assist in drainage. Do not further disturb base. Scarify sides of plant pit smeared or smoothed during excavation.
  - 1. Excavate approximately three times as wide as ball diameter.
  - 2. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
  - 3. Do not excavate subgrades of adjacent paving, structures, hardscapes or other new or existing improvements.
- B. Tree Pits within Paving: Tree pits within paved areas shall be excavated to the extents of surrounding paving and to depth specified.
- C. Subsoil and topsoil from excavations may be used as a component of the planting soil upon approval of the Landscape Architect.
- D. Notify Landscape Architect if unexpected rock, obstructions or impermeable soils detrimental to trees or shrubs are encountered in excavations. Notify Landscape Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

### 3.3 TREE PLANTING

- A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements. Do not use planting stock if root ball is cracked or broken before or during planting operation.
- B. Set plants to the elevations shown on the drawings. Place a maximum 2" soil on top of root ball. Set trees on compacted pads as shown. Use plant mix specified to backfill pit approximately 2/3 full. Water thoroughly before installing remainder of the plant mix to top of pit, eliminating all air pockets. Repeat watering until no more water is absorbed. Water again after placing and tamping final layer of planting soil mix.
- C. Place planting tablets in each tree planting pit when pit is approximately one half filled, in amounts recommended in soils reports from soil testing laboratory. Place tablets beside the root ball about one inch from root tips.

- D. Cut ropes and strings from top of tree root balls after plant has been set. Remove burlap or cloth wrapping from around top half of balls, do not remove from under root balls. Do not turn under and bury any portion of burlap.
- E. Smooth planting areas to conform to the grades indicated after full settlement has occurred and mulch has been applied. Thoroughly water plants after mulching.

#### 3.4 TREE PRUNING

- A. Prune, thin, and shape trees as only as directed by Landscape Architect.

#### 3.5 SHRUB PLANTING

- A. Preparation of planting beds: Excavate entire planting bed to specified depths as shown on Drawings. Till subsurface to a depth of 6 inches. Place planting soil per specified depths, allowing for settlement.
- B. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in shrub planting beds.
- C. Mulch entire planting bed with mulch. Thoroughly water plants after mulching

#### 3.6 GUYING AND STAKING

- A. Stake trees as shown on drawings.

#### 3.7 CLEANUP AND PROTECTION

- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.
- B. Protect exterior plants from damage due to landscape operations, operations by other contractors and trades, and others. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

#### 3.8 MAINTENANCE

- A. Contractor is responsible for the following maintenance period by pruning, cultivating, watering, weeding, fertilizing, restoring planting saucers, tightening and repairing stakes and guy supports, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Spray as required to keep trees and shrubs free of insects and disease.
  - 1. Maintenance Period: Until initial acceptance of all plant material.
- B. Maintenance between initial acceptance and final acceptance shall be the responsibility of the Owner.

END OF SECTION



## **SECTION 33 10 00 - WATER UTILITIES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

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

#### **1.2 DESCRIPTION**

- A. This section specifies materials and procedures for construction of underground water distribution for domestic and/or fire supply systems outside the building that are complete and ready for operation. This includes piping, structures, appurtenances and all other incidentals.

#### **1.3 RELATED WORK**

- A. Excavation, Trench Widths, Pipe Bedding, Backfill, Shoring, Sheeting, Bracing: Section 31 20 00, EARTH MOVING.
- B. Concrete: Section 03 30 00, CAST IN-PLACE CONCRETE.
- C. Submittals: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- D. Erosion and Sediment Control: Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.

#### **1.4 DELIVERY, STORAGE AND HANDLING**

- A. Ensure that valves are dry and internally protected against rust and corrosion. Protect valves against damage to threaded ends and flange faces.
- B. Use a sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.
- C. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- D. Protect stored piping from moisture and dirt by elevating above grade. Protect flanges, fittings, and specialties from moisture and dirt.
- E. Store plastic piping protected from direct sunlight and support to prevent sagging and bending.

F. Cleanliness of Piping and Equipment Systems:

1. Care shall be exercised in the storage and handling of equipment and piping material to be incorporated in the work. Debris arising from cutting, threading and welding of piping shall be removed.
2. Piping systems shall be flushed, blown or pigged as necessary to deliver clean systems.

1.5 COORDINATION

- A. Coordinate connection to water main with Public Utility Company.
- B. Coordinate water service lines with building contractor.

1.6 QUALITY ASSURANCE:

A. Products Criteria:

- a. When two or more units of the same type or class of materials or equipment are required, these units shall be products of one manufacturer.
- b. A nameplate bearing manufacturer's name or trademark, including model number, shall be securely affixed in a conspicuous place on equipment. In addition, the model number shall be either cast integrally with equipment, stamped, or otherwise permanently marked on each item of equipment.

- B. Materials and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products for at least three years. Digital electronic devices, software and systems such as controls, instruments or computer work stations shall be the current generation of technology and basic design that has a proven satisfactory service record of at least three years.

C. Regulatory requirements:

- a. Comply with the rules and regulations of the public utility company having jurisdiction over the connection to public water lines and the extension and/or modifications to public utility systems.
- b. Comply with the rules and regulations of the // Federal // State// and/or // Local Health Department // Department of Environmental Quality// having jurisdiction for potable water-service.
- c. Comply with rules and regulations of // Federal // State// and/or // Local // authorities having jurisdiction for fire-suppression water-service piping including materials, hose threads, installation and testing.

- D. Provide certification of factory hydrostatic testing of not less than 500 psi (3.5 MPa) in accordance with AWWA C151. Piping materials shall bear the label, stamp or other markings of the specified testing agency.

E. Before any welding is performed, contractor shall submit a certificate certifying that welders comply with the following requirements:

- a. Qualify welding processes and operators for piping according to ASME "Boiler and Pressure Vessel Code", Section IX, "Welding and Brazing Qualifications".
- b. Comply with provisions of ASME B31 series "Code for Pressure Piping".
- c. Certify that each welder has passed American Welding Society (AWS) qualification tests for the welding processes involved, and that certification is current.

- d. All welds shall be stamped according to the provisions of the American Welding Society.
- F. Where installation procedures or any part thereof are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations shall be furnished to the Resident Engineer prior to installation.
- G. Applicable codes:
  - a. Plumbing Systems: IPC, International Plumbing Code.
  - b. Electrical components, devices and accessories shall be listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction and marked for intended use.
  - c. Fire-service main products shall be listed in the FM Global "Approval Guide" or Underwriters Laboratories (UL) "Fire Protection Equipment Directory".

1.7 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. American National Standards Institute (ANSI):

MSS SP-60-2004 ..... Connecting Flange Joint Between Tapping Sleeves and Tapping Valves

MSS SP-108-2002..... Resilient-Seated Cast Iron, Eccentric Plug Valves

MSS SP-123-1998(R2006) Non-Ferrous Threaded and Solder-Joint Unions for Use With Copper Water Tube

C. American Society of Mechanical Engineers (ASME):

A112.1.2-2004 ..... Air Gaps in Plumbing Systems (for Plumbing Fixtures and Water-Connected Receptors))

A112.6.3-2001 ..... Floor Drains

B16.1-2010 ..... Gray Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250

B16.18-2001 ..... Cast Copper Alloy Solder Joint Pressure Fittings

B16.22-2001 ..... Wrought Copper and Copper Alloy Solder Joint Pressure Fittings

B16.24-2006 ..... Cast Copper Alloy Pipe Flanges and Flanged Fittings; Classes 150, 300, 600, 900, 1500 and 2500

B31 ..... Code for Pressure Piping Standards

D. American Society for Testing and Materials (ASTM):

A36/A36M-08..... Carbon Structural Steel

A48/A48M-08(2008) ..... Gray Iron Castings

A536-84(2009)..... Ductile Iron Castings

- A674-10..... Polyethylene Encasement for Ductile Iron Pipe for Water or Other Liquids
- B61-08..... Steam or Valve Bronze Castings
- B62-09..... Composition Bronze or Ounce Metal Castings
- B88/B88M-09..... Seamless Copper Water Tube
- C651-05..... Disinfecting Water Mains
- C858-10e1..... Underground Precast Utility Structures
- D1785-06..... Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
- D2239-03..... Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter
- D2464-06..... Threaded Poly (Vinyl Chloride) PVC Pipe Fittings, Schedule 80
- D2466-06..... Poly (Vinyl Chloride) (PVC) Pipe Fittings, Schedule 40
- D2467-06..... Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
- D2609-02(2008) ..... Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe
- D3350-10a..... Polyethylene Plastics Pipe and Fittings Materials
- F714-10 ..... Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter
- F1267-07 ..... Metal, Expanded, Steel
- E. American Water Works Association (AWWA):
- B300-10..... Hypochlorites
- B301-10..... Liquid Chlorine
- C104-08..... Cement–Mortar Lining for Ductile Iron Pipe and Fittings
- C105/A21.5-10 ..... Polyethylene Encasement for Ductile Iron Pipe Systems
- C110-08..... Ductile Iron and Gray-Iron Fittings
- C111/A21.11-07 ..... Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings
- C115/A21.11-11 ..... Flanged Ductile Iron Pipe with Ductile Iron or Gray-Iron Threaded Flanges
- C151/A21.51-09 ..... Ductile Iron Pipe, Centrifugally Cast
- C153/A21.53-11 ..... Ductile Iron Compact Fittings for Water Service
- C502-05..... Dry-Barrel Fire Hydrants
- C503-05..... Wet-Barrel Fire Hydrants
- C504-10..... Rubber-Seated Butterfly Valves

- C508-09..... Swing-Check Valves for Waterworks Service, 2-In. Through 24-In. (50-mm Through 600-mm) NPS
- C509-09..... Resilient-Seated Gate Valves for Water Supply Service
- C510-07..... Double Check Valve Backflow Prevention Assembly
- C511-07..... Reduced-Pressure Principle Backflow Prevention Assembly
- C512-07..... Air Release, Air/Vacuum and Combination Air Valves
- C550-05..... Protective Interior Coatings for Valves and Hydrants
- C600-10..... Installation of Ductile Iron Mains and Their Appurtenances
- C605-11..... Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
- C606-11..... Grooved and Shouldered Joints
- C651-05..... Disinfecting Water Mains
- C700-09..... Cold-Water Meters, "Displacement Type," Bronze Main Case
- C800-05..... Underground Service Line Valves and Fittings
- C900-09..... Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Transmission and Distribution
- C906-07..... Polyethylene (PE) Pressure Pipe and Fittings, 4 In. (100 mm) Through 64 In. (1,600 mm), for Water Distribution and Transmission
- C907-04..... Injection-Molded PVC Pressure Fittings, 4 Inch through 12 Inch (100 mm through 300 mm), for Water Distribution
- M23-2nd Ed..... PVC Pipe, Design and Installation
- M44-2nd Ed..... Distribution Valves: Selection, Installation, Field Testing and Maintenance
- F. National Fire Protection Association (NFPA):
- NFPA 24-2010 Ed..... Installation of Private Fire Service Mains and Their Appurtenances
- NFPA 1963-2009 Ed..... Fire Hose Connections
- D. NSF International (NSF):
- NSF/ANSI 14 (2013)..... Plastics Piping System Components and Related Materials
- NSF/ANSI 61-2012..... Drinking Water System Components - Health Effects
- NSF/ANSI 372-2011 ..... Drinking Water System Components – Lead Content
- G. American Welding Society (AWS):
- A5.8/A5.8M-2004 ..... Filler Metals for Brazing and Braze Welding
- E. American Society of Safety Engineers (ASSE):

- 1003-2009 ..... Water Pressure Reducing Valves
- 1015-2009 ..... Double Check Backflow Prevention Assemblies and  
Double Check Fire Protection Backflow Prevention  
Assemblies
- 1020-2004 ..... Pressure Vacuum Breaker Assembly
- 1047-2009 ..... Performance Requirements for Reduced Pressure  
Detector Fire Protection Backflow Prevention  
Assemblies
- 1048-2009 ..... Performance Requirements for Double Check Detector  
Fire Protection Backflow Prevention Assemblies
- 1060-2006 ..... Performance Requirements for Outdoor Enclosures for  
Fluid Conveying Components

H. Underwriters' Laboratories (UL):

- 246 ..... Hydrants for Fire-Protection Service
- 262 ..... Gate Valves for Fire-Protection Service
- 312 ..... Check Valves for Fire-Protection Service
- 405 ..... Fire Department Connection Devices
- 753 ..... Alarm Accessories for Automatic Water-Supply Control  
Valves for Fire Protection Service
- 789 ..... Indicator Posts for Fire-Protection Service
- 1091 ..... Butterfly Valves for Fire-Protection Service
- 1285 ..... Pipe and Couplings, Polyvinyl Chloride (PVC), and  
Oriented Polyvinyl Chloride (PVCO) for Underground  
Fire Service

1.8 WARRANTY

- A. The Contractor shall remedy any defect due to faulty material or workmanship and pay for any damage to other work resulting therefrom within a period of one year from final acceptance. Further, the Contractor will furnish all manufacturers' and supplier's written guarantees and warranties covering materials and equipment furnished under this Contract.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Material or equipment containing a weighted average of greater than 0.25 percent lead shall not be used in any potable water system intended for human consumption, and shall be certified in accordance with NSF/ANSI 61 or NSF 372.
- B. Plastic pipe, fittings, and solvent cement shall meet NSF/ANSI 14 and shall be NSF listed for the service intended.

## 2.2 FACTORY-ASSEMBLED PRODUCTS

- A. Standardization of components shall be maximized to reduce spare part requirements. The contractor shall guarantee performance of assemblies of components, and shall repair or replace elements of the assemblies as required to deliver specified performance of the complete assembly.

## 2.3 POLYVINYL CHLORIDE PIPE AND FITTINGS

- A. PVC, Schedule 40 Pipe: ASTM D1785.
  - a. PVC, Schedule 40 Socket Fittings: ASTM D2466.
- B. PVC, Schedule 80 Pipe: ASTM D1785.
  - a. PVC, Schedule 80 Socket Fittings: ASTM D2467.
  - b. PVC, Schedule 80 Threaded Fittings: ASTM D2464.
- C. PVC, AWWA Pipe: AWWA C900, Class 150, with bell end with gasket, and with spigot end.
  - a. Comply with UL 1285 for fire-service mains if indicated.
  - b. PVC Fabricated Fittings: AWWA C900, Class 150, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.
  - c. PVC Molded Fittings: AWWA C907, Class 150, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.
  - d. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern.
    - i. Gaskets: AWWA C111, rubber.
  - e. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
    - i. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

## 2.4 PE PIPE AND FITTINGS

- A. PE, ASTM Pipe: ASTM D2239, SIDR No. 5.3, 7, or 9; with PE compound number required to give pressure rating not less than 160 psi (1100 kPa)
  - a. Insert Fittings for PE Pipe: ASTM D2609, made of PA, PP, or PVC with serrated male insert ends matching inside of pipe. Include bands or crimp rings.
  - b. Molded PE Fittings: ASTM D3350, PE resin, socket- or butt-fusion type, made to match PE pipe dimensions and class.
- B. PE, AWWA Pipe: AWWA C906, DR No. 7.3, 9, or 9.3; with PE compound number required to give pressure rating not less than 200 psi (1380 kPa).
  - a. PE, AWWA Fittings: AWWA C906, socket- or butt-fusion type, with DR number matching pipe and PE compound number required to give pressure rating not less than 160 psi (1100 kPa).
- C. PE, Fire-Service Pipe: ASTM F714, AWWA C906, or equivalent for PE water pipe; FMG approved, with minimum thickness equivalent to FMG Class 150.

- a. Molded PE Fittings: ASTM D3350, PE resin, socket-or butt-fusion type, made to match PE pipe dimensions and class.

## 2.5 COPPER TUBE AND FITTINGS

- A. Soft Copper Tubing: ASTM B88, Type K water tube, annealed temper.
- B. Hard Copper Tubing: ASTM B88, Type K water tube, drawn temper.
- C. Fittings: ASME B16.18, cast copper alloy solder joint pressure fittings.
- D. Brazing Alloy: AWS A5.8/A5.8M, Classification BCuP.
- E. Bronze Flanges: ASME B16.24, Class 300 flanges if required to match piping.
- F. Copper Unions: ANSI MSS SP-123, cast copper alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.

## 2.6 PROTECTIVE ENCLOSURES

- A. Freeze-Protection Enclosures: Designed to protect aboveground water piping, equipment, or specialties from freezing and damage, with heat source to maintain minimum internal temperature of 40 deg F (4 deg C) when external temperatures reach as low as minus 34 deg F (minus 36 deg C) meeting the requirements of ASSE 1060.
  - I. Class I-V, for pressure or atmospheric vacuum breaker equipment or devices. Include drain opening in housing.
  - II. Reinforced fiberglass housing with dimensions indicated, but not less than those required for access and service of protected unit. Include a drain opening for units with drain connection; access doors with locking devices; insulation inside housing; and anchoring devices for attaching the housing to the concrete base.
- B. Weather-Resistant Enclosures: Un-insulated enclosure designed to protect aboveground water piping, equipment, or specialties from weather and damage meeting the requirements of ASSE 1060.
  - I. Class III-V, for pressure or atmospheric vacuum breaker equipment or devices. Include drain opening in housing.
  - II. Provide reinforced fiberglass housing with dimensions indicated, but not less than those required for access and service of protected unit. Include a drain opening for units with drain connection; access doors with locking devices; insulation inside housing; and anchoring devices for attaching the housing to the concrete base.
- C. Expanded-Metal Enclosures: ASTM F1267; designed to protect aboveground water piping, equipment, or specialties from damage; expanded metal side and top panels, of weight and with reinforcement of same metal at edges as required for rigidity.
  - I. Type II, expanded and flattened.
  - II. Class 3, corrosion-resisting steel.



D. Enclosure Bases: 6 inch (150 mm) minimum thickness precast concrete, extending at least 6 inches (150 mm) beyond edges of enclosure housings. Include openings for piping.

## 2.7 DISINFECTION CHLORINE

- A. Liquid chlorine: AWWA B301.
- B. Sodium Hypochlorite: AWWA B300 with 5 percent to 15 percent available chlorine.
- C. Calcium hypochlorite: AWWA B300 supplied in granular form of 5 g. tablets, and shall contain 65 percent chlorine by weight.

## 2.8 WARNING TAPE

- A. Warning tape shall be standard, 4 mil. Polyethylene, 3 inch (76 mm) wide tape, // detectable // non-detectable// type, blue with black letters and imprinted with "CAUTION BURIED WATER LINE BELOW".

## PART 3 - EXECUTION

### 3.1 PIPING APPLICATIONS

- A. Use pipe, fittings, and joining methods for piping systems according to the following applications.
  - I. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.
  - II. Do not use flanges or unions for underground piping.
  - III. Flanges, unions, grooved-end-pipe couplings, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.
- B. Underground water-service piping NPS 3/4 to NPS 3 (DN 20 to DN 80) shall be any of the following:
  - I. Soft copper tube with wrought-copper, solder-joint fittings; and brazed copper, pressure-seal fittings; and pressure-sealed joints.
  - II. PE, ASTM pipe; insert fittings for PE pipe; and clamped molded PE fittings; and heat-fusion joints.
  - III. PVC, Schedule 40 pipe, 80 pipe, socket fittings; and solvent-cemented joints.
- C. Water Meter Box Water-Service Piping NPS 3/4 to NPS 2 (DN 20 to DN 50) shall be same as underground water-service piping.
- D. Aboveground Water-Service Piping NPS 3/4 to NPS 3 (DN 20 to DN 80) shall be // any of the following:
  - I. Hard copper tube with wrought-copper, solder-joint fittings; and brazed copper, pressure-seal fittings; and pressure-sealed joints.
  - II. PVC, Schedule 80 pipe; socket fittings; and solvent-cemented threaded fittings; and threaded // joints.

- III. PVC, AWWA Class 200 pipe listed for fire-protection service; PVC Class 150 fabricated or molded fittings; and gasketed joints.

### 3.2 VALVE APPLICATIONS

- A. Use mechanical-joint-end valves for NPS 3 (DN 80) and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FMG, non-rising-stem gate valves for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for NPS 2 (DN 50) and smaller installation.
- B. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
  - I. Underground Valves, NPS 3 (DN 80) and Larger: AWWA, cast iron, non-rising-stem, // metal // resilient // high-pressure, resilient // -seated gate valves with valve box.
  - II. Underground Valves, NPS 4 (DN 100) and Larger, for Indicator Posts: UL/FMG, cast iron, non-rising-stem gate valves with indicator post.
  - III. Use the following for valves in vaults and aboveground:
    - 1) Gate Valves, NPS 2 (DN 50) and Smaller: Bronze, // non-rising // rising // stem.
    - 2) Gate Valves, NPS 3 (DN 80) and Larger: // AWWA, cast iron, OS&Y rising stem, metal seated // AWWA, cast iron, OS&Y rising stem, resilient seated // UL/FMG, cast iron, OS&Y rising stem // .
    - 3) Check Valves: // AWWA C508 // UL/FMG //, swing type.

### 3.3 PVC PIPE

- A. PVC piping shall be installed in strict accordance with the manufacturer's instructions and AWWA C605. Place selected material and thoroughly compacted to one foot above the top of the pipe.
- B. Install Copper Tracer Wire, No. 14 AWG solid, single conductor, insulated. Install in the trench with piping to allow location of the pipe with electronic detectors. The wire shall not be spiraled around the pipe nor taped to the pipe. Wire connections are to be made by stripping the insulation from the wire and soldering with rosin core solder per ASTM 828. Solder joints shall be wrapped with rubber tape and electrical tape. At least every 1000 feet (300 m) provide a 5 pound (2.3 kg) magnesium anode attached to the main tracer wire by solder. The solder joint shall be wrapped with rubber tape and with electrical tape. An anode shall also be attached at the end of each line.

### 3.4 COPPER PIPE

- A. Copper piping shall be installed in accordance with the Copper Development Association's Copper Tube Handbook and manufacturer's recommendations.
- B. Copper piping shall be bedded in 6 inches (150 mm) of sand.

### 3.5 ANCHORAGE INSTALLATION

- A. Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include: concrete thrust blocks, locking mechanical joints,

set-screw mechanical retainer glands, bolted flanged joints, heat-fused joints, pipe clamps and tie rods, Insert devices.

- B. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
  - a. Gasketed-Joint, Ductile Iron, Water-Service Piping: According to AWWA C600.
  - b. Gasketed-Joint, PVC Water-Service Piping: According to AWWA M23.
  - c. Fire-Service-Main Piping: According to NFPA 24.
- C. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

### 3.6 VALVE INSTALLATION

- A. AWWA Valves: Install each underground valve with stem pointing up and with valve box.
- B. UL/FMG, Valves: Install each underground valve and valves in vaults with stem pointing up and with vertical cast iron indicator post.
- C. MSS Valves: Install as component of connected piping system.
- D. Corporation Valves and Curb Valves: Install each underground curb valve with head pointed up and with service box.
- E. Pressure-Reducing Valves: Install in vault or aboveground between shutoff valves. // Install full-size valved bypass.
- F. Relief Valves: Install aboveground with shutoff valve on inlet.
- G. Raise or lower existing valve and curb stop boxes and fire hydrants to finish grade in areas being graded.

### 3.7 WATER METER INSTALLATION

- A. Install water meter type, piping, and specialties according to utility company's written instructions.

### 3.8 WATER METER BOX INSTALLATION

- A. Install water meter boxes in paved areas flush with surface.
- B. Install water meter boxes in grass or earth areas with top // 2 inches (50 mm) // Insert dimension // above surface.

### 3.9 BACKFLOW PREVENTER INSTALLATION

- A. Install backflow Preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.
- B. Do not install backflow Preventers that have relief drain in vault or in other spaces subject to flooding.
- C. Do not install bypass piping around backflow Preventers.

- 3.10 PROTECTIVE ENCLOSURE INSTALLATION
- A. Install concrete base level and with top approximately 2 inches (50 mm) above grade.
  - B. Install protective enclosure over valves and equipment and anchor protective enclosure to concrete base.
- 3.11 FIELD QUALITY CONTROL
- A. Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.
  - B. Prior to final acceptance, provide a video record of all piping from the building to the municipal connection to show the lines are free from obstructions, properly sloped and joined.
  - C. Perform hydrostatic tests at not less than one-and-one-half times working pressure for two hours.
    - a. Increase pressure in 50-psi (350-kPa) increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psi (0 kPa). Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts (1.89 L) per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.
  - D. Prepare reports of testing activities.
- 3.12 CLEANING
- A. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
  - B. Use purging and disinfecting procedure prescribed by local utility provider or other authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:
    - 1) Fill the water system with a water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.
    - 2) Drain the system of the previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow system to stand for 3 hours.
    - 3) After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
    - 4) Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.
    - 5) Prepare reports of purging and disinfecting activities.

**SECTION 33 40 00 - STORM DRAINAGE SYSTEM**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 WORK INCLUDED

- A. Provide all equipment and materials, and do all work necessary to construct the storm drainage system complete, including connections to existing structures and testing, as indicated on the Drawings and as specified.

1.3 RELATED WORK

- A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:
  - 1. Section 01 45 00, QUALITY CONTROL; Inspection and testing.
  - 2. Section 31 20 00, EARTH MOVING; Excavation and backfill and establishment of subgrade elevations.
  - 3. Section 32 13 13, PORTLAND CEMENT CONCRETE PAVEMENT; Cast-in-place portland cement concrete paving including concrete banding and concrete walkways.
  - 4. Section 03 30 00, CAST-IN-PLACE CONCRETE; Concrete.
  - 5. Division 22; Furnishing and installing storm drains beyond the limits specified in Paragraph 1.01 B., above, and connecting to these lines.

1.4 REFERENCES

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

- 1. American Association of State Highway and Transportation Officials (AASHTO):

Specifications	Standard Specifications for Highway Bridges
M 294	Corrugated Polyethylene Pipe 12 in. to 24 in. Diameter
M.252	Polyethylene Corrugated Drainage Pipe

2. American Concrete Institute (ACI):
 

318	Building Code Requirements for Reinforced Concrete
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3. American Concrete Pipe Association (ACPA):
 

Manual	Concrete Pipe Design Manual
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4. American National Standards Institute/American Water Works Association (ANSI/AWWA):
 

C110/A21.10	Gray-Iron and Ductile-Iron Fittings, 3 in. through 48 in., for Water and Other Liquids
C111/A21.11	Rubber-Gasket Joints for Ductile-Iron and Gray Pressure Pipe Fittings
C150/A21.50	Thickness Design of Ductile-Iron Pipe
C151/A21.51	Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids
C600	Installation of Ductile Iron Water Mains and their Appurtenances
  
5. American Society for Testing and Materials (ASTM):
 

A 48	Gray Iron Castings
C 32	Sewer and Manhole Brick (Made from Clay or Shale)
C 62	Building Brick (Solid Masonry Units Made from Clay or Shale)
C 76	Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
C 94	Ready-Mixed Concrete
C 139	Concrete Masonry Units for Construction of Catch Basins and Manholes
C 140	Sampling and Testing Concrete Masonry Units
C 270	Mortar for Unit Masonry

C 443	Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
C 478	Precast Reinforced Concrete Manhole Sections
C 789	Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers
C 990	Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
D 448	Sizes of Aggregate for Road and Bridge Construction
D 1557	Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using 10-lb. (4.54 kg) Rammer and 18-in. (475-mm) Drop
D 2321	Underground Installation of Flexible Thermoplastic Sewer Pipe
D 2487	Classification of Soils for Engineering Purposes
D 3034	Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
D 3212	Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
F 436	Hardened Steel Washers

## 1.5 SUBMITTALS

- A. Product data. Unless otherwise indicated, submit the following for each type of product provided under work of this Section: Manufacturer's product data shall be submitted for the following:

Area drain  
 Castings  
 Pipe and fittings  
 Precast concrete structures

### 1. Recycled Content:

- a. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.

- b. Indicate relative dollar value of recycled content product to total dollar value of product included in project.
- c. If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
- d. If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.

2. Local/Regional Materials:

- a. Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
- b. Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
- c. Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
- d. Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

B. Shop Drawings: For the following:

- 1. Manholes: Include plans, elevations, sections, details, and frames and covers.
- 2. Catch Basins and Area Drains. Include plans, elevations, sections, details, and frames, covers, and grates.

C. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

D. Field quality-control test reports.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic manholes, pipe, and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle catch basins, manholes and area drains according to manufacturer's written rigging instructions.



## 1.7 PROJECT CONDITIONS

- A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
1. Notify Architect and Owner no fewer than 2 days in advance of proposed interruption of service.
  2. Do not proceed with interruption of service without Owner's written permission.

## PART 2 PRODUCTS

### 2.1 CORRUGATED POLYETHYLENE PIPE

- A. HDPE Pipe shall be smooth interior and annular exterior corrugations for use in gravity-flow land drainage applications.
1. Pipe shall meet requirements of ASTM F 2648.
  2. Manning's "n" value for use in design shall be 0.012.
  3. Pipe shall be joined using a bell & spigot joint meeting ASTM F 2648. The joint shall be soil-tight and gaskets, when applicable, shall meet the requirements of ASTM F477. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris. A joint lubricant supplied by the manufacturer shall be used on the gasket and bell during assembly.
  4. Fittings shall conform to ASTM F 2306. Bell and spigot connections shall utilize a spun-on or welded bell and valley or saddle gasket meeting the soil-tight joint performance requirements of ASTM F 2306.
  5. Material for pipe production shall be an engineered compound of virgin and recycled high density polyethylene conforming with the minimum requirements of cell classification 424420C (ESCR Test Condition B) for 4- through 10-inch (100 to 250 mm) diameters, and 435420C (ESCR Test Condition B) for 12-through 60-inch (300 to 1500 mm) diameters, as defined and described in the latest version of ASTM D3350, except that carbon black content should not exceed 4%. The design engineer shall verify compatibility with overall system including structural, hydraulic, material and installation requirements for a given application.

### 2.2 CAST IRON PIPE AND FITTINGS

- A. Cast iron soil pipe and fittings shall be extra heavy hub and spigot type conforming to ASTM A 74, or no hub-type conforming to CISPI 301, at the Contractor's option.
1. Joints for hub and spigot type shall be rubber gasketed type, conforming to ASTM C 564.

2. Joints for no hub-type shall be made with hubless joint connectors.

### 2.3 DUCTILE IRON PIPE AND FITTINGS

- A. Ductile iron pipe shall be Class 56, conforming to ANSI/AWWA C151/A21.51.
- B. Ductile iron fittings shall conform to ANSI/AWWA C110/A21.20.
- C. Rubber gasket for pipe joint shall conform to ANSI/AWWA C111/A21.11.

### 2.4 MANHOLES AND CATCH BASINS

- A. Precast concrete manholes and catch basins shall conform to ASTM C 478, and shall be similar to those manufactured by Concrete Systems Inc., Hudson, NH; Rotondo and Sons, Inc., Rehoboth, MA 02769; or Hydro Conduit Corporation, Wauregan, CT.
  - 1. Sections shall have tongue and groove joints.
  - 2. Joints between sections shall be flexible, watertight joints, made with preformed butyl rubber joint sealant conforming to ASTM C 990, or rubber gasket joint conforming to ASTM C 443.
  - 3. Each section shall have no more than two suitable lifting holes or cast-in lifting devices.
  - 4. Precast base shall be manufactured with wall openings to receive the ends of pipes which are to be connected to structure.
  - 5. Pipe openings in base shall be minimum size required to receive pipe, and shall be accurately set to conform to the required line and grade.
  - 6. Drain pipe shall be joined to wall of concrete manhole or catch basin with nonshrink grout or flexible manhole sleeve, at the Contractor's option.
- B. Oil and gasoline separator shall be precast concrete and shall conform to ASTM C 913. Oil and gasoline separator shall be spray-coated with Tnemec Series 46-413, or approved equal coal tar-epoxy coating on inside and outside surfaces after brush-off blast surface preparation, for water-tight construction. Coating shall be approximately 9 mils DFT.
- C. Manhole steps shall be either extruded aluminum, conforming to Fed. Spec. QQ-A-200/8, or polypropylene plastic reinforced with 3/8 in. diameter steel rod.
  - 1. Steps shall be drop-front, anti-skid design, 12 in. wide. Projection of front edge of step shall be greater than or equal to 5 in. from manhole wall.
  - 2. Steps shall be embedded 4 in. into manhole wall. Those portions of aluminum steps to be embedded in manhole wall shall receive a heavy coat of heavy-bodied bituminous paint. Coating shall be thoroughly dry before steps are embedded in manhole.
  - 3. Steps in precast sections shall be embedded at time of casting.
- D. Manholes and catch basins shall be designed to safely withstand an AASHTO H-20 loading, as specified in the AASHTO Specifications.

2.5 AREA DRAINS

- A. Area drains shall be similar to NDS Catalog No. 1200, 12 in. x 12 in. Catch Basin, manufactured by National Diversified Sales, Inc.
  - 1. Provide number of openings based on locations and pipe configuration indicated on the Drawings.
  - 2. Include 6 inch catch basin riser.
- B. Area drain frame and grate shall be cast gray iron, conforming to ASTM A 48/A 48M, Class 35B; cast ductile iron. Grates shall be 12 in. square cast ductile iron, ADA compliant, similar to model # STA ADA 12x12 as manufactured by Urban Accessories.

2.6 CLEANOUTS

- A. Cleanouts shall be heavy weight cast iron plug and pipe from finished grade to three feet below finished grade. Plug shall have countersunk head, 4040 Finished Floor Cleanout with square adjustable nickel bronze top manufactured by Jay R. Smith Mfg. Co., Montgomery, AL 36109-0237; Z-1420-3 Supremo C.O., Square Scoriated, Tuf-Top with Nickel Bronze Top, manufactured by Zurn Industries, Inc., Erie, PA 16512, or approved equal.

2.7 BRICK

- A. Brick for support of castings shall be any of the following types:
  - 1. Common brick meeting the physical requirements of ASTM C 62, Grade SW.
  - 2. Clay brick meeting the physical requirements of ASTM C 32, Grade MS.

2.8 PORTLAND CEMENT MORTAR

- A. Mortar shall be a Portland cement mortar conforming to ASTM C 270, Type M.
- B. Mortar shall contain a waterproofing admixture. Waterproofing admixture shall be one of the following:

<u>Admixture</u>	<u>Manufacturer</u>
Hydratite Plus	W.R. Grace and Company
Medusa Waterproofing	Medusa Portland Cement Company
Omicron Mortarproofing	Master Builders Company
Mortaron	The Aquabar Company
Hydrocide Powder	Sonneborn Building Products, Inc.

2.9 NONSHRINK GROUT

- A. Grout shall be nonshrink cement-based type, such as Master Builders Company "Embeco" or U.S. Grout Corporation "5 Star Grout".

2.10 CASTINGS

- A. Manhole and catch basin frames, covers, and grates shall be cast iron, conforming to ASTM A 48, Class 35.
- B. Catalog numbers are provided to establish a standard of quality and configuration of castings. Equal products manufactured by Neenah Foundry Co., Neenah, WI; E.L. LeBaron Foundry, Brockton, MA; Quality Water Products, Barre, MA, or approved equal are acceptable.
- C. Castings shall be as follows:

<u>Service</u>	<u>Manufacturer</u>	<u>Type No.</u>
Drain Manhole	Neenah Foundry Co.	R-1769-A
Catch Basin	Neenah Foundry Co.	R-3339-B
Cleanout	Zurn	Z-1420-25
Oil Interceptor Hood	Neenah	R-3701

- 1. Catch basin at curb shall have three flanges. Double catch basin shall have two frame and grate sets with each frame having three flanges. All other catch basin frames shall have four flanges.

- D. Castings shall have shop-applied coal-tar-pitch varnish coating.

2.11 BITUMINOUS PAINT

- A. Bituminous paint shall be Koppers Company, Inc., "Bitumastic Black Solution", Sonneborn Building Products, Inc., "Gilsonite Base Paint", or equivalent bituminous-base product.

2.12 ASPHALT MASTIC CEMENT

- A. Asphalt mastic cement shall be an pitch-base or asphalt-base compound fibrated with non-asbestos fibers conforming to Fed. Spec. SS-C-153.

2.13 PIPE BEDDING AND BACKFILL MATERIALS

- A. Pipe bedding shall extend from bottom of trench to the spring line of the pipe. Bedding material shall be clean coarse sand, well-rounded pea gravel, or well-rounded crushed rock with maximum particle size of 1-1/2 in.
- B. Material around pipe from the spring line to a point at least 12 in. over the top of the pipe shall be selected backfill. Selected backfill shall be clean, well graded material of Soil Types GW, GP, GM, GC, or SW, as classified by ASTM D 2487. Maximum particle size shall be 4 in.

2.14 PRECAST CONCRETE OUTLET STRUCTURE

- A. Outlet structure shall be precast concrete construction.
- B. Precast concrete outlet structure shall be precast reinforced concrete to size, shape and dimensions indicated on the Drawings.
- C. Precast concrete outlet structure shall conform to ASTM C 789.
- D. Precast concrete outlet structure shall be designed to safely withstand an AASHTO H-20 loading as specified in AASHTO Specifications.
- E. Structure shall be four sided with open ends and shall be monolithically cast of reinforced concrete. Reinforcing steel shall conform to ASTM A 615, Grade 60. Concrete shall have a minimum 28 day compressive strength of 5,000 psi. Design and construction of structure shall meet the requirements of ACI 318 and the AASHTO Load Factor design method.
  - 1. Structure shall have no more than two suitable lifting holes or cast-in lifting devices.
  - 2. Structure shall be manufactured with wall opening to receive the end of pipe which is to be connected to structure.
  - 3. Pipe openings shall be minimum size required to receive pipe, and shall be accurately set to conform to the required line and grade.
  - 4. Reinforced concrete drain pipe shall be joined to wall of concrete outlet structure with nonshrink grout or flexible manhole sleeve, at the Contractor's option.
  - 5. The exterior surfaces of outlet structure shall be given one shop coat of bituminous paint.

### PART 3 EXECUTION

#### 3.1 PIPE INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Piping shall be installed as indicated on the Drawings. Where exact locating dimensions of piping are not given on the Drawings, the Architect's approval shall be obtained for proposed locations before installation.

1. Bottom of trench excavation shall be kept dry and free of water during pipe installation. Adequate measures shall be taken to prevent flotation of pipe in the trench.
  2. Pipe shall be laid with the groove or bell end upstream. Bell shall rest over a shallow excavation in pipe bedding to prevent pipe weight from bearing on bell.
  3. Each pipe length shall be installed to form a close joint with the next adjoining length and bring inverts to the required grade.
  4. No pipe or fitting shall be permanently supported on saddles, blocking, or stones.
  5. Piping shall be properly graded, free from pockets.
  6. Pipe shall be thoroughly cleaned before installation, and shall be maintained free from foreign matter during installation.
  7. Where necessary, tight-fitting temporary wood bulkheads shall be employed to close ends of pipeline at end of each day's work.
  8. Pipe shall not be backfilled until joints have been fully inspected, and approved.
  9. Entire length of pipe shall be thoroughly flushed clean following completion of backfill.
  10. Lifting holes in concrete pipe shall be at top of pipe as installed. Holes shall be sealed with precast concrete plugs. Before plugs are installed, entire contact surface between plug and pipe shall be coated with asphalt mastic. Plug shall be driven home before mastic has set up.
- E. Pipe joints shall be made with rubber gaskets, Portland cement mortar, nonshrink grout, or asphalt mastic compound.
1. Rubber gasketed joint: Pipe gasket shall be installed using lubricants, cements, adhesives, and other accessories and methods recommended by the gasket manufacturer. Pipe and gasket surfaces shall be kept clean until pipe has been properly drawn up and the joint closed. Gaskets and other jointing material shall be placed on the pipe immediately before joint is made up. Jointing materials shall be inspected and defects repaired before joint is completed.
  2. Portland cement mortared joint: Mortar joint shall be caulked with jute or oakum, and remainder of joint depth filled with cement mortar. Jute or oakum may be omitted if joint space is completely filled with mortar, and a continuous bead is left around full circumference on both inside and outside surfaces of pipe. Pipe surfaces to be in contact with mortar shall be thoroughly cleaned and well wetted before joint is made. On inside of pipe, joint shall be left smooth and flush with pipe wall, completely free from obstructions to flow. Joints shall be protected from sun and wind for a minimum of three days following jointing.
    - a. Placing of mortar in joints shall lag at least five pipe sections behind pipe installation. Final four joints shall be made up after last pipe section is in its final position.
    - b. Mortar in bell and spigot pipe joints shall be bevelled off on outside of pipe at a 45° angle to barrel. Mortar shall extend from barrel of one pipe to outermost edge of bell of next pipe.

3. Nonshrink grout joint: Joints shall be as specified for Portland cement mortar above, except using nonshrink grout.
  4. Asphalt mastic joint: Asphalt mastic joint shall be caulked with jute or oakum, and remainder of joint depth filled with asphalt mastic. Jute or oakum may be omitted if joint space is completely filled with mastic, and a continuous mastic bead is left around full circumference on both inside and outside surfaces of pipe. Surfaces of pipe to be in contact with asphalt mastic shall be thoroughly clean and dry when mastic is placed in the joint. Inside of pipe joints shall be left smooth and flush with pipe wall, completely free from obstructions to flow.
    - a. Placing of mastic in joints shall lag at least five pipe sections behind pipe installation. Final four joints shall be made up after last pipe section is in final position.
    - b. Mastic in bell and spigot pipe joints shall be bevelled off on outside of pipe at a 45<sup>o</sup> angle to barrel. Mastic shall extend from barrel of one pipe to outermost edge of bell of next pipe.
- F. Smooth interior corrugated polyethylene pipe installation shall conform to ASTM D 2321. End of polyethylene piping shall be inserted into bell end of adjoining reinforced concrete pipe. Contractor is cautioned regarding extreme care necessary during excavation and installation operations within root zone of existing trees.
- G. Cast iron and ductile iron pipe installation shall conform to ANSI/AWWA C600, Laying Condition Type 4.
- H. Ductile iron pipe and fittings shall be installed in accordance with ANSI/AWWA C600. Ductile iron bell and spigot type pipe and fitting joints shall be caulked with oakum, or joints shall be made with one piece elastomeric rubber gaskets. Hubless type ductile iron pipe joints shall be made with neoprene gaskets and stainless steel clamps.

### 3.2 MANHOLE AND CATCH BASIN INSTALLATION

- A. Manholes and catch basins shall be set to the required elevation and shall be plumb and vertical, with each section in true alignment.
1. Lifting holes in precast sections shall be thoroughly plugged with mortar and finished smooth and flush with adjoining surfaces.
  2. Drain pipe shall extend, around its entire circumference, to inside surface of wall of structure into which it is inserted. Pipe shall be joined to manhole wall using either a flexible manhole sleeve or nonshrink grout. For grouted joints, surface between pipe and wall shall be filled with nonshrink grout.
- B. Provide brick to bring cast iron frame, cover, and grate to required elevation. Completed brick installation shall be coated with at least a 3/4 in. thickness of mortar on outside to provide sealed watertight collar between top manhole or catch basin section and cover or grate frame.

1. Before installation of castings, touch up chipped and scraped areas with one coat of bituminous paint.
  2. Cast iron frame shall be set concentric with manhole or catch basin opening in a full bed of mortar. A thick ring of mortar extending to the outer edge of brick or concrete shall be placed all around the bottom flange of the cast iron frame. Mortar surface shall be smooth and shall be sloped to shed water away from the frame.
  3. Waterproofing shall be added to the mortar for underground masonry in accordance with the waterproofing manufacturer's directions. Other additives will not be permitted in the mortar.
- C. Portland cement-based mixtures used on this work shall receive a minimum of three days of moist curing, which shall start immediately after the material has been placed. Suitable means shall be employed to protect cement-based mixtures from too rapid drying and damage from cold weather and frost.
- D. Where required, connect new piping to existing manholes and catch basins by cutting or breaking into existing structures. Patch and finish with nonshrink grout to Architect's satisfaction.

### 3.3 AREA DRAINS

- A. Install area drains in strict accordance with manufacturer's printed instructions at locations indicated on the Drawings. Set area drains level and accurately in required elevation and position as indicated on Drawings.
- B. Recess grates 1/8 in. below finish grade.

### 3.4 CLEANOUTS

- A. Install cleanouts and riser extension from pipe to cleanout at grade. Use cast-iron soil pipe fittings in pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in pipe.
1. Use light-duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
  2. Use medium-duty, top-loading classification cleanouts in paved foot-traffic areas.
  3. Use heavy-duty, top-loading classification cleanouts in vehicle-traffic service areas.
  4. Use extra-heavy-duty, top-loading classification cleanouts in roads.
- B. Set cleanout frames and covers in earth in cast-in-place concrete block, 18 by 18 by 12 inches (450 by 450 by 300 mm) deep. Set with tops 1 inch (25 mm) above surrounding earth grade.
- C. Set cleanout frames and covers in concrete pavement with tops flush with pavement surface.



### 3.5 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches (610 mm) of backfill is in place, and again at completion of Project.
  - 1. Submit separate reports for each system inspection.
  - 2. Defects requiring correction include the following:
    - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
    - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
    - c. Crushed, broken, cracked, or otherwise damaged piping.
    - d. Infiltration: Water leakage into piping.
    - e. Exfiltration: Water leakage from or around piping.
  - 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
  - 4. Reinspect and repeat procedure until results are satisfactory.
- B. Test new piping systems, underground detention basin, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
  - 1. Do not enclose, cover, or put into service before inspection and approval.
  - 2. Test completed piping systems according to authorities having jurisdiction.
  - 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
  - 4. Submit separate report for each test.
  - 5. Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
    - a. Exception: Piping with soiltight joints unless required by authorities having jurisdiction.
    - b. Option: Test plastic piping according to ASTM F 1417.
    - c. Option: Test concrete piping according to ASTM C 924 (ASTM C 924M).
- C. Leaks and loss in test pressure constitute defects that must be repaired.
- D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

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## APPENDIX



PLAY EQUIPMENT

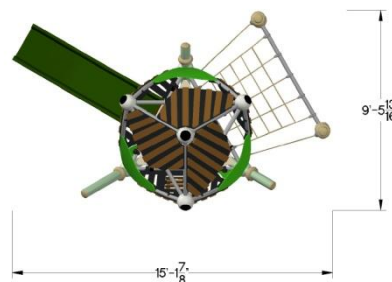




# Product Specification

Berliner Seilfabrik

Product Family	: Greenville tree house
Project Name	: Lincoln Park, MA.
Project Number	: USP.01928
Children's Age	: 3+
Fall Height	: 3'-3"
Dimensions: Length x Width x Height	: 9'-4" x 15'-1" x 10'-4"
Protective Surfacing Area required	: 21'-5" x 27'-0"
Minimum space required	: 445sf
Number of Foundations	: 4 pc.
Concrete Volume C20/C25	: 5,0m <sup>3</sup>
Number of skilled installers required	: 3
Installation Time without foundation	: 12h
Weight of heaviest part	: 35kg
Shipping Volume	: 5,0m <sup>3</sup>
Gross weight	: 600kg
Spare part guarantee	: Lifelong



**Product description (also available as a doc-file upon request):** Greenville tree house TRII 1 with plastic slide, a ladder, and access net as an entrance possibility.

## Steel posts:

Bend steel posts  $\varnothing$  133 mm (5 1/4"), minimum wall thickness 5.0mm (3/16"), with a rounded cast aluminum post top; anticorrosion treatment and color finish: sandblasting and zinc-/epoxy-/ polyester-process.

## Tube framework:

A combination of straight and bended stainless steel Framework<sup>®</sup>-tubes,  $\varnothing$  60,3 m(2 3/8"), material AISI304 (DIN 1.4301). The tubes are connected to build a space framework with a triangular footprint.

## Connecting parts:

Framework-aluminum ball connectors,  $\varnothing$  250mm (9 13/16"), securely closed with durable EPDM-caps & two-part cast aluminum connecting Terranos-clamps; anti-corrosion treatment and color finish: sandblasting and solvent-free epoxy-/ polyester-process. All bolts and nuts which are exposed to the elements are made out of stainless steel.

## Bamboo panels:

Bamboo strips 90mm, (3 1/2") mounted at a particle board made from polyethylene plastic 19mm (3/4") thickness, rounded edges, mounted with aluminium plate clamps to the tubes of the framework.

## Ladder:

Ladder flange made out of stainless steel profile 60x20mm (2-3/8"x 3/4"), steps made out of Bamboo strips 90mm, (3 1/2").

## Access net:

Rope  $\varnothing$  16 mm (5/8"), mesh size 300 x 300mm (11-13/16"x11-13/16"), rope crossing points localized by durable, drop forged aluminum-ballknots (no plastic).

## Attached slide:

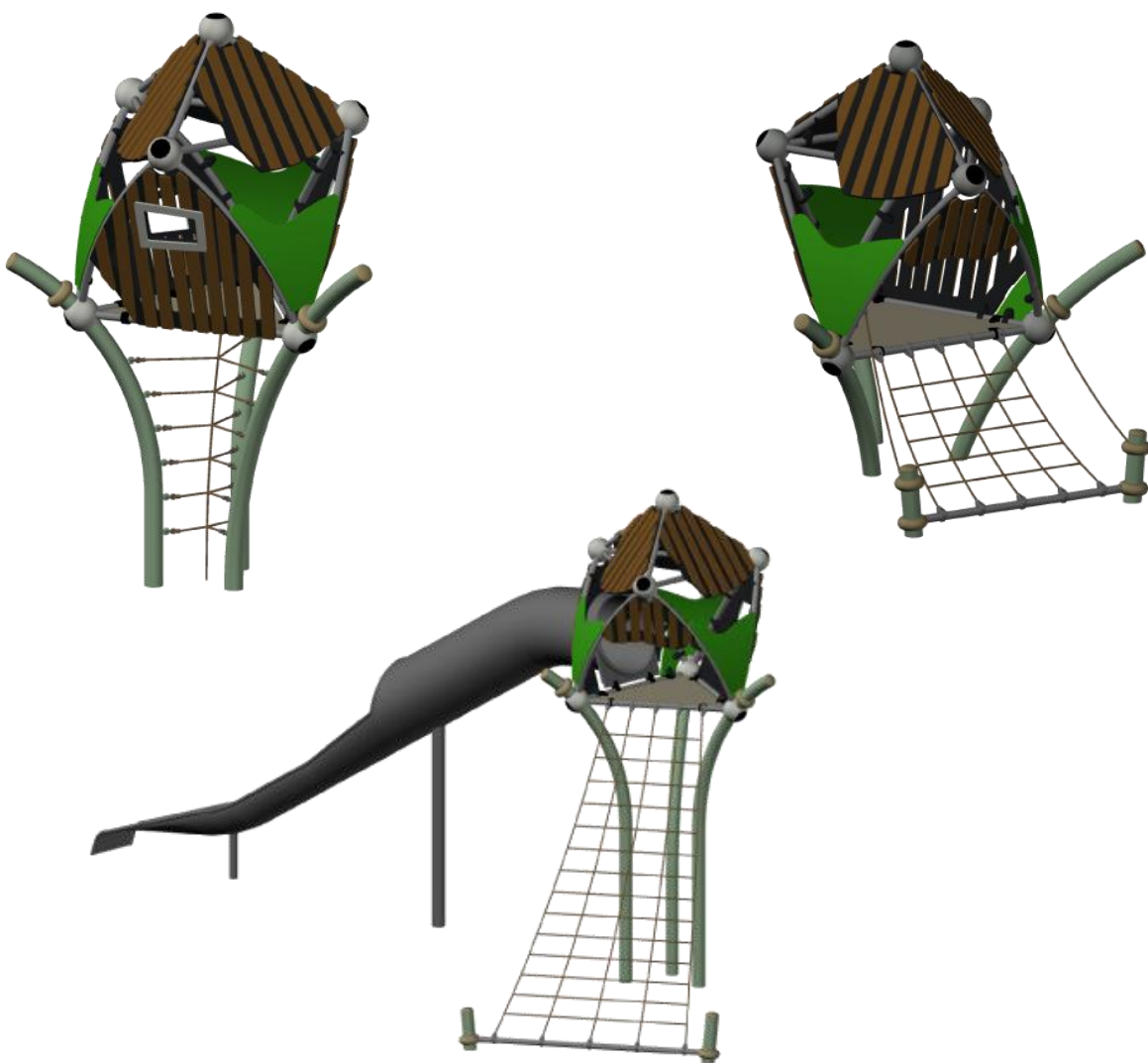
Straight slide made of plastic. Start height 3'-0". Connected to the tube at the framework with BSF-aluminum-slide clamps.





# MOUNTING INSTRUCTION

## Trii-Combis





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## 1 Mounting personnel and tools

### 1.1 Mounting personnel

A minimum of two specialists are required for the correct and professional mounting of this equipment. The mounting personnel must have the requisite knowledge of DIN EN 1176 and of the mounting of rope play equipment.

### 1.2 Tools

- Lifting appliances (e.g. winch, hoist)
- Ladder approx. 4 m length
- Ratchet with ½" square drive
- Extension with ½" square drive, 70 mm length
- Socket wrench insert with ½" square drive
  - drive size 19
  - drive size 30
- Screwdriver insert with ½" square drive
  - drive size 8
  - drive size 17
  - drive size TX45 with safety pin (supplied in delivery)
- impact drill
  - drill Ø14mm for concrete
- Spade
- Wheelbarrow
- Commercially available hammer/rubber hammer
- Spirit level/hydrostatic level
- Wedges / pillar
- Test blocks according to ASTM

Required tools that are not to hand can be supplied at a charge

### 1.3 Structure Mounting Instruction

The shipment contains all of the parts necessary for the assembly and set-up of the structure. The exact extent of the delivery for the structure (steel parts, nets, ropes, assembly material) can be derived from the parts list.



## 2 Foundations

A foundation plan is supplied to help you. This plan shows the positions and sizes of the foundations.

All specified dimensions (including overall heights) **MUST** be observed, as the end devices are manufactured based on the foundation plan.

### 2.1 Foundation construction

The following steps must be performed in order to create the foundations and the foundation frame:

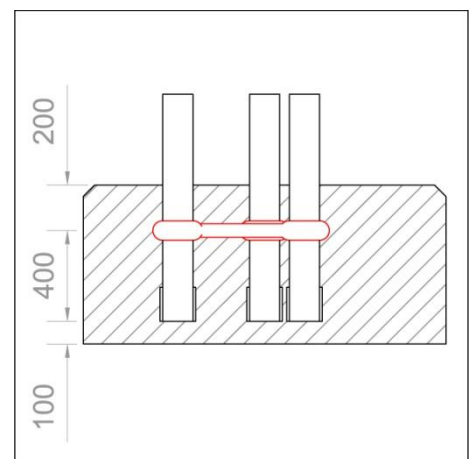
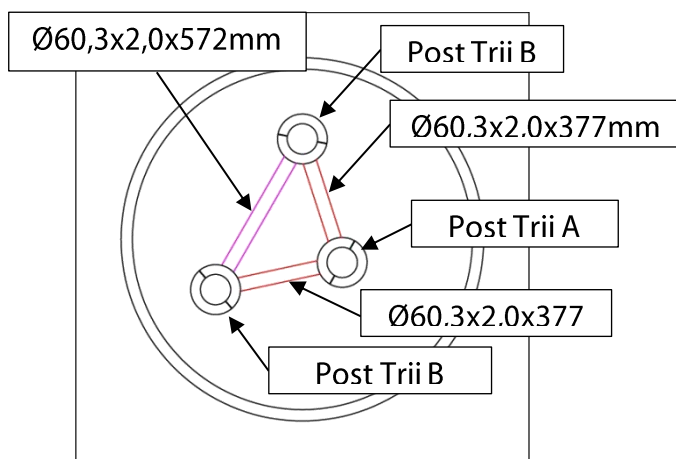
- ⇒ Approximately determine the foundation pits on site (according to the foundation plan)
- ⇒ Excavate the pits (as dimensioned in the foundation plan)
- ⇒ Fill the pits with concrete
- ⇒ Crabbing the concrete (There is needed a smooth bearing for the foundation plates, when the steel is fixed with chemical anchors)
- ⇒ **Attention: C20/25 is the minimum concrete quality**
- ⇒ Allow the concrete to set for around 1-2 weeks
- ⇒ If the concrete is completely dry, you can drill the foundation plates on the foundation and mount the posts on the foundation tubes

### 2.2 Foundation details Access Net

The Access Net is fixed between on a system tube between 2 posts. The system tube needs to be pre-mounted to get sure that the measure between the posts is correctly. We advise to use sleeve foundations.

### 2.3 Foundation details Trii's

The Trii's are placed in the pits with a foundation frame. This frame needs to be pre-mounted, to get sure that the measure between the posts is correctly. After installing the frame and adjusting the Trii, the pits can be filled with concrete. The frame will stay in the concrete.





## 2.4 Installing the connection anchors

If the structure is built to fix it with chemical anchors the posts are welded on steel plates. These plates must be fixed on the foundations with connection anchors. How to install them is written below.

The diameters and depths of the bore holes are to be observed, as are the setting times. Prior to application, make sure that the resin flows like honey from a cartridge that is warm to the touch. Do not use damaged cartridges. Store cartridges in a cool place in the original packaging and protect against direct exposure to sunlight. Brush or blow out the bore holes. Drive the anchor rod to the bottom of the bore by turning and hammering it (with a drill hammer). Any mortar coming out of the bore hole is to be subsequently removed. Installation has been performed correctly when the setting mark of the anchor rod is flush with the edge of the bore hole and the ring gap has been completely filled with mortar.

### Setting times:

Temperature in the ground (°C)

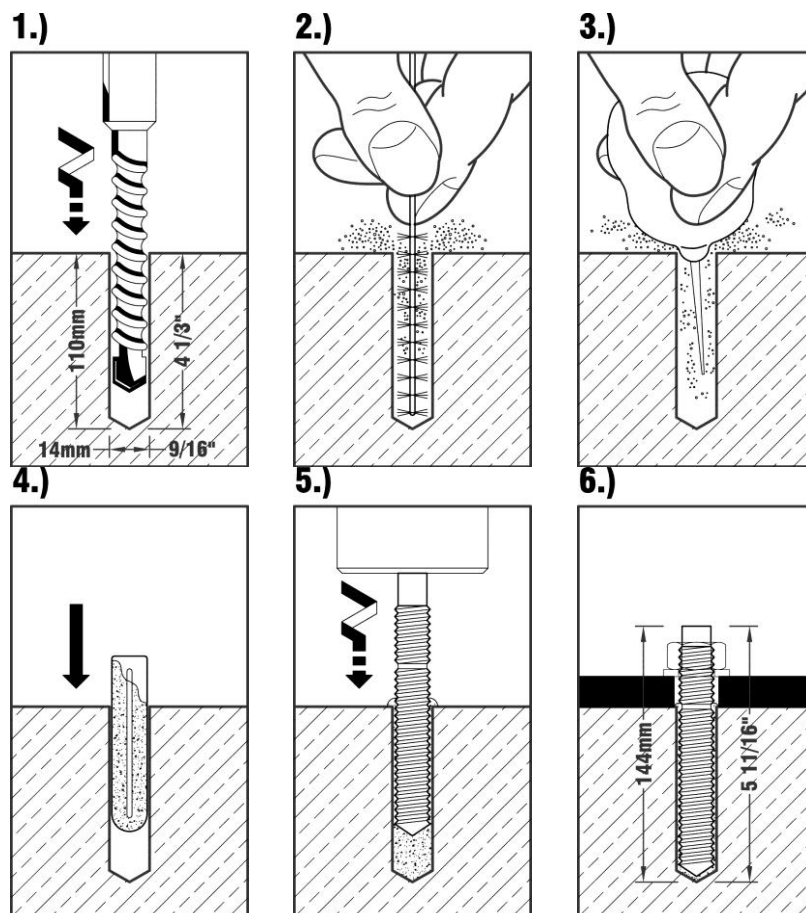
Setting time (min) with dry concrete

Setting time (min) with wet concrete

Over +20°  
+11° to +20°  
+5° to +10°  
-5° to +4°

10 min  
20 min  
60 min  
300 min (=5h)

20 min  
40 min  
120 min  
600 min (=10h)





## 3 Mounting the connecting components

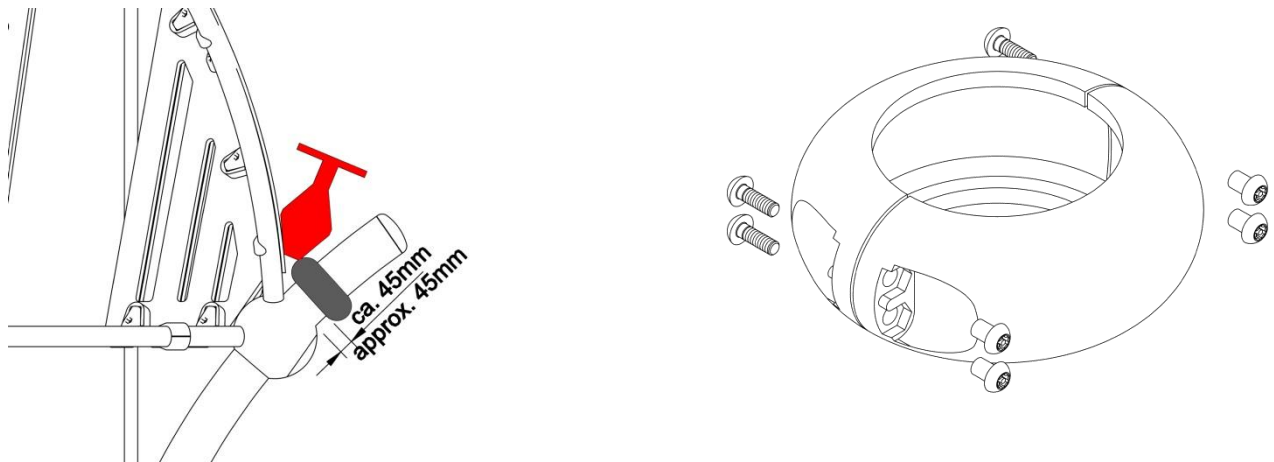
The mounting of the system components happens by the BSF connecting system.

- Terranos®-camps (with Frox-, ChroX-connection, Tube-connection)
- Ropeclamps
- Panelclamps
- Shackles

### 3.1.1 Terranos®-Clamp

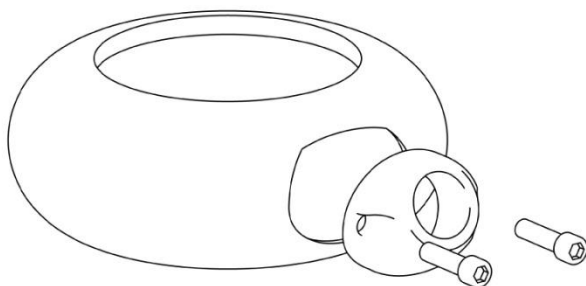
The Terranos®-clamps will be mounted with the screw driver size TX45 with safety pin, the tamperproof screws M8x24mm and the barrel nuts M8 on the post.

At mounting of the Terranos-clamp take care that the position of the clamp at the post avoid entrapments for head and neck, see picture:



### 3.1.2 Frox Connection

The Frox will be mounted with the screw driver size 8, the screws DIN6912 M10x35mm and the safety washers on the Terranos®-clamp.

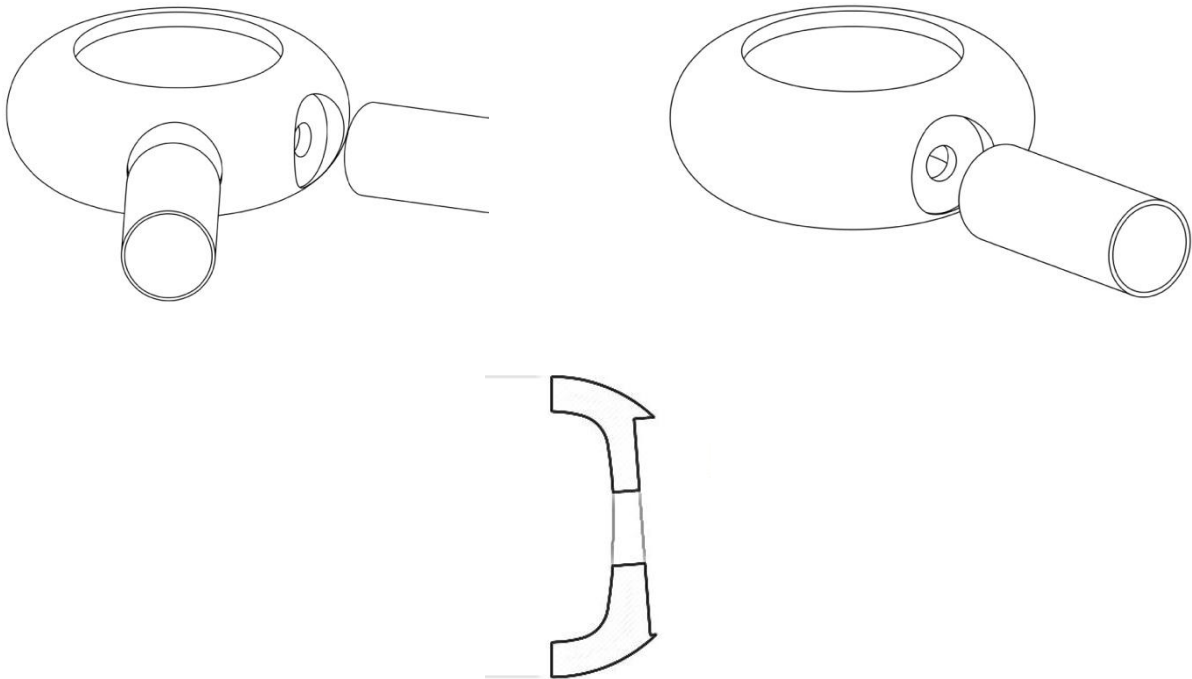


# Greenville Trii



## 3.1.3 Tube-Connection

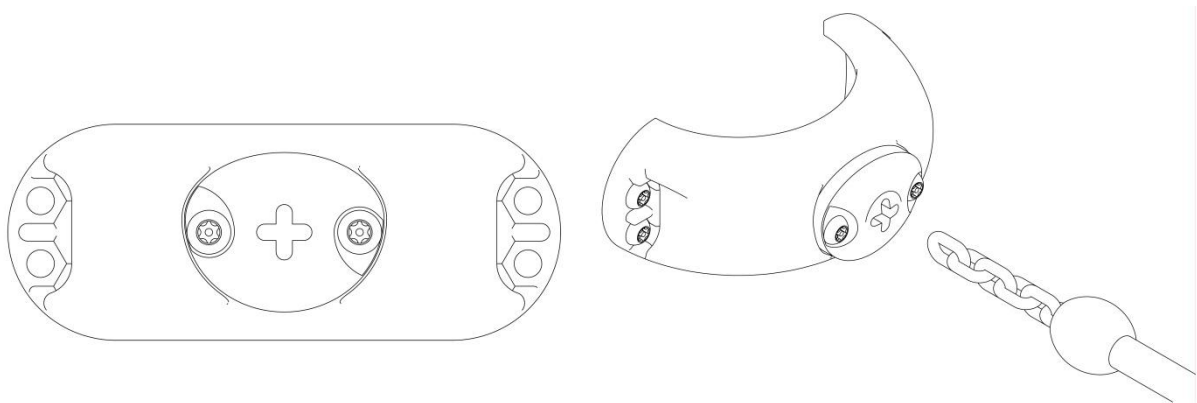
The system tubes are connected with the Terranos®-clamps on the posts. The M-Connection (M4.3 and M5.0 – Name of the connection, standing in the Terranos®-plan) are milled in a special angle, so that the system tubes are leveled to the playground. The system tubes will be mounted with screws M20x70mm DIN6912 and lock washers S20 on the Terranos®-clamps.



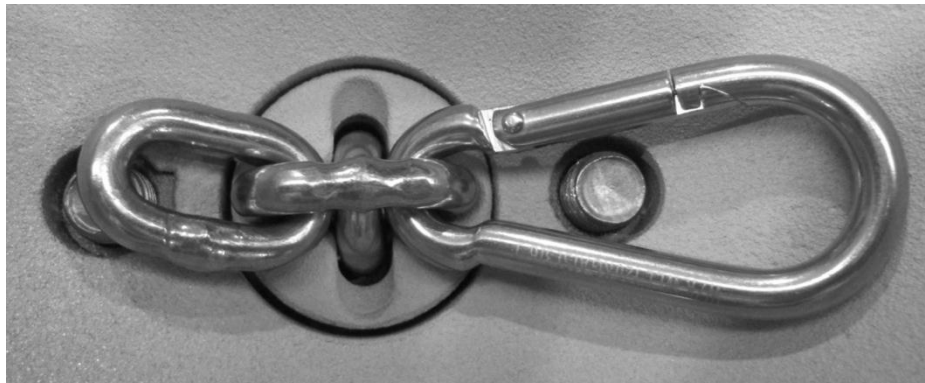
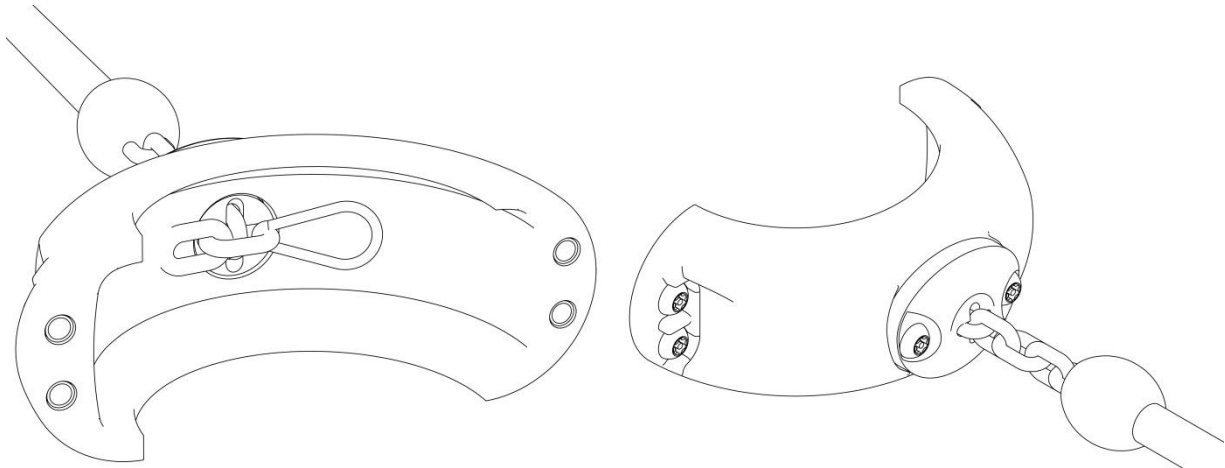
Sectional view of the milled M-connection to show the angle

## 3.1.4 ChroX-Connection

The ChroX is already mounted on the Terranos®-clamp in delivery. The rope ends with the chain must be inserted into the ChroX and fixed with snap-hook.



# Greenville Trii



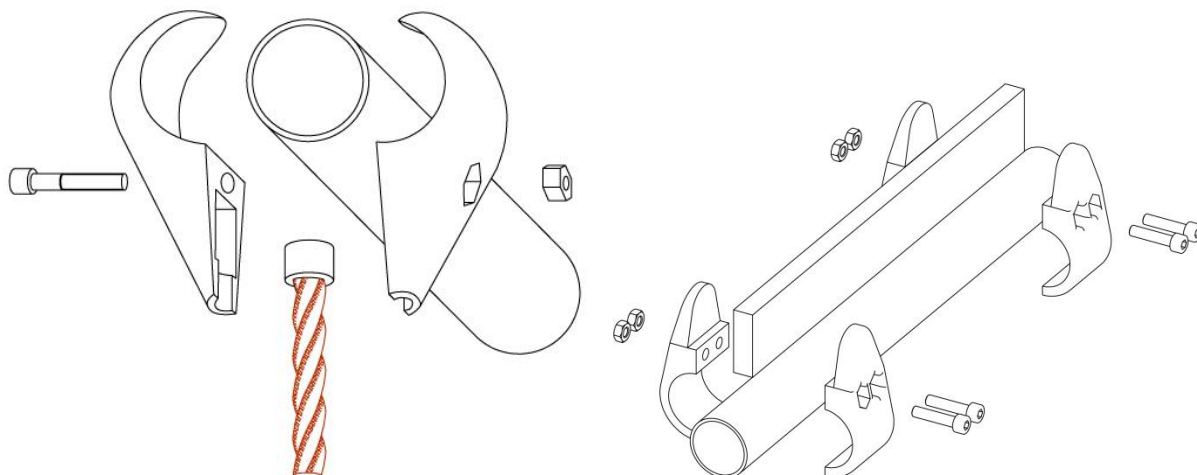
**!!!ATTENTION:** The spring must not bear loads. The load is taken up by the laterally positioned chain link in the ChroX. The spring hook must sit freely and only serves the purpose of fixing the laterally positioned chain link!!!





## 3.1.5 Mounting the Ropeclamps / Panelclamps

Some of the add units (Rope Ladder, Climbing Rope, Slide,...) will be mounted on the system tube with Rope- / and Panelclamps.

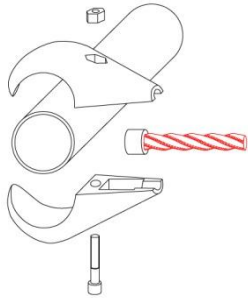


### ATTENTION:

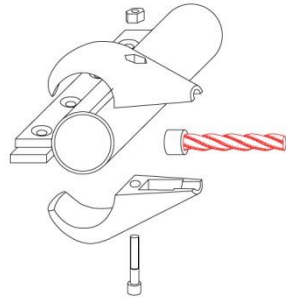
All threaded connections must be smeared with Metaflux® metal anti-seize paste (supplied) to prevent the screw/nut from seizing!!!



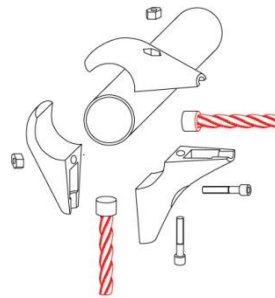
## 3.1.6 Overview rope clamps



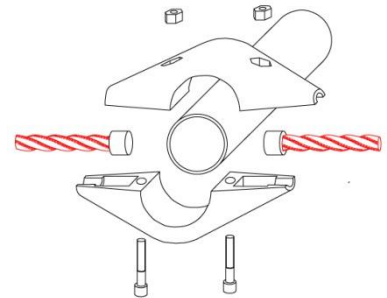
Rope clamp Ø60,3



Rope clamp e Ø60,3  
For flubber mem-  
brane shorten one-  
sided



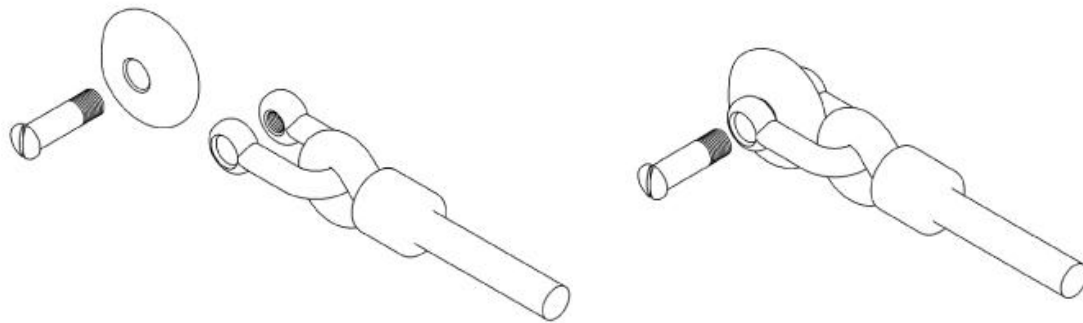
Rope clamp Ø60,3  
90°



Double rope clamp Ø60,3

## 3.1.7 Mounting the Shackles

Some rope components will be mounted with shackles on links. These links are welded on the system tubes and bolt together with the Terranos®-clamps. The shackle is directly pressed on the rope. To connect the shackle with the link, you must loosen the bolt and tighten it with the shackle and the link.



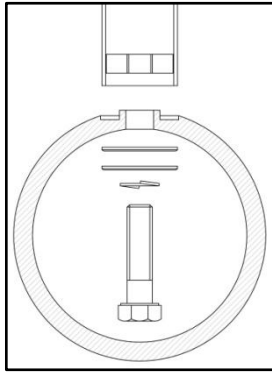
### ATTENTION:

All threaded connections must be smeared with Metaflux® metal anti-seize paste (supplied) to prevent the screw/nut from seizing!!!

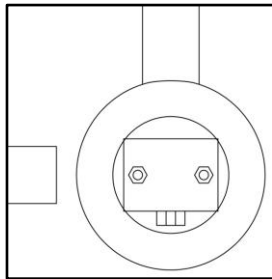


## 3.2 Mounting the Add On Units

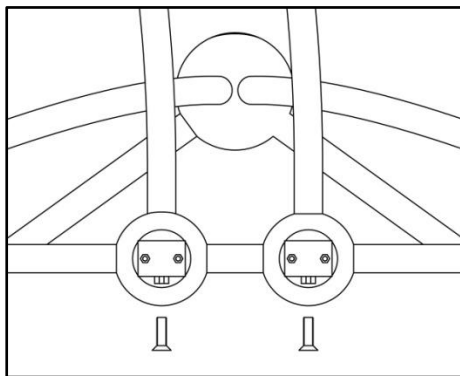
### 3.2.1 Mounting the Banister



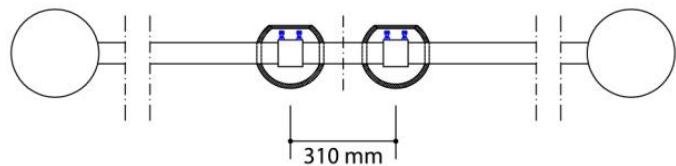
- The Banister will be tightened on the system balls
- **Mounting material:**  
hexagon screw M20x80 DIN933 ZNK  
spring lock washer S20 DIN127 ZNK  
washer M20 DIN9021 ZNK (2 pieces)



- The banisters are then pushed onto the horizontal tube together with the balls and positioned at the centre of the tube



- The banisters are then pushed onto the horizontal tube together with the balls and positioned at the centre of the tube



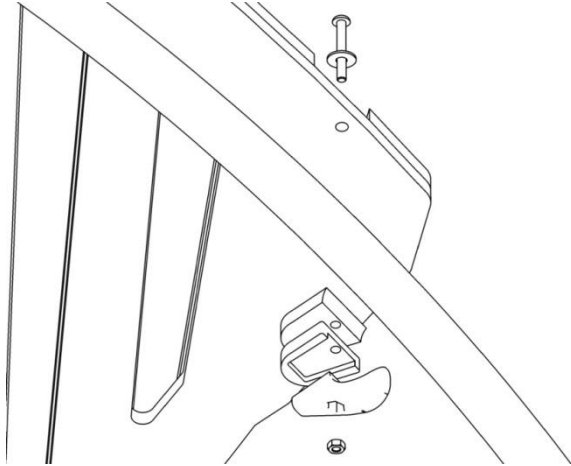
(centre of ball ↔ centre of ball = gap of 310 mm)

- The banister arches are aligned and fixed in the foundations using wedges
- Once everything is seated correctly, the banisters are fixed in place on the tube permanently using the M10x30 DIN 912 VA screws
- **Mounting materials:**  
countersunk screw M20x70 DIN7991 VA  
hexagon screw M10x30 DIN912 VA
- The banister is positioned on the horizontal tube provided for this purpose and pre-mounted on the system tube using the balls, clamping sleeves, screws, spring lock washers and washers supplied so it is hand-tight



## 3.2.2 Mounting the panels

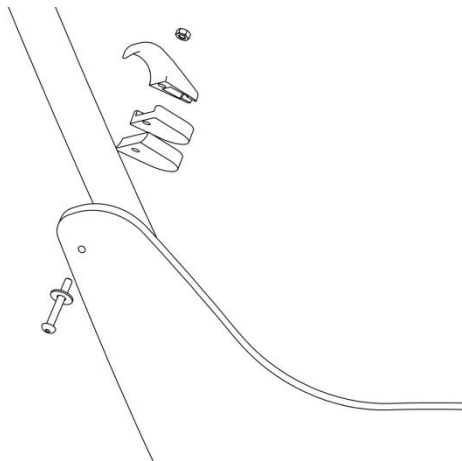
The panels will be mounted with Ropeclamps and HDPE-spacer on the system tubes.



The roof and wall panels are permanently fixed in place on the tube using tube clamps, HDPE spacers and screws/nuts (**ATTENTION: length 80mm**).

### Mounting materials for panels:

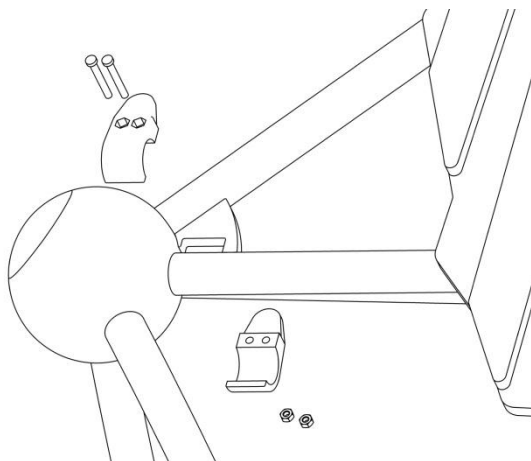
lens screw ISO7380 **M10x80mm**  
 nut M10 DIN985  
 washer M10 DIN9021  
 2x HDPE-spacer



The rails and corner panels for the wall are permanently fixed in place on the tube using tube clamps, HDPE spacers and screws/nuts (**ATTENTION: length 70mm**).

### Mounting materials for panels:

lens screw ISO7380 **M10x70mm**  
 nut M10 DIN985  
 washer M10 DIN9021  
 2x HDPE-spacer



The corner panels for the roof are permanently fixed in place on the tube using plate clamps and screws/nuts

### Montagematerial Eckpanel Dach:

2x hexagon socket screw DIN912 M10x45mm  
 2x nut M10 DIN985



## 3.2.3 Mounting the slide

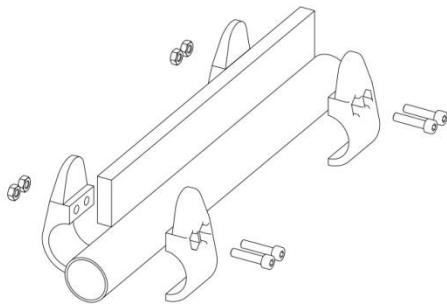
The following information must be observed during Mounting:

- All the drawings required for the Mounting are contained in the set of drawings
- The foundations for the slide are not determined and created until it is about to be attached, as the length dimensions can vary slightly (due to manufacturing tolerances)
- The slide and all associated elements may only be tightened using the tools named in Chapter 1.2 in order to avoid over-tensioning
- C20/25 is the minimum concrete quality

### Attention:

**Consideration must be given to the gradient at the top and bottom of the slide. The gradient must be selected in such a way that water can run off from these areas: this is checked using a spirit level!!!**

- The slide is positioned on the horizontal tube provided for this purpose and fastened to it using the plate clamps supplied so it is hand-tight



- **Mounting materials I:**  
Powder-coated plate clamps  
screws M10x45 DIN 912 VA  
nuts M10 DIN 985 VA

### ➤ Installing the connection anchors

The diameters and depths of the bore holes are to be observed, as are the setting times. Prior to application, make sure that the resin flows like honey from a cartridge that is warm to the touch. Do not use damaged cartridges. Store cartridges in a cool place in the original packaging and protect against direct exposure to sunlight. Brush or blow out the bore holes. Drive the anchor rod to the bottom of the bore by turning and hammering it (with a drill hammer). Any mortar coming out of the bore hole is to be subsequently removed. Installation has been performed correctly when the setting mark of the anchor rod is flush with the edge of the bore hole and the ring gap has been completely filled with mortar.

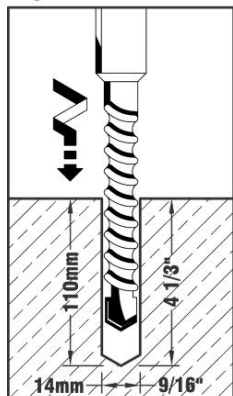
### Setting times:

Temperature in the ground (°C)	Setting time (min) with dry concrete	Setting time (min) with wet concrete
Over +20°	10 min	20 min
+11° to +20°	20 min	40 min
+5° to +10°	60 min	120 min
-5° to +4°	300 min (=5h)	600 min (=10h)

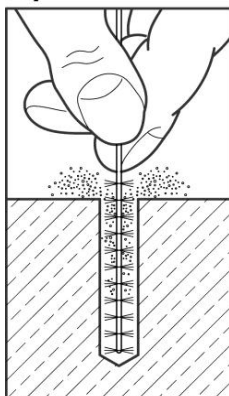
# Greenville Trii



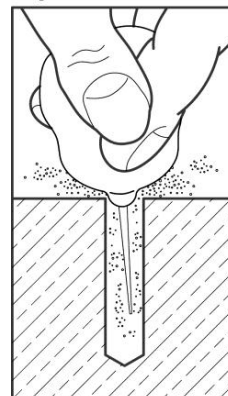
1.)



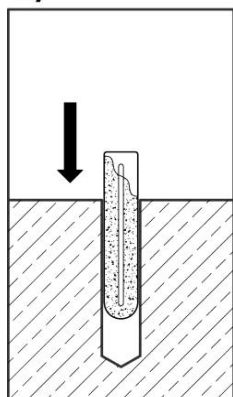
2.)



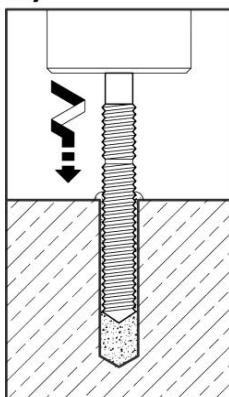
3.)



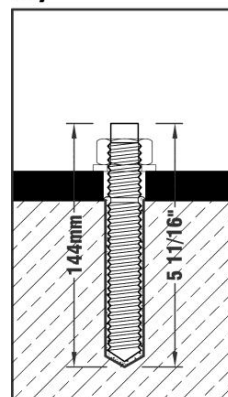
4.)



5.)



6.)

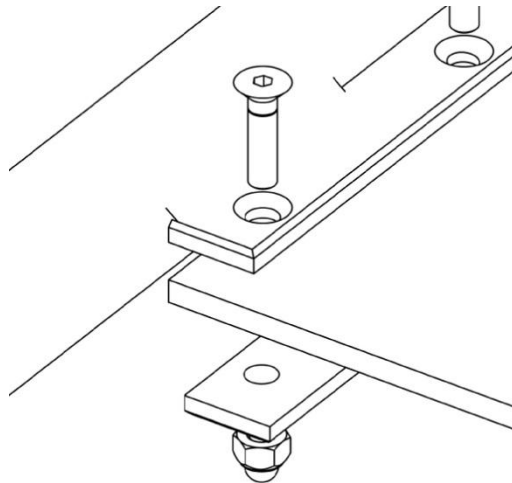




## 3.2.4 Mounting Flubber Membranes / Flubber Bridges

Flubber Membrane and Flubber Bridges will be mounted with steel connection on the system tubes. The upper part is welded on the system tube and the rubber will be fixed by fixing the two steel parts together.

Please take care that the steel connection dispositional to the Flubber Bridge.



## 4 Final work

Once all mounting work has been carried out, all threaded connections must be checked again to ensure that they are seated securely and re-tightened as required. The system balls are sealed with the rubber caps supplied. These can be inserted into the mounting openings by bending them slightly or using a rubber hammer.

Finally, the play level must be restored and the equipment carefully checked for faults/places where a limb could get caught using test pieces according to DIN EN 1176-1. The equipment is manufactured and certified according to DIN EN 1176-1, but incorrect mounting could lead to places where a limb could get caught, which must be eliminated before the play area is opened.



## 5 Mounting Instructions for WIEGAND slides

### Instructions for self-mounting of Wiegand Children slides

All Wiegand stainless steel children slides are playground equipment and correspond to the general and special safety-related requirements according to DIN EN 1176-1 and DIN EN 1176-3. They are provided for an outdoor erection in connection with DIN EN 1176-1 as well as DIN EN 1177.

If erected indoor take special care of observing of free space as well as the characteristic of the playground bottom which have to be considered when erecting outdoor.

The operator is responsible for the installation, inspection and maintenance of shock-absorbing playground bottoms according to DIN EN 1177 as necessary fall protection according to DIN EN 1176-3 in the section of bounding space.

The definition of slides results from DIN EN 1176-3 whereby three main groups have to be distinguished:

- Free-standing slides with ladder
- Ground installed slides of all types
- Slides combined with other equipment

This is valid for wave, tube, endless or curve slides, together or combined. These slides are operated without sliding persons or other auxiliary material.

All slides consist of a seating part (A), the slide part (B) and the exit part (C), the length of the slide results from the addition of the parts B + C, the height of the slide (D) results from the difference in height between the seating part and the bounding section in the exit area.

All slide parts are welded bearing, the seams will be reworked that injuries are impossible, where necessary single parts and welding seams will be grinded, polished and etched.

Small slides are normally prepared and delivered as one part for self-mounting; larger slides can be delivered in several single parts, prepared for self-mounting. We cannot guarantee a correct mounting of the slide parts. Reworks of our supervisors, resulting from mounting errors of the staff will be charged according to our list prices.

### 5.1 Mounting of free-standing slides

One-piece slides will be delivered ready for mounting, if the delivery is divided the ladder and the seating part with the delivered stainless steel screws and the safety nut. Then the slides have to be anchored on the block foundation with heavy-duty dowels according to our system drawings or to they have to be poured in site concrete foundations according to DIN EN 1176-1, page 29, pict. 20. The seating and exit area should have 2° inclination in sliding direction. Should you not have measuring equipment available the inclination could be checked with water. The water poured into the slide should run off in sliding direction slowly in the exit area. A "waterskin" should be absolutely avoided!





## 5.2 Mounting of ground installed slides

One-piece slides will be delivered ready for mounting, if it is a multipart delivery the single parts have to be connected with the stainless steel flange with the delivered stainless steel screws and safety nuts according to the mark. The delivered crossbars have to be bolted with the earth Archs.

The slide bed has to be prepared that the slide can be lifted in one piece on its final position, if necessary with a crane. Should we have enough planning material we will be able to prepare a contour map for the earth works. The inclination of the slide track should be approx. 30°, minimum 28°, maximum 35°. The slide bed should be approx. 25 cm wider than the slide at each side and it should have the half depth of the slide. The earth has to be stored next to the site as it is needed for the backfilling and coverage on the earth anchorage after the installation of the slide. The seating part could be bolted on the upper block foundation which is the start platform, too.

After reaching its final position the slide can be anchored with the ground. Left and right of the slide the ground anchorage will be rammed very deep into the ground downhill of the crossbars; the crossbar and the earth anchorage have to be provided with a continuous drilling in the middle of the crossing and to be connected with the delivered screws. The welded earth Archs have to be adjusted horizontally, only in this case the user will slide on the racing line. Overlaying earth anchorages, crossbars and thread parts will be cut, fin lines and edges have to be removed. Seating and exit area have to be assembled as described under pos. 1 ("Water test"). The slide exit will be fixed or screwed or poured into site concrete according to DIN EN 1176-1 (as mentioned above).

Afterwards the side space of the slide bed has to be filled with the stored earth; the earth anchorage has to be covered and the slope has to be paved. A seeding of grass and planting with hardwood plants is recommended.

## 5.3 Mounting of supported combined slides

At first the stability proof of the start platform has to be checked. A height of 2,5 m above terrain should not be exceeded with open slides. If it is higher additional safety provisions are necessary.

From a height of more than 2,50 m closed slides are binding prescribed.

Special regulations for nursery schools are not considered!!!

If we have detailed planning documentation we can deliver the foundation drawings; the lengths of the supports are adjusted to the heights according to the planning. Otherwise we will deliver the stainless steel supports in an adequate length resp. according to the agreement.

If all slide parts as well as the supports are connected it can be lifted and positioned resp. put on the prepared foundations. If there are only foundation holes the slide will be fixed provisionally and the supports will be poured in site concrete according to DIN EN 1076-1. The provisional support should be done directly next to the support position as the turning moment takes the strongest effect here. Thereby the positioning of the slide can be made easier.



Seating and exit part should have an inclination of  $2^\circ$ , so the correct inclination of  $30^\circ$  is kept; thereby waterskins are impossible ("Water test"). The foundations are to be covered and reinforced.

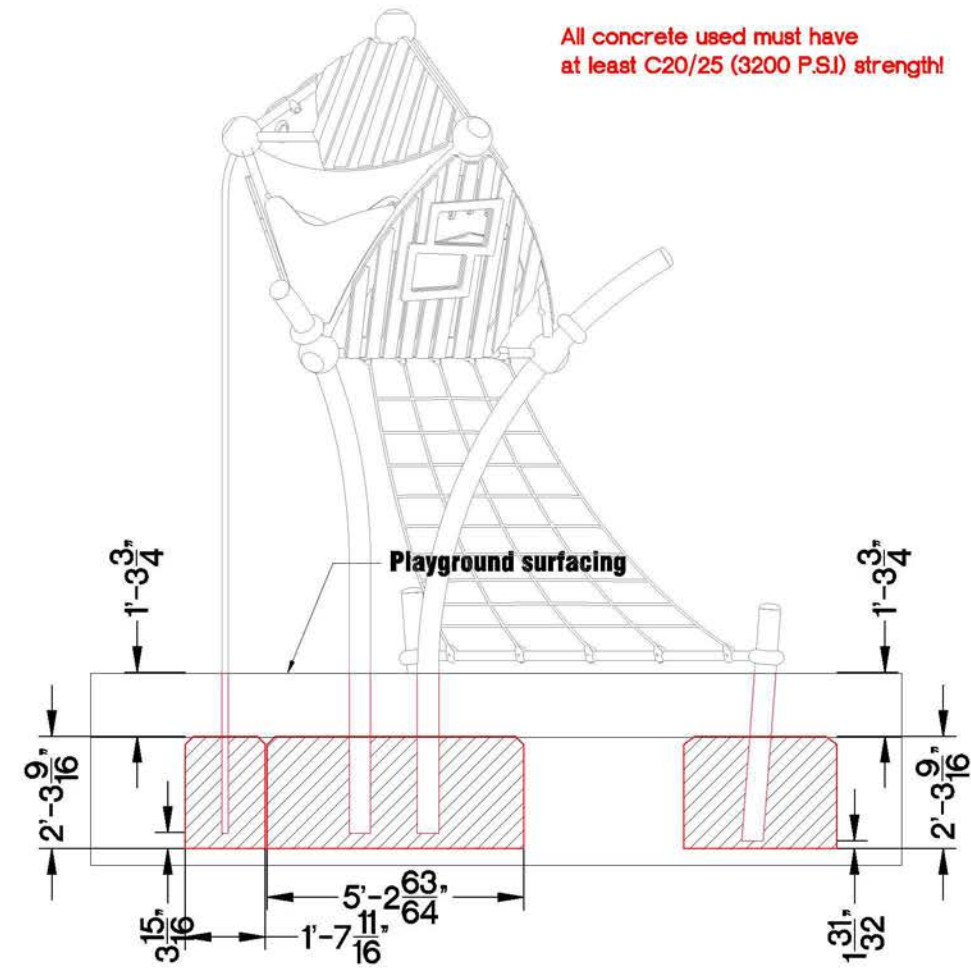
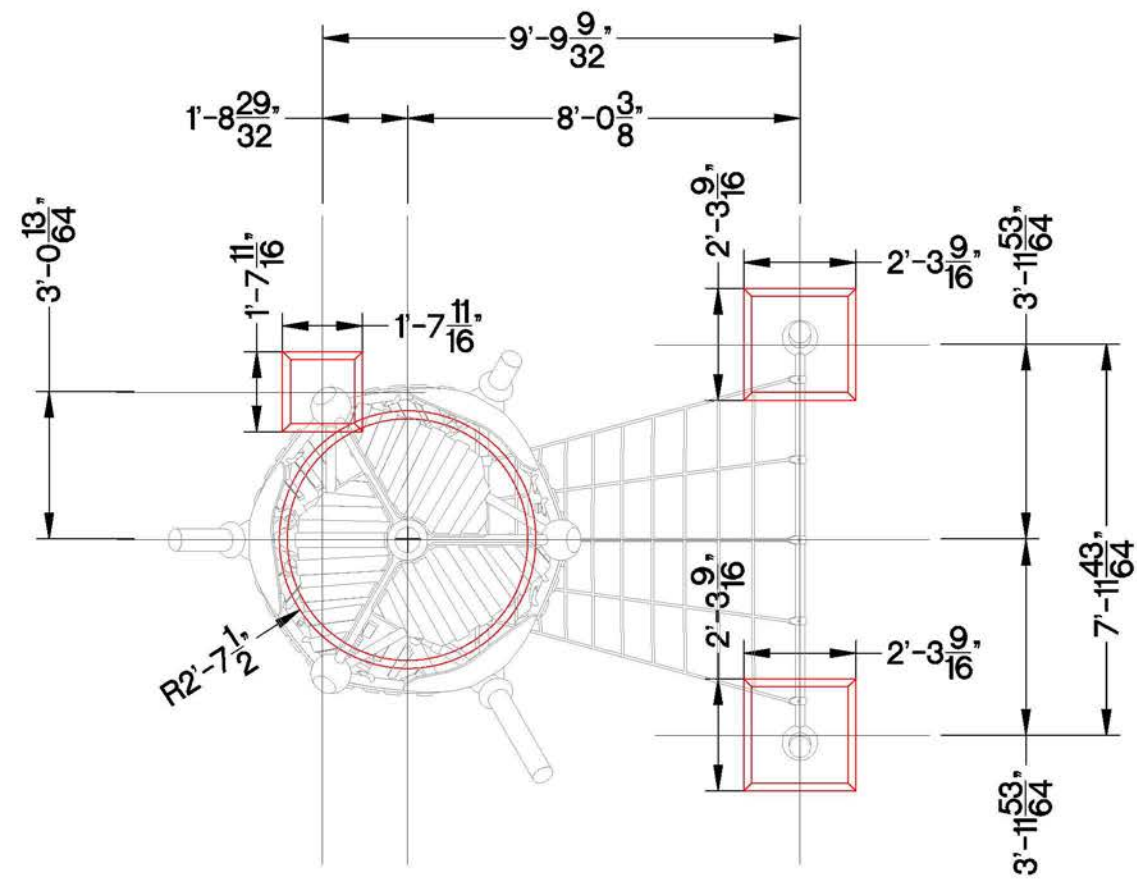
## 5.4 Self supporting combined slides

First of all the stability and/or the static capacitance of the start level need to be checked, too. For the exit section a foundation plate is to be provided and/or to lift out a burrow and to fix the slide temporarily. The start Arch will be connected with heavy duty dowels or similar with the start section and the exit with the foundation plate or to be poured in site concrete. The inclination here should be also in the exit section approx.  $2^\circ$  in slide direction ("water test").

The sections of bounding space at the side as well as the sections of bounding space in the exit section have to be executed with all slides according to DIN EN 1176-3 pict.10; the shock absorbing features have to be assured according to DIN EN 1177.

All slides need to be inspected and maintained according to DIN EN 1176-7 in regular intermittent; the safety of operation always needs to be assured. Regular check of the welding connections and bracings as well as the situation of the floor in the area of the sections of bounding space belong to the test and inspection program. Visual routine inspections should be effected at least one time per week; special attention should be attended to the surface condition and the situation of the welding connections. Operative inspections should be effected at least one time per month; hereby it should be checked, if the operating ability or the stability is endangered by wastage. At least one time per year a main inspection should be effected; beside the common safety of operation and the situation of the surfaces and foundations as well as the fixations need to be controlled. Changes of the device by repairs or additional attached or replaced parts are elements of the safety inspection.

**We advise the assembly of an inspection plan as well as the guidance of test records according to EN 1176-7**



All concrete used must have at least C20/25 (3200 P.S.I.) strength!

**Fundamente / Foundations / Fondations:**

- 2 x Concrete foundation (2'-4" x 2'-4" x 2'-4")
- 1 x Concrete foundation (1'-8" x 1'-8" x 2'-4")
- 1 x Concrete foundation triangle (Ø5'-3" x 2'-4")



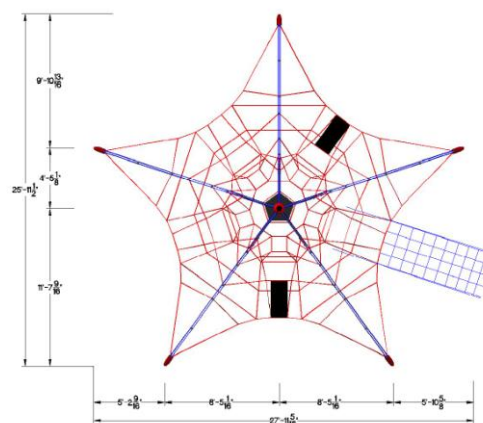
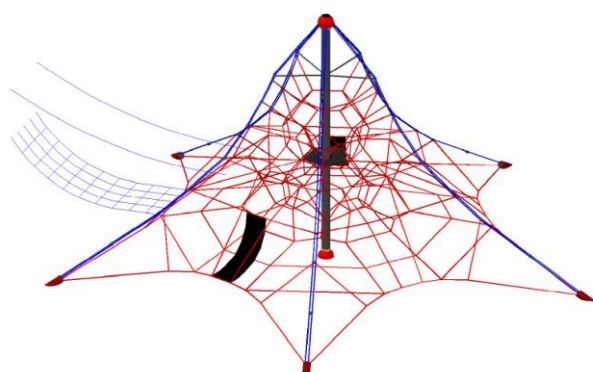
Greenville Trii2.01  
 US90.292.200.111  
 (-) 11'-5" x 13'-8" x 13'-6"  
 ASTM (sq.ft) 433  
 (-) 7'-11"  
 ASTM (-) 77  
 08.20.2014  
 L.VARDANIAN  
 ANSI B 11" x 17"  
 N.T.S.





# Product Specification

Product name : Pentagode  
 Project number : USP.01911-1  
 Children's age : 5+  
 Fall Height : 4'-5"  
 Dimensions: Length, width, height : 26'-11" x 43'-6" x 13'-2"  
 Protective Surfacing Area required : 37'-11" x 39'-3"  
 Minimum space required : 1280 Sq.Ft.  
 Number of foundations : 5  
 Concrete Volume B25 (3.000 psi) : 5.5 m<sup>3</sup>  
 Number of skilled installers required : 3  
 Installation time without foundation : 8 hours  
 Dimensions of largest part : Ø 0.14 x 3.69 m  
 Weight of heaviest part : 150 kg  
 Spare part guarantee : Lifelong  
 Certificate according to EN 1176 : No.: Z2 07 04 10256 049 – TÜV Product Service



Product description (on request also available as doc-file):

Net structure Pentagode S with TÜV-certificate according to EN 1176 and a 10 year-warranty-certificate.

Features: (1) Transfer Net, (1) Flubber Seat

Central mast: Steel post 133 x 5mm (5 ¼ x 3/16"), sandblasted and zinc-/ epoxy-/ polyester-powder-coated.  
 Ropes: U-Rope-round strand ropes with steel cores, Ø 16mm (5/8") with galvanized wires, external strands are covered with non-abrasive UV-resistant Polyamide-yarn (no Polypropylene!).  
 External bracing cables: Two parallel U-Rope-round strand ropes with steel cores, Ø 16mm (5/8"); load to failure is 65 kN per cable; galvanized wires surround the core, external strands are covered with non-abrasive UV-resistant Polyamide-yarn (no Polypropylene!).



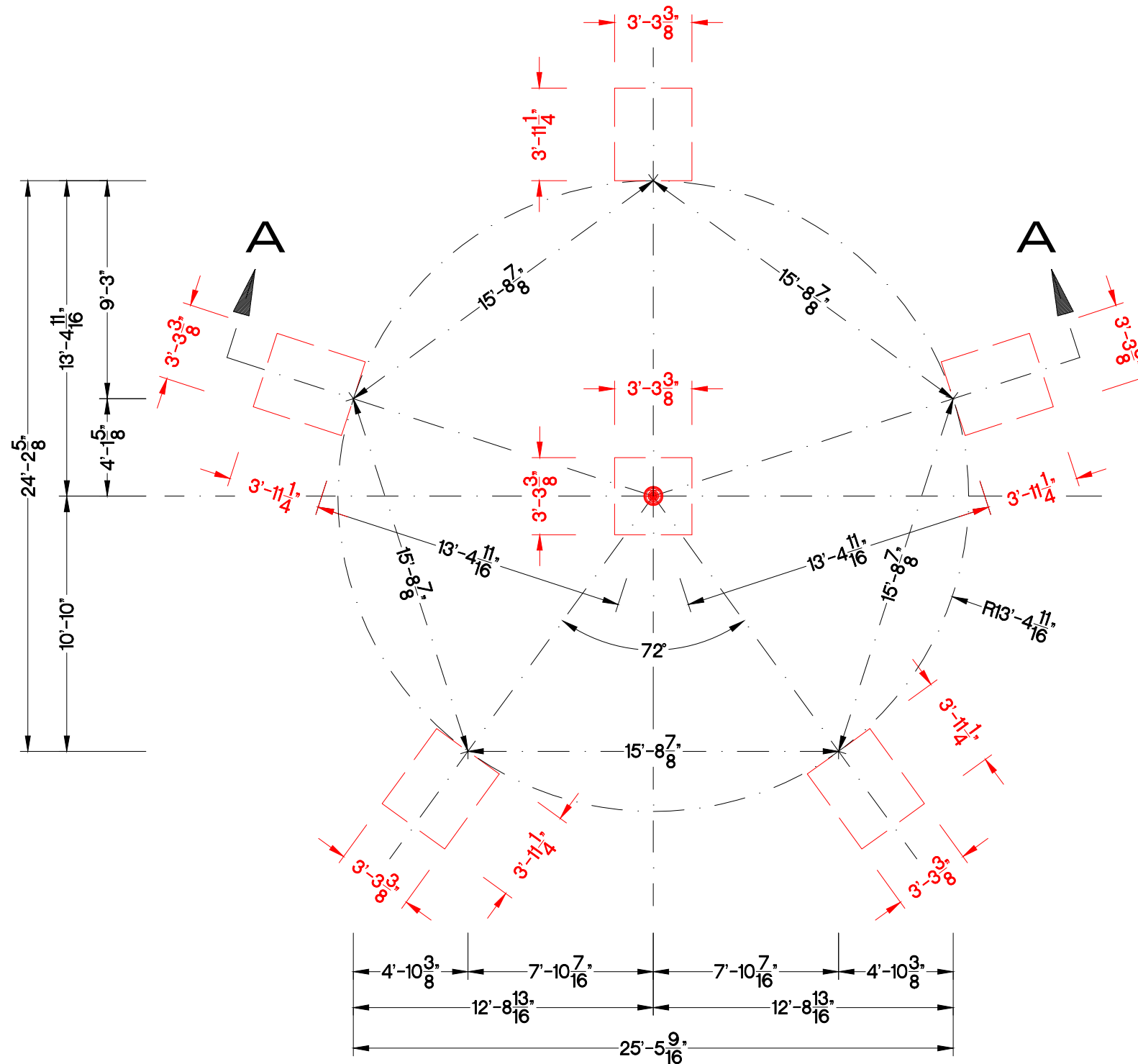
## Product Specification

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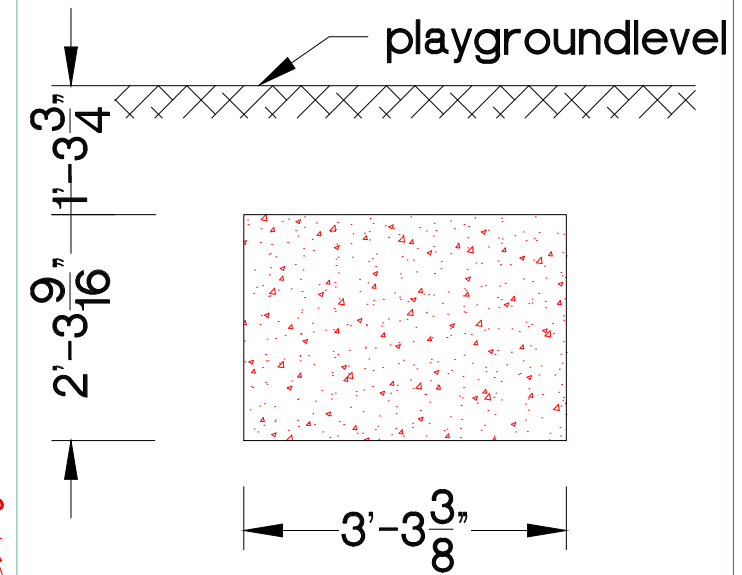
Spatial netting:	Rope crossing points are localized with durable, forged aluminum-alloy cloverleaf rings and forged aluminum-alloy ballknots (no plastic connections); in situ-replaceable rope strands (no special tools required).
Mast node:	<b>Frameworkx</b> -aluminum ball connector, $\varnothing$ 250mm (9-13/16"); sandblasted and zinc-/ epoxy-/ polyester-powder-coated, with inlaying net tensioning system, secured with a durable ebonite cap.

**Attention:**

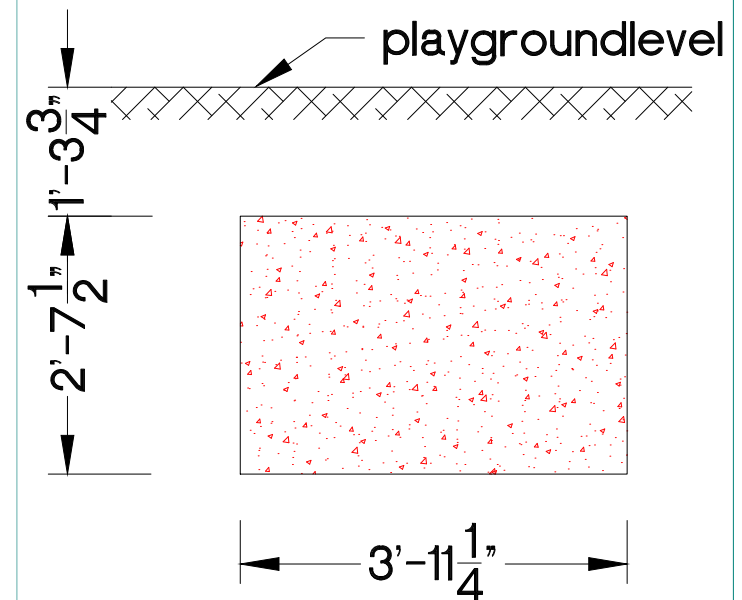
All dimensions leading edge foundation smooth surface



center foundation:  
 1x 3'-3<sup>3</sup>/<sub>8</sub>\" x 3'-3<sup>3</sup>/<sub>8</sub>\" x 2'-3<sup>9</sup>/<sub>16</sub>\"  
 concrete C20/25

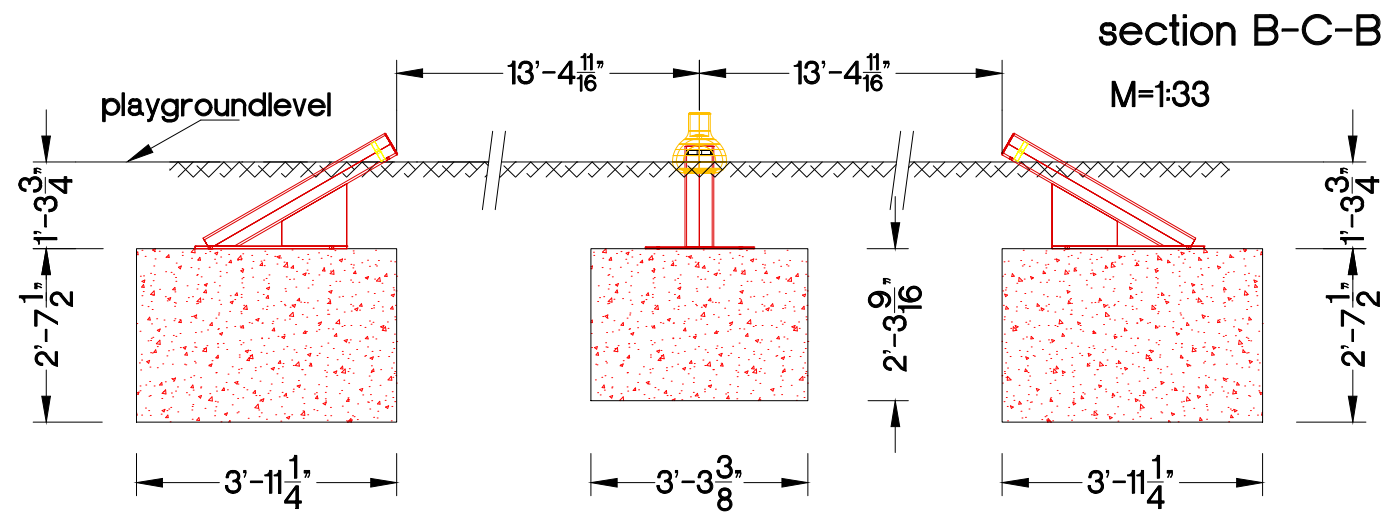


outer foundation point:  
 5x 3'-3<sup>3</sup>/<sub>8</sub>\" x 3'-11<sup>1</sup>/<sub>4</sub>\" x 2'-7<sup>1</sup>/<sub>2</sub>\"  
 concrete C20/25

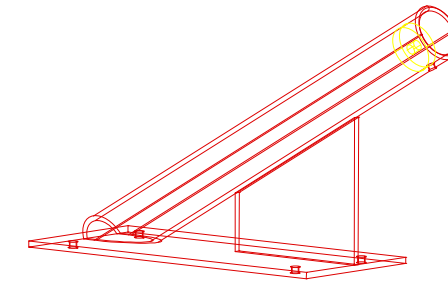


ASTM/CSA  
 Pentagode  
 Pentagode S  
 US.91.200.01011  
 (-) 27'-4\" x 26\" x 13'-2\"  
 ASTM (sq.ft) 980  
 (-) 3'-1\"  
 ASTM (-) 131  
 07.16.2010  
 L.VARDANIAN  
 ANSI B  
 11\" x 17\"  
 3/8\"=1'-0\"





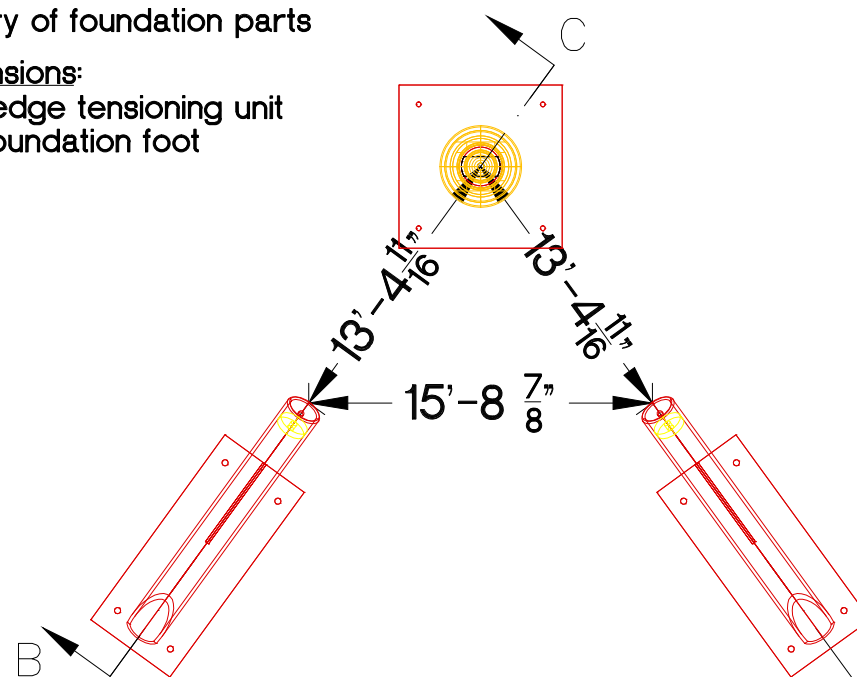
5x outer foundation point



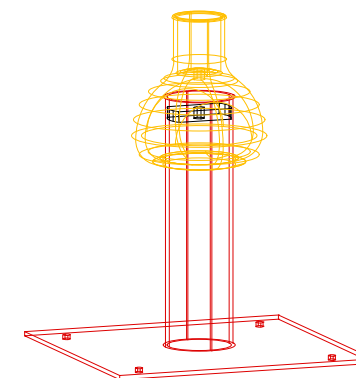
20x mortar M16  
20x anchor M16

Geometry of foundation parts

All dimensions:  
leading edge tensioning unit  
middle foundation foot

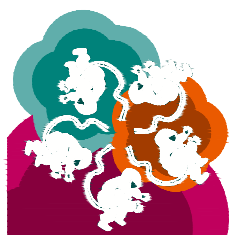


1x foundation stand  
center foundation



4x mortar M16  
4x anchor M16

ASTM/CSA  
 Pentagode  
 Pentagode S  
 US.91.200.01013  
 (-) 27'-4" x 26' x 13'-2"  
 ASTM (sq.ft) 980  
 (-) 3'-1"  
 ASTM (-) 131  
 07.16.2010  
 L.VARDANIAN  
 ANSI B  
 11" x 17"  
 3/8"=1'-0"



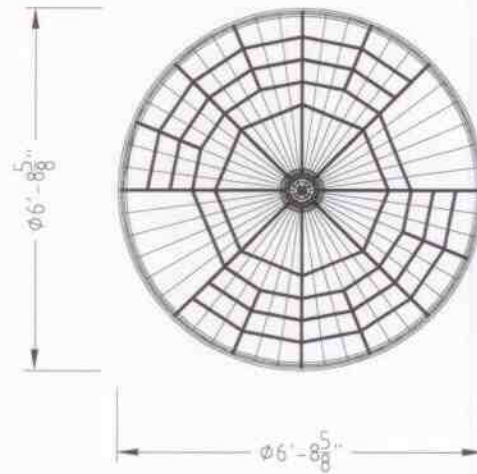


# Product Specification



BerlinerSeilfabrik

<b>Product Family</b>	: PicolinoPlaypoints
<b>Product name</b>	: O'Tannebaum 2.5
<b>Item number</b>	:
<b>Children's age</b>	: 3+
<b>Fall Height (EN1176)</b>	: 1.5 m (4'-11")
<b>Dimensions: Length, width, height</b>	: 6'-9" x 6'-9" x 8'-3"
<b>Protective Surfacing Area required (EN1176)</b>	: 6.1 x 6.1 m
<b>Protective Surfacing Area required (ASTM 1487)</b>	: 18'-9" x 18'-9"
<b>Minimum space required</b>	: <b>EN1176:</b> 28.8 m <sup>2</sup> / <b>ASTM 1487:</b> 276 sq ft
<b>Number of foundations</b>	: 1
<b>Concrete Volume C20/25 (3.000 psi)</b>	: 42 cu ft
<b>Number of skilled installers required</b>	: 3
<b>Installation time without foundation</b>	: 6 hours
<b>Dimensions of largest part</b>	: Ø 5 1/2" x 13'-2"
<b>Weight of heaviest part</b>	: 176lbs
<b>Freight volume</b>	: 60 cu ft
<b>Gross weight</b>	: 660lbs
<b>Spare part guarantee</b>	: Lifelong



Rotatable climber with central mast. Outer netting connected to steel ring is suspended from cables. The base is made from rubber with a robust conveyor-belt-quality allowing easy access for disabled users.

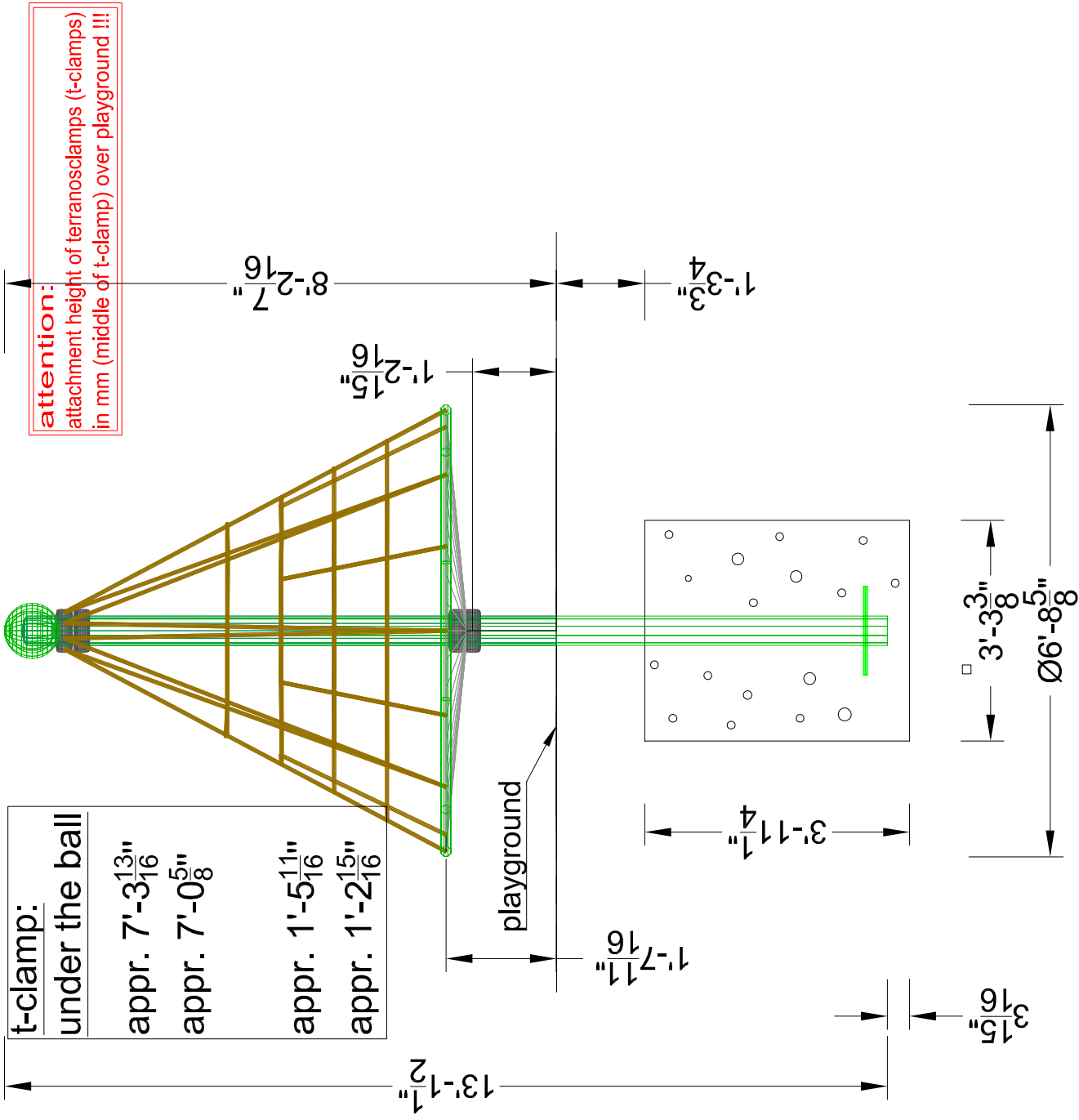
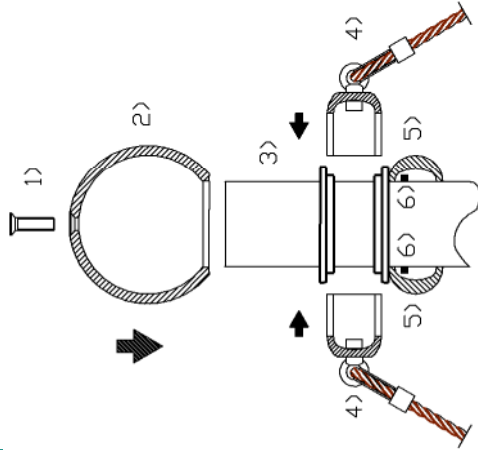
# Product Specification



BerlinerSeilfabrik

Central mast:	Steel pipes $\varnothing$ 133mm (5 1/4"), wall thickness 6.3mm (1/4"); anticorrosion treatment and color finish: sandblasting and zinc-/ epoxy-/ polyester-process.
Mast node:	<b>Frameworkx</b> -aluminum ball connector, $\varnothing$ 250mm (9-13/16"); anticorrosion treatment and color finish: sandblasting and zinc-/ epoxy-/ polyester-process
Outer ring:	Bended Frameworkx-steel pipe, $\varnothing$ 48.3 mm (1 7/8"); anticorrosion treatment and color finish: sandblasting and zinc-/ epoxy-/ polyester-process.
Netting and suspension ropes:	<b>U-Rope</b> -round strand ropes with steel cores, $\varnothing$ 16mm (5/8") – unless otherwise noted ; with galvanized wires, external strands are covered with non-abrasive UV-resistant Polyamide-yarn (no Polypropylene!); Rope crossing points are localized with durable, drop forged aluminum-ballknots (no plastic).
Flubber bottom:	Rotating bottom comprised of durable, vandal-resistant conveyor belt material.

foundation:  
 $3'-11\frac{1}{4}"$   $3'-3\frac{3}{8}"$   $3'-3\frac{3}{8}"$   
 concrete PSI 3000



**Terranos**  
 O'Tannebaum2,5

**KSK.045.11**

(m) 2,05 x 2,05 x 2,50  
 (-") 6'-9" x 6'-9" x 8'-3"

EN 1176 (m²) 28,73  
 ASTM/CSA (m²) 25,56  
 Australian Standard (m²) -----

(m) 1,50  
 (-") 4'-11"

EN 1176 (m) 19,00  
 ASTM/CSA (m) 17,92  
 Australian Standard (m) -----

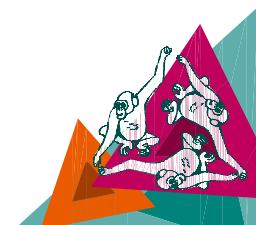
**22.01.2010**

Anno

F.Mokranti-Dutranoy

**DIN A 4**  
 21 cm x 29,7cm

**1:20**





*Product specifications listed were correct at time of publication. However, Henderson Recreation Equipment Limited has a commitment to continuous product development and improvement and therefore reserves the right to improve or alter specifications or discontinue products without notice.*

## GENERAL SPECIFICATIONS

### Steel Components

Steel tube components are Allied Flo-Coat® galvanized steel tube with 0.6 mil (0.015mm) zinc coating and 0.5 mil (0.013mm) internal corrosion coating unless otherwise specified. Steel tube components comply with ASTM standards A-500 or A-513. All other steel is zinc-coated, hot-dipped galvanized, Plastisol-coated, or powder-coat painted, as specified. Steel tube components contain between 30% and 100% recycled content. Steel tube components are 95-98% recyclable.

### Metal Preparation for Powder Coat Paint Finish

Metal preparation for powder coat paint finish consists of either a multiple bath system including a rust-prohibitive iron phosphate wash or sandblasting. Parts are free of excess weld splatter.

### Powder-Coat Paint Finish

Polyester dry powder-coating is electrostatically applied and oven cured at 400°F (200°C). Finished membrane is 3-5 mil (0.076-0.127mm) and includes additives for resistance to ultraviolet (U.V.) degradation. Finished membrane complies with the following performance standards:

- ASTM D 522 (Mandrel Bending)
- ASTM D 2794-90 (Impact)
- ASTM B 117-90 (Salt Spray Resistance)
- ASTM D 3359B (Cross Hatch Adhesion)
- ASTM D 2247-87 (Humidity Resistance)
- ASTM D 3363 (Pencil Hardness)
- ASTM D 822 (Weatherability)
- ASTM D 2454 (Overbake Resistance)

### Welded Components

Welded components are Canadian Welding Bureau (CWB) certified under CSA standards W47.1 Div. 2.1 and W47.2 Div. 2.1.

### Plastisol Coating

Plastisol coating is Denflex PX-12412 poly-

vinyl-chloride with an average thickness of 0.15" (4mm) unless otherwise specified. Prior to coating, parts are chemically washed with phosphate coat 4013A, treated with a spray-on primer at room temperature, and allowed to dry completely. Parts are heated to 350°F (176°C) internal temperature for 3.5 minutes in an 800°F (427°C) oven and submerged in Plastisol. Coated parts are cured in a liquid salt bath at 395°F (202°C). Coating contains flame-retardant additive, ultraviolet (U.V.) ray stabilizer to maintain colour, and fungastat to improve resistance to fungal growth. Tensile strength is 2300 lb/in<sup>2</sup> (15858.5 kPa), tear strength is 419 lb/in (74.8 kg/cm), ultimate elongation is 250%, and shore "A" durometer is 95 +/- 2. Materials comply with the following performance standards:

- ASTM D 624 (Tear Strength)
- ASTM D 412 (Tensile Strength)

### Hardware and Fasteners

All hardware and fasteners are treated to resist corrosion. Hardware and fasteners are tamper resistant unless otherwise specified. All necessary hardware and fasteners are provided.

### Rotationally-Moulded Plastic Parts

Rotationally-moulded plastic parts are moulded from linear medium-density polyethylene resin with ultraviolet (U.V.) light stabilizers and colour moulded in. Rotationally-moulded plastic parts have an average wall thickness ranging from 0.125" (3mm) to 0.375" (10mm), as specified. Rotationally-moulded plastic parts comply with the following performance standards:

- ASTM D 790 (Flex Modulus)
- ASTM D 638 (Tensile Strength)
- ASTM D 648 (Heat Distortion Temperature)
- ARM-STD (Low Temperature Impact)

### 0.75" (19mm) Sheet Polyethylene Parts

0.75" (19mm) sheet polyethylene parts are stress-relieved high-density polyethylene with ultraviolet (U.V.) light stabilizers and anti-static guard. Sheet polyethylene parts contain maximum 67% recycled content and are 100% recyclable. Materials comply with:

- ASTM D 790 (Flex Modulus)
- ASTM D 638 (Tensile Strength)
- ASTM D 648 (Heat Distortion Temperature)

ture)

### Recycled Plastic

Recycled plastic is injection moulded 100% solid blended recycled plastic consisting of 96% polyolefins (HDPE/LDPE/PP), 2% PET, 1% PS, and 1% other. Recycled plastic is ultraviolet (U.V.) light resistant, skid resistant when wet, resistant to infestation by borers, and will not leach. Recycled plastic contains no preservatives. Specific gravity is 0.96. Expansion and contraction with 122°F (50°C) temperature variation is 0.3%. Melting point is 374°F (190°C). Compression strength is 1200 to 2400 lb/in<sup>2</sup> (8274 to 16548 kPa) depending on profile. No absorption, solubility, or evaporation.

## MOTION TOYS

### Accessible Mr. Fishy

Accessible Mr. Fishy is a mechanical assembly of see saw assembly and anchors. See saw assembly is a mechanical assembly of plastic parts, backrest frames, handles, footrests, platform frame, base frame, and spring assembly. Plastic parts are 0.75" (19mm) sheet polyethylene. Backrest frames are a welded assembly of 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat steel. Handles are a mechanical assembly of 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube and 1" (25mm) I.D. x 0.125" (3mm) ultraviolet (U.V.) light stabilized low-density polyethylene tube. Footrests are a welded assembly of 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat steel. Platform frame is a welded assembly of 4" (102mm) square x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 1.5" (38mm) square x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Base frame is a welded assembly of 0.1875" x 1.75" x 6" (5mm x 44mm x 152mm) hot-rolled mild steel channel and 1.5" (38mm) square x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Spring assembly is a mechanical assembly of spring brackets, spring clamps, coil springs, and rubber bumper spring. Spring brackets are a welded assembly of 0.25" x 8" (6mm x 203mm) hot-rolled mild flat steel and 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel. Spring clamps are a welded assembly of 0.5" (13mm) O.D. hot-rolled steel bar, 0.25" (6mm)



assembly of 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 0.25" x 1.5" (6mm x 38mm) hot-rolled mild flat steel. Side beams, base plate, and handles are powder-coat painted. Lower base is a welded assembly of 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 0.1875" x 1.75" x 6" (5mm x 44mm x 152mm) hot-rolled flat steel channel, 0.25" x 3" (6mm x 76mm) hot-rolled mild flat steel, and 0.25" x 0.75" (6mm x 19mm) hot-rolled mild flat steel. Springs are a mechanical assembly of 8" (203mm) O.D. x 0.75" (19mm) type 5160 steel wire, 0.25" (6mm) hot-rolled mild flat steel, and 0.5" (13mm) sheet polyethylene. Springs are powder-coat painted. Clamps are a welded assembly of 0.25" x 2" (6mm x 51mm) hot-rolled mild flat steel and minimum 0.25" (6mm) O.D. hot-rolled steel bar. Anchors are a mechanical assembly of 4" (102mm) square x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 0.25" x 6" (6mm x 152mm) hot-rolled mild flat steel, and minimum 0.1875" x 1.5" (5mm x 38mm) hot-rolled mild flat steel. Anchors are powder-coat painted.

### Elephant

Elephant is a mechanical assembly of side panels, seat assembly, crossbars, spring, upper spring base, and lower spring base. Side panels are 0.75" (19mm) sheet polyethylene. Seat assembly is a mechanical assembly of seat and frame. Seat is 0.75" (19mm) sheet polyethylene. Frame is 10 gauge (3mm) satin-coated steel sheet. Crossbars are a mechanical assembly of 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube and 1" (25mm) I.D. x 0.125" (3mm) ultraviolet (U.V.) light stabilized low-density polyethylene tube. Spring is 5.625" (143mm) O.D. x 0.75" (19mm) type 5160 steel wire. Upper spring base is a welded assembly of 5" (127mm) schedule 40 black steel pipe, 3.5" (89mm) schedule 40 black steel pipe, 0.5" (13mm) square hot-rolled steel bar, 0.375" (10mm) O.D. hot-rolled steel bar, 0.375" x 3.4375" (10mm x 87mm) hot-rolled mild flat steel, and 0.25" x 7.25" (6mm x 184mm) hot-rolled mild flat steel. Lower spring base is a welded assembly of 5" (127mm) schedule 40 black steel pipe, 3.5" (89mm) schedule 40 black steel pipe, 0.5" (13mm) square hot-rolled steel bar, 0.375" (10mm) O.D. hot-rolled steel bar, 0.375" x 3.4375" (10mm x 87mm) hot-rolled mild flat steel, and 0.25" x 1.25" (6mm x 32mm) hot-

rolled mild flat steel. Spring, upper spring base, and lower spring base are powder-coat painted.

### Lucky Clover

Lucky Clover is a mechanical assembly of upper assembly, lower assembly, and spring assembly. Upper assembly is a mechanical assembly of upper support, seat frame, and plastic. Upper support is 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Seat frame is a welded assembly of 14 gauge (2mm) satin-coated steel sheet and 1.5" x 3" (38mm x 76mm) rectangular x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Plastic is 0.75" (19mm) sheet polyethylene. Upper support and seat frame are powder-coat painted. Lower assembly is a mechanical assembly of spring cover, lower support, and plastic. Spring cover is a welded assembly of 14 gauge (2mm) satin-coated steel sheet and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat steel. Lower support is 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Plastic is 0.75" (19mm) sheet polyethylene. Spring cover and lower support are powder-coat painted. Spring assembly is a mechanical assembly of spring, upper spring assembly, lower spring assembly, and chain. Spring is 8" (203mm) O.D. x 0.75" (19mm) type 5160 steel wire. Upper spring assembly is a welded assembly of 4" (102mm) schedule 40 black steel pipe, 3.5" (89mm) schedule 40 black steel pipe, 0.5" (13mm) square hot-rolled steel bar, 0.375" (10mm) hot-rolled steel plate, and 0.25" x 7.25" (6mm x 184mm) hot-rolled mild flat steel. Lower spring assembly is a welded assembly of 4" (102mm) schedule 40 black steel pipe, 3.5" (89mm) schedule 40 black steel pipe, 3.5" (89mm) O.D. Allied Flo-Coat® galvanized steel tube, 0.5" (13mm) square hot-rolled steel bar, 0.375" (10mm) hot-rolled steel plate, and 0.25" x 3" (6mm x 76mm) hot-rolled mild flat steel. Chain is 0.375" (10mm) load grade 70 welded chain. Spring assembly steel components are powder-coat painted.

### Mr. Fishy

Mr. Fishy is a mechanical assembly of see saw assembly and anchors. See saw assembly is a mechanical assembly of plastic parts, handles, footrests, platform frame, base frame, and spring assembly. Plastic parts are 0.75" (19mm) sheet polyethylene. Handles are a mechanical assembly of 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube and 1" (25mm) I.D. x

0.125" (3mm) ultraviolet (U.V.) light stabilized low-density polyethylene tube. Footrests are a welded assembly of 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat steel. Platform frame is a welded assembly of 4" (102mm) square x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 1.5" (38mm) square x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Base frame is a welded assembly of 0.1875" x 1.75" x 6" (5mm x 44mm x 152mm) hot-rolled mild steel channel and 1.5" (38mm) square x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Spring assembly is a mechanical assembly of spring brackets, spring clamps, coil springs, and rubber bumper spring. Spring brackets are a welded assembly of 0.25" x 8" (6mm x 203mm) hot-rolled mild flat steel and 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel. Spring clamps are a welded assembly of 0.5" (13mm) O.D. hot-rolled steel bar, 0.25" (6mm) O.D. hot-rolled steel bar, and 0.25" x 2" (6mm x 51mm) hot-rolled mild flat steel. Coil springs are 8" (203mm) O.D. x 0.75" (19mm) type 5160 steel wire. Rubber bumper spring is a mechanical assembly of frame, plates, and rubber. Frame is a welded assembly of 2.5" (64mm) square x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 2" (51mm) square x 0.125" (3mm) hollow structural steel tube, 0.25" x 6" (6mm x 152mm) hot-rolled mild flat steel, and 0.25" x 4" (6mm x 102mm) hot-rolled mild flat steel. Plates are 0.25" x 8" (6mm x 203mm) hot-rolled flat mild steel. Rubber is 1" (25mm) O.D. neoprene cord. Coil spring steel components are powder-coat painted. Anchors are a welded assembly of 4" (102mm) square x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 0.1875" x 6" (5mm x 152mm) hot-rolled mild flat steel, and 0.25" x 2" (6mm x 51mm) hot-rolled flat mild steel.

### Multi-Spring See Saw

Multi-Spring See Saw is a mechanical assembly of see saw assembly and anchors. See saw assembly is a mechanical assembly of plastic parts, handles, footrests, platform frame, base frame, and spring assembly. Plastic parts are 0.75" (19mm) sheet polyethylene. Handles are a mechanical assembly of 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube and 1" (25mm) I.D. x 0.125" (3mm) ultraviolet (U.V.) light stabilized low-density polyethylene tube. Footrests are a welded assembly of 1.315" (33mm) O.D. x 12 gauge (3mm) Allied

Flo-Coat® galvanized steel tube and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat steel. Platform frame is a welded assembly of 4" (102mm) square x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 1.5" (38mm) square x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Base frame is a welded assembly of 0.1875" x 1.75" x 6" (5mm x 44mm x 152mm) hot-rolled mild steel channel and 1.5" (38mm) square x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Spring assembly is a mechanical assembly of spring brackets, spring clamps, coil springs, and rubber bumper spring. Spring brackets are a welded assembly of 0.25" x 8" (6mm x 203mm) hot-rolled mild flat steel and 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel. Spring clamps are a welded assembly of 0.5" (13mm) O.D. hot-rolled steel bar, 0.25" (6mm) O.D. hot-rolled steel bar, and 0.25" x 2" (6mm x 51mm) hot-rolled mild flat steel. Coil springs are 8" (203mm) O.D. x 0.75" (19mm) type 5160 steel wire. Rubber bumper spring is a mechanical assembly of frame, plates, and rubber. Frame is a welded assembly of 2.5" (64mm) square x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 2" (51mm) square x 0.125" (3mm) hollow structural steel tube, 0.25" x 6" (6mm x 152mm) hot-rolled mild flat steel, and 0.25" x 4" (6mm x 102mm) hot-rolled mild flat steel. Plates are 0.25" x 8" (6mm x 203mm) hot-rolled flat mild steel. Rubber is 1" (25mm) O.D. neoprene cord. Coil spring steel components are powder-coat painted. Anchors are a welded assembly of 4" (102mm) square x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 0.1875" x 6" (5mm x 152mm) hot-rolled mild flat steel, and 0.25" x 2" (6mm x 51mm) hot-rolled flat mild steel.

## Octopus

Octopus motion toy module is a mechanical assembly of upper assembly, lower assembly, and spring assembly. Upper assembly is a mechanical assembly of upper support, seat frame, and plastic. Upper support is 10 gauge (3mm) satin-coated steel sheet. Seat frame is a welded assembly of 14 gauge (2mm) satin-coated steel sheet and 1.5" x 3" (38mm x 76mm) rectangular x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Plastic is 0.75" (19mm) sheet polyethylene. Upper support and seat frame are powder coated. Lower assembly is a mechanical assembly of spring cover, lower support, and plastic. Spring cover is a welded assembly of 14 gauge (2mm) satin-coated steel sheet and 0.1875" x 1.75" (5mm

x 44mm) hot-rolled mild flat steel. Lower support is 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Plastic is 0.75" (19mm) sheet polyethylene. Spring cover and lower support are powder coated. Spring assembly is a mechanical assembly of spring, upper spring assembly, lower spring assembly, and chain. Spring is 8" (203mm) O.D. x 0.75" (19mm) type 5160 steel wire. Upper spring assembly is a welded assembly of 4" (102mm) schedule 40 black steel pipe, 3.5" (89mm) schedule 40 black steel pipe, 0.5" (13mm) square hot-rolled steel bar, 0.375" (10mm) hot-rolled steel plate, and 0.25" x 7.25" (6mm x 184mm) hot-rolled mild flat steel. Lower spring assembly is a welded assembly of 4" (102mm) schedule 40 black steel pipe, 3.5" (89mm) schedule 40 black steel pipe, 3.5" (89mm) O.D. Allied Flo-Coat® galvanized steel tube, 0.5" (13mm) square hot-rolled steel bar, 0.375" (10mm) hot-rolled steel plate, and 0.25" x 3" (6mm x 76mm) hot-rolled mild flat steel. Chain is 0.375" (10mm) load grade 70 welded chain. Spring assembly steel components are powder coated.

## Quad-Spring See Saw

Quad-Spring See Saw is a mechanical assembly of upper assembly, lower base, springs, clamps, and anchors. Upper assembly is a mechanical assembly of plastic components, side beams, base plate, and handles. Plastic components are 0.75" (19mm) sheet polyethylene. Side beams are 1.5" x 3" (38mm x 76mm) rectangular x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Base plate is a welded assembly of 0.25" x 3.5" (6mm x 19mm) hot-rolled mild flat steel and 0.25" x 2" (6mm x 51mm) hot-rolled mild flat steel. Handles are a welded assembly of 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat steel. Side beams, base plate, and handles are powder-coat painted. Lower base is a welded assembly of 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 0.1875" x 1.75" x 6" (5mm x 44mm x 152mm) hot-rolled flat steel channel, 0.25" x 7.25" (6mm x 184mm) hot-rolled mild flat steel, and 0.25" x 3" (6mm x 76mm) hot-rolled mild flat steel. Springs are a mechanical assembly of 8" (203mm) O.D. x 0.75" (19mm) type 5160 steel wire, 0.25" (6mm) hot-rolled mild flat steel, and 0.75" (19mm) sheet polyethylene. Springs are powder-coat painted. Clamps are a welded assembly of 0.25" x 2" (6mm x 51mm) hot-rolled mild flat steel and minimum 0.25"

(6mm) O.D. hot-rolled steel bar. Anchors are a welded assembly of 4" (102mm) square x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 0.25" x 6" (6mm x 152mm) hot-rolled mild flat steel, and minimum 0.1875" x 1.5" (5mm x 38mm) hot-rolled mild flat steel. Anchors are powder-coat painted.

## Rhino

Rhino is a mechanical assembly of side panels, seat assembly, crossbars, spring, upper spring base, and lower spring base. Side panels are 0.75" (19mm) sheet polyethylene. Seat assembly is a mechanical assembly of seat and frame. Seat is 0.75" (19mm) sheet polyethylene. Frame is 10 gauge (3mm) satin-coated steel sheet. Crossbars are a mechanical assembly of 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube and 1" (25mm) I.D. x 0.125" (3mm) ultraviolet (U.V.) light stabilized low-density polyethylene tube. Spring is 5.625" (143mm) O.D. x 0.75" (19mm) type 5160 steel wire. Upper spring base is a welded assembly of 5" (127mm) schedule 40 black steel pipe, 3.5" (89mm) schedule 40 black steel pipe, 0.5" (13mm) square hot-rolled steel bar, 0.375" (10mm) O.D. hot-rolled steel bar, 0.375" x 3.4375" (10mm x 87mm) hot-rolled mild flat steel, and 0.25" x 7.25" (6mm x 184mm) hot-rolled mild flat steel. Lower spring base is a welded assembly of 5" (127mm) schedule 40 black steel pipe, 3.5" (89mm) O.D. x 0.188" (5mm) hollow structural steel tube, 3.5" (89mm) schedule 40 black steel pipe, 0.5" (13mm) square hot-rolled steel bar, 0.375" (10mm) O.D. hot-rolled steel bar, 0.375" x 3.4375" (10mm x 87mm) hot-rolled mild flat steel, and 0.25" x 1.25" (6mm x 32mm) hot-rolled mild flat steel. Spring, upper spring base, and lower spring base are powder-coat painted.

## See Saw

See Saw is a mechanical assembly of frame, crossbars, seat, ground anchor, and spring column. Frame is a welded assembly of 1" (25mm) square x 0.125" (3mm) hollow structural steel tube and 0.25" x 2" (6mm x 51mm) hot-rolled mild flat steel. Frame is powder-coat painted. Crossbars are a mechanical assembly of handles and disc. Handles are a mechanical assembly of 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube and 1" (25mm) I.D. x 0.125" (3mm) ultraviolet (U.V.) light stabilized low-density polyethylene tube. Disc is minimum 0.5" (13mm) sheet polyeth-



ylene. Seat is minimum 0.5" (13mm) sheet polyethylene. Ground anchor is a welded assembly of 2.375" (60mm) O.D. x 0.125" (3mm) hollow structural steel tube, 0.25" x 8" (6mm x 203mm) hot-rolled mild flat steel, and 0.1875" x 2.5" (5mm x 64mm) hot-rolled mild flat steel. Ground anchor is powder-coat painted. Spring column is a mechanical assembly of 2" (51mm) square x 0.125" (3mm) hollow structural steel tube, 0.25" x 6" (6mm x 152mm) hot-rolled mild flat steel, 0.25" x 4" (6mm x 102mm) hot-rolled mild flat steel, 0.1875" x 8" (5mm x 203mm) hot-rolled mild flat steel, 0.1875" x 1.5" (5mm x 38mm) hot-rolled mild flat steel, and 1" (25mm) O.D. neoprene cord. Spring column steel components are powder-coat painted.

## Shark

Shark is a mechanical assembly of side panels, seat assembly, crossbars, spring, upper spring base, and lower spring base. Side panels are 0.75" (19mm) sheet polyethylene. Seat assembly is a mechanical assembly of seat and frame. Seat is 0.75" (19mm) sheet polyethylene. Frame is 10 gauge (3mm) satin-coated steel sheet. Crossbars are a mechanical assembly of 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube and 1" (25mm) I.D. x 0.125" (3mm) ultraviolet (U.V.) light stabilized low-density polyethylene tube. Spring is 5.625" (143mm) O.D. x 0.75" (19mm) type 5160 steel wire. Upper spring base is a welded assembly of 5" (127mm) schedule 40 black steel pipe, 3.5" (89mm) schedule 40 black steel pipe, 0.5" (13mm) square hot-rolled steel bar, 0.375" (10mm) O.D. hot-rolled steel bar, 0.375" x 3.4375" (10mm x 87mm) hot-rolled mild flat steel, and 0.25" x 7.25" (6mm x 184mm) hot-rolled mild flat steel. Lower spring base is a welded assembly of 5" (127mm) schedule 40 black steel pipe, 3.5" (89mm) O.D. x 0.188" (5mm) hollow structural steel tube, 3.5" (89mm) schedule 40 black steel pipe, 0.5" (13mm) square hot-rolled steel bar, 0.375" (10mm) O.D. hot-rolled steel bar, 0.375" x 3.4375" (10mm x 87mm) hot-rolled mild flat steel, and 0.25" x 1.25" (6mm x 32mm) hot-rolled mild flat steel. Spring, upper spring base, and lower spring base are powder-coat painted.

## Train

Train is a mechanical assembly of side panels, seat assembly, crossbars, spring, upper spring base, and lower spring base. Side panels are a mechanical assembly of 0.75"

(19mm) sheet polyethylene. Seat assembly is a mechanical assembly of seat and frame. Seat is 0.75" (19mm) sheet polyethylene. Frame is 10 gauge (3mm) satin-coated steel sheet. Crossbars are a mechanical assembly of 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube and 1" (25mm) I.D. x 0.125" (3mm) ultraviolet (U.V.) light stabilized low-density polyethylene tube. Spring is 5.625" (143mm) O.D. x 0.75" (19mm) type 5160 steel wire. Upper spring base is a welded assembly of 5" (127mm) schedule 40 black steel pipe, 3.5" (89mm) schedule 40 black steel pipe, 0.5" (13mm) square hot-rolled steel bar, 0.375" (10mm) O.D. hot-rolled steel bar, 0.375" x 3.4375" (10mm x 87mm) hot-rolled mild flat steel, and 0.25" x 7.25" (6mm x 184mm) hot-rolled mild flat steel. Lower spring base is a welded assembly of 5" (127mm) schedule 40 black steel pipe, 3.5" (89mm) O.D. x 0.188" (5mm) hollow structural steel tube, 3.5" (89mm) schedule 40 black steel pipe, 0.5" (13mm) square hot-rolled steel bar, 0.375" (10mm) O.D. hot-rolled steel bar, 0.375" x 3.4375" (10mm x 87mm) hot-rolled mild flat steel, and 0.25" x 1.25" (6mm x 32mm) hot-rolled mild flat steel. Spring, upper spring base, and lower spring base are powder-coat painted.

## Wally the Whale

Wally the Whale is a mechanical assembly of whale and coil spring base. Whale is rotationally-moulded medium-density polyethylene with an average wall thickness of 0.375" (10mm). Coil spring base is a mechanical assembly of spring, upper spring base, and lower spring base. Spring is 5.625" (143mm) O.D. x 0.75" (19mm) type 5160 steel wire. Upper spring base is a welded assembly 0.25" x 7.25" (6mm x 184mm) hot-rolled mild flat steel, 0.375" (10mm) O.D. hot-rolled steel bar, 0.375" x 3.4375" (10mm x 87mm) hot-rolled mild flat steel, 3.5" (89mm) schedule 40 black steel pipe, 5" (127mm) schedule 40 black steel pipe, and 0.5" (13mm) square hot-rolled steel bar. Lower spring base is a welded assembly of 3.5" (89mm) O.D. x 0.188" (5mm) hollow structural steel tube, 5" (127mm) schedule 40 black steel pipe, 3.5" (89mm) schedule 40 black steel pipe, 0.25" x 1.25" (6mm x 32mm) hot-rolled mild flat steel, 0.375" x 3.4375" (10mm x 87mm) hot-rolled mild flat steel, 0.5" (13mm) square hot-rolled steel bar, and 0.375" (10mm) O.D. hot-rolled steel bar. Coil spring base is powder-coat painted.

## Whale

Whale is a mechanical assembly of side panels, seat assembly, crossbars, spring, upper spring base, and lower spring base. Side panels are 0.75" (19mm) sheet polyethylene. Seat assembly is a mechanical assembly of seat and frame. Seat is 0.75" (19mm) sheet polyethylene. Frame is 10 gauge (3mm) satin-coated steel sheet. Crossbars are a mechanical assembly of 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube and 1" (25mm) I.D. x 0.125" (3mm) ultraviolet (U.V.) light stabilized low-density polyethylene tube. Spring is 5.625" (143mm) O.D. x 0.75" (19mm) type 5160 steel wire. Upper spring base is a welded assembly of 5" (127mm) schedule 40 black steel pipe, 3.5" (89mm) schedule 40 black steel pipe, 0.5" (13mm) square hot-rolled steel bar, 0.375" (10mm) O.D. hot-rolled steel bar, 0.375" x 3.4375" (10mm x 87mm) hot-rolled mild flat steel, and 0.25" x 7.25" (6mm x 184mm) hot-rolled mild flat steel. Lower spring base is a welded assembly of 5" (127mm) schedule 40 black steel pipe, 3.5" (89mm) O.D. x 0.188" (5mm) hollow structural steel tube, 3.5" (89mm) schedule 40 black steel pipe, 0.5" (13mm) square hot-rolled steel bar, 0.375" (10mm) O.D. hot-rolled steel bar, 0.375" x 3.4375" (10mm x 87mm) hot-rolled mild flat steel, and 0.25" x 1.25" (6mm x 32mm) hot-rolled mild flat steel. Spring, upper spring base, and lower spring base are powder-coat painted.

## SWINGS

### 8' (2438mm) Arch Swing (1-, 2-, 3-, 4-Bay)

8' (2438mm) Arch Swing is a mechanical assembly of top bar, swing bearings, and end frames. Top bar is 3.5" (89mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube. Swing bearings are a mechanical assembly of upper and lower bracket. Upper bracket is 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel. Lower bracket is a mechanical assembly of hanger and swivel bearing. Hanger is a welded assembly of 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat steel. Swivel bearing is a welded assembly of 1" (25mm) schedule 40 black steel pipe, 0.375" (10mm) O.D. hot-rolled steel bar, 1.03" (26mm) O.D. x 0.51" (13mm) I.D. Nylatron® bushing, 0.5" (13mm) machine bolt, and 0.5" (13mm) lock nut.

Swing bearings are hot-dipped galvanized. End frames are a welded assembly of 3.5" (89mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube, 3" (76mm) O.D. x 0.120" (3mm) hollow structural steel tube, and 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube.

## 8' (2438mm) Heavy Duty Swing (1-, 2-, 3-, 4-Bay)

8' (2438mm) Heavy Duty Swing is a mechanical assembly of top bar, swing fittings, swing bearings, and swing legs. Top bar is 3.5" (89mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube. Swing fittings are a welded assembly of 2.75" (70mm) O.D. x 0.125" (3mm) hollow structural steel tube and 3" (76mm) O.D. x 0.120" (3mm) hollow structural steel tube. Swing fittings are powder-coat painted. Swing bearings are a mechanical assembly of upper and lower bracket. Upper bracket is 0.1875" x 3" (5mm x 76mm) hot-rolled mild flat steel. Lower bracket is a mechanical assembly of hanger and swivel bearing. Hanger is a welded assembly of 0.1875" x 3" (5mm x 76mm) hot-rolled mild flat steel and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat steel. Swivel bearing is a mechanical assembly of 1" (25mm) schedule 40 black steel pipe, 0.375" (10mm) O.D. hot-rolled steel bar, 1.03" (26mm) O.D. x 0.51" (13mm) I.D. Nylatron® bushing, 0.5" (13mm) machine bolt, and 0.5" (13mm) lock nut. Swing bearings are hot-dipped galvanized. Swing legs are 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube.

## 8' (2438mm) Standard Swing (1-, 2-, 3-, 4-Bay)

8' (2438mm) Standard Swing is a mechanical assembly of top bar, swing fittings, swing bearings, and swing legs. Top bar is 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Swing fittings are a welded assembly of 2.75" (70mm) O.D. x 0.125" (3mm) hollow structural steel tube and 3" (76mm) O.D. x 0.120" (3mm) hollow structural steel tube. Swing fittings are powder-coat painted. Swing bearings are a mechanical assembly of upper and lower bracket. Upper bracket is 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel. Lower bracket is a mechanical assembly of hanger and swivel bearing. Hanger is a welded assembly of 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat steel. Swivel bearing is a mechanical assembly of 1" (25mm) schedule 40 black steel pipe, 0.375" (10mm) O.D. hot-rolled steel bar, 1.03" (26mm) O.D. x 0.51" (13mm) I.D. Nylatron® bushing, 0.5" (13mm) machine bolt, and 0.5" (13mm) lock nut. Swing bearings are hot-dipped galvanized. Swing legs are 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube.

ing is a mechanical assembly of 1" (25mm) schedule 40 black steel pipe, 0.375" (10mm) O.D. hot-rolled steel bar, 1.03" (26mm) O.D. x 0.51" (13mm) I.D. Nylatron® bushing, 0.5" (13mm) machine bolt, and 0.5" (13mm) lock nut. Swing bearings are hot-dipped galvanized. Swing legs are 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube.

## 10' (3048mm) Arch Swing (1-, 2-, 3-, 4-Bay)

10' (3048mm) Arch Swing is a mechanical assembly of top bar, swing bearings, and end frames. Top bar is 3.5" (89mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube. Swing bearings are a mechanical assembly of upper and lower bracket. Upper bracket is 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel. Lower bracket is a mechanical assembly of hanger and swivel bearing. Hanger is a welded assembly of 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat steel. Swivel bearing is a mechanical assembly of 1" (25mm) schedule 40 black steel pipe, 0.375" (10mm) O.D. hot-rolled steel bar, 1.03" (26mm) O.D. x 0.51" (13mm) I.D. Nylatron® bushing, 0.5" (13mm) machine bolt, and 0.5" (13mm) lock nut. Swing bearings are hot-dipped galvanized. End frames are a welded assembly of 3.5" (89mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube, 3" (76mm) O.D. x 0.120" (3mm) hollow structural steel tube, and 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube.

## 10' (3048mm) Heavy Duty Swing (1-, 2-, 3-, 4-Bay)

10' (3048mm) Heavy Duty Swing is a mechanical assembly of top bar, swing fittings, swing bearings, and swing legs. Top bar is 3.5" (89mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube. Swing fittings are a welded assembly of 2.75" (70mm) O.D. x 0.125" (3mm) hollow structural steel tube and 3" (76mm) O.D. x 0.120" (3mm) hollow structural steel tube. Swing fittings are powder-coat painted. Swing bearings are a mechanical assembly of upper and lower bracket. Upper bracket is 0.1875" x 3" (5mm x 76mm) hot-rolled mild flat steel. Lower bracket is a mechanical assembly of hanger and swivel bearing. Hanger is a welded assembly of 0.1875" x 3" (5mm x 76mm) hot-rolled mild flat steel and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat

steel. Swivel bearing is a mechanical assembly of 1" (25mm) schedule 40 black steel pipe, 0.375" (10mm) O.D. hot-rolled steel bar, 1.03" (26mm) O.D. x 0.51" (13mm) I.D. Nylatron® bushing, 0.5" (13mm) machine bolt, and 0.5" (13mm) lock nut. Swing bearings are hot-dipped galvanized. Swing legs are 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube.

## 10' (3048mm) Standard Swing (1-, 2-, 3-, 4-Bay)

10' (3048mm) Standard Swing is a mechanical assembly of top bar, swing fittings, swing bearings, and swing legs. Top bar is 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Swing fittings are a welded assembly of 2.75" (70mm) O.D. x 0.125" (3mm) hollow structural steel tube and 3" (76mm) O.D. x 0.120" (3mm) hollow structural steel tube. Swing fittings are powder-coat painted. Swing bearings are a mechanical assembly of upper and lower bracket. Upper bracket is 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel. Lower bracket is a mechanical assembly of hanger and swivel bearing. Hanger is a welded assembly of 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat steel. Swivel bearing is a mechanical assembly of 1" (25mm) schedule 40 black steel pipe, 0.375" (10mm) O.D. hot-rolled steel bar, 1.03" (26mm) O.D. x 0.51" (13mm) I.D. Nylatron® bushing, 0.5" (13mm) machine bolt, and 0.5" (13mm) lock nut. Swing bearings are hot-dipped galvanized. Swing legs are 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube.

## Heavy Duty Tire Swing

Heavy Duty Tire Swing is a mechanical assembly of top bar, tire swivel bearing, end frames, and tire swing assembly. Top bar is a welded assembly of 3" (76mm) schedule 40 galvanized steel pipe and 0.25" x 8" (6mm x 203mm) hot-rolled mild flat steel. Tire swivel bearing is a mechanical assembly of housing and bearing. Housing is 4" (102mm) square x 0.188" (5mm) hollow structural steel tube, 0.75" (19mm) O.D. x hollow structural steel tube, 1.5" x 1.5" x 0.1875" (38mm x 38mm x 5mm) hot-rolled steel angle, and 10 gauge (3mm) hot-rolled steel sheet. Bearing is a mechanical assembly of lightly greased Nylatron® ball and socket, 0.5" (13mm) O.D. hot-rolled round steel bar, and 0.375" (10mm) O.D. cold-rolled steel bar. Tire swivel bearing is zinc-plated. End frames

are a welded assembly of 3.5" (89mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube, 3" (76mm) O.D. x 0.120" (3mm) hollow structural steel tube, and 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. End frames are powder-coat painted. Tire swing assembly is a mechanical assembly of seat, brackets, quick links, and chain. Seat is a mechanical assembly of tire, tube, and fasteners. Tire is new steel-belted, passive tread tire with a combination of natural and synthetic rubber. Tube is 1" (25mm) schedule 40 galvanized steel pipe. Fasteners are 0.5" (13mm) machine bolts. Brackets are 10 gauge (3mm) satin-coated steel sheet. Quick links are 0.3125" (8mm) zinc-plated electrogalvanized. Chain is 4/0 hot-dipped galvanized straight-link coil chain.

### PlaySteel Classic Swing (1-, 2-Bay)

PlaySteel Classic Swing is a mechanical assembly of top bar, crossbars, swing bearings, and posts. Top bar is 3.5" (89mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube. Crossbars are a welded assembly of 3.5" (89mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube, 3" (76mm) O.D. x 0.120" (3mm) hollow structural steel tube, and 0.25" x 3.5" (6mm x 89mm) hot-rolled mild flat steel. Crossbars are powder-coat painted. Swing bearings are a mechanical assembly of upper and lower bracket. Upper bracket is 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel. Lower bracket is a mechanical assembly of hanger and swivel bearing. Hanger is a welded assembly of 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat steel. Swivel bearing is a mechanical assembly of 1" (25mm) schedule 40 black steel pipe, 0.375" (10mm) O.D. hot-rolled steel bar, 1.03" (26mm) O.D. x 0.51" (13mm) I.D. Nylatron® bushing, 0.5" (13mm) machine bolt, and 0.5" (13mm) lock nut. Swing bearings are hot-dipped galvanized. Posts are a mechanical assembly of uprights, post caps, and post cap brackets. Uprights are 4" (102mm) square x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Post caps are alloy 319 cast aluminum. Post cap brackets are 0.25" x 1.5" (6mm x 38mm) zinc-plated hot-rolled mild flat steel brackets. Uprights, post caps, and post cap brackets are powder-coat painted.

### Single Post Swing (1-, 2-Bay)

Single Post Swing is a mechanical assembly of top bar, swing bearings, and posts. Top

bar is 3.5" (89mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube. Swing bearings are a mechanical assembly of upper and lower bracket. Upper bracket is 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel. Lower bracket is a mechanical assembly of hanger and swivel bearing. Hanger is a welded assembly of 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat steel. Swivel bearing is a welded assembly of 1" (25mm) schedule 40 black steel pipe, 0.375" (10mm) O.D. hot-rolled steel bar, 1.03" (26mm) O.D. x 0.51" (13mm) I.D. Nylatron® bushing, 0.5" (13mm) machine bolt, and 0.5" (13mm) lock nut. Swing bearings are hot-dipped galvanized. Posts are a mechanical assembly of uprights, post caps, and post cap brackets. Uprights are a welded assembly of 4" (102mm) square x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 2.75" (70mm) O.D. x 0.125" (3mm) hollow structural steel tube and 3" (76mm) O.D. x 0.120" (3mm) hollow structural steel tube. Post caps are alloy 319 cast aluminum. Post cap brackets are 0.25" x 1.5" (6mm x 38mm) zinc-plated hot-rolled mild flat steel brackets.

### T-Frame Swing

T-Frame Swing is a mechanical assembly of top bar, swing bearings, caps, and upright. Top bar is 3" (76mm) schedule 40 galvanized steel pipe. Swing bearings are a mechanical assembly of upper and lower bracket. Upper bracket is 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel. Lower bracket is a mechanical assembly of hanger and swivel bearing. Hanger is a welded assembly of 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat steel. Swivel bearing is a mechanical assembly of 1" (25mm) schedule 40 black steel pipe, 0.375" (10mm) O.D. hot-rolled steel bar, 1.03" (26mm) O.D. x 0.51" (13mm) I.D. Nylatron® bushing, 0.5" x 3.25" (13mm x 83mm) machine bolt, and 0.5" (13mm) lock nut. Swing bearings are hot-dipped galvanized. Upright is 4" (102mm) O.D. x 0.188" (5mm) hollow structural steel tube, 3.5" (89mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube, 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube, and 2.5" x 2.5" x 0.1875" (64mm x 64mm x 5mm) hot-rolled steel angle.

## SWING ACCESSORIES

### 3/16" (5mm) Small Quick Link

3/16" (5mm) Small Quick Link is 0.1875" (5mm) zinc-plated electrogalvanized quick link.

### 5/16" (8mm) Large Quick Link

5/16" (8mm) Large Quick Link is 0.3125" (8mm) zinc-plated electrogalvanized quick link.

### 3/8" (10mm) Shackle

3/8" (10mm) Shackle is type 316 stainless steel "D" shackle with flush pin.

### 3/8" (10mm) S-Hook

3/8" (10mm) S-Hook is zinc-plated.

### 2" (50mm) Swing Bearing

2" (50mm) Swing Bearing is a mechanical assembly of upper and lower bracket. Upper bracket is 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel. Lower bracket is a mechanical assembly of hanger and swivel bearing. Hanger is a welded assembly of 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat steel. Swivel bearing is a mechanical assembly of 1" (25mm) schedule 40 black steel pipe, 0.375" (10mm) O.D. hot-rolled steel bar, 1.03" (26mm) O.D. x 0.51" (13mm) I.D. Nylatron® bushing, 0.5" x 3.25" (13mm x 83mm) machine bolt, and 0.5" (13mm) lock nut. Entire assembly is hot-dipped galvanized.

### 3" (76mm) Swing Bearing

3" (76mm) Swing Bearing is a mechanical assembly of upper and lower bracket. Upper bracket is 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel. Lower bracket is a mechanical assembly of hanger and swivel bearing. Hanger is a welded assembly of 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat steel. Swivel bearing is a mechanical assembly of 1" (25mm) schedule 40 black steel pipe, 0.375" (10mm) O.D. hot-rolled steel bar, 1.03" (26mm) O.D. x 0.51" (13mm) I.D. Nylatron® bushing, 0.5" x 3.25" (13mm x 83mm) machine bolt, and 0.5" (13mm) lock nut. Entire assembly is hot-dipped galvanized.

### Anti-Wrap Swing Bearing

Anti-Wrap Swing Bearing is a mechanical

assembly of collars and bearing assembly. Collars are cast aluminum. Bearing assembly is a mechanical assembly of housing, bushing, and swivel bearing. Housing is a welded assembly of 3.5" (89mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube and 0.1875" x 1.25" (5mm x 32mm) hot-rolled mild flat steel. Bushing is 3.182" (81mm) O.D. x 2.5" (64mm) Nylatron®. Swivel bearing is a mechanical assembly of 1" (25mm) schedule 40 black steel pipe, 0.375" (10mm) O.D. hot-rolled steel bar, 1.03" (26mm) O.D. x 0.51" (13mm) I.D. Nylatron® bushing, 0.5" (13mm) machine bolt, and 0.5" (13mm) lock nut. Swivel bearing is hot-dipped galvanized. Collars and housing are powder-coat painted. Anti-Wrap Swing Bearing is for use on standard size 2.375" (60mm) O.D. swing top bar only.

### Belt Baby Chair

Belt Baby Chair is a mechanical assembly of seat, safety bars, brackets, and chain. Seat is 4" (102mm) 4-ply folded-edge transmission belt with an average thickness of 0.196" (5mm). Safety bars are 0.75" (19mm) O.D. x 18 gauge (1mm) Allied Flo-Coat® galvanized steel tube. Safety bars are powder-coat painted. Brackets are a welded assembly of 0.125" x 2" (3mm x 51mm) hot-rolled mild flat steel and 0.25" (6mm) screw eyes. Brackets are hot-dipped galvanized. Chain is 0.125" (3mm) zinc-plated electrogalvanized straight-link coil chain.

### Belt Seat

Belt Seat is a mechanical assembly of seat and brackets. Seat is 4" (102mm) 4-ply folded-edge transmission belt with an average thickness of 0.196" (5mm). Brackets are a welded assembly of 0.125" x 2" (3mm x 51mm) hot-rolled mild flat steel, 0.125" x 1" (3mm x 51mm) hot-rolled mild flat steel, and 0.25" (6mm) screw eyes. Brackets are hot-dipped galvanized.

### Centre Swing Fitting

Centre Swing Fitting is 2.75" (70mm) O.D. x 0.125" (3mm) hollow structural steel tube.

### End Swing Fitting

End Swing Fitting is 2.75" (70mm) O.D. x 0.125" (3mm) hollow structural steel tube.

### S-Hook Pliers

S-Hook Pliers are a heavy-duty steel assembly of jaws toggle joints, and handles. Jaws are heat-treated alloy steel. Toggle joints turn

50 lb. hand pressure to 4000 lb. cutting pressure. Handles are all steel.

### Slash-Proof Baby Seat

Slash-Proof Baby Seat is vandal-resistant 70 durometer EPDM rubber with 0.025" (1mm) stainless steel insert and stainless steel grommets.

### Slash-Proof Belt Seat

Slash-Proof Belt Seat is vandal-resistant 70 durometer EPDM rubber with 0.025" (1mm) stainless steel insert and stainless steel grommets.

### Swing Chain

Swing Chain is 4/0 hot-dipped galvanized straight-link coil chain.

### Tire Swing Assembly

Tire Swing Assembly is a mechanical assembly of tire, tube, fasteners, and brackets. Tire is new steel-belted, passive tread tire with a combination of natural and synthetic rubber. Tube is 1" (25mm) schedule 40 galvanized steel pipe. Fasteners are 0.5" (13mm) machine bolts. Brackets are 10 gauge (3mm) satin-coated steel sheet.

### Tire Swivel Bearing

Tire Swivel Bearing is a mechanical assembly of housing and bearing. Housing is 4" (102mm) square x 0.188" (5mm) hollow structural steel tube, 0.75" (19mm) O.D. x hollow structural steel tube, 1.5" x 1.5" x 0.1875" (38mm x 38mm x 5mm) hot-rolled steel angle, and 10 gauge (3mm) hot-rolled steel sheet. Bearing is a mechanical assembly of lightly greased Nylatron® ball and socket, 0.5" (13mm) O.D. hot-rolled round steel bar, and 0.375" (10mm) O.D. cold-rolled steel bar. Entire assembly is zinc-plated.

### Trapeze Ring

Trapeze Ring is a welded assembly of 1" (25mm) O.D. x 0.120" (3mm) electric resistance welded tube, 0.5" (13mm) O.D. hot-rolled steel bar, and 0.375" (10mm) O.D. hot-rolled steel bar. Ring is Plastisol-coated to a depth of 0.125" (3mm).

## GAMES & SPORTS GOALS

### 3½" Cantilever Basketball Standard

3½" Cantilever Basketball Standard is a mechanical assembly of post assembly, H-frame, backboard, hoop, and net. Post

assembly is a welded assembly of 3" (76mm) schedule 40 galvanized steel pipe, minimum 1.5" x 2" x 6" (38mm x 50mm x 152mm) hot-rolled steel channel, 0.5" x 0.5" x 0.1875" (13mm x 13mm x 5mm) hot-rolled steel angle, 10 gauge (3mm) satin-coated steel sheet, 14 gauge (2mm) satin-coated steel sheet, 0.25" x 0.75" (6mm x 19mm) hot-rolled mild flat steel, and 0.125" x 8" (3mm x 203mm) hot-rolled mild flat steel. Post assembly is hot-dipped galvanized. H-frame is a welded assembly of 0.1875" x 2.5" x 2.5" (5mm x 64mm x 64mm) hot-rolled steel angle and 0.1875" x 2" x 2" (5mm x 51mm x 51mm) hot-rolled steel angle. H-frame is powder-coat painted. Steel fan-shaped backboard is a welded assembly of 12 gauge (3mm) steel sheet, 12 gauge (3mm) steel channel, and 10 gauge (3mm) steel channel. Steel fan-shaped backboard is phosphate treated and powder-coat painted. Hoop and net are as specified by customer.

### 4½" Cantilever Basketball Standard

4½" Cantilever Basketball Standard is a mechanical assembly of post assembly, H-frame, backboard, hoop, and net. Post assembly is a welded assembly of 4" (102mm) schedule 40 galvanized steel pipe, minimum 1.5" x 2" x 6" (38mm x 50mm x 152mm) hot-rolled steel channel, 0.5" x 0.5" x 0.1875" (13mm x 13mm x 5mm) hot-rolled steel angle, 10 gauge (3mm) satin-coated steel sheet, 14 gauge (2mm) satin-coated steel sheet, 0.25" x 0.75" (6mm x 19mm) hot-rolled mild flat steel, and 0.125" x 8" (3mm x 203mm) hot-rolled mild flat steel. Post assembly is hot-dipped galvanized. H-frame is a welded assembly of 0.1875" x 2.5" x 2.5" (5mm x 64mm x 64mm) hot-rolled steel angle and 0.1875" x 2" x 2" (5mm x 51mm x 51mm) hot-rolled steel angle. H-frame is powder-coat painted. Steel fan-shaped backboard is a welded assembly of 12 gauge (3mm) steel sheet, 12 gauge (3mm) steel channel, and 10 gauge (3mm) steel channel. Steel fan-shaped backboard is phosphate treated and powder-coat painted. Hoop and net are as specified by customer.

### Basketball Chain Net

Basketball Chain Net is a mechanical assembly of 14 gauge (2mm) zinc-plated steel wire.

### Breakaway Double-Rim Basketball Hoop

Breakaway Double-Rim Basketball Hoop is a welded assembly of 7 gauge (5mm) ASTM A569 hot-rolled steel mounting plate and SAE 1018 or SAE 1022 cold-rolled steel ring.

Entire assembly is powder-coat painted. Hoop is reverse mount with continuous no-tie ring.

### Nylon Basketball Net

Nylon Basketball Net is a mechanical assembly of minimum 3.5 oz (100g) braided nylon strands.

### Combination Goal

Combination Football/Soccer Goal is a mechanical assembly of vertical posts, crossbar, uprights, and optional tie-downs. Vertical posts are 4" (102mm) square x 0.125" (3mm) hollow structural steel tube. Crossbar is a welded assembly of 4" (102mm) square x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 2.875" (73mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube, 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube, and 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Uprights are a welded assembly of 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Optional tie-downs are 0.25" (6mm) O.D. hot-rolled steel bar. Entire assembly is powder-coat painted.

### Double-Rim Basketball Hoop

Double-Rim Basketball Hoop is a welded assembly of 7 gauge (5mm) ASTM A569 hot-rolled steel mounting plate and SAE 1018 or SAE 1022 cold-rolled steel ring. Entire assembly is powder-coat painted. Hoop is reverse mount.

### Permanent Soccer Goal

Permanent Soccer Goal is a mechanical assembly of vertical posts, crossbar, and optional tie-downs. Vertical posts are a welded assembly of 3" (76mm) square x 0.125" (3mm) hollow structural steel tube and 10 gauge (3mm) satin-coated steel sheet crossbar stubs. Crossbar is 3" (76mm) square x 0.125" (3mm) hollow structural steel tube. Optional tie-downs are 0.25" (6mm) O.D. hot-rolled steel bar. Entire assembly is powder-coat painted.

### Permanent Soccer Goal With Back

Permanent Soccer Goal with Back is a mechanical assembly of vertical posts, crossbar, side frames, base supports, and tie-downs. Vertical posts are a welded assembly of 3" (76mm) square x 0.125" (3mm) hollow structural steel tube, 1.315" (33mm) x 12

gauge (3mm) Allied Flo-Coat® galvanized steel tube and 10 gauge (3mm) satin-coated steel sheet stubs. Crossbar is 3" (76mm) square x 0.125" (3mm) hollow structural steel tube. Side frames are welded assembly of 1.66" (42mm) O.D. x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 1.315" (34mm) x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Base supports are a welded assembly of 1.66" (42mm) O.D. x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 1.315" (34mm) x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Tie-downs are 0.25" (6mm) O.D. hot-rolled steel bar. Entire assembly is powder-coat painted.

### Portable Soccer Goal

Portable Soccer Goal is a mechanical assembly of vertical posts, crossbar, side frames, base supports, and tie-downs. Vertical posts are a welded assembly of 3" (76mm) square x 0.125" (3mm) hollow structural steel tube, 1.315" (33mm) x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 10 gauge (3mm) satin-coated steel sheet stubs. Crossbar is 3" (76mm) square x 0.125" (3mm) hollow structural steel tube. Side frames are a welded assembly of 1.66" (42mm) O.D. x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 1.315" (34mm) x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Base supports are a welded assembly of 1.66" (42mm) O.D. x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 1.315" (34mm) x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Tie-downs are 0.25" (6mm) O.D. hot-rolled steel bar. Entire assembly is powder-coat painted.

### Single-Rim Basketball Hoop

Single-Rim Basketball Hoop is a welded assembly of 7 gauge (5mm) ASTM A569 hot-rolled steel mounting plate and SAE 1018 or SAE 1022 cold-rolled steel ring. Entire assembly is powder-coat painted. Hoop is reverse mount.

### Steel Fan-Shaped Backboard

Steel Fan-Shaped Backboard is a welded assembly of 12 gauge (3mm) steel sheet, 12 gauge (3mm) steel channel, and 10 gauge (3mm) steel channel. Entire assembly is phosphate treated and powder-coat painted. Assembly is vibration free, reverse mount, and official size.

### Tetherball and Rope

Tetherball and Rope is a mechanical assembly of tetherball, rope, and hitch. Tetherball is size 5 rubber composite. Rope is 9' (2.74m). Hitch is recessed.

### Tetherball Post

Tetherball Post is 2.375" (60mm) schedule 40 galvanized steel pipe.

### Triple Hoop Game

Triple Hoop Game is a mechanical assembly of goal and post. Goal is rotationally-moulded medium-density polyethylene with an average wall thickness of 0.3125" (8mm). Post is 3.5" (89mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube.

### Zinc Double-Rim Basketball Hoop

Zinc Double-Rim Basketball Hoop is a welded assembly of 7 gauge (5mm) ASTM A569 hot-rolled steel mounting plate and SAE 1018 or SAE 1022 cold-rolled steel ring. Entire assembly is zinc coated. Hoop is reverse mount.

## TRADITIONAL EQUIPMENT & SLIDES

### 4x4

4x4 is a mechanical assembly of body, seats, steering wheels, steering wheel brackets, wheels, and ground legs. Body is a welded assembly of 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube, and 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel. Body is powder-coat painted. Seats are 0.75" (19mm) sheet polyethylene. Steering wheels are rotationally-moulded medium-density polyethylene with an average wall thickness of 0.125" (3mm). Steering wheel brackets are a welded assembly of 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube and 10 gauge (3mm) satin-coated steel sheet. Steering wheel brackets are powder-coat painted. Wheels are 0.75" (19mm) sheet polyethylene. Ground legs are 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Ground legs are powder-coat painted.

### Barn Beam Climber

Barn Beam Climber is a mechanical assembly of upright ladders, crossbrace ladders, ridge connectors, ridge poles, ground legs,

and ridge joiner. Upright ladders are a welded assembly of 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube, and 0.25" x 1.5" (6mm x 38mm) hot-rolled mild flat steel. Crossbrace ladders are a welded assembly of 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Ridge connectors are a welded assembly of 1.66" (42mm) O.D. x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Ridge poles are 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Ground legs are 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Ridge joiner is 1.66" (42mm) O.D. x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Entire assembly is powder-coat painted.

## Bedrock Climbing Wall

Bedrock Climbing Wall is rotationally-moulded polyethylene.

## Bridge Climber

Bridge Climber is a mechanical assembly of half sections, middle section, and joiners. Half sections are a welded assembly of 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube, and 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Middle section is a welded assembly of 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube, and 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Joiners are 2.875" (73mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube. Entire assembly is powder-coat painted.

## Challenge Bridge Climber

Challenge Bridge Climber is a mechanical assembly of half sections, tower section, corkscrew section, and joiners. Half sections are a welded assembly of 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube, and 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Tower section is a welded assembly of 1.66" (42mm) O.D. x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube, and 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Corkscrew section is a welded assembly of 1.66" (42mm) O.D. x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube, and 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized

steel tube. Joiners are 2.875" (73mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube. Entire assembly is powder-coat painted.

## Elephant Climber

Elephant Climber is a welded assembly of 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube, 4" (102mm) x 0.188" (5mm) hollow structural steel tube, 0.625" (16mm) O.D. hot-rolled steel bar, and 14 gauge (2mm) steel sheet. Entire assembly is powder-coat painted.

## Freestanding Stainless Slide & Ladder

Freestanding Stainless Slide & Ladder is a mechanical assembly of slide assembly, ladder, ladder legs, handrails, safety bar, and safety railing. Slide assembly is a mechanical assembly of slide and ground legs. Slide is a welded assembly of slide rails, slide bed, and angle. Slide rails are 2" x 4" (51mm x 102mm) rectangular x 11 gauge (3mm) hollow structural steel tube. Slide bed is 16 gauge (2mm) stainless steel sheet. Slide bed is 16" (406mm) wide. Angle is 10 gauge (4mm) formed stainless steel sheet. Ground legs are 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Ground legs are powder-coat painted. Ladder is a welded assembly of 1.5" x 3" (38mm x 76mm) rectangular x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 10 gauge (3mm) satin-coated steel sheet, 14 gauge (2mm) checker-plated steel sheet, and 0.25" x 1.5" (6mm x 38mm) zinc-plated hot-rolled mild flat steel. Ladder legs are 2.375" (60mm) schedule 40 galvanized steel pipe. Handrails are a welded assembly of 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Safety bar is 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Safety railing is a welded assembly of 1.315" (33mm) x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube, and 0.25" x 2" (6mm x 51mm) zinc-plated hot-rolled mild flat steel. Ladder, ground legs, handrails, and safety railings are powder-coat painted.

## Geodesic Climber (10' (3048mm)),

## 15' (4572mm))

Geodesic Climber is a mechanical assembly of tube, connectors, and ground anchors. Tube is 1" (25mm) O.D. x 16 gauge (2mm) galvanized steel tube. Tube is powder-coat painted. Connectors are 1.375" (35mm) O.D. alloy 6351 aluminum rod. Ground anchors are 0.5" (13mm) O.D. hot-rolled steel bar.

## Gymnastic Climber

Gymnastic Climber is a mechanical assembly of vertical ladders, horizontal ladder, turning bars, and vertical support. Vertical ladders are a welded assembly of 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 1.9" (48mm) O.D. x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube, and 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Horizontal ladders are a welded assembly of 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 1.029" (26mm) O.D. x 13 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Turning bars are a welded assembly of 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Vertical support is 1.9" (48mm) O.D. x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Entire assembly is powder-coat painted.

## Horizontal Ladder

Horizontal Ladder is a mechanical assembly of vertical ladders and horizontal ladder. Vertical ladders are a welded assembly of 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 1.9" (48mm) O.D. x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube, and 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Horizontal ladders are a welded assembly of 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 1.029" (26mm) O.D. x 13 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Entire assembly is powder-coat painted.

## Independent Poly Spiral Slide

Independent Poly Spiral Slide is a mechanical assembly of slide, ladder, safety railing, handrail and support post. Slide is one-piece, double wall, rotationally-moulded medium-density polyethylene with an average wall thickness of 0.3125" (8mm). Slide has no seams or exposed hardware. Slide bed is

minimum 16" (406mm) wide. Ladder is a welded assembly of 1.5" x 3" (38mm x 76mm) rectangular x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 10 gauge (3mm) satin-coated steel sheet, 14 gauge (2mm) checker-plated steel sheet, and 0.25" x 1.5" (6mm x 38mm) zinc-plated hot-rolled mild flat steel. Safety railings are a welded assembly of 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube, 0.1875" x 1.75" (5mm x 44mm) zinc-plated hot-rolled mild flat steel connecting lugs, and 0.25" x 2" (6mm x 51mm) zinc-plated hot-rolled mild flat steel connecting lugs. Handrails are 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Support post is 5" (76mm) O.D. x 0.125" (3mm) hollow structural steel tube. Ladder, safety railing and handrails are powder-coat painted.

### **Intergalactic Pods**

Intergalactic Pods is a mechanical assembly of poles, pods, climber frame, connecting brackets, and ground legs. Poles are 1.66" (42mm) O.D. x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Pods are a welded assembly of 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube and 10 gauge (3mm) perforated steel sheet. Pods are Plastisol-coated to a depth of 0.125" (3mm). Climber is a mechanical assembly of 1.66" (42mm) O.D. x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 0.1875" x 1.75" (5mm x 44mm) zinc-plated hot-rolled mild flat steel, and 0.25" x 2" (6mm x 51mm) zinc-plated hot-rolled mild flat steel. Connecting brackets are a welded assembly of 1.9" (48mm) O.D. x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 10 gauge (3mm) satin-coated steel sheet. Ground legs are 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Poles, climber frame, connecting brackets, and ground legs are powder-coat painted.

### **Mini Bridge Climber**

Mini Bridge Climber is a mechanical assembly of half sections, and joiners. Half sections are a welded assembly of 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube, and 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Joiners are 2.875" (73mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube. Entire assembly is powder-coat painted.

### **Tidal Wave**

Tidal Wave is a welded assembly of 1.66" (42mm) O.D. x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube, and 0.1875" x 1.75" (5mm x 44mm) zinc-plated hot-rolled mild flat steel. Entire assembly is powder-coat painted.

### **Whirl**

Whirl is a mechanical assembly of upper bearing assembly, lower bearing assembly, handles, post, platform, and post cap. Upper bearing assembly is a welded assembly of bearing holder, base plate, and gussets. Bearing holder is 4" (102mm) O.D. hot-rolled steel bar. Base plate is 0.375" (10mm) hot-rolled steel plate. Gussets are 0.25" (6mm) hot-rolled mild flat steel. Lower bearing assembly is a welded assembly of bar, concrete cover, pressure plate, and ground leg. Bar is 2" (51mm) O.D. hot-rolled steel bar. Concrete cover is 14 gauge (2mm) hot-rolled steel sheet. Pressure plate is 2.375" (60mm) hot-rolled steel plate. Ground leg is a welded assembly of 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 14 gauge (2mm) hot-rolled steel plate. Handles are a welded assembly of 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 0.25" x 2" (6mm x 51mm) hot-rolled mild flat steel. Pole is a welded assembly of 3.5" (89mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube. Platform is a welded assembly of 14 gauge (2mm) checker-plated steel sheet, 0.25" x 1.5" (6mm x 38mm) hot-rolled mild flat steel, and 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel.





# GENERAL SPECIFICATIONS

## Playground Equipment Designs

It is the opinion of the manufacturer that playground equipment designs are developed in compliance with the most recent published edition of the following safety standards:

- CAN/CSA-Z614 Children's PlaySpaces and Equipment
- ASTM F 1487 Standard Consumer Safety Performance Specification for Playground Equipment for Public Use
- U.S. Consumer Product Safety Commission (CPSC) Handbook for Public Playground Safety
- Americans with Disabilities Act (ADA) accessibility standards

## Uprights

PlaySteel® vertical uprights for PlaySteel® Max are 5" (127mm) x 11 gauge (3mm), PlaySteel® Squared are 4" (102mm) square x 11 gauge (3mm), PlaySteel® Fit are 3.5" (89mm) x 13 gauge (2.3mm), PlayTots™ are 2.5" square x 11 gauge. Outer surfaces are zinc-plated and inner surfaces are treated to resist corrosion. All posts are powder-coat painted. All PlaySteel® post caps are alloy 319 cast aluminum with 0.1875" (5mm) top thickness, 0.125" (3mm) side thickness, and 0.34375" (9mm) corner thickness. Post caps are secured to posts with 10 gauge (3mm) satin-coated steel sheet brackets and mechanical fasteners. Post caps are powder-coat painted to match posts unless otherwise requested.

## Steel Components

Steel tube components are Allied Flo-Coat® galvanized steel tube with 0.6 mil (0.015mm) zinc coating and 0.5 mil (0.013mm) internal corrosion coating. Steel tube components comply with ASTM standards A-500 or A-513. All other steel is zinc-coated, hot-dipped galvanized, Plastisol-coated, or powder-coat painted, as specified. Steel tube components contain between 30% and 100% recycled content. Steel tube components are 95-98% recyclable.

## Hot Rolled Metal

Hot rolled metal is 13 gauge perforated steel used on Polis Street Furnishings and Park Amenities. Hot rolled perforated metal are totally encapsulated with either plastisol or polyethylene coatings. Hot rolled steel provides better adhesion characteristics for such coatings.

## Engineering Properties

- Young's Modulus of Elasticity 200 x 106 MPa at 20°C
- Density 7.87 g/cm<sup>3</sup> at 20°C
- Coefficient of Thermal Expansion Low-Carbon/HSLA:
- 12.4 µm/m/°C in 20°C to 100°C range I-F Steel; 12.9 µm/m/°C in 20°C to 100°C range
- Thermal Conductivity Low-Carbon/HSLA: 89 W/m°C at 20°C
- I-F Steel: 93 W/m°C at 20°C
- Specific Heat 481 J/kg/°C in 50°C to 100°C range
- Electrical Resistivity 0.142 µΩm at 20°C

## Decks

PlaySteel® decks are a welded assembly of 12 gauge perforated sheet steel. Entire assembly Polyethylene-coated to a depth of 0.040" (1mm). Decks are pre-punched to receive components.

## Metal Preparation for Powder Coat Paint Finish

Metal preparation for powder coat paint finish consists of sandblasting. Parts are free of excess weld splatter.

## Powder-Coat Paint Finish

Polyester dry powder-coating is electrostatically applied and oven cured at 400°F (200°C). Finished membrane is 3-5 mil (0.076-0.127mm) and includes additives for resistance to ultraviolet (U.V.) degradation. Finished membrane complies with the following performance standards:

- ASTM D 522 (Mandrel Bending)
- ASTM D 2794-90 (Impact)
- ASTM B 117-90 (Salt Spray Resistance)
- ASTM D 3359B (Cross Hatch Adhesion)
- ASTM D 2247-87 (Humidity Resistance)
- ASTM D 3363 (Pencil Hardness)
- ASTM D 822 (Weatherability)
- ASTM D 2454 (Overbake Resistance)

## Welded Components

Welded components are Canadian Welding Bureau (CWB) certified under CSA standards W47.1 Div. 2.1 and W47.2 Div. 2.1.

## Polyethylene Coating

Polyethylene coating is Polyarmor® G17, a functionalized polyethylene copolymer-based thermoplastic powder coating designed for maximum mechanical performance, impact resistance and UV-stability. Polyarmor® G17 is a good general-purpose protective coating. On Polis Park Furniture PlaySteel decks will be coated in a fluidized bed to an overall thickness of 25 to 30 mil and cured in an oven at 425°F. Thickness shall average approximately 1/8" (3.2 mm) providing a safe, resilient surface. Materials comply with the following performance standards:

- ASTM D 792 (Specific Gravity)
- ASTM D 4541 (Adhesion)
- ASTM D 2240 (Hardness Shore D)
- ASTM B 2794 (Impact Resistance)
- ASTM D 1525 (Vicat Softening Point)
- ASTM D 638 (Tensile Strength)
- ASTM D 638 (Elongation)
- ASTM D 2247 (Humidity Resistance)
- ASTM B 117 (Salt Spray)
- ASTM G 53 (QUV)
- ASTM D 4060 (Taber Abrasion)
- ASTM D 522 (Flexibility)
- ASTM D 523 (Gloss)
- ASTM D 1238 (Melt Index)

## Hardware and Fasteners

All hardware and fasteners are stainless steel or otherwise treated to resist corrosion. Hardware and fasteners are tamper resistant unless otherwise specified. All necessary hardware and fasteners are provided.

## Rotationally-Moulded Plastic Parts

Rotationally-moulded plastic parts are moulded from linear medium-density polyethylene resin with ultraviolet (U.V.) light stabilizers and colour moulded in. Rotationally-moulded plastic parts have an average wall thickness ranging from 0.125" (3mm) to 0.375" (10mm), as specified. Rotationally-moulded plastic parts comply with the following performance standards:

- ASTM D 790 (Flex Modulus)
- ASTM D 638 (Tensile Strength)
- ASTM D 648 (Heat Distortion Temperature)
- ARM-STD (Low Temperature Impact)

## 0.75" (19mm) Sheet Polyethylene Parts

0.75" (19mm) sheet polyethylene parts are stress-relieved high-density polyethylene with ultraviolet (U.V.) light stabilizers and anti-static guard. Sheet polyethylene parts contain maximum 67% recycled content and are 100% recyclable. Materials comply with:

- ASTM D 790 (Flex Modulus)
- ASTM D 638 (Tensile Strength)
- ASTM D 648 (Heat Distortion Temperature)

## Recycled Plastic

Recycled plastic is injection moulded 100% solid blended recycled plastic consisting of 96% polyolefins (HDPE/LDPE/PP), 2% PET, 1% PS, and 1% other. Recycled plastic is ultraviolet (U.V.) light resistant, skid resistant when wet, resistant to infestation by borers, and will not leach. Recycled plastic contains no preservatives. Specific gravity is 0.96. Expansion and contraction with 122°F (50°C) temperature variation is 0.3%. Melting point is 374°F (190°C). Compression strength is 1200 to 2400 lb/in<sup>2</sup> (8274 to 16548 kPa) depending on profile. No absorption, solubility, or evaporation.

## 0.625" (16mm) Rope

0.625" (16mm) O.D. vandal-resistant, polypropylene-covered, galvanized steel strand fibre-core cable and 0.25" x 1.5" (6mm x 38mm) zinc.

## Orbis Arches

Orbis Arches are ø2.375" (60.3mm) x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Outer surfaces are zinc-plated and inner surfaces are treated to resist corrosion. Arches are screwed with 3/8" stainless steel self tapping screws in corresponding location for clamps. All arches are powder coated.

## Orbis Clamps

Orbis clamps are cast with the highest grade 356.1 aluminum. The clamps are then drilled with a ø1/2" hole to fit its 3/8" hardware and T-Nut. The Antigravity Clamp uses 3/8-16 x 3.00" tamper resistant hardware with a T-Nut. The Aphelion and Bridge Clamp use 3/8-16 x 3.50" tamper resistant hardware with a T-Nut. All clamps are powder coated.

## Post Caps

Post caps are alloy 319 cast aluminum.

## Marine Board (Anti-Skid Plastic)

Non Skid Plastic is 0.75" (19mm) anti-skid marine-grade polymer. Non Skid is specially formulated to withstand the rigors of harsh outdoor playground environments. It is UV-stabilized to resist damage and retain its beauty, even after years of direct sunlight. It does not splinter, crack, delaminate, rot, swell, or absorb water. Even under heavy foot traffic on playgrounds, it remains virtually maintenance-free. The color is integrated with the polymer and retains its vibrant appearance.

Materials comply with:

- ASTM D 790 (Flex Modulus)
- ASTM D 638 (Tensile Strength)
- ASTM D 648 (Heat Distortion Temperature)





## Play Structure General Specifications

### Playground Equipment Designs

It is the opinion of the manufacturer that playground equipment designs are developed in compliance with the most recent published edition of the following safety standards:

- CAN/CSA-Z614 Children's PlaySpaces and Equipment
- ASTM F 1487 Standard Consumer Safety Performance Specification for Playground Equipment for Public Use
- U.S. Consumer Product Safety Commission (CPSC) Handbook for Public Playground Safety
- Americans with Disabilities Act (ADA) accessibility standards

### Steel Components

Steel tube components are Allied Flo-Coat® galvanized steel tube with 0.6 mil (0.015mm) zinc coating and 0.5 mil (0.013mm) internal corrosion coating. Steel tube components comply with ASTM standards A-500 or A-513. All other steel is zinc-coated, hot-dipped galvanized, Plastisol-coated, or powder-coat painted, as specified. Steel tube components contain between 30% and 100% recycled content. Steel tube components are 95-98% recyclable.

### Uprights

PlaySteel® vertical uprights for PlaySteel® Max are 5" (127mm) x 11 gauge (3mm), PlaySteel® Squared are 4" (102mm) square x 11 gauge (3mm), PlaySteel® Fit are 3.5" (89mm) x 13 gauge (2.3mm), PlayTots™ are 2.5" square x 11 gauge. Outer surfaces are zinc-plated and inner surfaces are treated to resist corrosion. All posts are powder-coat painted. All PlaySteel® post caps are alloy 319 cast aluminum with 0.1875" (5mm) top thickness, 0.125" (3mm) side thickness, and 0.34375" (9mm) corner thickness. Post caps are secured to posts with 10 gauge (3mm) satin-coated steel sheet brackets and mechanical fasteners. Post caps are powder-coat painted to match posts unless otherwise requested.

### Decks

PlaySteel® decks are a welded assembly of 12 gauge perforated sheet steel. Entire assembly Polyethylenecoated to a depth of 0.040" (1mm). Decks are pre-punched to receive components.

### Metal Preparation for Powder Coat Paint Finish

Metal preparation for powder coat paint finish consists of sandblasting. Parts are free of excess weld splatter.

### Powder-Coat Paint Finish

Polyester dry powder-coating is electrostatically applied and oven cured at 400°F (200°C). Finished membrane is 3-5 mil (0.076-0.127mm) and includes additives for resistance to ultraviolet (U.V.) degradation. Finished membrane complies with the following performance standards:

- ASTM D 522 (Mandrel Bending)
- ASTM D 2794-90 (Impact)
- ASTM B 117-90 (Salt Spray Resistance)
- ASTM D 3359B (Cross Hatch Adhesion)
- ASTM D 2247-87 (Humidity Resistance)
- ASTM D 3363 (Pencil Hardness)
- ASTM D 822 (Weatherability)
- ASTM D 2454 (Overbake Resistance)

### Welded Components

Welded components are Canadian Welding Bureau (CWB) certified under CSA standards W47.1 Div. 2.1 and W47.2 Div. 2.1.

### Polyethylene Coating

Polyethylene coating is Polyarmor® G17, a functionalized polyethylene copolymer-based thermoplastic powder coating designed for maximum mechanical performance, impact resistance and UV-stability. Polyarmor® G17 is a good general-purpose protective coating. On Polis Park Furniture PlaySteel decks will be coated in a fluidized bed to an overall thickness of 25 to 30 mil and cured in an oven at 425°F. Thickness shall average approximately 1/8" (3.2 mm) providing a safe, resilient surface.

### Hardware and Fasteners

All hardware and fasteners are stainless steel or otherwise treated to resist corrosion. Hardware and fasteners are tamper resistant unless otherwise specified. All necessary hardware and fasteners are provided.

### Rotationally-Moulded Plastic Parts

Rotationally-moulded plastic parts are moulded from linear medium-density polyethylene resin with ultraviolet (U.V.) light stabilizers and colour moulded in. Rotationally-moulded plastic parts have an average wall thickness ranging from 0.125" (3mm) to 0.375" (10mm), as specified. Rotationally-moulded plastic parts comply with the following performance standards:

- ASTM D 790 (Flex Modulus)
- ASTM D 638 (Tensile Strength)
- ASTM D 648 (Heat Distortion Temperature)
- ARM-STD (Low Temperature Impact)

### 0.75" (19mm) Sheet Polyethylene Parts

0.75" (19mm) sheet polyethylene parts are stress-relieved high-density polyethylene with ultraviolet (U.V.) light stabilizers and anti-static guard. Sheet polyethylene parts contain maximum 67% recycled content and are 100% recyclable.

Materials comply with:

- ASTM D 790 (Flex Modulus)
- ASTM D 638 (Tensile Strength)

- ASTM D 648 (Heat Distortion Temperature)

### Recycled Plastic

Recycled plastic is injection moulded 100% solid blended recycled plastic consisting of 96% polyolefins (HDPE/LDPE/PP), 2% PET, 1% PS, and 1% other. Recycled plastic is ultraviolet (U.V.) light resistant, skid resistant when wet, resistant to infestation by borers, and will not leach. Recycled plastic contains no preservatives. Specific gravity is 0.96. Expansion and contraction with 122°F (50°C) temperature variation is 0.3%. Melting point is 374°F (190°C). Compression strength is 1200 to 2400 lb/in<sup>2</sup> (8274 to 16548 kPa) depending on profile. No absorption, solubility, or evaporation.

### Hot Rolled Metal

Hot rolled metal is 13 gauge perforated steel used on Polis Street Furnishings and Park Amenities. Hot rolled perforated metal are totally encapsulated with either plastisol or polyethylene coatings. Hot rolled steel provides better adhesion characteristics for such coatings.

Engineering Properties

- Young's Modulus of Elasticity 200 x 106 MPa at 20°C
- Density 7.87 g/cm<sup>3</sup> at 20°C
- Coefficient of Thermal Expansion Low-Carbon/HSLA:
- 12.4 µm/m/°C in 20°C to 100°C range I-F Steel: 12.9 µm/m/°C in 20°C to 100°C range
- Thermal Conductivity Low-Carbon/HSLA: 89 W/m°C at 20°C
- I-F Steel: 93 W/m°C at 20°C
- Specific Heat 481 J/kg/°C in 50°C to 100°C range
- Electrical Resistivity 0.142 µΩm at 20°C

### 0.625" (16mm) Rope

0.625" (16mm) O.D. vandal-resistant, polypropylenecovered, galvanized steel strand fibre-core cable and 0.25" x 1.5" (6mm x 38mm) zinc.

### Post Caps

Post caps are alloy 319 cast aluminum.

### Marine Board (Anti-Skid Plastic)

Non Skid Plastic is 0.75" (19mm) anti-skid marine-grade polymer. Non Skid is specially formulated to withstand the rigors of harsh outdoor playground environments. It is UV-stabilized to resist damage and retain its beauty, even after years of direct sunlight. It does not splinter, crack, delaminate, rot, swell, or absorb water. Even under heavy foot traffic on playgrounds, it remains virtually maintenance-free. The color is integrated with the polymer and retains its vibrant appearance.

Materials comply with:

- ASTM D 790 (Flex Modulus)
- ASTM D 638 (Tensile Strength)
- ASTM D 648 (Heat Distortion Temperature)

### Orbis Arches

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### Orbis Clamps

Orbis clamps are cast with the highest grade 356.1 aluminum. The clamps are then drilled with a ø1/2" hole to fit its 3/8" hardware and T-Nut. The Antigravity Clamp uses 3/8-16 x 3.00" tamper resistant hardware with a T-Nut. The Aphelion and Bridge Clamp use 3/8-16 x 3.50" tamper resistant hardware with a T-Nut. All clamps are powder coated.

### Activity Panels

#### Periscope Panel with Vertical Rail

PlayShip Periscope Panel is a mechanical assembly of periscope panel rail, periscope mounting bar and periscope. Periscope panel rail is a welded assembly of 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 1.029" (26mm) O.D.

#### Steering Wheel Panel

Steering Wheel Panel is a mechanical assembly of vertical rail, steering wheel, and steering wheel bracket. Vertical rail is a welded assembly of 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 1.029" (26mm) O.D. x 14 gauge (2)

#### X&O Panel

X&O Panel is a mechanical assembly of frame panel, X&O drums, rods, and panel brackets. Frame panel is 0.75" (19mm) bi-colour sheet polyethylene. X&O drums are rotationally-molded medium-density polyethylene with an average wall thickness of 0.125" (3mm)

### Climbing Activities

#### Cobra Climber 5'

Cobra Climber is a mechanical assembly of climber and safety rail. Climber is a welded assembly of 1.66" (42mm) O.D. x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube structural rails, 1.66" (42mm) 1018 carbon steel tube insert, 1.315" (33mm) O.D.

#### Stepping Stones 4' With Rails

Stepping Stone is a mechanical assembly of handrail, safety rail, ground legs and pods. Handrail is 1.66" (42mm) x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 1.66" (42mm) 1018 carbon steel tube insert. Safety rail

is a welded assembly of

#### Tower Climber 6'

Tower Climber is a mechanical assembly of climber and slide pole universal hoop. Climber is a welded assembly of 1.66" (42mm) O.D. x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 0.1875" x 1.75" (5mm x 44mm) zinc-plated hot-rolled mild flat steel

### Decks

#### P4 Split Deck

Split Deck is a welded assembly of deck, support rib, and bracket. Deck is a formed assembly of 12 gauge top sheet steel. Support ribs are a formed assembly of 12 gauge to sheet steel. Brackets are a welded assembly of 0.1875" x 1.75" (5mm x 44mm) zinc

#### P4 Square Deck

Square Deck is a welded assembly of deck, support rib, and bracket. Deck is a formed assembly of 12 gauge top sheet steel. Support ribs are a formed assembly of 12 gauge to sheet steel. Bracket is a welded assembly of 0.1875" x 1.75" (5mm x 44mm) zinc-

### Infill Panels

#### Infill Panel 8"

Infill Panel is 10 gauge satin-coat steel. Panel is powder-coat painted.

#### Infill Panel 8" - Split Deck

Infill Panel is 10 gauge satin-coat steel. Panel is powder-coat painted.

### Motion Toy

#### Lucky Clover

Lucky clover motion toy module is a mechanical assembly of upper assembly, lower assembly, and spring assembly. Upper assembly is a mechanical assembly of upper support, seat frame, and plastic. Upper support is 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Seat frame is a welded assembly of 14 gauge (2mm) satincoated steel sheet and 1.5" x 3" (38mm x 76mm) rectangular x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Plastic is 0.75" (19mm) sheet polyethylene. Upper support and seat frame are powder coated. Lower assembly is a mechanical assembly of spring cover, lower support, and plastic. Spring cover is a welded assembly of 14 gauge (2mm) satincoated steel sheet and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat steel. Lower support is 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Plastic is 0.75" (19mm) sheet polyethylene. Spring cover and lower support are powder coated. Spring assembly is a mechanical assembly of spring, upper spring assembly, lower spring assembly, and chain. Spring is 8" (203mm) O.D. x 0.75" (19mm) type 5160 steel wire. Upper spring assembly is a welded assembly of 4" (102mm) schedule 40 black steel pipe, 3.5" (89mm) schedule 40 black steel pipe, 0.5" (13mm) square hot-rolled steel bar, 0.375" (10mm) hot-rolled steel plate, and 0.25" x 7.25" (6mm x 184mm) hot-rolled mild flat steel. Lower spring assembly is a welded assembly of 4" (102mm) schedule 40 black steel pipe, 3.5" (89mm) schedule 40 black steel pipe, 0.5" (13mm) square hot-rolled steel bar, 0.375" (10mm) hot-rolled steel plate, and 0.25" x 7.25" (6mm x 184mm) hot-rolled mild flat steel. Chain is 0.375" (10mm) load grade 70 welded chain. Spring assembly steel components are powder coated.

#### Wally the Whale

Wally the Whale is a mechanical assembly of whale and coil spring base. Whale is rotationally-moulded medium-density polyethylene with an average wall thickness of 0.375" (10mm). Coil spring base is a mechanical assembly of spring, upper spring base, and lower spring base. Spring is 5.625" (143mm) O.D. x 0.75" (19mm) type 5160 steel wire. Upper spring base is a welded assembly 0.25" x 7.25" (6mm x 184mm) hot-rolled mild flat steel, 0.375" (10mm) O.D. hot-rolled steel bar, 0.375" x 3.4375" (10mm x 87mm) hot-rolled mild flat steel, 3.5" (89mm) schedule 40 black steel pipe, 5" (127mm) schedule 40 black steel pipe, and 0.5" (13mm) square hot-rolled steel bar. Lower spring base is a welded assembly of 3.5" (89mm) O.D. x 0.188" (5mm) hollow structural steel tube, 5" (127mm) schedule 40 black steel pipe, 3.5" (89mm) schedule 40

black steel pipe, 0.25" x 1.25" (6mm x 32mm) hot-rolled mild flat steel, 0.375" x 3.4375" (10mm x 87mm) hot-rolled mild flat steel, 0.5" (13mm) square hot-rolled steel bar, and 0.375" (10mm) O.D. hot-rolled steel bar. Coil spring base is powder-coat painted.

## Motion Toys

### Lucky Clover

Lucky clover motion toy module is a mechanical assembly of upper assembly, lower assembly, and spring assembly. Upper assembly is a mechanical assembly of upper support, seat frame, and plastic. Upper support is 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Seat frame is a welded assembly of 14 gauge (2mm) satincoated steel sheet and 1.5" x 3" (38mm x 76mm) rectangular x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Plastic is 0.75" (19mm) sheet polyethylene. Upper support and seat frame are powder coated. Lower assembly is a mechanical assembly of spring cover, lower support, and plastic. Spring cover is a welded assembly of 14 gauge (2mm) satincoated steel sheet and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat steel. Lower support is 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Plastic is 0.75" (19mm) sheet polyethylene. Spring cover and lower support are powder coated. Spring assembly is a mechanical assembly of spring, upper spring assembly, lower spring assembly, and chain. Spring is 8" (203mm) O.D. x 0.75" (19mm) type 5160 steel wire. Upper spring assembly is a welded assembly of 4" (102mm) schedule 40 black steel pipe, 3.5" (89mm) schedule 40 black steel pipe, 0.5" (13mm) square hot-rolled steel bar, 0.375" (10mm) hot-rolled steel plate, and 0.25" x 7.25" (6mm x 184mm) hot-rolled mild flat steel. Lower spring assembly is a welded assembly of 4" (102mm) schedule 40 black steel pipe, 3.5" (89mm) schedule 40 black steel pipe, 0.5" (13mm) square hot-rolled steel bar, 0.375" (10mm) hot-rolled steel plate, and 0.25" x 3" (6mm x 76mm) hot-rolled mild flat steel. Chain is 0.375" (10mm) load grade 70 welded chain. Spring assembly steel components are powder coated.

### Wally the Whale

Wally the Whale is a mechanical assembly of whale and coil spring base. Whale is rotationally-moulded medium-density polyethylene with an average wall thickness of 0.375" (10mm). Coil spring base is a mechanical assembly of spring, upper spring base, and lower spring base. Spring is 5.625" (143mm) O.D. x 0.75" (19mm) type 5160 steel wire. Upper spring base is a welded assembly 0.25" x 7.25" (6mm x 184mm) hot-rolled mild flat steel, 0.375" (10mm) O.D. hot-rolled steel bar, 0.375" x 3.4375" (10mm x 87mm) hot-rolled mild flat steel, 3.5" (89mm) schedule 40

black steel pipe, 5" (127mm) schedule 40 black steel pipe, and 0.5" (13mm) square hot-rolled steel bar. Lower spring base is a welded assembly of 3.5" (89mm) O.D. x 0.188" (5mm) hollow structural steel tube, 5" (127mm) schedule 40 black steel pipe, 3.5" (89mm) schedule 40 black steel pipe, 0.25" x 1.25" (6mm x 32mm) hot-rolled mild flat steel, 0.375" x 3.4375" (10mm x 87mm) hot-rolled mild flat steel, 0.5" (13mm) square hot-rolled steel bar, and 0.375" (10mm) O.D. hot-rolled steel bar. Coil spring base is powder-coat painted.

## Playsteel Posts

### P4 Post - Aluminum Cap (Price / Foot)

P4 Post - Aluminum Cap is a welded assembly of post, cap and bracket. Post is 4" (102mm) square x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Cap is aluminum. Bracket is 10 gauge (3mm) hot rolled steel bar. Entire assembly is powder-coat pa

## Slides

### Spiral Slide 6'

Poly Spiral Slide is a mechanical assembly of slide, deck, safety railing, mounting frame, and support post. Slide is one-piece, double-wall, rotationally-molded medium-density polyethylene with an average wall thickness of 0.3125" (8mm). Slide has no s

## Social Play Activities

### PlayCounter

PlayCounter is a mechanical assembly of brackets, panel, and top. Brackets are a welded assembly of 0.1875" x 1.75" (5mm x 44mm) zinc-plated hot-rolled mild flat steel, and 10 gauge (3mm) satin-coated steel sheet. Panel is 0.75" (19mm) bi-colour sheet p

## Stairs & Access Points

### Poly Deck Ladder 2'

Poly Deck Ladder is a mechanical assembly of ladder step, turning bar lug, and and safety railings. Ladder step is 0.75" (19mm) bi-colour sheet polyethylene. Turning bar lug is 0.1875" x 1.75" (5mm x 44mm) zinc-plated hot-rolled mild flat steel. Safety

### Transfer Station 4'

Transfer Station is a mechanical assembly of grab bar, step, transfer deck, barrier rail, handrails, post, and ground leg. Grab bar is 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube. Step is a formed assembly of 12 gauge top

## Swings

### 8' Arch Swing 1-Bay

Arch Swing is a mechanical assembly of top bar, swing bearings, and end frames. Top bar is 3.5" (89mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube. Swing bearings are a mechanical assembly of upper and lower bracket. Upper bracket is 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel. Lower bracket is a mechanical assembly of hanger and swivel bearing. Hanger is a welded assembly of 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat steel. Swivel bearing is a welded assembly of 1" (25mm) schedule 40 black steel pipe, 0.375" (10mm) O.D. hotrolled steel bar, 1.03" (26mm) O.D. x 0.51" (13mm) I.D. Nylatron® bushing, 0.5" (13mm) machine bolt, and 0.5" (13mm) lock nut. Swing bearings are hot-dipped galvanized. End frames are a welded assembly of 3.5" (89mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube, 3" (76mm) O.D. x 0.120" (3mm) hollow structural steel tube, and 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube.

### 8' Arch Swing Extend-A-Bay

Arch Swing is a mechanical assembly of top bar, swing bearings, and end frames. Top bar is 3.5" (89mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube. Swing bearings are a mechanical assembly of upper and lower bracket. Upper bracket is 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel. Lower bracket is a mechanical assembly of hanger and swivel bearing. Hanger is a welded assembly of 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat steel. Swivel bearing is a welded assembly of 1" (25mm) schedule 40 black steel pipe, 0.375" (10mm) O.D. hotrolled steel bar, 1.03" (26mm) O.D. x 0.51" (13mm) I.D. Nylatron® bushing, 0.5" (13mm) machine bolt, and 0.5" (13mm) lock nut. Swing bearings are hot-dipped galvanized. End frames are a welded assembly of 3.5" (89mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube, 3" (76mm) O.D. x 0.120" (3mm) hollow structural steel tube, and 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube.

## **Traditional Equipment**

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### **Sand Digger**

Sand Digger is a mechanical assembly of frame, scoop, seat, and ground leg. Frame is a welded assembly of 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube. Scoop is cast aluminum. Seat is moulded polyethylene. Ground leg is a mechanical assembly of 2.375" (60mm) O.D. x 10 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 0.25" x 5" (6mm x 127mm) hot-rolled mild flat steel, 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel, and bearing. Frame and ground leg are powder-coat painted.

# In-Ground Installation Instructions for PlaySteel



Please take the time to review this very IMPORTANT information concerning the installation of your new Henderson Recreation Equipment Play Structure. To assist you with the installation of your new play structure, we have listed a few important details for you to consider that will help to ensure there are no unnecessary delays and additional costs for the installation of your equipment. If you have any questions or require additional information, please contact your sales representative or the installation coordinator.

### **Information Included in this Package**

Component Installation Instructions  
 In-ground Method Installation Instructions  
 Layout Drawings / 3d Drawings  
 Packing Slip / Customer Count-sheet

### **Tools Provided for Installation**

Allen Key, 7/32"  
 Allen Key, 3/8"  
 Tamper Resistant Key Torx #55

### **Tools Required for Installation**

Allen Socket, 7/32"  
 Allen Socket, 3/8"  
 Tamper Resistant Socket T-45T  
 Bolt Cutters  
 Claw Hammer  
 Drill, 1/2" Heavy Duty and Variable Speed  
 Drill Bit Set  
 Levels, 24", 48"  
 Pliers  
 Pry Bar  
 Ratchets, 3/8", 1/2" c/w Extension  
 Round File  
 Rubber Mallet  
 Screwdriver Set  
 Sockets, Deep 1/2" to 3/4", 10mm  
 Square, Small Corner Square  
 Tape Measures, 20', 25', 100'  
 Tin Snips  
 Utility Knife  
 Vice Grips  
 Wire Cutters  
 Wrenches, 3/8" to 3/4", 10mm

### **Utility Locates**

If installation of your equipment will require digging or excavation, it is important that the underground locations of utilities such as electric, gas, telephone, cable, water or any other private or underground obstructions are known prior to excavation work commencing. Failure to complete this necessary step may result in damage to the underground services or cause a potentially dangerous situation.

Contact your local providers to have this service performed. The utility representative should leave a document with you to indicate there is no conflict with the area designated for the new play structure.

### **Tools Required for Site Layout**

Line Level (50' minimum)  
 Plumb Bob  
 Stakes (for Locating)  
 Spray Paint

### **Equipment Required for Installation**

Auger, 12" Diameter  
 Chainsaw (for Wood Border)  
 Cleanup Supplies, Bucket and Clean Rags  
 Extension Cord, 50'  
 Generator, 4000 Watt (or Eq. Power Source)  
 Jack All Jack  
 Rakes  
 Shovels  
 Sledge Hammer  
 Water / Water Source  
 Wheelbarrow

### **Material Required for Post Support**

Carriage Bolt, 3/8" x 4" (2 per Ground Hole)  
 Chain, 4/0 Coil 16" Long (1 per Ground Hole)  
 Flat Washers, 3/8" (2 per Ground Hole)  
 Lock Nuts, 3/8" (2 per Ground Hole)  
 Wood, 2" x 4" x 2' (3 per Ground Hole)



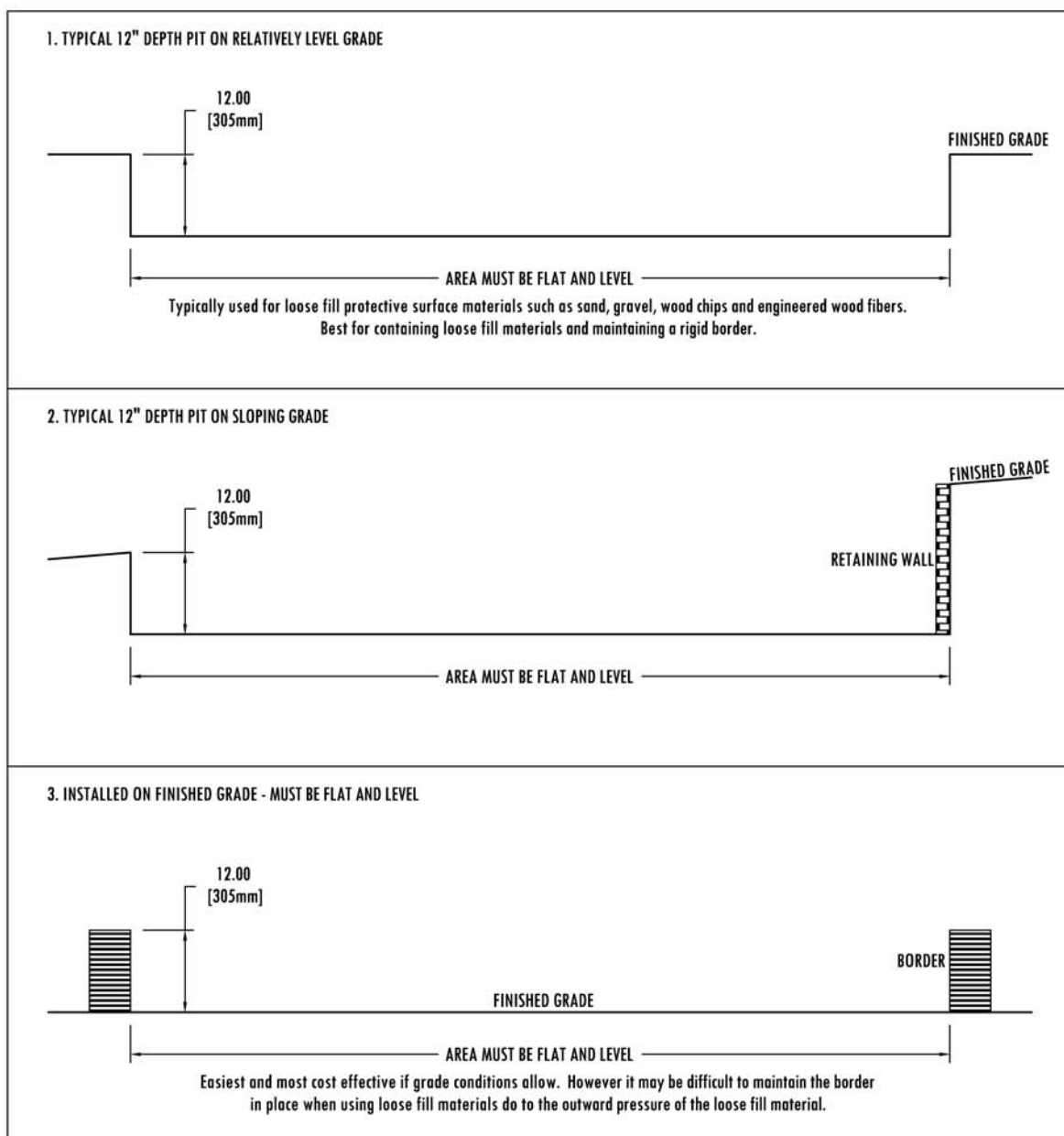
## Play Structure Site Excavation Details

All play structures must be installed on a flat and level surface to ensure that the end result is compliant with the CSA (Canada) or ASTM (U.S.) standard. Depending on the physical site, the type of containment border and protective surfacing material chosen, there are several methods of site preparation that will produce acceptable results. Pit Depths or Border Heights will vary depending on surfacing material.

Some examples of the installation types are shown below in sectional views. In all cases, the grade on which the protective surfacing will be installed must be **FLAT** and **LEVEL**. The perimeter dimensions of the protective surface zone required for your equipment are indicated on the drawings that were provided to you.



Filter cloth, drainage tiles, borders or protective surfacing material should not be installed prior to the installation of the play structure as any of these can be easily damaged due to the construction activity.



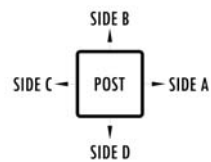
## **Understanding Your Layout Drawing**

Before beginning the installation of your play structure, study your layout drawing, 3d drawing, and component installation instructions carefully.

### **IMPORTANT**

**The required site dimensions are marked on the layout drawing and should be compared to the actual area to ensure that the play structure will fit. This overall bordered area includes the actual play structure plus a minimum protective surface area that extends to cover the zone of use. Note any no-encroachment zones (Canada only) on your layout drawing. This extra space is required for certain play components such as slides, swings and certain rotating equipment and is intended to allow pedestrian traffic near the play equipment in use while minimizing the risk of injury to pedestrians. Depending on the layout arrangement, a no-encroachment zone does not require protective surfacing but must be free of obstructions that would hinder free pedestrian movement.**

Your layout drawing is used to identify post locations. The numbers at the post bases coincide with the numbers on the bottoms of the actual play structure posts. Each of the 4 sides of a play structure post will also be identified with a side letter A,B,C or D. You will use these to orient the post in the appropriate direction within the site. A post compass is provided on your layout drawing that identifies your unique post direction.



Your layout drawing is also marked with a scale key that can be used to obtain additional measurements not directly provided.

## **Laying Out Your Play Structure**

Always begin by measuring the prepared site to ensure that it is large enough to safely contain your play structure, including all required safety zones. If the site is not large enough, your play structure will not comply with the CSA (Canada) or the ASTM (U.S.) standard.

Unless otherwise specified, face the play structure so that any stainless steel slides face north or east to avoid heating by the sun.

It is generally easier to install a play structure from the lowest to the highest deck. Lower decks are typically supported by shorter posts. Shorter posts are easier to stand and balance than taller posts. Once the lower decks are installed, they can be used to balance the taller posts and decks.

Your layout drawing will contain a starting dimension from the edge of the site to the lowest deck. Other optional starting points will also be dimensioned. Use the scale key for measurements if you wish to start at a location not directly dimensioned. In certain circumstances it may be beneficial to assemble the play structure starting in areas that are dimensionally critical. An example of this may be when you are required to mate a wheelchair ramp or bridge with an existing concrete curb. In this scenario it would be prudent to assemble the play structure starting with that wheelchair ramp or bridge.

Once you have determined a starting point, translate this point into the prepared site by measuring in from the edge of the site. Placement of this point is very important because all other points depend on its accuracy. Once the starting point is located in the prepared site, confirm that there is enough area in the opposite directions to safely contain the play structure.

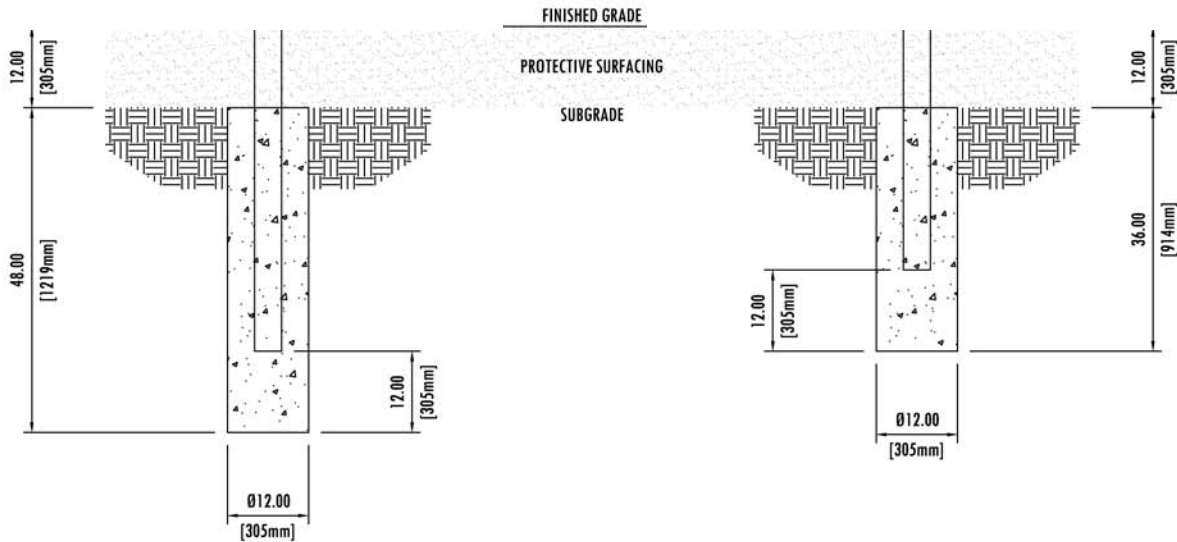
Now that you have your starting point located, begin to layout the rest of the post locations. You can layout post locations by measuring with a tape measure and marking the location with a stake (or spray paint), or by using the physical component. For example, if installing a deck, set the deck in the appropriate location and mark the locations of the posts with stakes (or spray paint). Remove the deck and use the stakes (or spray paint) to indicate where to auger the holes.

## Drilling Ground Holes

Once post locations are marked, auger ground holes for them. A typical ground hole will have a 12" diameter and be 48" deep. Hole depth may need adjustment based on the geographical location of the installation site. High frost areas may require a deeper hole. It may be necessary to dig out the bottom of the hole by shovel after the power auger has been removed to ensure proper depth.

**Typical** 48" deep ground hole with 12" protective surfacing material

**Non-Typical** 36" deep ground hole with 12" protective surfacing material



### IMPORTANT

All included installation drawings assume a 48" deep hole. If you have asked for a different hole depth, the post length supplied to you will already be adjusted to match your required depth. In this case it is your responsibility to adjust your hole depths accordingly. Failure to do so could result in your play structure being too high or too low once the protective surfacing has been added to the site. Always confirm the depth your posts have been cut for by finding the depth number on the Post Holes page included within this package.

### Post Holes 17/32"

Label: 06-00001 Customer: HENDERSON RECREATION  
 Date: Project:  
 Post Colour: Blue # of Posts: 8 Post Caps: 8

Ground  
 In Ground  
 On Ground  
 Mixed

Order: 06-00001  
 Depth: 48 Product: PF00001R0

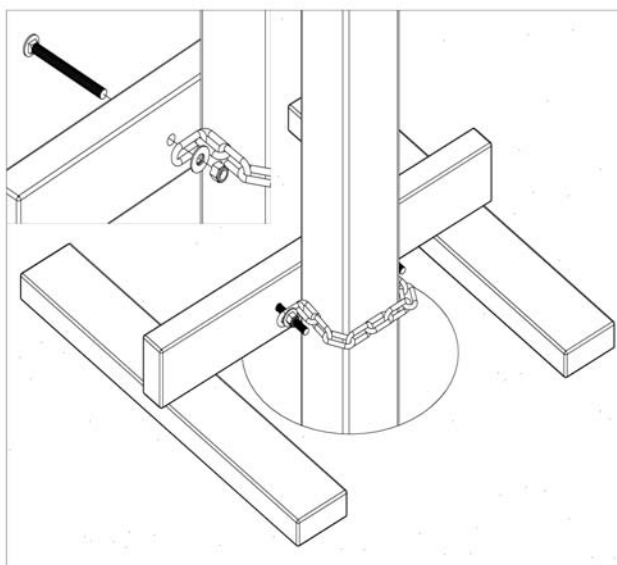
Install  Supply

Num	Component Name	side A	side B	side C	side D	length
<b>4" Post c/w Alum Cap</b>						
1	Inground 4" Post c/w Alum Cap	1.25, 4, 8, 89.5	No Holes	No Holes	No Holes	90
2	Inground 4" Post c/w Alum Cap	1.25, 4, 8, 101.5	No Holes	16, 20	No Holes	102
3	Inground 4" Post c/w Alum Cap	1.25, 4, 8, 131.5	No Holes	34, 38	No Holes	132
4	Inground 4" Post c/w Alum Cap	1.25, 131.5	No Holes	4, 8	No Holes	132
5	Inground 4" Post c/w Alum Cap	1.25, 4, 8, 131.5	No Holes	No Holes	No Holes	132
6	Inground 4" Post c/w Alum Cap	1.25, 10, 14, 131.5	No Holes	4, 8	No Holes	132
7	Inground 4" Post c/w Alum Cap	1.25, 16, 20, 125.5	No Holes	4, 8	No Holes	126
8	Inground 4" Post c/w Alum Cap	1.25, 112.5	No Holes	3, 7	No Holes	113

## **Supporting The Play Structure**

Once four post holes have been drilled, locate the appropriate numbered posts according to the layout drawing. Stand the posts upright in the ground holes and ensure that they are positioned in the appropriate direction identified by the post compass. Lift the deck into position, and fasten using the hardware identified in the deck installation instruction.

Once the deck has been connected at all four corners, the posts should be raised in order to achieve the proper deck height. To brace the posts in place you will need a way to support them. Start by drilling out two 7/16" holes in one 2' length of 2" x 4". The holes should be 7" apart and centred on the board in both directions. Using a 16" length of chain, two 3/8" x 4" carriage bolts, two 3/8" flat washers, and two 3/8" locknuts, fasten the chain around the post and tighten to the board. Tighten until the brace does not move along the post. A rubber mallet can be used to test the strength of your brace. Support the 2" x 4" brace with two other 2" x 4" boards on either side of the ground hole. To raise or lower your deck, slightly loosen the nut, adjust the height and retighten.



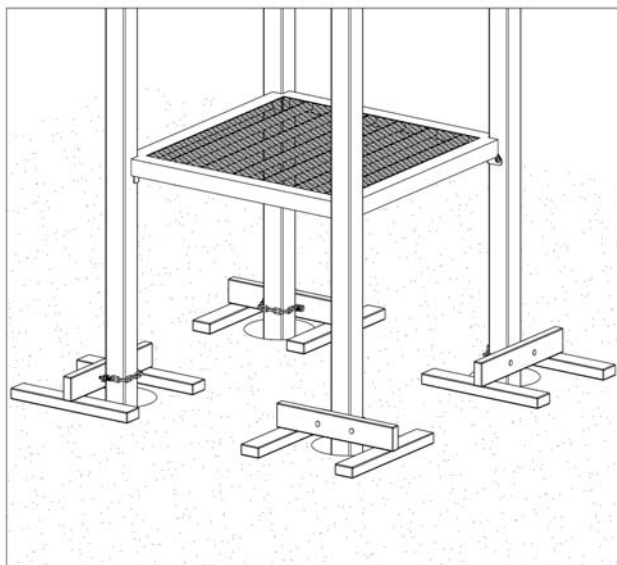
### **IMPORTANT**

**The deck heights shown on the layout drawing are measured from finished grade. If the site has been excavated for 12" protective surfacing, a 12" high deck will measure 24" from the sub-grade to the top of the deck.**

When arranging braces for a deck it is necessary to alter the directions of the braces under each post. The deck will be unstable if all four braces are facing the same direction.

Whenever you can, install components such as vertical rail panels, turning bars, plastic activity panels, and slide hoods as you go. These will help keep your decks square and rigid as you continue drilling more holes and adding more decks to your play structure.

Continue to assemble the play structure following the procedures that have been outlined thus far. Post locations for attaching decks can be found by measuring out with a tape measure or by using the physical part as a guide.



For connecting components such as bridges or crawl tunnels, refer to the layout drawing or individual instructions for measurements to locate their corresponding post holes.

Continually check your dimensions to make sure you are running true within the site. Each component that is added to the play structure makes it more difficult to readjust the direction of the play structure. If the unit is veering off in any direction that may cause your protective surfacing zone to be smaller than anticipated, correct the problem before continuing to install the remaining components.

## **Component Installation**

Once all decks and connecting components have been attached, it is time to install all the components that connect the play structure and the ground. These components include slides, climbers, and stairs. The attached individual installation instructions will detail ground hole locations and the assembly procedure for these components.

Most multiple deck play structures contain infill panels. These are easy to miss on the layout and 3d drawings but they must be installed to ensure a safe playground. The customer count-sheet will identify the number of infill panels that have been shipped and should be installed on your play structure.

## **Checking**

Once assembly is complete, do a final check before proceeding. Ensure that all posts are plumb on all sides. All decks should be level and adjusted to the correct height for the amount of protective surfacing required. Ensure all components are attached per their instructions. Finally, ensure that all fasteners are tight and firmly secured.

## **Concrete Footings**

Concrete should be poured only after all posts, decks and components are properly and securely installed. While adding concrete to the ground holes, prevent splashing on the equipment. As the ground hole is being filled, use a shovel to stir the concrete to remove any air pockets. Fill the ground hole completely to sub-grade level.

After the concrete had been poured, ensure that all posts and decks have remained level and plumb. The recommended setting time for concrete is 24 to 48 hours. After the concrete has set, remove all wooden braces and chain. These may pose a hazard if left in the protective surfacing.

Note: 1 cubic yard (27 cubic feet) of ready-mix concrete will fill approximately nine 12" diameter 48" deep ground holes.

## **Protective Surfacing Installation**

Install protective surface material after all concrete footings have been placed and set, as well as all wooden braces have been removed. The protective surfacing should be evenly distributed and raked level. The playground should not be opened until this step is complete.

## **Installation Safety**

While installing any playground equipment, if the site must be left unattended, make sure the area is left safe. Clean up all tools, cover all open ground holes, and erect a snow fence or other barrier to keep children out of the area.

Installation of playground equipment should be carried out strictly in accordance with the manufacturer's recommendations.

## **Recycling**

Many of our packaging materials can be recycled. Please take the time to separate and deliver them to a recycling centre. Thank you!

## **Torque Requirements**

The following are target torque values for typical fasteners. The actual values should be determined by means of a torque wrench. The torque values given are (unless otherwise noted) typical for all lengths of the given fastener size.

<b>Size</b>	<b>Description</b>	<b>Torque in*lbs</b>
1/4"	Carriage Bolt	66
5/16"	Carriage Bolt	132
3/8"	Carriage Bolt	240
7/16"	Carriage Bolt	600
1/2"	Carriage Bolt	600
3/8"	Eye Bolt	240
3/8"	Machine Bolt	240
7/16" x 2 1/2"	Machine Bolt	600
7/16"	Machine Bolt	384
1/2"	Machine Bolt	600
5/16"	Truss Bolt	132
3/8" x 3/4"	Button head Cap Screw	540
3/8"	Button head Cap Screw	240
3/8"	Flat Head Hex Socket Cap Screw	240
5/16"	Hex Head Lag Screw	132
3/8"	Hex Head Lag Screw	240
3/8" x 1/4"	Set Screw	130
3/8" x 3/8"	Set Screw	240
1/2" x 1/2"	Set Screw	316

Installation Time: 2.0 hours, 2 installers

Weight: 614 lb (279kg)

Concrete Required: 18.8 ft<sup>3</sup> (0.53m<sup>3</sup>)

Area Required: See Fig. 5 and Fig. 6

### Product Specifications

8' (2438mm) Arch Swing is a mechanical assembly of top bar, swing bearings, and end frames. Top bar is 3.5" (89mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube. Swing bearings are a mechanical assembly of upper and lower bracket. Upper bracket is 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel. Lower bracket is a mechanical assembly of hanger and swivel bearing. Hanger is a welded assembly of 0.1875" x 2" (5mm x 51mm) hot-rolled mild flat steel and 0.1875" x 1.75" (5mm x 44mm) hot-rolled mild flat steel. Swivel bearing is a welded assembly of 1" (25mm) schedule 40 black steel pipe, 0.375" (10mm) O.D. hot-rolled steel bar, 1.03" (26mm) O.D. x 0.51" (13mm) I.D. Nylatron® bushing, 0.5" (13mm) machine bolt, and 0.5" (13mm) lock nut. Swing bearings are hot-dipped galvanized. End frames are a welded assembly of 3.5" (89mm) O.D. x 8 gauge (4mm) Allied Flo-Coat® galvanized steel tube, 3" (76mm) O.D. x 0.120" (3mm) hollow structural steel tube, and 1.029" (26mm) O.D. x 14 gauge (2mm) Allied Flo-Coat® galvanized steel tube.

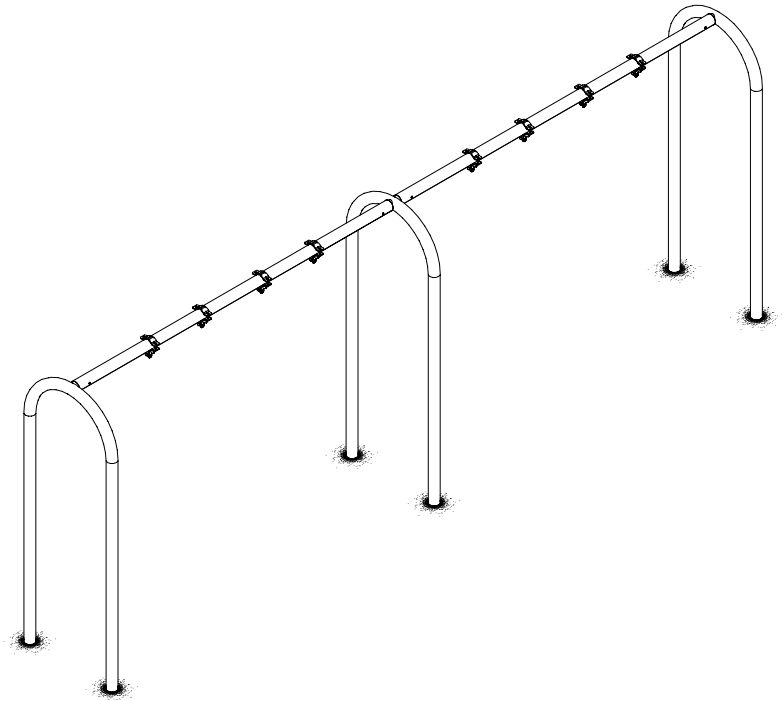


Fig. 1

### Parts List

Qty	Part Name	Part No.
2	Swing Topbar - Heavy Duty	1M-SA-SWP00900-00
2	End Frame	1M-SA-SWP01200-01
1	Centre Frame	1M-SA-SWP01300-01
8	Swing Bearing 3"	1M-SA-SWP01500-00
2	<b>Hardware Kit</b>	<b>1M-SA-HWK20210-00</b>
8	Carriage Bolt 7/16" x 2-1/2"	1C-0710
2	Machine Bolt 1/2" x 4-1/2"	1M-0818
8	Lock Nut c/w Nylon Locking 7/16"	4L-0700
2	Lock Nut c/w Nylon Locking 1/2"	4L-0800
8	Lock Washer 7/16"	5L-0700

### Materials Required for Installation

Imperial Socket Set  
 Hammer  
 Level  
 Measuring Tape  
 Layout Paint or Wooden Stakes  
 Shovel or Auger  
 Wooden Boards  
 Wooden Shims  
 Concrete

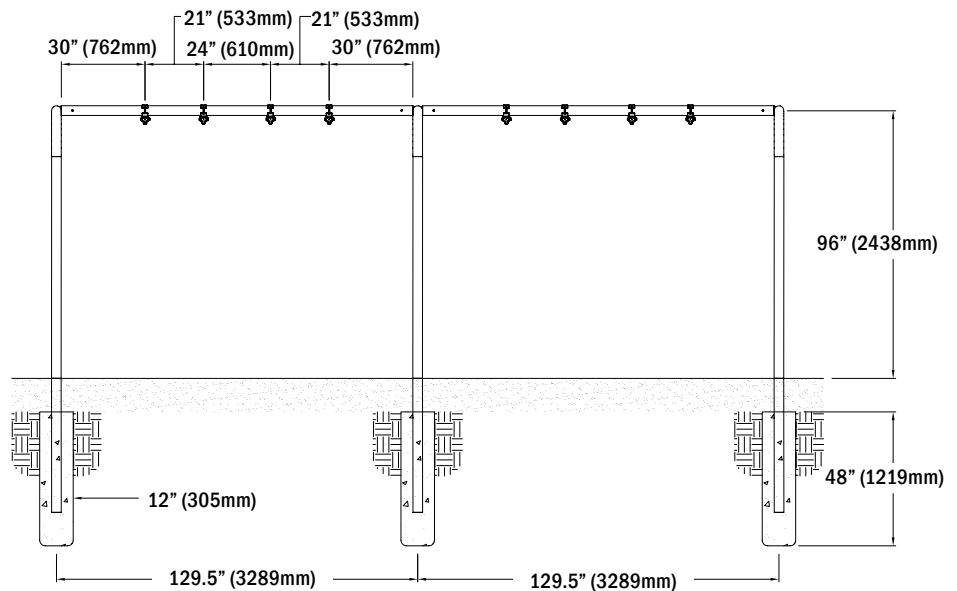


Fig. 2







## Installation Instructions

1. Find a level area in which to install the swing. The location selected must be large enough to accommodate the entire area required for the safe use of the swing (Fig. 5; Fig. 6). The area required varies based on the type of swing seat used. A swing using strictly baby seats requires less area than a swing using belt seats or a combination of belt seats and baby seats. Be sure to take this into account when planning your site.
2. Mark desired locations of ground holes using layout paint or wooden stakes. Holes for frames should be approximately 33" (838mm) (Fig. 3) apart, with each frame separated by 129.5" (3289mm) (Fig. 2).
3. In each of the marked locations, dig a hole 12" (305mm) across and 48" (1219mm) deep (Fig. 2).

Note: Hole depth may need adjustment based on the geographical location of the installation site. High frost areas may require a deeper hole.

4. Attach each top bar to swing end frames and centre frame using four 1/2" x 4-1/2" machine bolt and four 1/2" lock nut per frame (Fig. 4-2). Tighten all hardware.
5. Mark desired locations of swing bearings on top bar using a marker or crayon. The marked locations should be 30" (762mm) from the inside of the end frame and 21" (533mm) apart (Fig. 2).
6. Secure swing bearings to top bar using two 7/16" x 2-1/2" carriage bolts, two 7/16" lock washers and two 7/16" lock nuts per swing bearing (Fig. 4-1). Tighten all hardware.
7. Place swing in ground holes and ensure the centre of the top bar is 96" (2438mm) above finish grade (Fig. 2). Brace in place using wooden boards and wooden shims, if necessary.
8. Fill holes with concrete. Be sure to allow sufficient room for installation of protective surfacing. Ensure swing is level and plumb, adjusting with wooden shims as necessary. Allow concrete footings to cure a minimum of 72 hours before use. Remove wooden boards used for bracing.
9. Install swing seats and chain according to individual installation instructions.

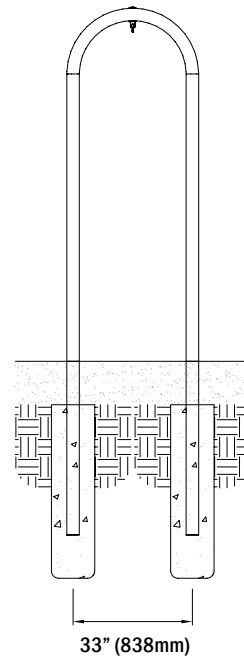


Fig. 3

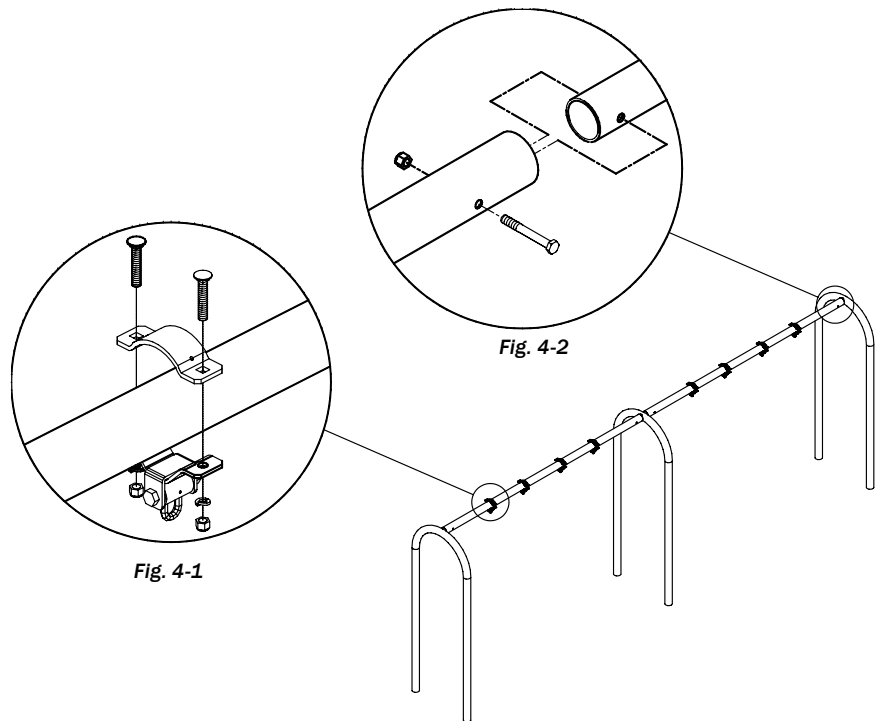


Fig. 4-1

Fig. 4-2

10. Install protective surfacing before allowing users access to swing.

**Product Maintenance**

Check regularly to ensure all hardware is tightly fastened and all swing seats are in good repair. Replace any damaged or missing hardware or swing seats.

SITE LAYOUT - CANADA

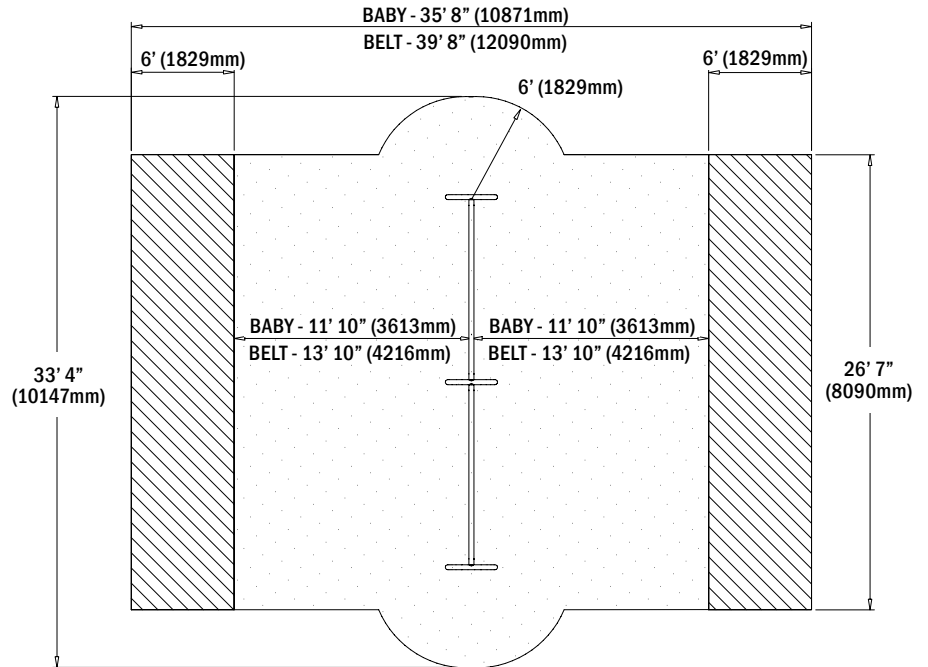


Fig. 5  
 NO-ENCROACHMENT ZONE (CANADA ONLY)  
 PROTECTIVE SURFACE

SITE LAYOUT - USA

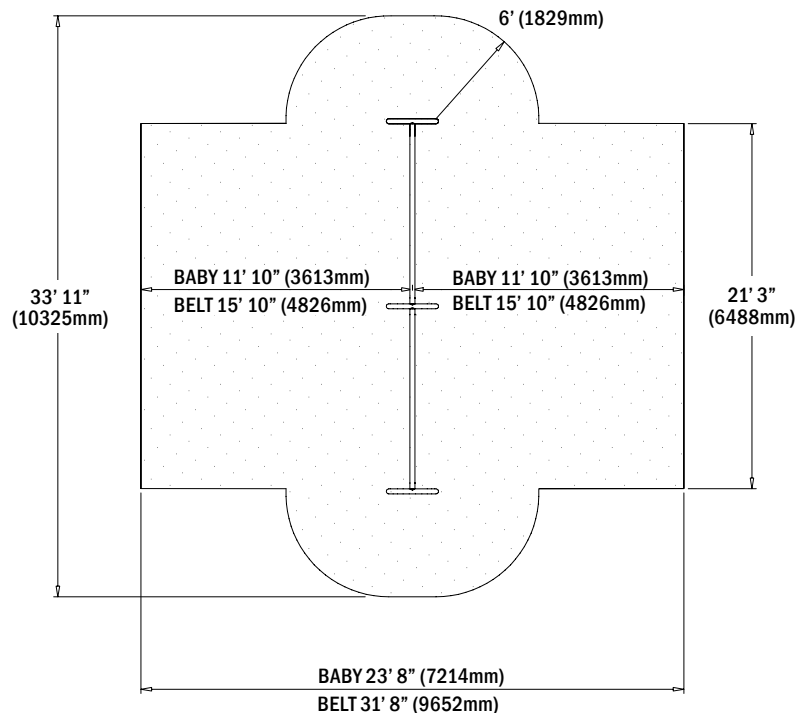


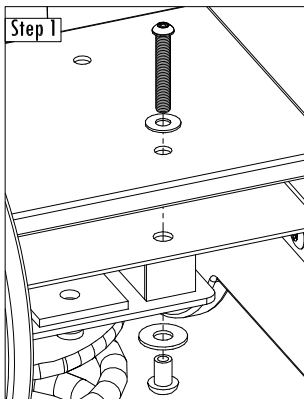
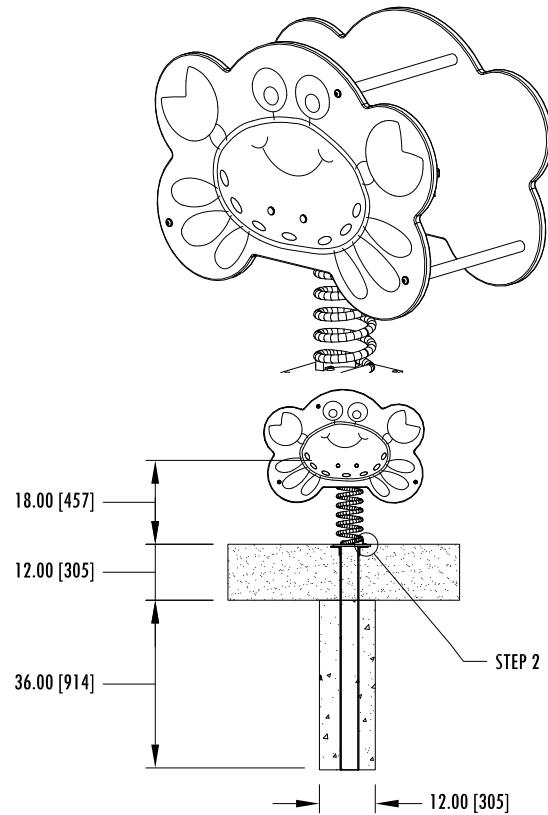
Fig. 6

**This Instruction Applies To The Following Modules :**

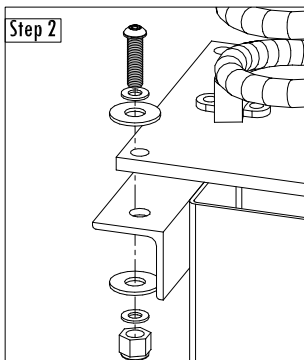
- |                               |                                |
|-------------------------------|--------------------------------|
| MT005 - Whale Motion Toy      | MT221 - Fire Rescue Motion Toy |
| MT006 - Car Motion Toy        | MT225 - Whale Motion Toy       |
| MT007 - Bird Motion Toy       | MT226 - Train Motion Toy       |
| MT011 - Train Motion Toy      | MT227 - Horse Motion Toy       |
| MT013 - Dino Motion Toy       | MT228 - Bulldozer Motion Toy   |
| MT014 - Rhino Motion Toy      | MT230 - Elephant Motion Toy    |
| MT021 - Elephant Motion Toy   | MT231 - Jet Boat Motion Toy    |
| MT213 - Shark Motion Toy      | MT232 - Airplane Motion Toy    |
| MT216 - SUV Motion Toy        | MT233 - Triceratops Motion Toy |
| MT217 - Jet Motion Toy        | MT234 - Race Car Motion Toy    |
| MT218 - Mr. Crabby Motion Toy | MT235 - Motorcycle Motion Toy  |
| MT220 - Pig Motion Toy        |                                |

**Parts List**

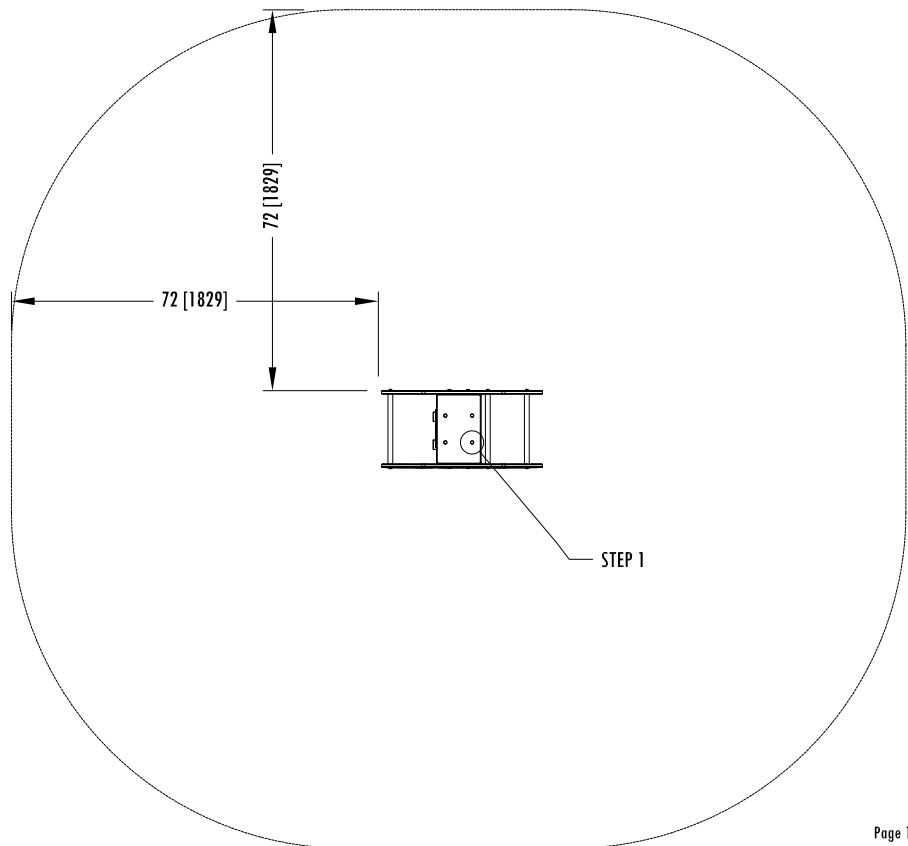
- |    |                   |                                     |
|----|-------------------|-------------------------------------|
| 1  |                   | Motion Toy Assembly                 |
| 1  | 1M-SA-MT000100-01 | Spring Base Assembly                |
| 1  | 1M-SA-GND00500-00 | Motion Toy Ground Leg               |
| 4  | 2T-0606           | Button Cap Torx w/Pin 3/8" x 1-1/2" |
| 4  | 2T-0610           | Button Cap Torx w/Pin 3/8" x 2-1/2" |
| 4  | 4L-0600           | Lock Nut w/ Nylon Locking 3/8"      |
| 4  | 4R-0603           | Barrel Nut 3/8" x 3/4"              |
| 12 | 5F-0500           | Flat Washer 5/16" S/S w/ 3/8" hole  |
| 12 | 5F-0800           | Flat Washer 1/2"                    |



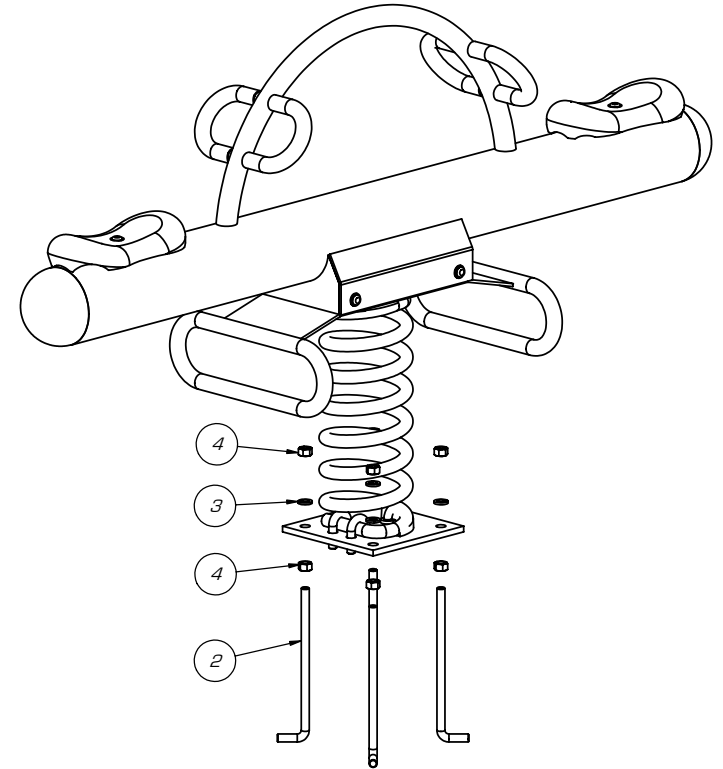
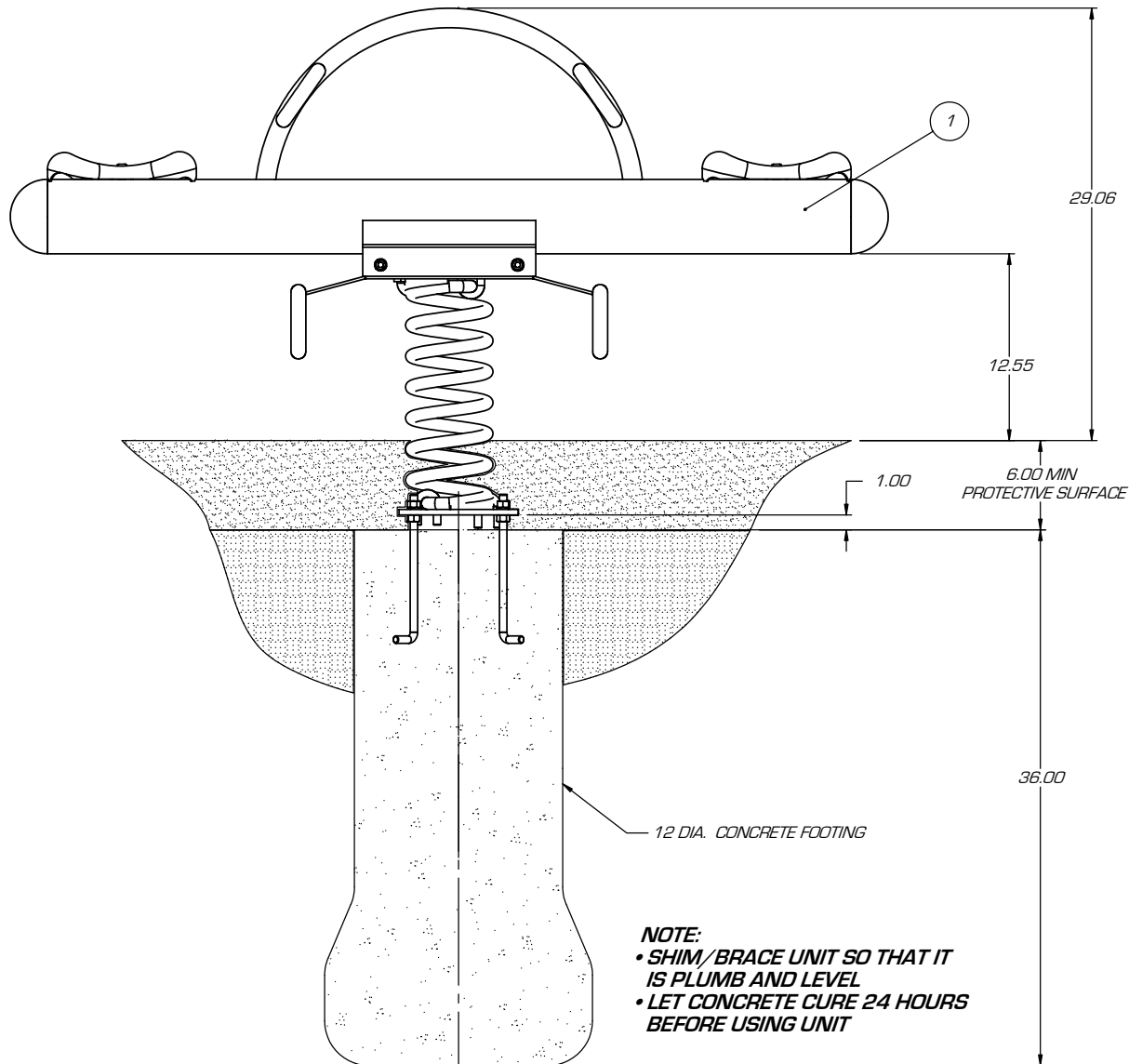
2-1/2" Button Cap, 5/16" Flat Washer, 1/2" Flat Washer, Barrel Nut (x4)



1-1/2" Button Cap, 5/16" Flat Washers, 1/2" Flat Washers, Lock Nut (x4)



# ASSEMBLY INSTRUCTIONS AND SPECIFICATIONS



## MATERIAL SPECIFICATIONS:

CAST ALUMINUM SEATS  
5.00" OD x .120 ILG TUBING  
1.315" OD x .083 ILG TUBING  
1.00" OD x .083 ILG TUBING  
7 GA & 11 GA GALV BRACKETS  
.375 HR GALV MOUNTING PLATE

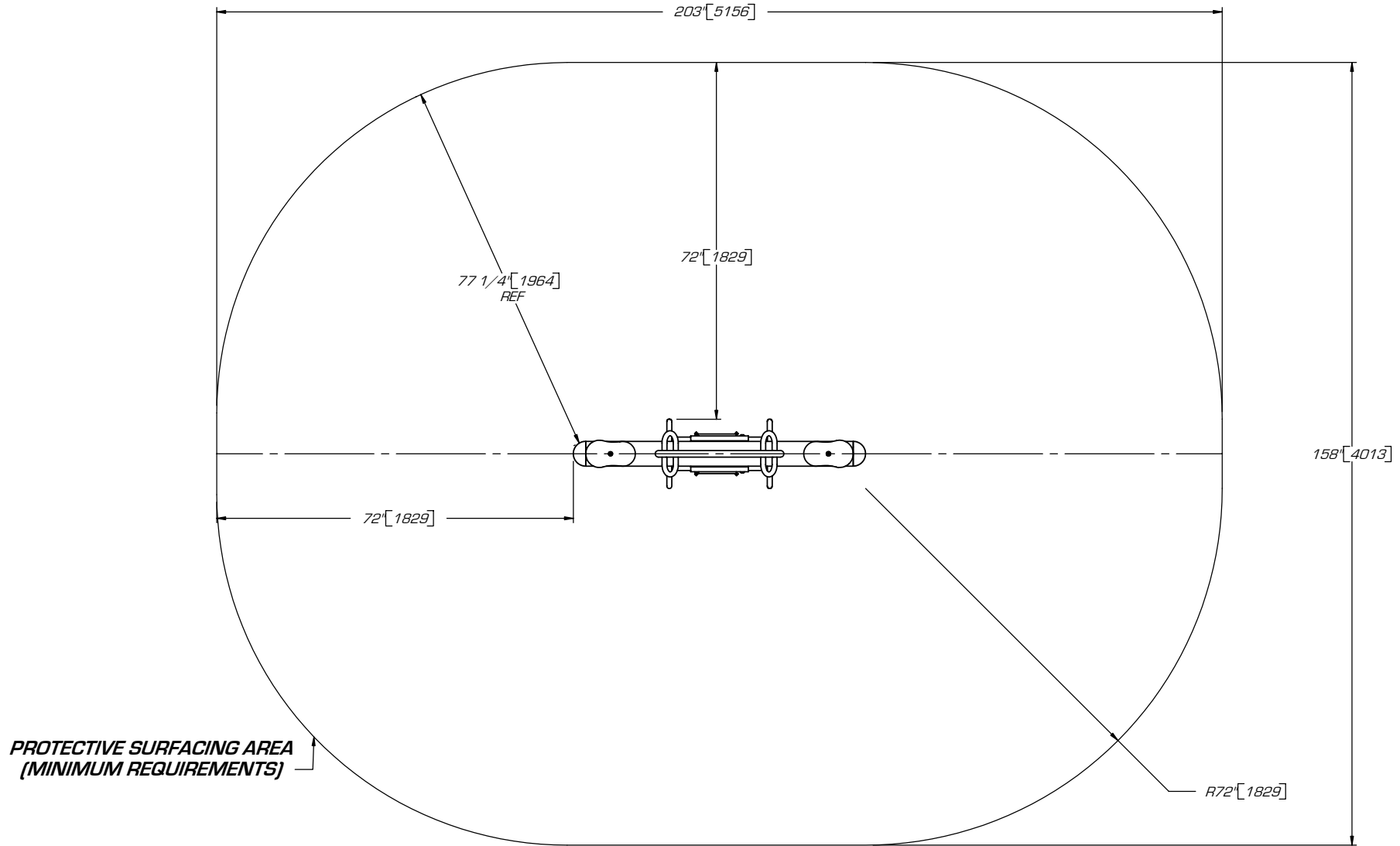
## RETRO ROCKER ASSEMBLY & INSTALLATION

MODEL: 75013900

ITEM NO.	DESCRIPTION	PART NO.	QTY.
1	RETRO ROCKER ASSEMBLY	65057200	1
2	1/2-13 'U' ANCHOR BOLT, 10.00 x 2.00 GALV	200009646	4
3	WASHER, LOCK, .50 GALV	200009819	4
4	HEX NUT, 1/2-13 GALV	200009800	8

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES

# ASSEMBLY INSTRUCTIONS AND SPECIFICATIONS



## RETRO ROCKER ASSEMBLY & INSTALLATION

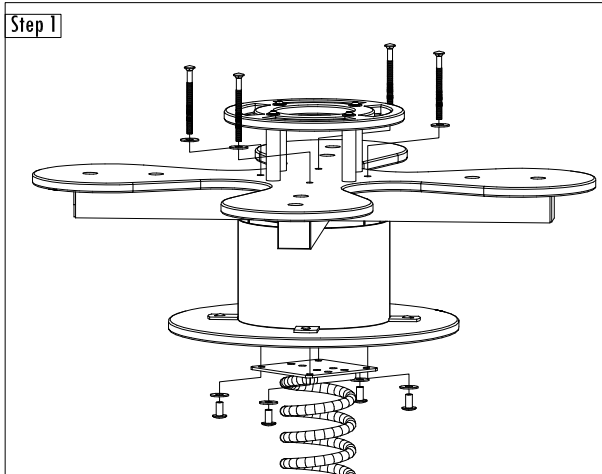
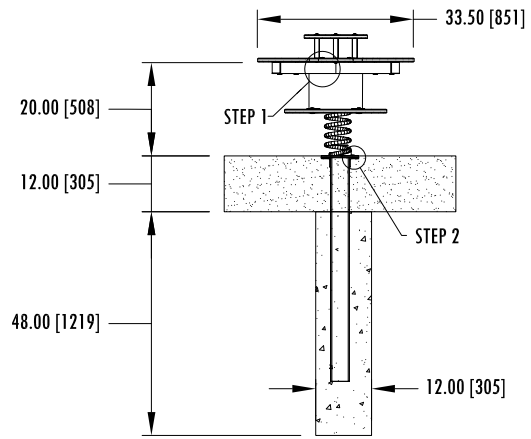
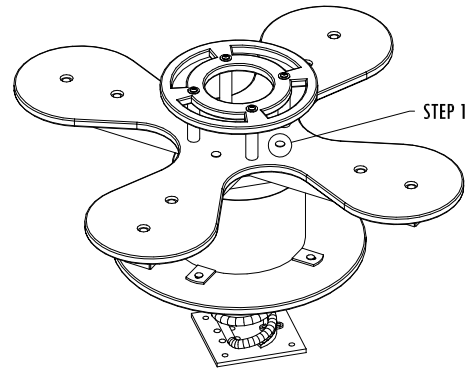
MODEL: 75013900

**This Instruction Applies To The Following Modules :**

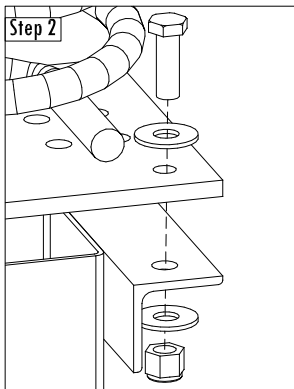
MT209 - Lucky Clover  
 MT212 - Octopus

**Parts List**

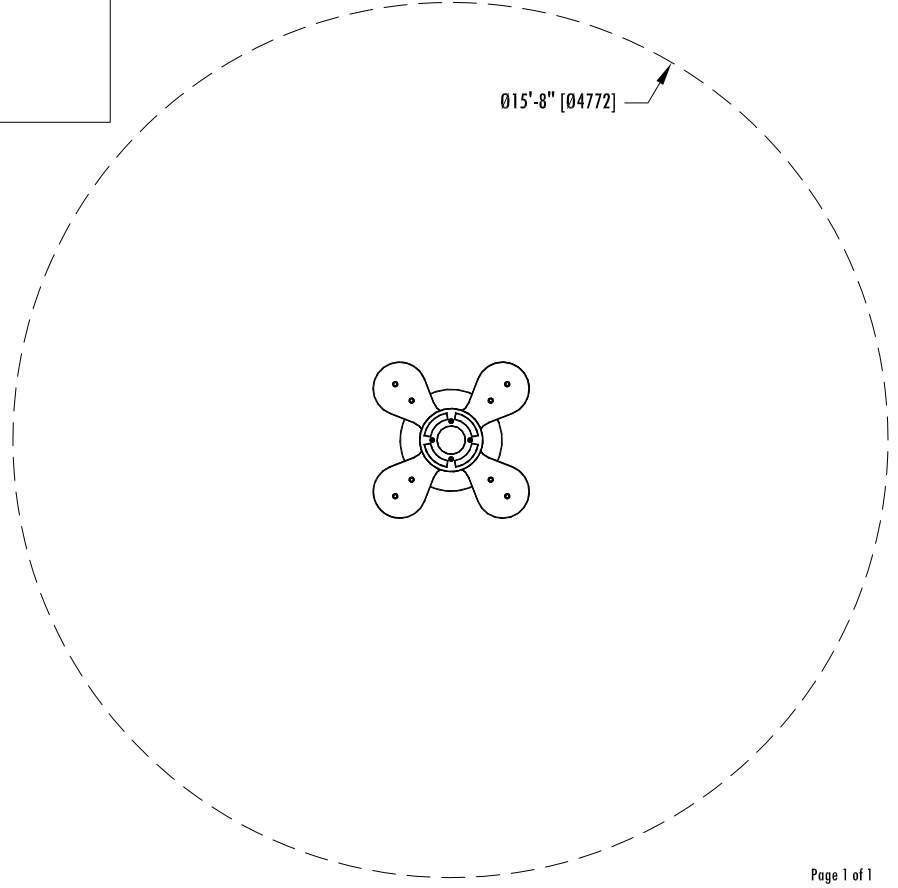
1		Spring Toy Assembly
1	1A-SA-GND00500-00	Motion Toy Ground Leg
1	1S-SA-PSP04700-00	Spring Assembly
4	1C-0620	Carriage Bolt 3/8" x 5"
4	1M-0806	Machine Bolt 1/2" x 1-1/2"
4	4L-0800	Lock Nut w/ Nylon Locking 1/2"
4	4S-0604	Spenco Nut 3/8" x 1"
16	5F-0800	Flat Washer 1/2"



3/8" x 5" Carriage Bolt, Flat Washers, Spenco Nut (x4)



1/2" x 1-1/2" Button Cap, 1/2" Flat Washers, Lock Nut (x4)



# PlayWood PLUS™

## General Guide for Installation and Maintenance



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INC

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## **1.0 INTRODUCTION**

For maximum safety and durability, the proper installation of your Playventures, Inc. wood play structure is vital. This guide is part of an information package, which, if followed closely, will minimize the time and effort needed to install the equipment properly and ensure a safe and enjoyable play environment.

The entire information package you receive consists of the following:

- ✓ **GENERAL PLAYGROUND INSTALLATION AND MAINTENANCE GUIDE**
- ✓ **INDIVIDUAL COMPONENT INSTRUCTIONS**
- ✓ **PLAYGROUND PLAN & DETAIL DRAWINGS**
- ✓ **LOADING REPORT**

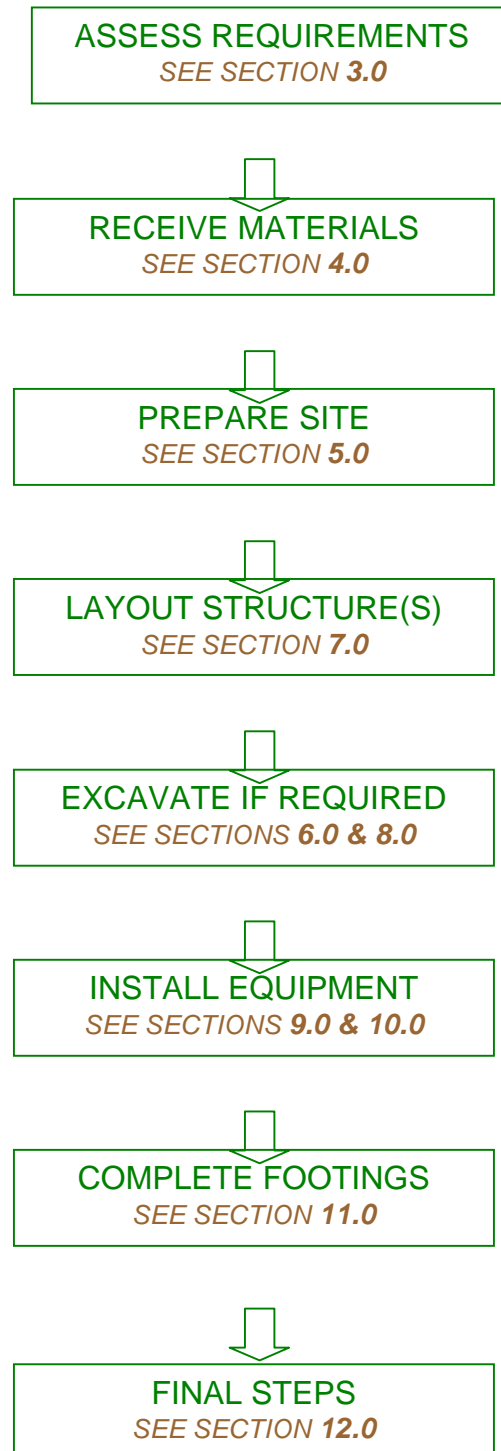
The information package assumes a certain degree of technical knowledge – for community volunteer installations, Playventures, Inc has available, for a fee, the services of a skilled supervisor to guide the installation process. Speak with your local sales representative for details.

It is important to familiarize yourself with all information before starting construction. If technical questions arise, do not hesitate to telephone our Head Office at the following number with enquires.

**Head Office 1-800-799-7529**

**2.0 OVERVIEW OF PLAYGROUND INSTALLATION**

The diagram, shown below, outlines the normal sequence of activities involved in building a Playventures, Inc PlayWood Plus plsstructure.



**3.0 RESOURCES REQUIRED**

**3.0.1 ITEMS SUPPLIED BY Playventures, Inc**

With a purchase of a Playventures, Inc. playground, you will normally receive the following on the day of delivery:

- EQUIPMENT.....packaged in strapped bundles
- HARDWARE.....packaged in boxes
- LOADING REPORT.....a list of all equipment that was shipped
- INFORMATION PACKAGE.....as outlined in the Introduction 1.0

If desired, Playventures, Inc. will install your playground or provide the services of a skilled supervisor to guide the installation. Speak with your local sales representative for details.

**3.0.2 ITEMS SUPPLIED BY PURCHASER**

In order to install the playground, the purchaser/builder will need to have the following available:

- LAYOUT TOOLS.....see recommended tools in **Appendix 1**
- EXCAVATION TOOLS.....see recommended tools in **Appendix 1**
- ASSEMBLY TOOLS .....see recommended tools in **Appendix 1**
- CONCRETE.....if required for the type of footing detail specified
- TOOLS FOR WORKING WITH CONCRETE .....see recommended tools in **Appendix 1**
- RESILIENTT SAFETY SURFACE.....i.e. sand, pea gravel, wood mulch etc.  
(may require retaining wall)

**4.0 UNLOADING AND RECEIVING MATERIALS**

Your Playventures, Inc. equipment will normally arrive in an assortment of bundles and boxes on a truck. The recommended procedure for unloading and receiving is as follows:

- 4.0.1** Locate the **LOADING REPORT** and compare it to the number of bundles and boxes shipped to verify that the correct number has in fact arrived. Make note of any discrepancies. It is the responsibility of the customer to unload the equipment from the delivery vehicle unless special prior arrangements have been made with a PlayVentures, Inc. representative.

- 4.0.2** The use of a forklift or other mechanical means is strongly recommended for unloading the equipment. If unavailable, proceed to undo the bundles on the truck. Note: *UNDO AND UNLOAD TOP BUNDLES FIRST. BE CAREFUL WHEN CUTTING STRAPPING TO AVOID POSSIBLE FALLING PARTS AND/OR THE WHIPLASH OF THE STEEL STRAP AS IT SNAPS APART. DISPOSE OFF ALL STRAPPING AND SHIPPING MATERIALS IN THE PROPER MANNER.*
- 4.0.3** Hand lift the individual items from the bundles onto the ground and lay them as close the playground site as possible. It is helpful to lay the pieces down with all of the identity labels facing up (or out) for ease of identification during assembly. Boxes should be light enough to lift without opening.
- 4.0.4** Make sure the groups of materials are arranged in an organized fashion so that all items are easily identified, accessible and as close to the playground site (but not in) as possible. If there is more than a day between delivery and installation, it may be necessary to provide a measure of security to protect the equipment. Hardware boxes and specialty items should be secured and protected from the elements.



***PLAYVENTURES, INC. CANNOT BE HELD RESPONSIBLE FOR DAMAGES INCURRED WHILE UNDER THE INSTRUCTION OF THE PURCHASER OR THE PURCHASER'S REPRESENTATIVES WHILE DELIVERING AND UNLOADING EQUIPMENT***

**5.0 SITE PREPARATION**

The main issues involved in site preparation are site access, appropriate grades and elevations and approvals.

**5.1.1 Site Access:**

The closer the delivery truck can get to the location of the play space the better. Take care not to damage existing site surfaces such as asphalt, sod, concrete curbs, sidewalks etc. Most often, movement of materials by hand, pick up truck etc. is more cost effective than the expense incurred in repairing damage.

**5.1.2 Grades and Elevations**

The method of site preparation is dependent upon the type of footing chosen (in-ground or on-ground: see **6.0 FOOTINGS**). The most important issue is that the site be reasonably level and clean of debris. Intentionally sloped sites will occur in special cases and will be indicated as such on the Playground Plan & Detail Drawings.

Existing slopes greater than 1:50 need to be considered in the design of the

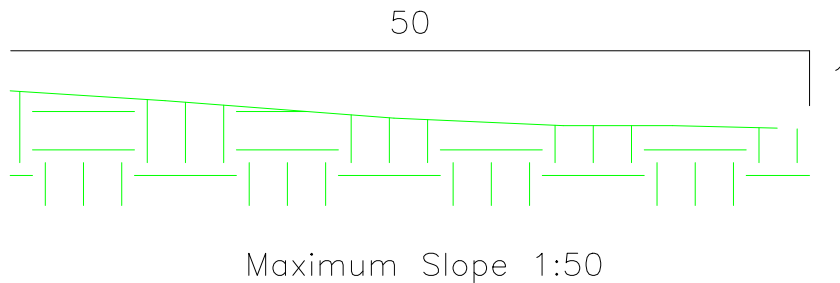


FIG. 135

individual pieces of equipment selected.

**5.1.3 Notification:**



**PRIOR TO ANY EXCAVATION, THE PURCHASER'S REPRESENTATIVE MUST CALL ALL LOCAL GAS, WATER, ELECTRIC AND PHONE AUTHORITIES FOR LOCATIONS OF ANY UNDERGROUND SERVICES.**



- 7.0.1** The object of the layout procedure is to accurately mark out the position of the play structure and the required safety zones, non-encroachment zones etc, within the play area. Post center to center distances are indicated on your Playground Plan & Detail Drawings along with the specified footing method. Normally steel spikes and / or spray paint are used to mark these locations.
- 7.0.2** **Before starting** check overall site dimensions and verify that the equipment and proper safety zones will indeed fit within the site.
- 7.0.3** Establish a Baseline: Pick an imaginary line which runs through the middle of the most central posts in the play structure as shown on the Playground Plan & Detail Drawings. Construct this line in the site by *measuring from an appropriate benchmark*, for example a building wall, by running a string line between two spikes. This line should extend beyond the boundary of the equipment.
- 7.0.4** *It is vey helpful if the two stakes holding this line remain in position until equipment is installed.* This will allow for the alignment of the structure based on the original layout position. The ground surface is often greatly disturbed during excavation and it is difficult to re-align the equipment with the original layout.

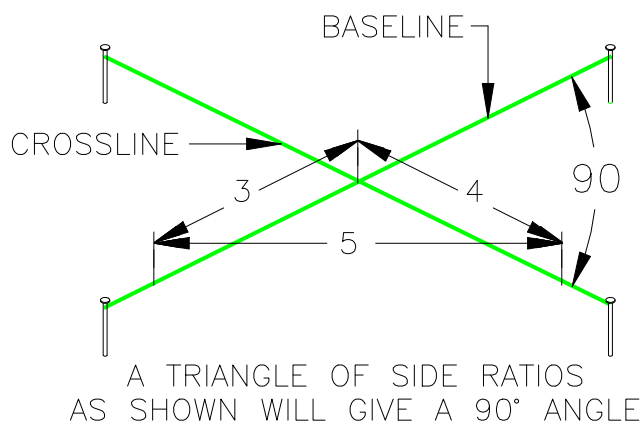


FIG. 137

**7.0.5** Establish a central cross line at a right angle to the baseline by using the right triangle method (or the 3-4-5 method as it is sometimes referred to). This involves laying out a second string line to the triangular side ratios as shown in Fig. 137. This cross line will establish a 90 degree angle between the two string lines. As long as the ratios of the sides of the triangle are multiples of those shown, they can be in feet, yards or meters – the larger the measurement, the more accurate the layout.

**7.0.6** Measure and mark locations of all remaining posts as per Playground Plan & Detail Drawings. Use the base and cross lines as references. Check accuracy of post locations by measuring the diagonal dimensions of all rectangles. Use spikes or spray paint to mark the post locations. It may be helpful at this time to label each post location with the corresponding post letter/number as shown on your Playground Plan & Detail Drawings with spray paint.

Note: if this particular playground requires in-ground footings, it may be a good idea to spray paint large crosses which intersect at the centre of each post location. This will give a reference mark which will still show during excavation when debris tends to accumulate around the holes or trenches.

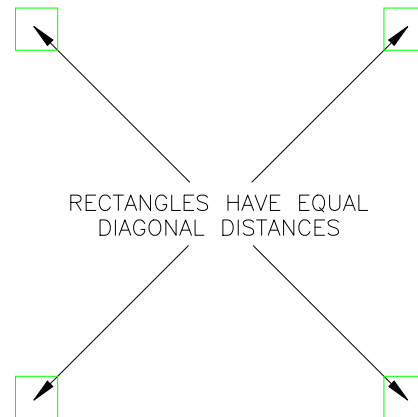


FIG. 138

**7.0.7** To complete the layout, re-check all post dimensions and ensure that adequate spacing for the safety zones (as shown on your Playground Plan & Detail Drawings and/or Quotation Plan View Drawings) has been incorporated.



FIG. 139



## 8.0 EXCAVATIONS

### 8.1 EXCAVATIONS FOR IN GROUND FOOTINGS

8.1.1 Make sure that all upright locations have been determined and marked out as per the Playground Plan & Detail Drawings and Layout Instructions (7.0).

8.1.2 Use a power auger, post hole digger or shovels to excavate 10" to 12" (250mm to 305mm) diameter holes to a depth of approximately 36" (914mm) below the sub grade. If resilient surfacing is already in place, include an allowance as specified on Playground Plan & Detail Drawings when determining hole depth. For large volunteer built structures where holes are dug in advance of the installation, an 18" (450mm) diameter auger is recommended.

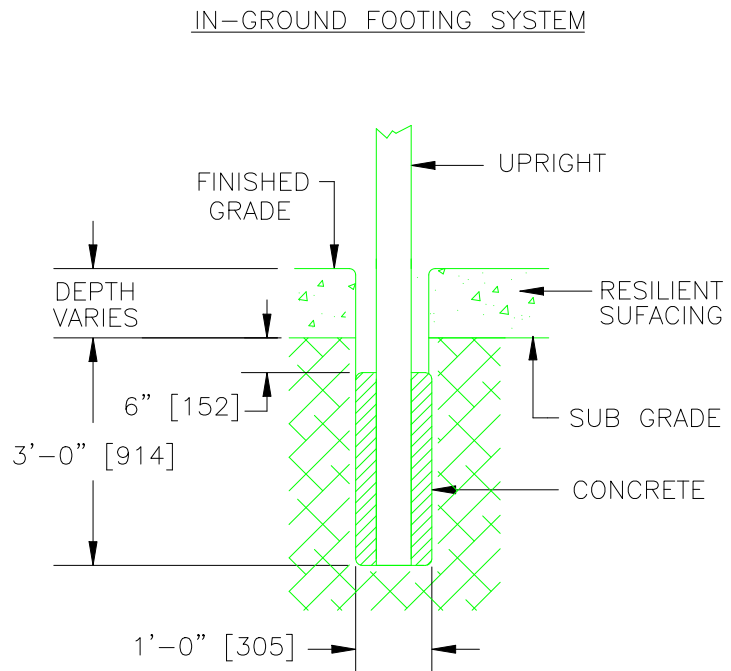


FIG. 140 A

8.1.3 Excavate holes near the centre of the structure first and work out towards the edges or in such a manner as not to destroy the layout markings.

8.1.4 Clean away debris as you work to maintain a safe and unobstructed approach to carry in and install equipment.

8.1.5 Try to produce cylindrical holes that have clean vertical sides and that are centered on the post location mark.

**Note: Concrete or crushed stone are not placed until after the structure has been completely assembled.**

**8.2 EXCAVATION FOR ON GROUND TRENCHED STRINGER SYTEM**

- 8.2.1** Make sure that all upright locations have been determined and marked out as per the Playground Plan & Detail Drawings and Layout Instructions (7.0).
- 8.2.2** Dig holes at post locations that are 14" (300mm) in diameter and 6" (150 mm) deep. Be sure to center the holes over the previously marked locations.
- 8.2.3** Determine stringer locations as indicated on Playground Plan & Detail Drawings. Dig trenches that are 6" (150mm) wide and 6" (150 mm) deep in the appropriate locations
- 8.2.4** In areas with slight grade differences, start excavating at the low end of the playground. This will mean that the trenches at the high end of the playground will need to be deeper in order to maintain a level structure.

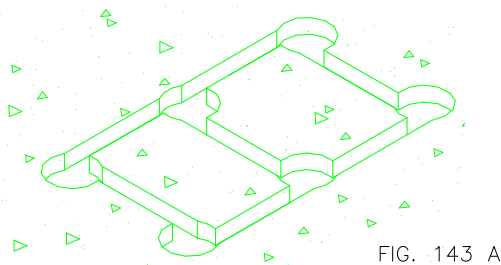


FIG. 143 A

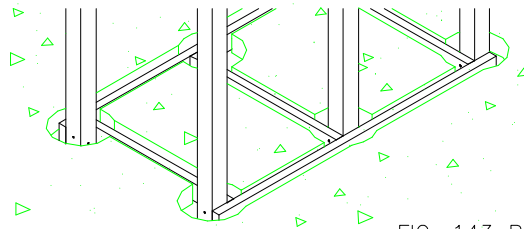
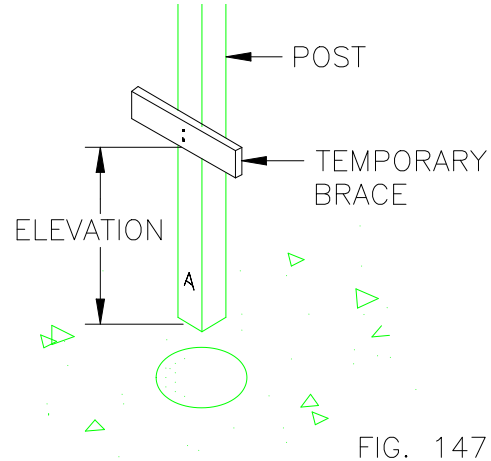


FIG. 143 B

**9.0 ASSEMBLY PROCEDURES**

**9.1 ASSEMBLY PROCEDURES FOR IN GROUND FOOTINGS:**

After all ground holes have been excavated, upright posts can now be positioned. Each post has been marked with a letter corresponding to the Playground Plan Drawings. Nail a short 2"x4" brace at the correct elevation on the lower end of the upright to provide support (fig. 147). Stand the post in vertical position and place cleanly into the hole. Avoid touching the surrounding edges to avoid knocking earth into the hole.  
**Proceed to section 10.0.**

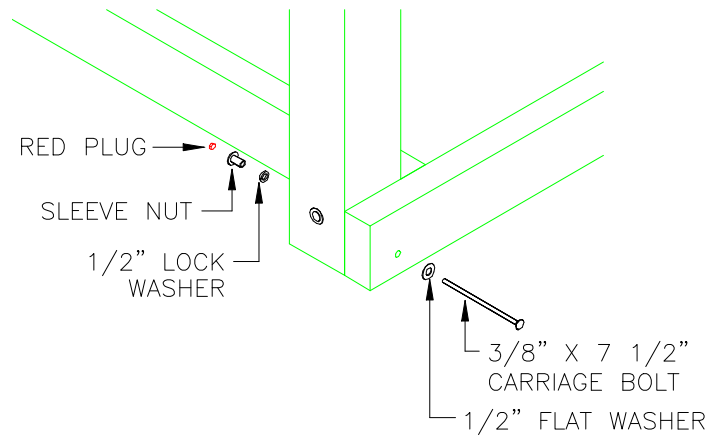


**MAKE SURE THAT THE POST BRACE IS AT THE CORRECT ELEVATION!**

**9.2 ASSEMBLY PROCEDURES FOR POST AND STRINGER FOOTINGS:**

With layout procedures complete (7.0) and if required, trenches excavated (8.2), begin assembling the central platform and posts (section 10.0) and work outwards. The stringers/ ground braces have been marked with their corresponding upright letters and may stabilize more than one platform.

**9.2.1** Position the stringers in the orientation shown on the Playground Plan & Detail Drawings and fasten to the bottom of the posts with the typical 3/8" (912mm) carriage bolt assembly as shown in Figure 156.



**9.2.2** Pay particular attention to, and install any additional braces, diagonals, gussets and/or other ground anchors that are specified on the Playground Plan & Detail Drawings.

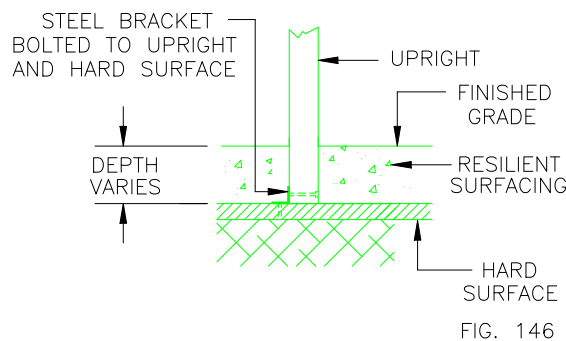
**9.3 ASSEMBLY PROCEDURES FOR BOLT AND BRACKET FOOTINGS:**

**9.3.1** Make certain that all upright locations have been determined and marked out as per the Playground Plan & Detail Drawings and Layout Instructions (7.0). The hard surface should be reasonably level and free of debris.

**9.3.2** *Proceed to section 10.0* and assemble platforms, railings and components as outlined, ignoring any references to ground holes or trenches. Shims may be necessary to ensure the equipment will be plumb and level.

**9.3.3** Adequate bracing will be required until the anchoring system is installed. Appropriate bolts and brackets, for the type of surfacing specified, will be supplied in the hardware kit. Refer to section 11.3 *Completion of Footings for Bolt and Bracket Installations.*

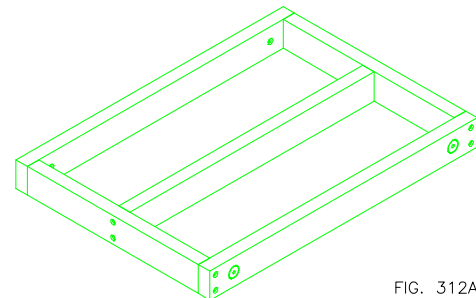
BOLT & BRACKET ONTO HARD SURFACE



**10.0 EQUIPMENT ASSEMBLY**

All equipment has been pre-cut, pre-drilled and labeled. Each play structure has been designed and manufactured to ensure that it fits together properly. There may, however, be special cases where minor cutting or drilling of the wood is necessary to adapt to unforeseen site conditions (e.g. slopes) or layout changes. Larger platforms will require assembly prior to installation. *Note: with larger platforms, it may be easier to attach the frame (only) to the uprights before installing the decking.*

TYPICAL PLATFORM FRAME



**10.0.1** Lay out platform frame as shown in Fig. 312A or on Playground Plan & Detail Drawings. The frame pieces have been labeled with corresponding numbers/letters.

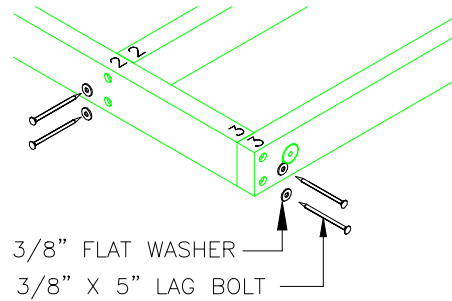


FIG. 312B

**10.0.2** Using 3/8" X 5" lag bolts c/w 3/8" flat washers, secure corners and middle support piece(s), if required, through the pre-drilled holes.

**10.0.3** Lay the deck boards on the platform frame according to the numerical sequence found on the underside of the decking pieces. The decking is designed to have a 3/8" space between each board. Use nails provided in the kit as spacers. The first piece of decking should be 3/16" from the end of the platform frame. Secure to frame with #10 x 3" deck screws.

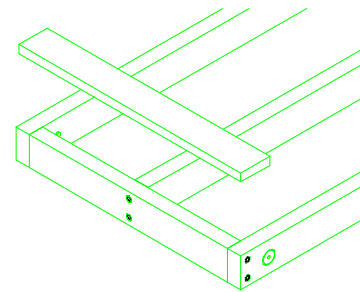


FIG. 149

**10.0.4** Beginning with the uprights of the most central platform in the play structure, position the load distribution rings into the precut ring grooves of the uprights (not the platforms or carriers). Drive a 3/8" X 7 1/2" carriage bolt c/w 1/2" flat washer into the uprights making sure that the threaded end projects past the surface of the ring approximately 1/2" (12 mm).

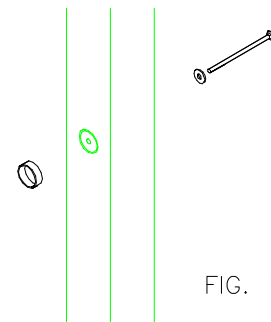


FIG. 150

**10.0.5** Position the central platform (in the location and orientation as shown on the Playground Plan & Detail Drawings) between its support posts. Lift into position and drive the rings/bolts into the corresponding platform frame holes. Secure all bolts with a 1/2" lock washer and sleeve nut. Bar or pipe clamps are helpful to squeeze upright and platform frame tightly together while installing connecting hardware.

**10.0.6** Attach rails to posts as shown in Fig. 152R1. Rails will be marked with corresponding upright letters and arrows to indicate the top edge. Depending on the platform height, there may be a combination of an upper and lower guard rail or a protective barrier consisting of a top guard rail and a number of 2"x4" vertical rails. *Install only the guard rail at this point.* Consult your Playground Plan and Detail drawings to determine rail applications. Temporary braces /rails may be required if there are no or few rails indicated for this particular platform. Be aware that in some cases two rails may share a common bolt hole; therefore longer bolts would be necessary.

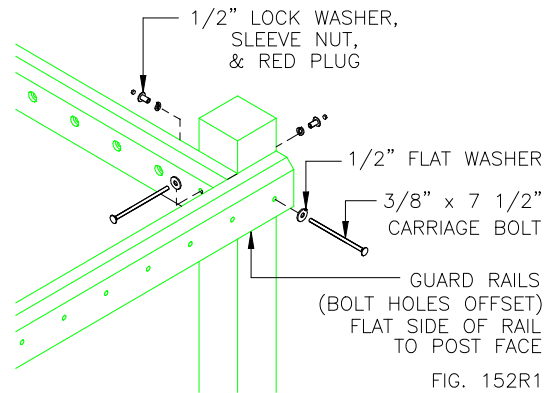
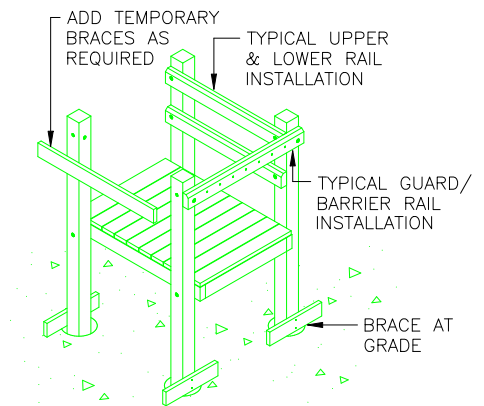


FIG. 152R1

**10.0.7** Be sure to install railings flush with the platform edges unless otherwise stated. Bolt holes in the posts and rails have been offset to allow bolts to “crisscross” inside the post yet keep the tops of the rails flush with one another. With rails in place, upright posts will move as a unit thus making the leveling of platforms and plumbing of posts much easier.



NOTE: RAILINGS ARE FLUSH WITH DECK EDGES.  
FIG. 151R1

**10.0.8** Level and securely brace the first platform before proceeding to the next. Starting at the highest corner post, shim the other three corner posts as necessary to produce a level platform and straight upright posts. Make the structure rigid with diagonal braces as required.

**10.0.9** Assemble remaining platforms and railings in the same manner making sure to level and plumb each platform as it is assembled. The entire play structure should be plumb and level prior to any concrete placement. **MAKE YOUR ADJUSTMENTS AT THIS STAGE!** It is difficult and costly to make adjustments after the concrete has been placed.

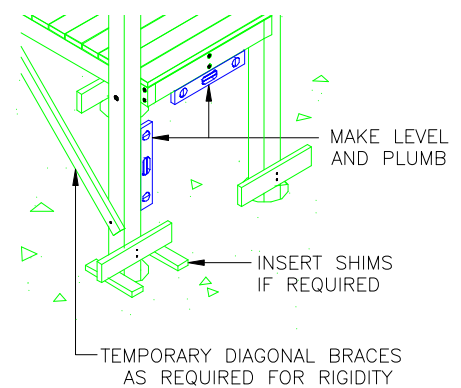
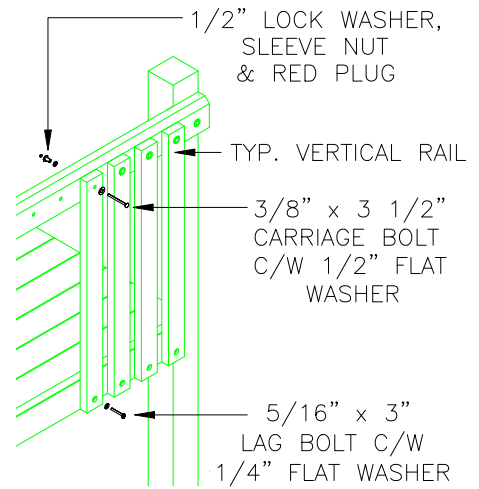


FIG. 153

**10.0.10** Vertical rails (see Figure 154R1) and play components may now be installed. Each component will have an individual installation instruction accompanying this document. Be sure to read each instruction thoroughly before proceeding.



**10.0.11** Tighten all hardware and install red plugs into carriage bolt / sleeve nut hardware applications.

**10.0.12** Install upright caps on the 6"x6" posts with #8 X 1 1/2" truss head screws – 4 places typical. (Fig. 155R1)

**10.0.13** Proceed to Footings Completion, Section 11.0.

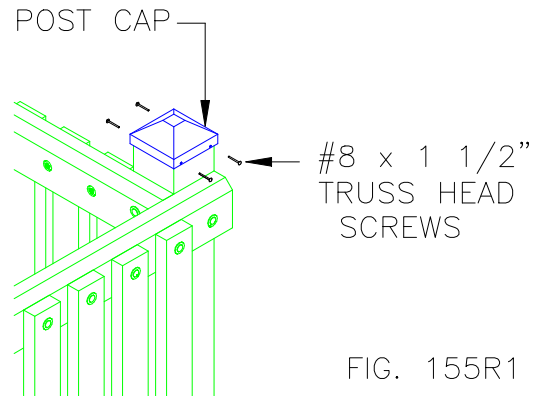


FIG. 154R1

FIG. 155R1

**11.0 FOOTINGS COMPLETION**

**11.1 COMPLETION OF FOOTINGS FOR INGROUND INSTALLATIONS**

**Concrete Is Most Commonly Used For In Ground Footings.**

**11.1.1** Concrete can be ordered from a concrete batch plant or for small structures, bags of dry "gravel mix" or equivalent can be

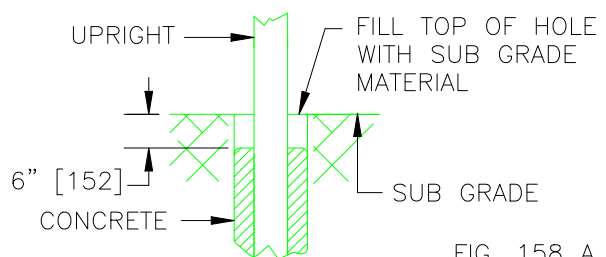


FIG. 158 A

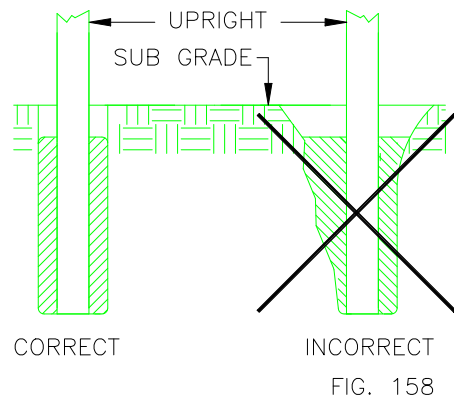
used to mix the concrete on site. Concrete is not normally supplied by PlayVentures, Inc. Recommended strength for concrete is 3000 p.s.i. (15 Mpa).

- 11.1.2 Use wheel barrows to transport concrete to post holes and place (rather than pour) the concrete around each post. As the hole fills, vibrate the concrete (with shovel or bar) to ensure that no air voids occur and the concrete completely surrounds the post. **BE SURE TO RE-CHECK HORIZONTAL AND VERTICAL ALIGNMENT OF THE STRUCTURE AS YOU GO!**

- 11.1.3 Place concrete to within 6" (152 mm) of existing sub grade elevation and then fill the remainder of the hole with loose sub grade material.

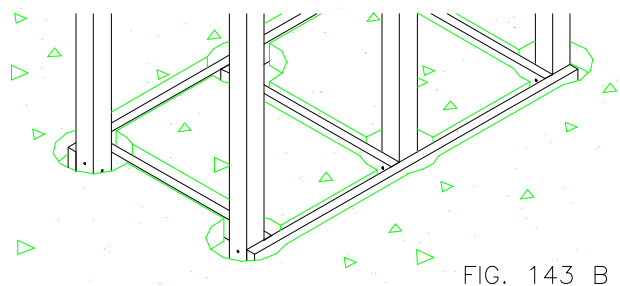
- 11.1.4 While it is still wet, clean off any concrete that splatters onto posts above finished grade level.

- 11.1.5 Allow concrete to cure overnight *prior* to removing any temporary braces. Concrete around swing support posts should cure for a minimum of two days prior to attachment of swing seat assemblies.



## 11.2 COMPLETION OF FOOTINGS FOR STRINGER SYSTEMS

- 11.2.1 Re-check that the entire structure has been assembled level and plumb. Make any adjustments using shims (not provided) under the posts and stringers as required and/or by excavating into the rough grade.

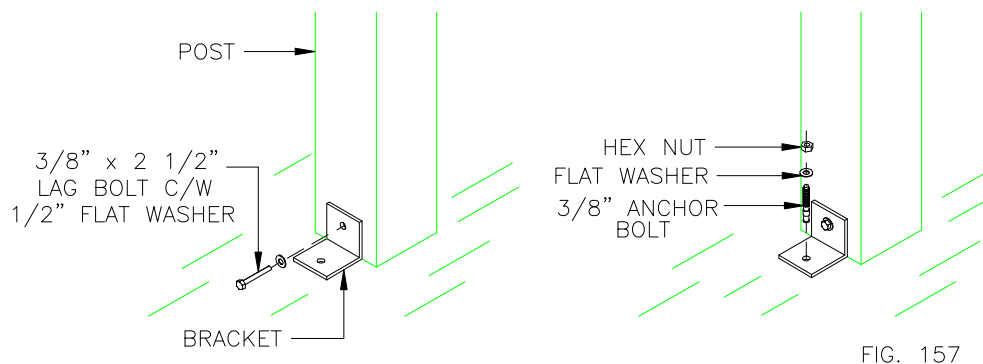




- 11.2.2 Tighten all hardware and insert red plugs into all carriage bolt / sleeve nut applications at post & stringer connections.
- 11.2.3 Where required, backfill the trenched stringers with loose material to make it level with the sub grade elevation.

### 11.3 COMPLETION OF FOOTINGS FOR BOLT & BRACKET SYSTEMS

- 11.3.1 Re-check that the entire structure has been assembled level and plumb. Make any adjustments using shims (not provided) under posts if necessary.
- 11.3.2 Position angle brackets provided at the bottom of posts and mark the hard surface for drilling. Note: The size and type of anchor provided will vary with the surface encountered. See Fig. 157.



- 11.3.3 Drill holes into the hard surface material. **ENSURE THAT THE BRACKET ANCHORING SYSTEM WILL NOT DAMAGE ANY THING THAT IS EMBEDDED OR BELOW THE HARD SURFACE!** Proceed to fasten brackets to posts with lag bolts and flat washers and secure the bracket to the hard surface with anchor bolts, flat washers and hex nuts as shown in Fig. 157.

**12.1 FINISHING TOUCHES**

- 12.1.1 Re-check and tighten all hardware and insert red plugs into bolt / sleeve nut applications if not already done.
- 12.1.2 Check that all wooden surfaces are free of any splinters or other surface damages and sand smooth as required.
- 12.1.3 Make sure that no sharp edges or protrusions exist anywhere on the structure and rectify if necessary.
- 12.1.4 If a slide has been installed that requires mid-span support post /cradle assembly, check that the supporting bolt heads on the are firmly pulled into the plastic slide material and no catch points exist.

**12.2 CLEANUP AND SURFACING**

- 12.2.1 Secure the site when unattended to prevent children from playing on equipment before concrete has cured and /or installation has been completed.
- 12.2.2 On stringer or bolt and bracket footing structures, remove any temporary braces. For in-ground structures, let concrete cure for a minimum of 24 hours before removing any braces.
- 12.2.3 If applicable, install swing seat assemblies or other suspended elements after appropriate concrete curing time.
- 12.2.4 Remove all waste material and debris from site and properly dispose of.
- 12.2.5 Install, or have installed, the specified surfacing material within the protective surfacing zone and /or retained area of the play structure.
- 12.2.6 **The play structure may not be used until the protective surfacing has been instated!**

***If any doubt exists*** that any part of the structure may have been installed incorrectly or may present even the slightest safety hazard to children, do not hesitate to contact our Head Office at **1-800-799-7529** for advice.

*If possible, send a photograph or sketch of the suspected hazard – this will help in evaluating the problem.*

## 13.0 APPENDICES

### 13.1 APPENDIX 1 – RECOMMENDED TOOLS

#### 13.1.1 Layout Tools

- String line; minimum 200 ft. (61 meters).
- Tape measures; 25 ft. (7.5 meters) and 100 ft. (30 meters) if possible.
- Spikes; approximately 10" (250 mm) long for string line and marking post locations, estimate 2 spikes per post.
- Fluorescent spray paint for marking ground.
- Transit level (if available, not necessary).
- Miscellaneous carpenters level, framing squares and hammers.

#### 13.1.2 Excavation Tools

- 12" (300 mm) diameter by 3 ft. (900 mm) long power auger, either hand held or machine (tractor etc.) mounted, for digging post holes as required (see section 8.1).
- Miscellaneous spade shovels, clam shovels, pickaxes and post hole diggers.
- 
- Heavy duty rakes and wheelbarrows.
- Heavy duty steel pry bars (breaker bars).
- Snow fence or caution tape to surround entire site while unattended.
- Jack hammer (to break asphalt etc.) if required.

## 13.1.3

**Assembly Tools**

- Electric power generator (if required) and extension cords.
- Electric impact wrench, circular saw and heavy duty drill with ½" (12 mm) chuck.
- Electric router with ½" (12 mm) radius easing bit for "finishing" minor changes to wooden parts if necessary.
- 2" x 4" (38 mm x 90mm) scrap lumber for use as bracing material – minimum 5 ft. (1.5 meters) of scrap for each upright.
- 3 ½" (90mm) long 20 penny common or double headed nails to fasten bracing.
- Miscellaneous handsaws, claw hammers, sledge hammers, wood planes, rasps, sandpaper, bar clamps and other woodworking tools.
- Set of ½" drive socket wrenches c/w 9/16" & ¾" sockets.
- Miscellaneous vice grips, channel lock pliers, bolt cutters, hacksaws and files.
- Spirit levels, measuring tapes, plumb bob and other carpenters measuring tools.
- Special spirit level that can measure angles (for long slide installations).

## 13.1.4

**Assembly Tools Supplied by Henderson Recreation:**

- 3/8" hex key or bit.
- 8 mm hex key or bit.
- # 2 and # 3 Robertson bit.

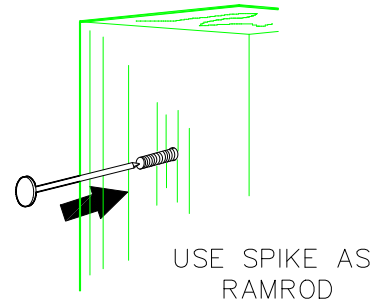
## 13.1.5

**Tools for Working with Concrete**

- Large heavy duty wheelbarrows and shovels.
- Powered concrete mixer if desired.
- Water hoses, source of water, miscellaneous brushes, buckets and brooms for cleanup.

**13.2 APPENDIX 2 – TRICKS OF THE TRADE**

**13.2.1** To remove a carriage bolt from a post etc. – use a long dull spike as a ramrod on the threaded end of the bolt. Make sure to hit the bolt on centre so as not to damage threads. Before using a removed bolt, test the thread with a nut to ensure it has not been damaged.



**13.2.2** If you need to hammer any surfaces of the play structure, use a smooth short piece of scrap lumber to protect the play structure from damaging marks.

USE SMOOTH SCRAPS TO AVOID  
HAMMER MARKS

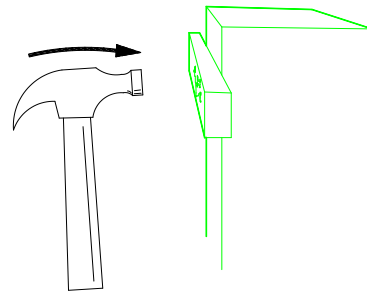


FIG. 160

**13.2.3** Carriage bolt threaded ends should not protrude past the sleeve nut – if one does, replace it with the appropriate sized bolt. If no replacement is available, cut the protruding bolt to length with a hacksaw.

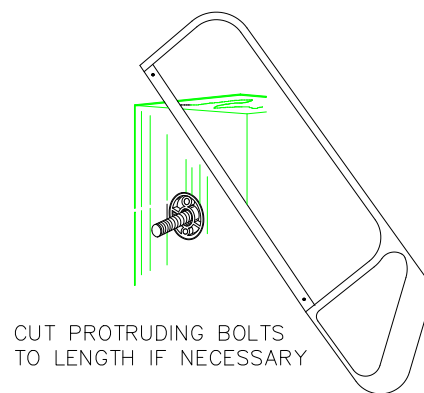


FIG. 161

### 13.3 APPENDIX 3 – GENERAL MAINTENANCE REQUIREMENTS

A program of routine inspection and regular maintenance is the key to ensuring continuous years of trouble free use of the playground. It is important that a public playground have an appointed individual who is responsible for making sure that the playground is inspected on a routine basis and that corrective measures are taken as required.

The frequency of inspection of a playground is dependent on a number of factors;

- Use factors i.e. vandalism, number of users and intended age & design of equipment.
- Materials i.e. moving equipment vs. stationary, resilient surfacing, age of equipment.
- Environmental i.e. acid rain, salty air near coastal regions, ultraviolet rays (intense sunlight), rainy areas, poor drainage conditions

At PlayVentures, Inc. , we propose that an *initial minimum inspection* program be followed, but would advise that the frequency of inspection should be modified to adapt to the particular factors and conditions encountered.

***An initial program should consist of the following routine:***

#### **Daily / Weekly Inspections**

- Light inspections to check for obvious hazards such as broken or damaged parts, loose components, hazardous debris etc. Make note of and rectify any hazards.

#### **Detailed Monthly Inspections**

- Medium intensity inspections with extra attention paid to moving components, lubrication, sanding wood, and plastic wear etc. Make note of and rectify any hazards.

#### **Annual Inspections**

- Thorough audit and maintenance check of all structural and moving components. This should include a fastener check, paint and coatings inspection, sanding of wood etc. Make an annual safety inspection report.

**Playground Safety Training Materials Available**

- a) CAN/CSA Z614-07 *Children's Playspaces and Equipment*
- b) ASTM F1487-07 *Standard Consumer Safety Performance Specification for Playground Equipment for Public Use*
- d) Kutska K and Hoffman K and Malkusak T. (2002) *Playground Safety is No Accident: Developing a Public Playground Safety and Maintenance Program*. Third Edition. National Recreation and Park Association
- d) *Handbook for Public Safety: 2008 Consumer Product Safety Commission*, Publication Number 325.

**13.4 APPENDIX 4 - INSPECTION / ACTION PROCEDURES****Wooden Components**

- Check for large cracks, surface wear, splinters. Note: minor checking and cracking up to 5/8" wide is normal\*.
- Sand with 80 grit sandpaper to smooth surfaces, replace boards that appear weakened or damaged.

*\*Checking is a natural occurrence in wood components that contain the pith, or center of a tree. Checking, the separation of continuous wood fibers, is a natural occurrence as a consequence of the seasoning process of wood. The outer fibers lose moisture to the surrounding atmosphere and attempt to shrink, but the inner portion of the timber member loses moisture at a much slower rate. The different rates of shrinkage can cause the wood to check or split. Rapid drying increases the differential moisture content between the inner and outer fibers and thus increases the propensity for checking in timber. The checking (and shrinkage) process will stabilize as the moisture content of the member reaches equilibrium with the surrounding environmental conditions.*

**Metal Components**

- Check for damaged faces, jagged edges, rust, structural wear, broken parts.
- File and sand any jagged edges and touch up paint as required.
- Replace any broken parts with original factory paints.

**Plastic Parts**

- Check for burn marks, cuts and jagged edges, tiny cracks and crazing, chalky looking brittle surfaces.
- Minor surface damage can be smoothed with a rasp, file or wood plane – structural damage or holes require part replacement.
- Chalky brittle parts should be checked for structural soundness and replaced at any sign of weakness.

**Fasteners**

- Check for loose or missing nuts, bolts or red plugs. Tighten all loose fasteners.
- Replace any missing or damaged parts.

**Moving Parts**

- Check for damaged or worn bearing surfaces on chains, cables, rings, pulleys and pivot points, pinch or crush points.
- Lubricate all bearings that have grease nipples at least twice a year (if not more).
- Replace any damaged parts.
- Tighten or adjust any moving parts that appear loose and replace damaged or worn parts that can create crush or pinch points in use.

**Safety Surface**

- Check for debris, wear, holes or lack of material at wear points especially under swings and at ends of slides.
- Remove debris and rake al level sand etc. often.
- Replace any damaged synthetic safety surfaces.



# Playground Maintenance Checklist

**Instructions:**

This Playground Maintenance Checklist is a general guide to help you maintain your new Henderson Recreation play equipment. Proper maintenance through regular inspection can help reduce the possibility of broken equipment, product failure, and injury. Henderson Recreation recommends the use of regularly scheduled inspections and maintenance (daily, weekly, or monthly) subject to the frequency of use. For further information on playground maintenance please refer to the Canadian National Standard, CAN/CSA Z614-98, "Children's Playspaces and Equipment" for Canadian residents or the U.S. National Standard, ASTM F1487-01, "Standard Consumer Safety Performance Specification for Playground Equipment for Public Use" for United States residents. For area specific standards please refer to your local guidelines. Please make multiple copies of this form and keep one blank master copy.

Inspector: \_\_\_\_\_  
 Location: \_\_\_\_\_  
 Date: \_\_\_\_\_  
 Start/Finish: \_\_\_\_\_  
 Repaired by: \_\_\_\_\_  
 Date: \_\_\_\_\_  
 Signed: \_\_\_\_\_

**General Site Conditions:**

Note: Listed below are some general rules regarding site maintenance. For detailed information please contact your national or local standards listed in the instructions box above.

Resilient Surfacing: worn/low-needs topping up/foreign objects/garbage/animal droppings
Playground Site & Surrounding Area: trip hazards/ garbage/objects/poor drainage
Border: worn/damage/deterioration/rebar-anchors heaving

**Comments**

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

						<b>Maintenance Checklist</b>
Play/Steel	Play/Wood	Traditional Equipment	Traditional Slides	Motion Toys	Swings	Legend: ✓ = OK M = Maintenance R = Repair ■ = Not Applicable
						Fasteners: loose/missing/damaged/worn
						S - Hooks & Quick Links: 25% wear/openings larger than 1 mm/loose
						Boards: decay/warping/checking max. 19 mm
						Wood Posts: decay/warping/checking max. 19 mm
						Plastic: damage/burns/cracks/protruding objects
						Metal Components: rust perforation/damage
						Tires: tears/damage
						Handrails & Grab bars: loose/missing
						Plastisol Coated Decks: tears/damage/burns
						Footings: loose/exposed/broken/cracked
						Support Posts: loose/exposed footings/rust perforation
						Cables: damage/burns/frayed wire/broken/wear
						Swing Seats: broken/damage/cuts/wear
						Springs: damage/cracks/broken
						Vandal Resistant Red Plugs: loose/missing/damaged
						Panels: loose/cracks/damage
						Welds: cracked
						Other:

# PlayWood PLUS Playground Equipment Specifications

## Lumber

Lumber is southern yellow pine grade marked #1 or better, S4S. Lumber is milled smooth on all sides and is kiln dried after treatment to thoroughly season to moisture content of 19% or less for 2" nominal dimensions and 25% or less for 3" or thicker nominal dimensions. The edges will be eased to 3/8" radius during the milling process. Other characteristics are in accordance with "Standard Grading Rules of Southern Pine Inspections Bureau" latest edition or "Timber Products Inspection". The lumber is pressure treated with MCA (micronized copper azole). The 2" is treated to above ground retention of .07 pcf. The 3" and thicker is treated to a ground contact retention of .16 pcf. All treatments are in accordance with the American Wood Protection Association.

## Metal Preparation for Powder Coat Paint Finish

Metal preparation for powder coat paint finish consists of either a multiple bath system including a rust-prohibitive iron phosphate wash or sandblasting. Parts are free of excess weld splatter.

## Powder-Coat Paint Finish

Polyester dry powder-coating is electro-statically applied and oven cured at 400°F (200°C). Finished membrane is 3-5 mil (0.076-0.127mm) and includes additives for resistance to ultraviolet (U.V.) degradation. Finished membrane complies with the following performance standards:

ASTM D 522 (Mandrel Bending)

ASTM D 2794-90 (Impact)

ASTM B 117-90 (Salt Spray Resistance) ASTM D 3359B (Cross Hatch Adhesion) ASTM D 2247-87 (Humidity Resistance) ASTM D 3363 (Pencil Hardness)

ASTM D 822 (Weatherability)

ASTM D 2454 (Overbake Resistance)

## Plastisol Coating

Plastisol coating is Denflex PX-12412 poly-vinyl-chloride with an average thickness of 0.15" (4mm) unless otherwise specified. Prior to coating, parts are chemically washed with phosphate coat 4013A, treated with a spray-on primer at room temperature, and allowed to dry completely. Parts are heated to 350°F (176°C) internal temperature for 3.5 minutes in an 800°F (427°C) oven and

submerged in Plastisol. Coated parts are cured in a liquid salt bath at 395°F (202°C). Coating contains flame-retardant additive, ultraviolet (U.V.) ray stabilizer to maintain color, and fungastat to improve resistance to fungal growth. Tensile strength is 2300 lb/in<sup>2</sup> (15858.5 kPa), tear strength is 419 lb/in (74.8 kg/cm), ultimate elongation is 250%, and shore "A" durometer is 95 +/- 2. Materials comply with the following performance standards:

ASTM D 624 (Tear Strength)

ASTM D 412 (Tensile Strength)

2

## **Playground Equipment Specifications**

### **Recycled Plastic**

Recycled plastic is injection molded 100% solid blended recycled plastic consisting of 96% polyolefins (HDPE/LDPE/PP), 2% PET, 1% PS, and 1% other. Recycled plastic is ultraviolet (U.V.) light resistant, skid resistant when wet, resistant to infestation by borers, and will not leach. Recycled plastic contains no preservatives. Specific gravity is 0.96. Expansion and contraction with 122°F (50°C) temperature variation is 0.3%. Melting point is 374°F (190°C). Compression strength is 1200 to 2400 lb/in<sup>2</sup> (8274 to 16548 kPa) depending on profile. No absorption, solubility, or evaporation.

### **Rotationally Molded Plastic Parts**

Rotationally molded plastic parts are molded from linear medium-density polyethylene resin with ultraviolet (U.V.) light stabilizers and color molded in. Rotationally molded plastic parts have an average wall thickness ranging from 0.125" (3mm) to 0.375" (10mm), as specified. Rotationally molded plastic parts comply with the following performance standards:

ASTM D 790 (Flex Modulus)

ASTM D 638 (Tensile Strength)

ASTM D 648 (Heat Distortion Temperature) ARM-STD (Low Temperature Impact)

### **Steel Tube Components**

Steel tube components comply with ASTM standards A- 500 or A-513. Steel tube components are pre-galvanized. Any steel that is not pre-galvanized is zinc-coated before or after fabrication with the exception of any steel receiving a Plastisol coating.

### **Welded Components**

Welded components are Canadian Welding Bureau (CWB) certified under CSA standards W47.1 Div. 2.1 and W47.2 Div. 2.1.

## **PlayWood Plus General Component Specifications**

### **Horizontal Guardrail Panel**

Horizontal guardrail panel consists of two 2.5" x 5.5" (64mm x 140mm) pressure treated southern yellow pine rails fastened directly to the vertical posts.

### **PlayWood Plus Horizontal Decks**

PlayWood Plus decks are a mechanical assembly consisting of a pressure treated southern yellow pine frame and TREX composite wood and plastic deck surface. The frame consists of 2.5" x 5.5" (64mm x 140mm) framing members. The deck surface consists of 1.5" x 5.5" (38mm x 140mm) TREX deck boards between which there is a 0.188" (5mm) space.

**Steel Handrail Module** is a welded assembly of 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 0.25" x 2.25" (6mm x 57mm) zinc-plated hot-rolled mild flat steel. The assembly is powder coated after fabrication.

3

## **Playground Equipment Specifications**

### **Vertical Posts**

Vertical posts for PlayWood Plus are 5.5" (140mm) square pressure treated southern yellow pine complete with a cast aluminum upright cap. Post caps are powder-coat painted.

### **Wood Handrails**

Handrails consist of 2.5" x 5.5" (64mm x 140mm) pressure treated southern yellow pine machined to the appropriate shape.

## **Slides**

### **Stargate Slide**

Stargate Slide is a mechanical assembly of slide, slide brackets, and ground legs. Slide is multiple-piece, double wall, rotationally-molded medium-density polyethylene with an average wall thickness of 0.3125" (8mm). Slide brackets are a welded assembly of 1.66" (42mm) O.D. x 11 gauge (3mm) Allied Flo-Coat® galvanized steel tube and 0.1875" x 1.75" (5mm x 44mm) zinc-plated hot-rolled

mild flat steel. Wood mounting components, (if required) are 2.5" x 5.5" (64mm x 140mm) pressure treated southern yellow pine vertical infills or a deck infill assembly comprised of 1.5" x 2.5" (38mm x 64mm) and 2.5" x 5.5" (64mm x 140mm) pressure treated southern yellow pine. Ground legs are a mechanical assembly of leg and mount. Leg is 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo- Coat® galvanized steel tube. Mount is a welded assembly of 1" x 1" x 0.125" (25mm x 25mm x 3mm) hot-rolled steel angle and 0.1875" x 2" (5mm x 51mm) zinc-plated hot- rolled mild flat steel. Slide brackets and ground legs are powder-coat painted.

### **Cable Net**

#### **Cables:**

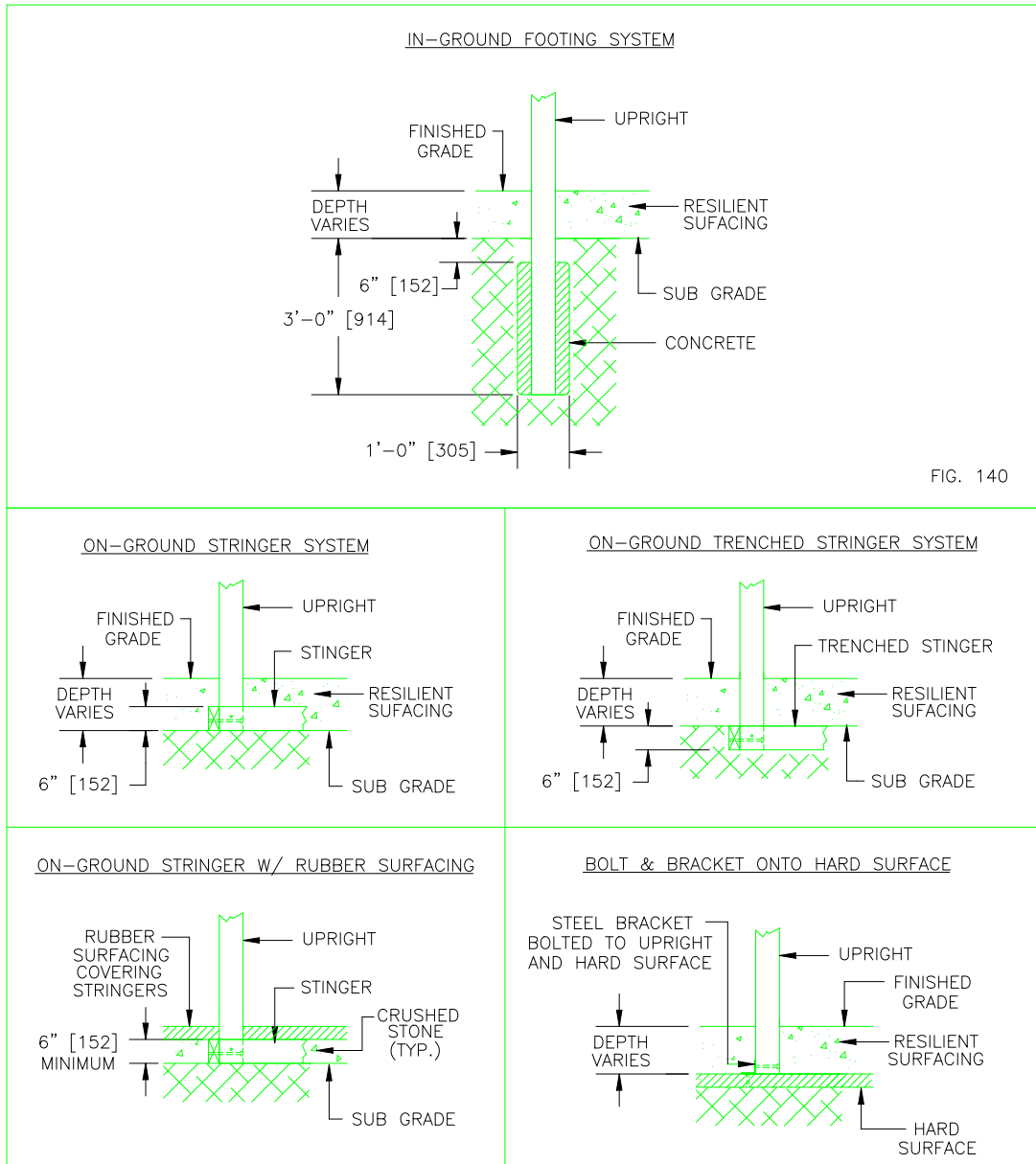
All cable elements are round 4-strand U-ROPE® cables with galvanized wires and outer strands covered with UV- resistant polyamide yarn. The cable diameter is 16mm (5/8") .

#### **Cable Connectors**

A corrosion resistant hydraulically pressed forged ball connector made of alloyed aluminum connects the cable crossings for this two dimensional flat net. The "ball connector" warrants a smooth cable transition without any risk for strings entrapment or entanglement

**6.0 TYPICAL FOOTING METHODS**

PlayVentures, Inc. PlayWood Plus equipment is usually installed using one of the footing methods shown below. Check your Playground Plan & Detail Drawings to determine which type of footing has been specified. *Note: A resilient safety surface is required beneath all play equipment.*





1800 Mearns Road, Unit GG  
Warminster, PA 18974  
Tel: 800.799.7529 or 215-672-6097  
Fax: 215-675-8702  
Email: sales@playventuresinc.com

# PlayWood PLUS

## Playground Equipment Specifications

© 2015 PlayVentures, Inc. All rights reserved. Specifications are subject to change without notice. Product specifications listed were correct at time of publication. However, PlayVentures, Inc. has a commitment to continuous product development and improvement and therefore reserves the right to improve or alter specifications or discontinue products without notice.

### Playground Equipment Designs

It is the opinion of the manufacturer that playground equipment designs are developed in compliance with the most recent published edition of the following safety standards:

ASTM F 1487 Standard Consumer Safety Performance Specification for Playground Equipment for Public Use

Consumer Product Safety Commission (CPSC) Handbook for Public Playground Safety  
Americans with Disabilities Act (ADA) accessibility standards  
Canadian CAN/CSA-Z614 Children's PlaySpaces and Equipment

### General Specifications

#### 0.75. (19mm) Sheet Polyethylene Parts

0.75. (19mm) sheet polyethylene parts are stress-relieved high-density polyethylene with ultraviolet (U.V.) light stabilizers and anti-static guard. Sheet polyethylene parts contain maximum 67% recycled content and are 100% recyclable. Materials comply with:

ASTM D 790 (Flex Modulus)  
ASTM D 638 (Tensile Strength)  
ASTM D 648 (Heat Distortion Temperature)

#### Hardware and Fasteners

All hardware and fasteners are either stainless steel or carbon steel treated with special Magni 550 coating to resist corrosion. Hardware and fasteners are tamper resistant unless otherwise specified. All load bearing connections include compressions rings in posts and beams. All necessary hardware and fasteners are provided with playstructure.

**Lumber**

Lumber is southern yellow pine grade marked #1 or better, S4S. Lumber is milled smooth on all sides and is kiln dried after treatment to thoroughly season to moisture content of 19% or less for 2" nominal dimensions and 25% or less for 3" or thicker nominal dimensions. The edges will be eased to 3/8" radius during the milling process. Other characteristics are in accordance with "Standard Grading Rules of Southern Pine Inspections Bureau" latest edition or "Timber Products Inspection". The lumber is pressure treated with MCA (micronized copper azole). The 2" is treated to above ground retention of 0.05 pcf uCA-C. The 3" and thicker is treated to a ground contact retention of 0.14 pcf uCA-C. All treatments are in accordance with the American Wood Protection Association.

**Metal Preparation for Powder Coat Paint Finish**

Metal preparation for powder coat paint finish consists of either a multiple bath system including a rust-prohibitive iron phosphate wash or sandblasting. Parts are free of excess weld splatter.

**Powder-Coat Paint Finish**

Polyester dry powder-coating is electro-statically applied and oven cured at 400°F (200°C). Finished membrane is 3-5 mil (0.076-0.127mm) and includes additives for resistance to ultraviolet (U.V.) degradation. Finished membrane complies with the following performance standards:

- ASTM D 522 (Mandrel Bending)
- ASTM D 2794-90 (Impact)
- ASTM B 117-90 (Salt Spray Resistance)
- ASTM D 3359B (Cross Hatch Adhesion)
- ASTM D 2247-87 (Humidity Resistance)
- ASTM D 3363 (Pencil Hardness)
- ASTM D 822 (Weatherability)
- ASTM D 2454 (Overbake Resistance)

**Polyethylene Coating**

Polyethylene coating is Polyarmor® G17, a function- alized polyethylene copolymer-based thermoplastic powder coating designed for maximum mechani- cal performance, impact resistance and UV-stability. Polyarmor® G17 is a good general-purpose protective coating. On Polis Park Furniture PlaySteel decks will be coated in a fluidized bed to an overall thickness of 25 to 30 mil and cured in an oven at 425°F. Thickness shall average approximately 1/8" (3.2 mm) providing a safe, resilient surface. Materials comply with the following performance standards:

- |                                     |                                   |
|-------------------------------------|-----------------------------------|
| ASTM D 792 (Specific Gravity)       | ASTM D 4541 (Adhesion)            |
| ASTM D 2240 (Hardness Shore D)      | ASTM B 2794 (Impact Resistance)   |
| ASTM D 1525 (Vicat Softening Point) | ASTM D 638 ( Tensile Strenght)    |
| ASTM D 638 (Elongation)             | ASTM D 2247 (Humidity Resistance) |
| ASTM B 117 (Salt Spray)             | ASTM G 53 (QUV )                  |
| ASTM D 4060 ( Taber Abrasion)       | ASTM D 522 (Flexibility)          |
| ASTM D 523 (Gloss)                  | ASTM D 1238 (Melt Index)          |



**Recycled Plastic**

Recycled plastic is injection molded 100% solid blended recycled plastic consisting of 96% polyolefins (HDPE/LDPE/PP), 2% PET, 1% PS, and 1% other. Recycled plastic is ultraviolet (U.V.) light resistant, skid resistant when wet, resistant to infestation by borers, and will not leach. Recycled plastic contains no preservatives. Specific gravity is 0.96. Expansion and contraction with 122°F (50°C) temperature variation is 0.3%. Melting point is 374°F (190°C). Compression strength is 1200 to 2400 lb/in<sup>2</sup> (8274 to 16548 kPa) depending on profile. No absorption, solubility, or evaporation.

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ASTM D 638 (Tensile Strength)  
ASTM D 648 (Heat Distortion Temperature)  
ARM-STD (Low Temperature Impact)

**Steel Tube Components**

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**Welded Components**

Welded components are Canadian Welding Bureau (CWB) certified under CSA standards W47.1 Div. 2.1 and W47.2 Div. 2.1.

**Horizontal Guardrail Panel**

Horizontal guardrail panel consists of two 2.5" x 5.5" (64mm x 140mm) pressure treated southern yellow pine rails fastened directly to the vertical posts.

**PlayWood Plus Horizontal Decks**

PlayWood Plus decks are a mechanical assembly consisting of a pressure treated southern yellow pine frame and deck boards. The frame consists of 2.5" x 5.5" (64mm x 140mm) framing members. The deck surface consists of 1.5" x 5.5" (38mm x 140mm) southern yellow pine deck boards between which there is a 0.375" (10 mm) space.

**Steel Handrail Module** is a welded assembly of 1.315" (33mm) O.D. x 12 gauge (3mm) Allied Flo-Coat® galvanized steel tube, 0.25" x 2.25" (6mm x 57mm) zinc-plated hot-rolled mild flat steel. The assembly is powder coated after fabrication.

**Vertical Posts**

Vertical posts for PlayWood Plus are 5.5" (140mm) square pressure treated southern yellow pine complete with a cast aluminum upright cap. Post caps are powder-coat painted stamped aluminum and secured with four # 10 x 1-1/2" stainless steel pan head screws

**Wood Handrails**

Handrails consist of 2.5" x 5.5" (64mm x 140mm) pressure treated southern yellow pine machined to the appropriate shape. All handrails are secured to posts with 3/8" x 7-1/2" carriage bolts, 1/2" flat washers, 1/2" lock washers, and special stainless steel 3/8" x 1" long torx head safety sleeve nuts

**Roof Decking**

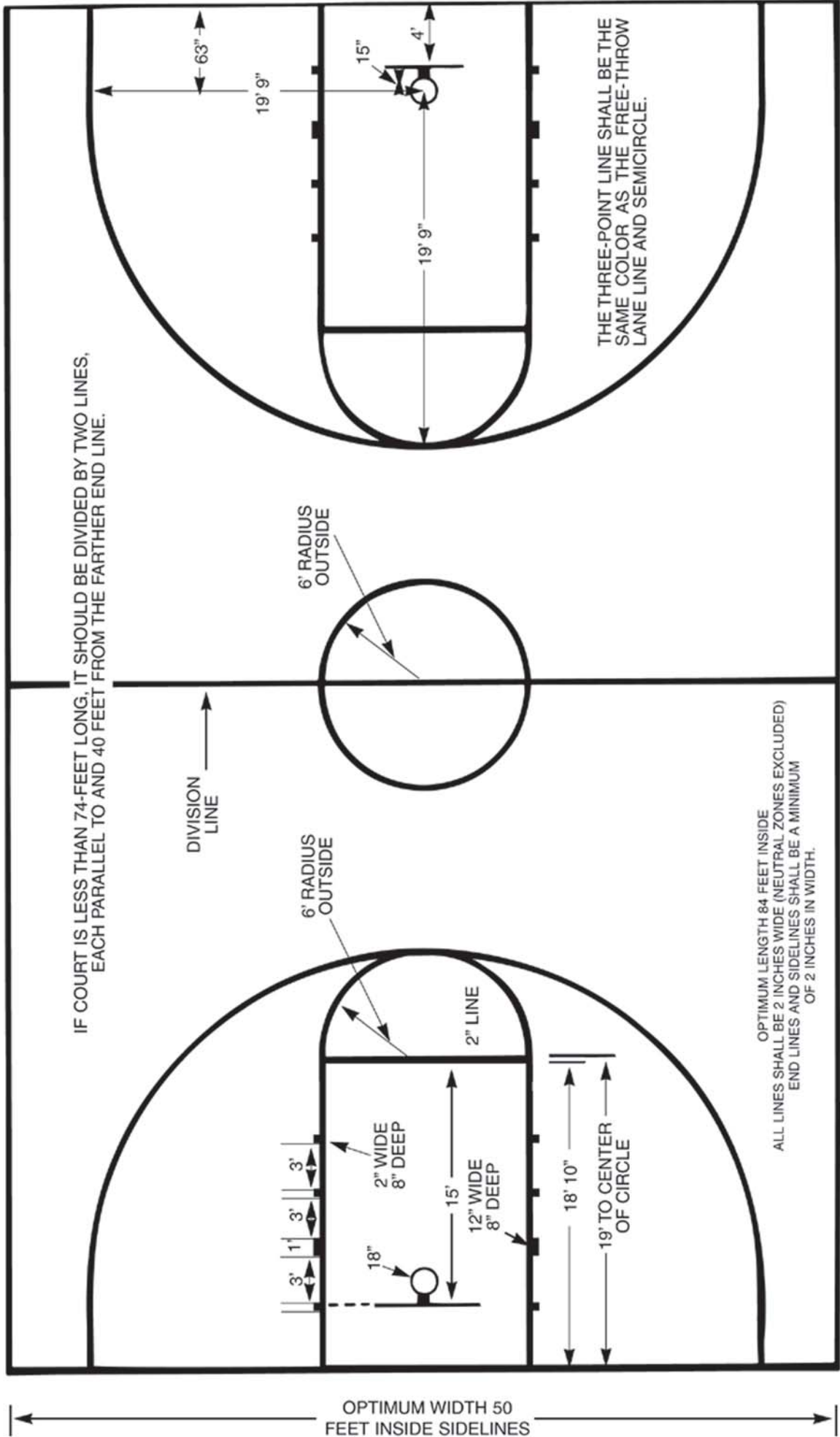
Roof deck boards are custom made "log siding" profile single lap joint boards molded from PlayVentures, Inc. designed molding heads. Log siding boards are molded from a standard 2" x 6" MCA treated kiln dried timber.

BASKETBALL COURT AND HOOP



# BASKETBALL COURT DIAGRAM

(See Rule 1-13 for location and size of optional coaching box)



Left End Shows  
Rectangular Backboard  
72-Inches Wide

MINIMUM OF 3 FEET

Preferably 10 feet of unobstructed space outside. If impossible to provide 3 feet, a narrow broken 1-inch line should be marked inside the court parallel with and 3 feet inside the boundary.

Right End Shows  
Fan Backboard  
54-Inches Wide



# OWNER'S MANUAL



## Warning

- ! Do not slide, climb, or play on pole.
- ! Keep organic material away from pole base. Grass, litter, etc. could cause corrosion and /or deterioration.
- ! Check pole system twice a year for signs of corrosion (rust, pitting, and chipping). Remove rust and/or loose paint completely and repaint with exterior enamel paint. If rust has penetrated through the steel anywhere, replace pole immediately.
- ! Check unit before each use for loose hardware, excessive wear, and signs of corrosion and repair before using.
- ! During play, use extreme caution to keep players face away from the backboard, rim, and net.
- ! Wear a mouth guard when playing to avoid dental injuries.
- ! When adjusting height, keep hands and fingers away from moving parts.
- ! During play, do not wear jewelry (rings, watches, necklaces, etc.). Objects may entangle in net.



## Pro Dunk® Diamond

### Basketball System

## WELCOME TO THE FAMILY OF PRO DUNK® OWNERS

Thank you for purchasing our basketball system. We try hard to ensure that our products are of high quality and free of manufacturing defects and of missing parts. However, if you have any problems with your basketball pole, such as a manufacturing defect or a missing part please contact us at the following:

**Toll Free:** 1.888.600.8545

**Pro Dunk® Hoops**

**Web:** [www.produnkhoops.com](http://www.produnkhoops.com)

22047 Lutheran Church Rd.

**FAX:** (281) 357-4822

Tomball, TX 77377

Please provide model number, serial number, and/or part number of the product and/or part when you call, write or email. These numbers can be found on the product, packaging, or on the back of the main pole.

**Purchase Parts:** [www.produnkhoops.com/parts](http://www.produnkhoops.com/parts)

**Support:** [www.produnkhoops.com/support](http://www.produnkhoops.com/support)

**Installation Video:** [www.produnkhoops.com/video/installation.php](http://www.produnkhoops.com/video/installation.php)

***Read this manual all the way through before starting to put up your system. Then read each step completely before beginning installation.***



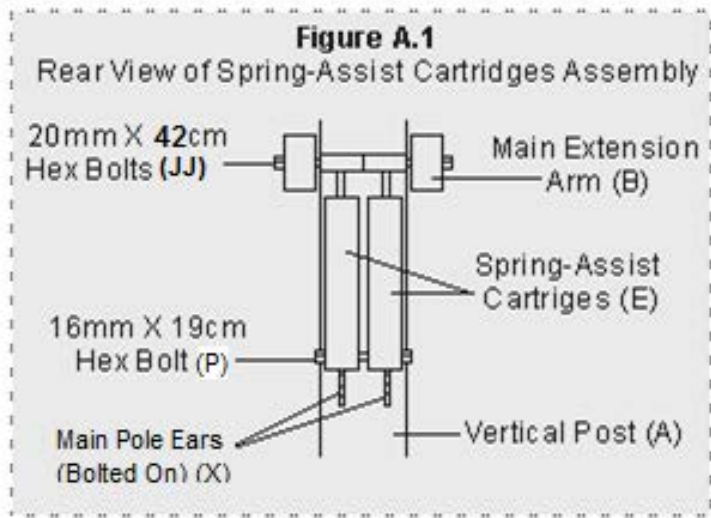
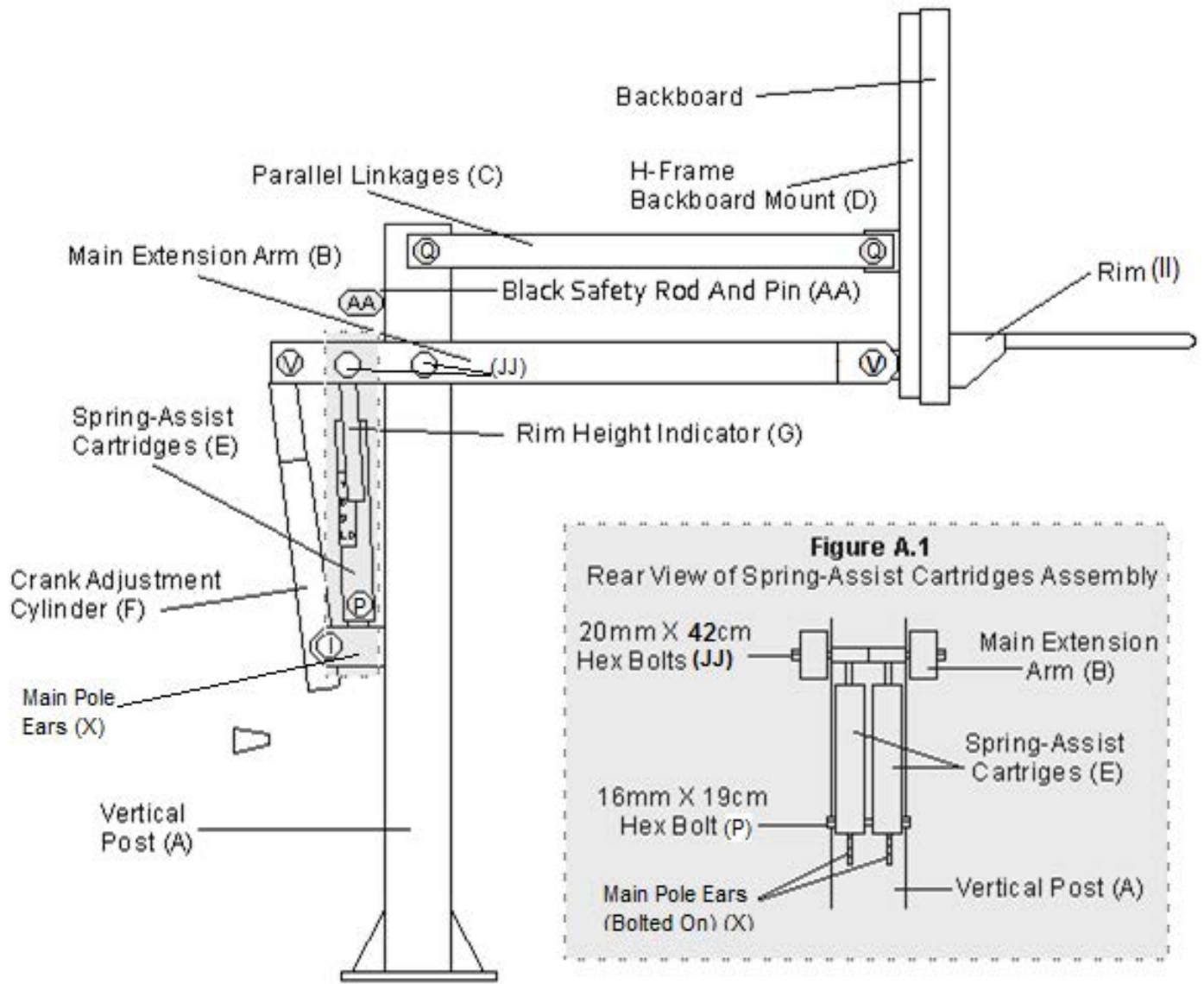
**Know what's below.  
Call before you dig.**

**[www.Call811.com](http://www.Call811.com)**

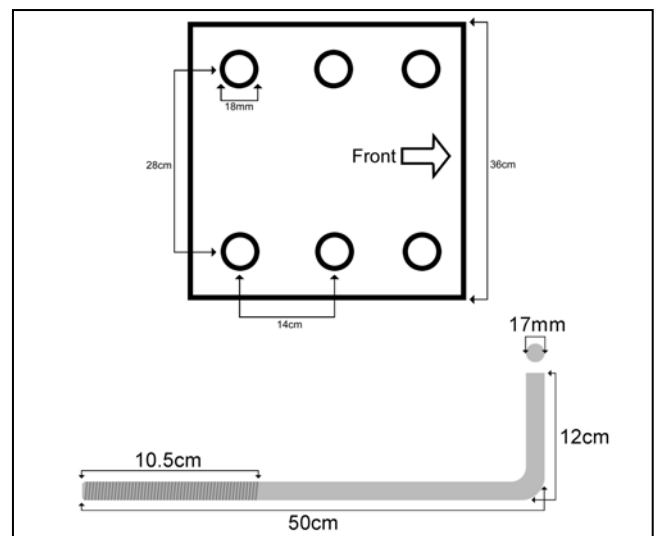
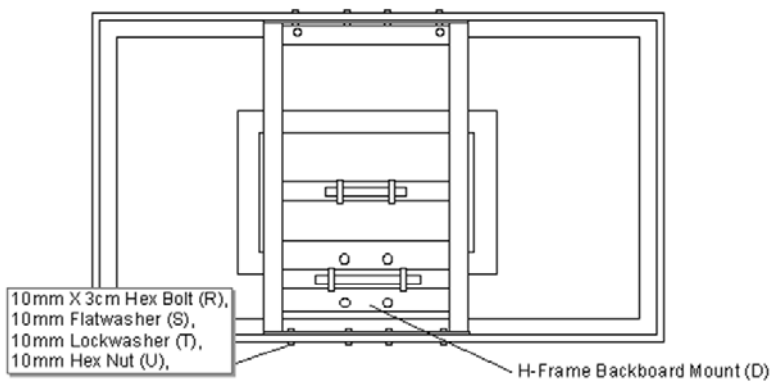
# Bill Of Materials

Ref.	Qty.	Description
A	1	Vertical Post
B	1	Main Extension Arm
C	2	Parallel Linkages
D	1	H-Frame Backboard Mount (pre-assembled to backboard)
E	2	Spring-Assist Cartridges
F	1	Crank Adjustment Cylinder
G	1	Steel Rim Height Indicator
H	1	Rim Height Sticker
I	1	16mm X 14cm Hex Bolt
J	2	16mm Hex Nut
K	6	18mm Anchor J-Bolts (needed for day 1)
L	18	18mm J-Bolt Hex Nuts (needed for day 1)
M	6	Anchor Footing Rebars (needed for day 1)
N	1	Anchor Footing Template (needed for day 1)
O	6	18mm Footing Lock Washers (needed for day 1)
P	1	16mm X 19mm Hex Bolt
Q	2	18mm X 36mm Hex Bolts
R	8	10mm X 3cm Hex Bolts (pre-assembled)
S	8	10mm Flatwashers (pre-assembled)
T	8	10mm Lockwashers (pre-assembled)
U	8	10mm Hex Nuts (pre-assembled)
V	2	18mm X 42cm Hex Bolts
W	4	Plastic and Steel Rim Spacers (for the rim assembly)
X	2	Main Pole Ears (1 left, 1 right)
Y	6	Main Pole Ear Bolts, washers and lock nuts
Z	12	18mm Anchor J-bolt Washers (needed for day 1)
AA	1	Black Safety Rod And Pin
BB	4	18mm Hex Nuts
CC	4	10mm X 7cm Hex Bolts (For the rim Assembly)
DD	8	10mm Flatwashers (for the rim assembly)
EE	4	10mm Lockwashers (for the rim assembly)
FF	2	Rim Plate Screws (for the rim assembly)
GG	1	Metal Rim Plate (for the rim assembly)
HH	1	White Mesh Net (for the rim assembly)
II	1	Rim (for the rim assembly)
JJ	2	20mm X 42cm Hex Bolts
KK	2	20mm Hex Nut





**Pre-Assembled**



# Safety Instructions



## IMPORTANT

It is the responsibility of purchaser to ensure that all installers and players fully comply with the detailed instructions set forth in this product installation manual. Product assembly should be carried out exactly as instructed and owner supervision of use and installation is required to prevent risk of product malfunction or risk injury.

- All tools used to assemble this product should be used in compliance with manufacturer's guidelines.
- Installation of this product will require heavy lifting and bending. Any person that is not capable of such activity should not participate in the installation of this product.
- If using a ladder during assemble, use extreme caution and refer to the warnings and cautions on the ladder.
- Due to the size and weight of this product, we recommend at least (4) competent adults are present.
- Before digging the hole for the anchor system, please call 811 to ensure that all underground utilities are a safe distance away from the anchor system.
- Make sure there are no overhead power lines within a 25 foot radius of the basketball system.
- All parts and components necessary to complete proper installation are included within this product. Do not use parts not included with our system. Failure to follow this requirement could cause product malfunction and will void warranty of this product.
- Keep all organic materials away from parts and components to avoid corrosion.
- Please use caution when performing Slam Dunks on your Pro Dunk® system.
- Do not climb on any part of the basketball system as it was not intended for this activity.

- Do not use the basketball system as a lift or to hoist anything.
- Players should wear protective mouth guard during play to avoid any time of dental injury.
- Players should refrain from wearing any jewelry that could potentially get caught in the rim or net.
- Only hang on the rim momentarily to regain your balance. Release the rim as soon as possible.
- Do not allow children to adjust basketball system.
- Check the basketball system on a regular basis to ensure that there are no signs of deterioration or corrosion, loose hardware, or damaged parts. If you see any signs of damage perform maintenance or contact Pro Dunk® Hoops for replacement.
- For maintenance repairs please contact a professional.
- **Failure to follow these safety instructions could result in product malfunction, serious injury, or even death.**

Pro Dunk® Hoops retains the right to modify this document at any time without notice or obligation.

Keep this installation manual as a reference for your safety and the safety of those playing on the basketball system. Additional copies of these safety instructions are available by calling customer service at **1.888.600.8545** or at **[www.produnkhoops.com/support](http://www.produnkhoops.com/support)**

# Installation Overview

In order to have the safest, fun and longest use of your Pro Dunk® system, please note and heed the following:

- 1) Prior to goal assembly, call utility services (811) for location of underground utility lines before you dig.
- 2) Immediately unpack all components and cross check against bill of materials. Report any shortages to Hoops Inc. customer service at 1.888.600.8545.
- 3) Parts can be ordered at [www.produnkhoops.com/parts](http://www.produnkhoops.com/parts)
- 4) Assembly is a two part process.

## PART 1

- Day 1.** Complete Anchor System Installation Instructions. (Below)
- Day 2.** Allow concrete to cure.
- Day 3** Allow concrete to cure.
- Day 4.** Allow concrete to cure.

## PART 2

- Day 5.** Complete Pro Dunk® assembly instructions.

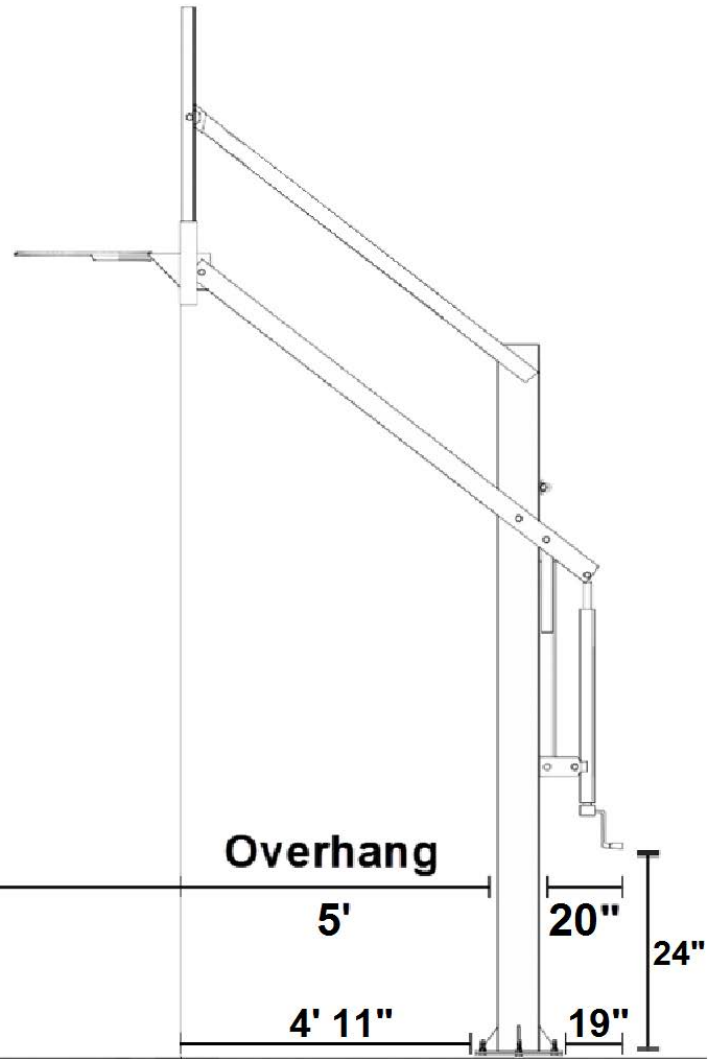
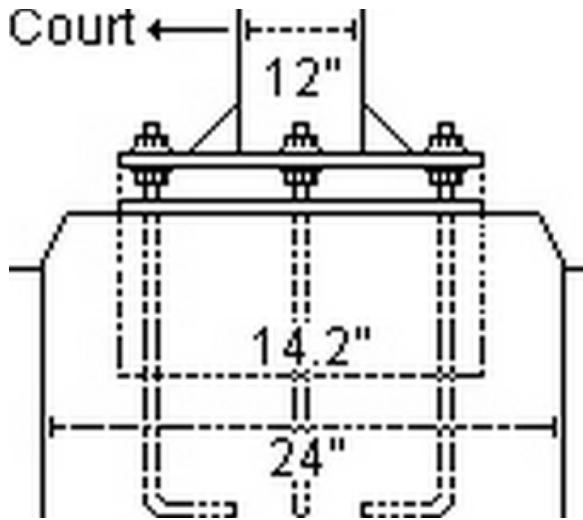
- 5) For safety measures, have at least 4 capable persons to assist you in assembly of your Pro Dunk® Goal.



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

[www.Call811.com](http://www.Call811.com)

- White**—Proposed Excavation
- Pink**—Temporary Survey Markings
- Red**—Electric Power Lines, Cables, Conduit, and Lighting Cables
- Yellow**—Gas, Oil, Petroleum, or Gaseous Materials
- Orange**—Communication, Alarm or Signal Lines, Cables or Conduit
- Blue**—Portable Water
- Purple**—Reclaimed Water, Irrigation and Slurry Lines
- Green**—Sewers and Drain Lines



3 Point Line	Distance to Free Throw Line	Overhang		
6'	15'	5'	20"	24"
		4' 11"	19"	

## Required Tools

- Post Hole Digger
- Shovel
- Wheel Barrow
- (20-25) 80 lbs. bags of concrete OR (27-32) 60 lbs. bags of concrete
- Garden Hose
- Trowel
- Level
- Tape Measure
- Box Cutter
- (2) Large Crescent Wrenches (main bolts and pier)
- (2) 17mm Wrenches (rim hardware)

Bolt/Nut Sizes
Socket/Wrench Sizes Recommended
• 30mm
• 27mm
• 24mm
• 18mm
• 17mm

# Installation Video

Navigate to be below URL to watch our installation video.

[www.produnkhoops.com/video/installation.php](http://www.produnkhoops.com/video/installation.php)

Installation of a Pro Dunk® Platinum basketball goal system by an experienced professional assembly crew. It shows the two step process starting with the pier installation followed by assembly of the basketball goal on the cured pier. Tips and explanation is given throughout by the experts at [www.produnkhoops.com](http://www.produnkhoops.com).



[www.produnkhoops.com/video/installation.php](http://www.produnkhoops.com/video/installation.php)

# Day 1

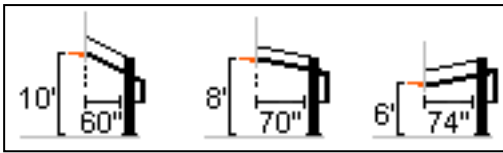
## ANCHOR SYSTEM INSTALLATION INSTRUCTIONS

### WARNING

Before digging the hole for this pole, check for buried power, gas, water, and telecommunication lines! Failure to do so could result in serious or fatal injury! Contact your local utility company if unsure.

### 1) Installation Location

Choose the proper location to dig for the concrete footing. Use the distance chart on the previous page to help you make your decision. When choosing the exact position to dig, make sure to maximize the amount of playing surface while minimizing possible driveway obstruction.

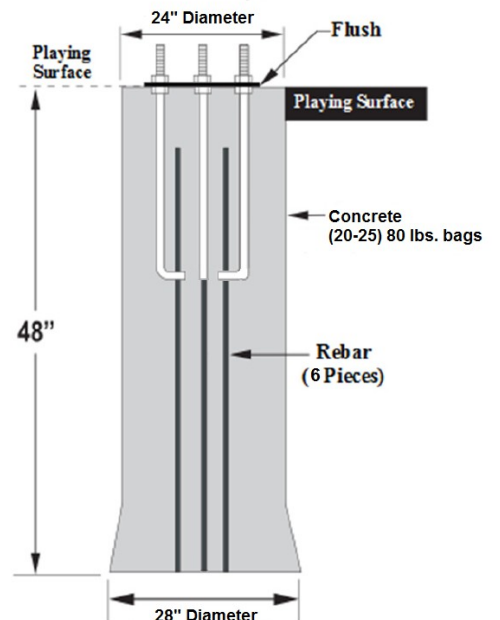


Rim Height	Distance from the face of the backboard to the front of the Vertical Post (A)
6'	74"
8'	70"
10'	60"

### 2) Digging Pier Hole

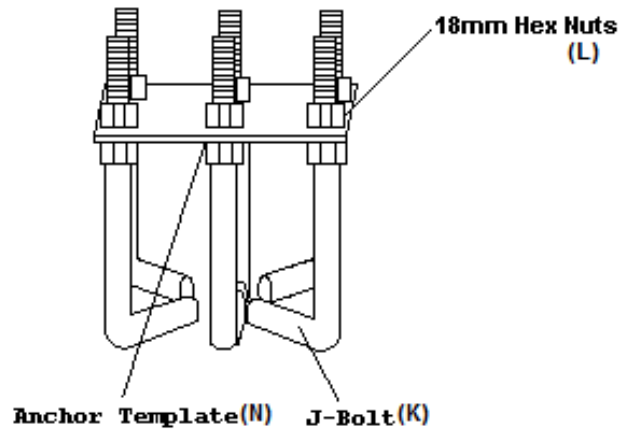
Dig hole 48" deep and 24" square. Be sure to bell out the bottom of the hole 28" to give added stability to the footing.

**NOTE:** If you live in an area where the frost line is below 48" it is advisable to dig to normal frost line.



### 3) Anchor Assembly

Twist (6) nuts (L) to the bottom of threads on (6) J-bolts (K). Place these J-bolts through the holes on the black anchor plate (N) and install (6) nuts (L) and tighten. The bottom of the J-bolts should be positioned as shown.



### 4) Pouring Concrete and Setting Pier Kit

For this step you will need: level, broomstick and tape measure. The 48" x 24" anchor footing will require a little over a 1/2 yard of 3000 psi concrete (20-25 80 pound sacks of premix concrete). More will be needed if you dig a larger hole.

**NOTE:** Make certain that you have enough concrete to finish the job. Allowing a portion to dry while you purchase more concrete will weaken the footing.



Mix (20-25) 80 lbs. bags of concrete in wheel barrow or cement mixer and pour in pre-dug hole about half full. Agitate concrete with shovel or broomstick to ensure proper fill. Place (6) Pieces of rebar (M) (included) in the middle of the hole about 6 inches apart to create a rectangle in the middle of the hole. All 6 pieces of rebar need to overlap the J-bolts at least 6 inches.

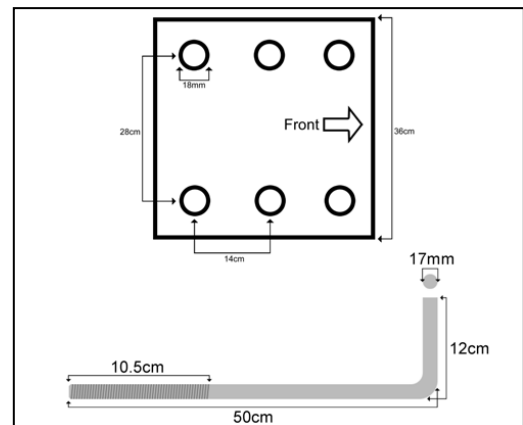
**NOTE:** It is better to mix it slightly wet than too dry.

Pour the remaining concrete into the hole until completely full and coming out of the top. Using a trowel, smooth the concrete to your preferred liking.



Place the assembled anchor system in hole to the point where the bottom of the black anchor plate (N) is flush with the top of the finished concrete and (3) 18mm J-Bolts (K) are on the right and (3) 18mm J-Bolts (K) are on the left.

**NOTE:** The (6) 18mm J-Bolt Hex Nuts (L) on the bottom of the Anchor Footing Template (N) will be sacrificed into the concrete.





Use the level to ensure that the pier anchor template (L) it is level in all directions. Additionally, the center line of the 18mm Anchor J-Bolts (K) must be parallel with the edge of the playing surface.



Once completely smooth let the concrete cure. This can take up to a week. Consult the instructions on the concrete bag for curing times and directions.

**Day 1 Complete!**

# Day ~5

## PRO DUNK® ASSEMBLY INSTRUCTIONS



**CAUTION!**

FOUR PEOPLE ARE RECOMMENDED FOR  
SAFE INSTALLATION OF THE SYSTEM

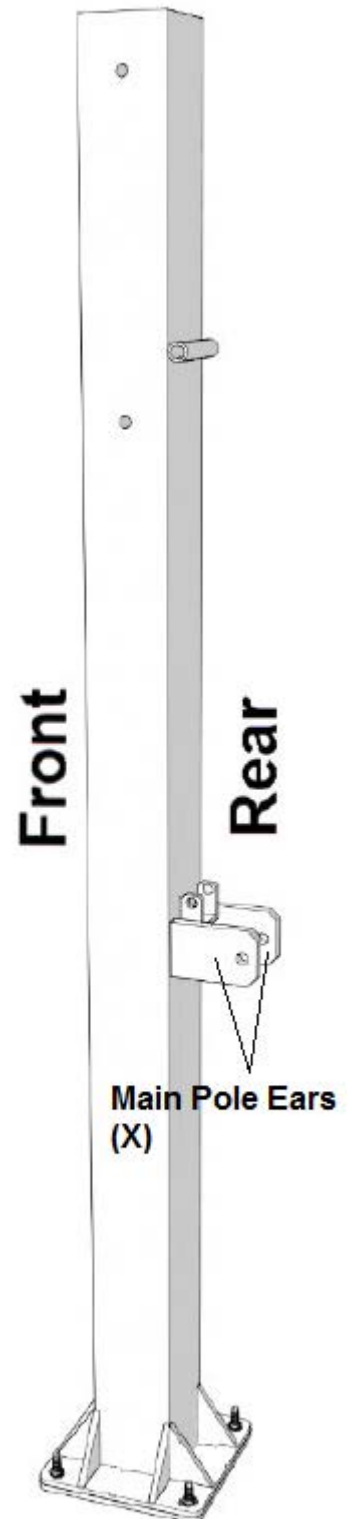
### 5) Main Pole Assembly

Loosen the top six 18mm J-Bolt Hex Nuts (L) from the 18mm Anchor J-Bolts (K). Level all six 18mm J-Bolt Hex Nuts (L). Leave Anchor Footing Template (N) in place.

Install (6) metal washers (Z) on top of the anchor bolts (K). Install the main pole (A) shown to the right. Install (6) metal washers (Z) to top of the anchor bolts (K). Install (6) lock washers to top of the anchor bolts. Install (6) 18mm hex nuts (L) to top of the anchor bolts and tighten down. **Make sure that base plate is square to playing surface.**



Bolt the main pole to the 4 J-bolts



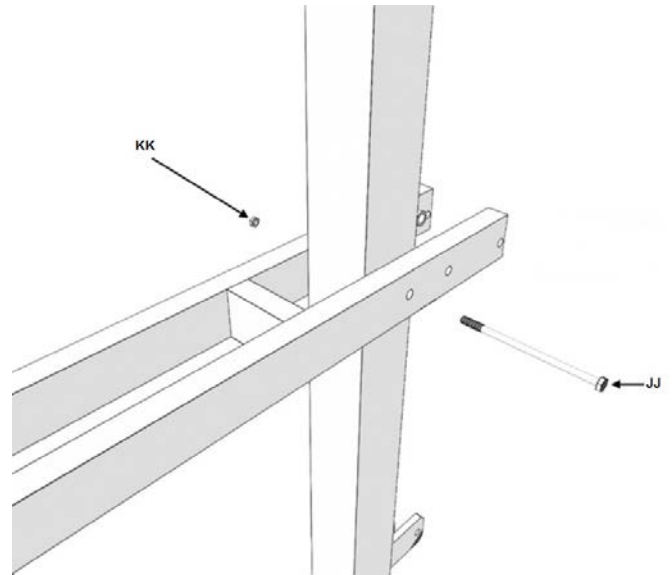
Install both Main Pole Ears (X) using the (6) hex bolts, washers, and lock nuts (Y) to the rear of the main pole as shown to the right. The Main Pole Ears (X) will be mounted on the outside of the tabs welded to the rear of the Main Pole (A).



## 6) Main Extension Arm Assembly

Slide the Main Extension Arm (B) over the top of the Vertical Post (A) and attach to the lower pivot tube with a 20mm X 42cm Hex Bolt (JJ) and a 20mm Lock Nut (KK).

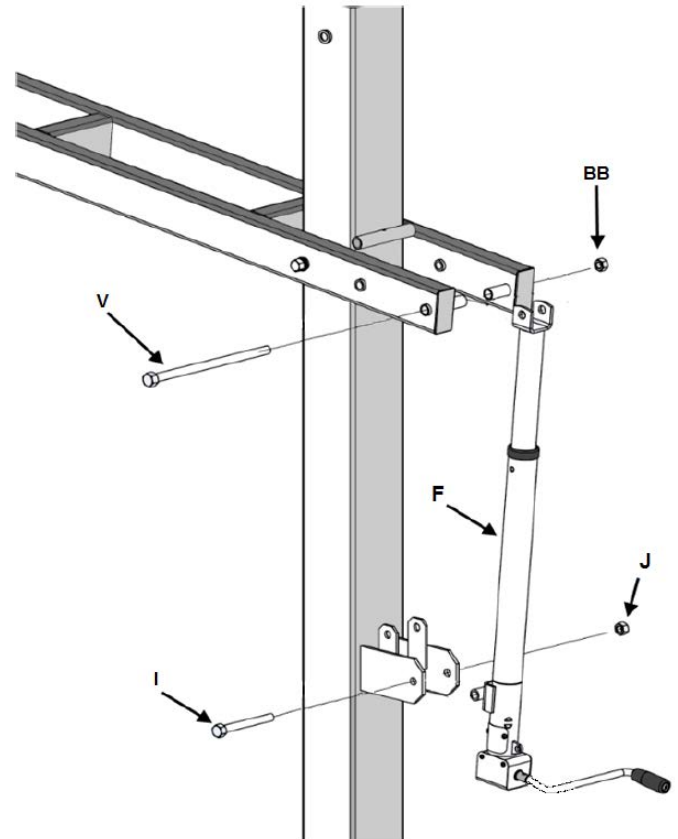
**NOTE:** Tighten the lock nut down and then back off a 1/4 turn to allow the joint to pivot when adjusting the system up and down.



## 7) Actuator Assembly

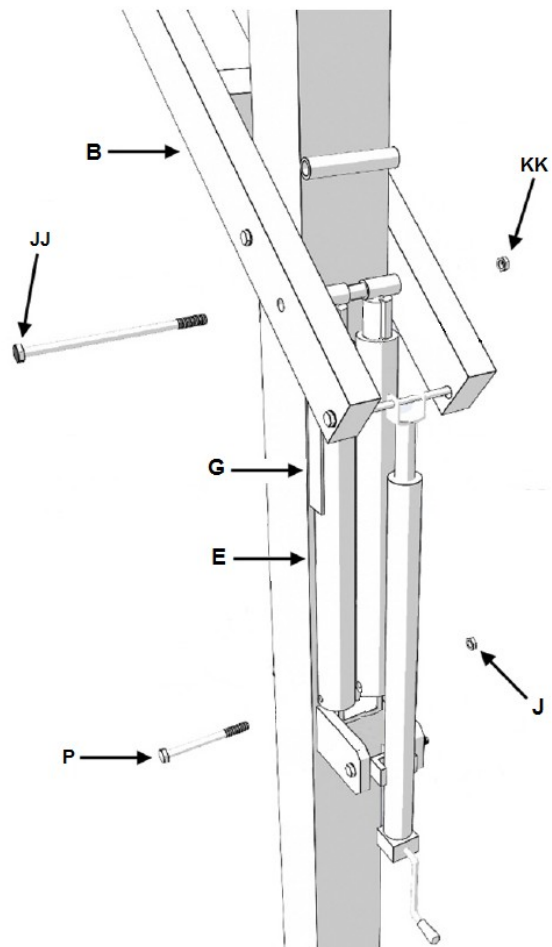
Next attach the Crank Adjustment Cylinder (F) using an 18mm X 42cm Hex Bolt (V) at the top and 16mm X 14cm Hex Bolt (I) at the bottom. Tighten each with a 18mm Lock Nut (BB) and 16mm Lock Nut (J).

**NOTE:** Tighten the lock nuts down and then back off a 1/4 turn to allow the joint to pivot when adjusting the system up and down.



## 8) Spring Assist Assembly

Attach both Spring-Assist Cartridges (E) to the Main Extension Arm (B) using an 20mm X 42cm Hex Bolt (JJ) and 20mm Lock Nut (KK). In order to attach both Spring-Assist Cartridges (E) at the bottom, lower the open end of each Spring-Assist Cartridge (E) down over the top of each welded tab as shown in the diagram. Use the 16mm X 19cm Hex Bolt (P) and 16mm Lock Nut (J) to attach them to the welded tabs. You may need to turn or rotate the Spring-Assist Cartridges (E) to line up holes. The Rim Height Indicator (G) should hang freely along the outside of one of the Spring-Assist Cartridges (E). Next, remove and discard the plastic spring assist spacer from Spring-Assist Cartridge (E).



**NOTE:** Tighten the lock nuts down and then back off a 1/4 turn to allow the joint to pivot when adjusting the system up and down.

## 9) Upper Linkage Assembly

Attach Parallel Linkages (C) to Vertical Post (A) with a 18mm X 36cm Hex Bolt (Q) and a 18mm Lock Nut (BB).

**NOTE:** It does not matter which end of the parallel link you attach to the vertical post.

**⚠ CAUTION:** Injury may occur if linkages are allowed to fall off main arm during assembly



**NOTE:** Tighten the lock nut down and then back off a 1/4 turn to allow the joint to pivot when adjusting the system up and down.

## 10) Backboard Assembly

**⚠ CAUTION: ATTACHING THE BACKBOARD REQUIRES AT LEAST FOUR CAPABLE ADULTS.**

Mount the H-Frame Backboard Mount (D) and Backboard assembly lower pivot tube first to the Main Extension Arm (B) using one 18mm X 42cm Hex Bolt (V) and one 18mm Lock Nut (BB). Next, attach the upper H-Frame Backboard Mount (D) pivot tube to the Parallel Linkages (C) using one 18mm X 36cm Hex Bolt (Q) and one 18mm Lock Nut (BB).

**NOTE:** Tighten the lock nuts down and then back off a 1/4 turn to allow the joint to pivot when adjusting the system up and down.



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## 11) Level Backboard

Check face of backboard to see if it is level forward and back. If it is not level, correct it by adjusting the 18mm J-Bolt Hex Nuts (L) located underneath the Vertical Post (A) flanged base plate.



## 11) Rim Spacers Assembly

Prior to installing the rim, locate four Plastic and Steel Spacers (W). Insert them into four rim holes in the backboard. This is very important to prevent backboard breakage.

 **CAUTION:** Do not proceed with rim installation without these spacers!



## 12) Rim Assembly

Mount the rim to the H-Frame Backboard Mount (D) and Backboard assembly using the hardware supplied in the rim box.



**NOTE:** Use a level to make sure rim is level side to side before tightening nuts



**OPTIONAL:** If desired, you can level the rim front to back using shim washers placed between the rim spacer (W) and Rim (II).

Attach the white nylon net to the system. If this step has already been completed at the factory you can skip this part of the rim assembly.

Using (2) Rim Plate Screws (FF) attach the Metal Rim Plate (GG) to the rim (II). The Metal Rim Plate (GG) covers the springs in the Rim (II) as shown below.



Make sure all nuts on the system have been tightened.

**NOTE:** Do not over tighten. If unit is excessively difficult to crank up and down the 18mm Lock Nut (Q) that secures the Main Extension Arm (B) and Vertical Post (A) is probably too tight.

If not already done, remove the spring assist spacers. Cut off the spring assist spacer that is attached to the Spring-Assist Cartridge(s) (E) using a box cutter.



### 13) Height Meter and Sticker Assembly

To apply the Rim Height Sticker (H) and Steel Rim Height Indicator (G), first use a tape measure to crank rim up to exactly 10' from the playing surface. This is measured from the top of the rim to the playing area.

#### YouTube Instructional Video



<https://youtu.be/X0cVd4j70Zw>

Attach the Steel Rim Height Indicator (G) to the upper bolt that holds the Spring-Assist Cartridge (E) to the Main Extension Arm (B). The Steel Rim Height Indicator (G) will just hang on the bolt loosely.

Use a pencil to make a mark on the Spring-Assist Cartridge (E) where the bottom of the Rim Height Indicator (G) stops. Then, peel and apply sticker (H) to outside of Spring-Assist Cartridge (E) lining up the pencil mark with the 10' mark on the sticker. See image below for a diagram of a completed height indicator assembly.

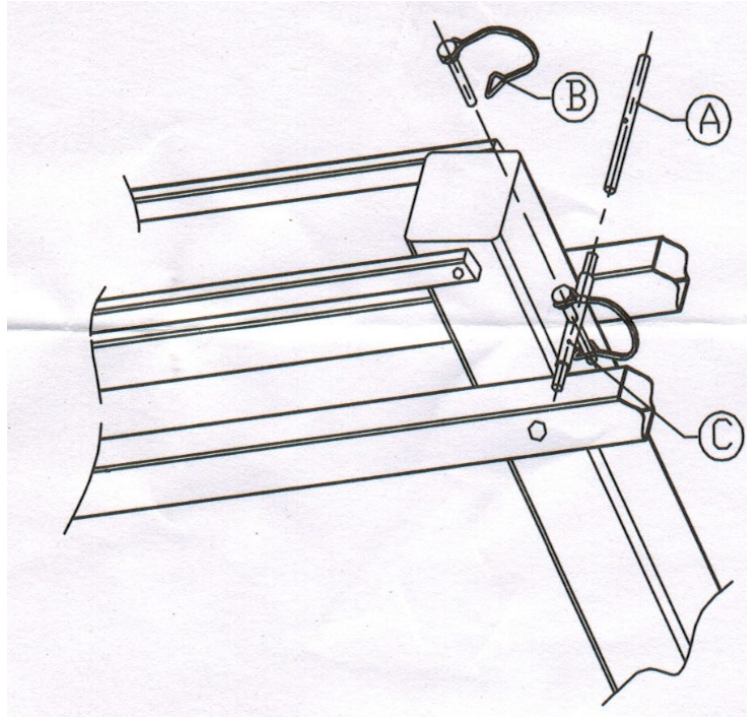
**NOTE:** *It is advisable to wait up to two weeks to allow the anchor footing to fully cure before aggressive play.*



## 14) Safety Pin Installation

If you'd like to restrict height adjustment from 10' to 7' 6" you can optionally insert the Black Safety Rod And Pin (AA) into the tube on the back of the Vertical Post (A).

**If a lower height is desired remove the Safety Rod and Pin (AA) before adjusting any lower than 7' 6".**



- 1) Insert the Steel Safety Pin (A) into tube (C) on the back of the main pole.
- 2) Insert the Locking Pin (B) through the hole in the Tube (C) and the hole in the Steel Safety Pin (A).
- 3) Lock the Locking Pin (B) as shown in figure above.

**NOTE:** *It is advisable to do so to avoid injury*

## 15) Protective Padding Assembly

Attach gusset padding if removed during installation. Attach using the Velcro on the back of the gusset padding to secure it to the base of the system.

Attach pole padding if removed during installation. Attach using the Velcro on the back of the pole padding to secure it to the main pole of the system.

## 16) Maintenance

Like any piece of hardware proper maintenance is required. Several factors such as the environment, organic materials, herbicides, pesticides, excessive use or misuse can eventually cause the basketball system to require maintenance. Failure to do so could result in system failure, property damage, or even personal injury.

1) All organic materials should be kept away from the system at all times. This will alleviate any chance of rust penetrating the powder coated finish and causing structural damage.

**Examples:** grass clippings, moisture, garbage, dirt, etc.

2) If you see any signs of rust on the system remove the loose paint, sand the area with a media grit sandpaper and apply outdoor enamel to the affected area.

**Suggested Touchup Paint:** Rustoleum Semi-Gloss Black Enamel

3) To clean the backboard use a 100% cotton soft cloth with mild dishwashing liquid for soap and luke warm water. Rinse backboard with lukewarm water. Wash gently with a 100% Cotton soft cloth, lukewarm water and mild soap. Do not scrub. Rinse backboard with lukewarm water again. Dry with 100% cotton soft cloth. To minimize scratches and minor abrasions to your backboard

4) Never adjust the rim below 6' or over 10'. Adjustments of the goal should be done under adult supervision. When attempting to slam dunk you should always wear a mouth guard to avoid dental injury. **If safety pin (AA) is installed do not adjust the system below 7' 6"**. If a lower height is desired remove the safety pin (AA) and continue to adjust downward.

5) If installed in a public area it is suggested to lock the adjustment mechanism. You can purchase a pad lock to do this.

**Suggested Lock:** Pro Dunk® Lock—[https://youtu.be/5ssaaQ4p\\_d0](https://youtu.be/5ssaaQ4p_d0)

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## 17) Routine System Inspection

Before each use inspect the entire system for any signs of Loose nuts and bolts, any excessive wear and tear, any signs of rust or corrosion.

If replacement parts are needed you can contact Pro Dunk® Hoops directly or navigate to [www.produnkhoops.com/parts](http://www.produnkhoops.com/parts) to purchase parts for your system. Only parts provided by Pro Dunk® Hoops should be used for repair. Not doing so could cause the system to fail resulting in injury or death and voids the limited lifetime warranty.

## Hoops Inc. Pro Dunk® Limited Lifetime Warranty

Hoops Pro Dunk® basketball structural components are warranted to the original purchaser to be free from defects in material or workmanship for the duration of ownership by the original retail purchaser. The word “defects” is defined as imperfections that impair the use of the product.

### Warranty Fulfillment

Merchandise must be shipped prepaid with a copy of proof of purchase to Hoops Inc. for examination to see whether it needs to be repaired or replaced. Any labor costs, travel expenses and any other changes involved in the removal, installation or replacement of the defective/repared parts from/to your Hoops Pro Dunk® system will be your (the purchaser's) responsibility. Shipping charges for replaced or warranted merchandise being sent back to the customer must be prepaid by the customer in advance. If not, the replacement shipment will be sent out collect. Hoops Inc. reserves the right to examine photographs or physical evidence of merchandise claimed to be defective, and to recover said merchandise, prior to authorization of warranty claims.

### What is not covered by this warranty

This warranty does not cover defects or damage due to improper installation, shipping, handling, alteration, accidents, vandalism, weather conditions (rusting), exposure to corrosives, negligence, misuse (anything other than a type of basketball activity or related contact with the unit), scratching, scuffing or any event beyond the control of the Hoops Inc.. If unit is not maintained as stated in the user manual the warranty will be void.

### Liability

Hoops Inc. shall not be liable for indirect, special, or consequential damages arising out of or in connection with the use or performance of the products or other damages with respect to any economical loss, loss of property, loss of enjoyment of use, costs of removal, installation or other consequential damages for breach of any expressed or implied warranty on these products.

### Guidelines

Keep your proof of purchase (original retail purchaser). Without it, we will not be able to proceed with any warranty service.

Call

1-888-600-8545 / Warranty Dept.

Write

Hoops Inc.  
Attn: Warranty Dept  
22047 Lutheran Church Rd.  
Tomball TX 77377

Email

[support@hoopsincorporated.com](mailto:support@hoopsincorporated.com)

For the most up to date warranty information please navigate to [www.produnkhoops.com](http://www.produnkhoops.com).

## 3-BIN COMPOST SYSTEM



## **WOOD AND WIRE THREE COMPARTMENT BIN**

Multi-compartment composter bins allow for continuous processing of large amounts of material in batches. In a three compartment composter, material can be turned and mixed between two of the compartments, with the third compartment used for curing and storage.

A three compartment composter can be simply thought of as two additional sections attached to a single compartment unit. A simple three section unit can be constructed with seven discarded pallets lashed together. This particular design employs four identically constructed wooden frames connected to common top and bottom boards and with a single fiberglass lid. It is adapted from a design originally developed for the Community Composting Education Program in Seattle, Washington.

### **List of Materials**

- 4 10'2x4s
- 4 12' 2x4s  
or eight 6' 2x4s
- 4 10' 2x2s
- 2 6' 2x2s
- 1 12' 2x6s
- 9 6' 1x6s
- 22' 36" wide 1/2" mesh hardware cloth
- 1 10' x 2' sheet and one 8' x 2' sheet of 4 oz. corrugated fiberglass
- 40 gasketed aluminum nails for corrugated fiberglass roofing
- 3 8' lengths of wiggle molding to fit corrugated fiberglass
- 2 3" zinc plated butt hinges for lid
- 12 1/2" carriage bolts 4" long c/w nuts
- 12 1/2" flat washers for the bolts

12 1/2" flat washers for the bolts

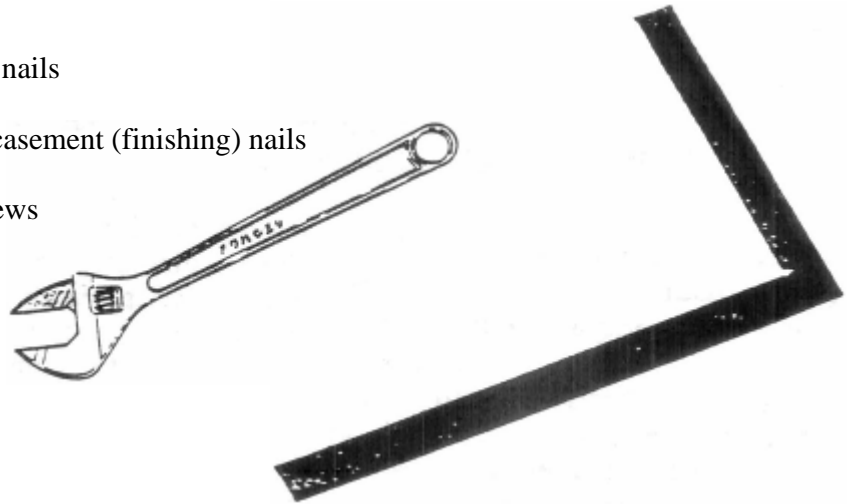
2 pounds of 3-1/2" galvanized nails

1/2 pound of 2-1/2" galvanized casement (finishing) nails

4 flat 4" corner braces c/w screws

4 flat 3" T braces c/w screws

carpenter's glue



### **Specialized Tools**

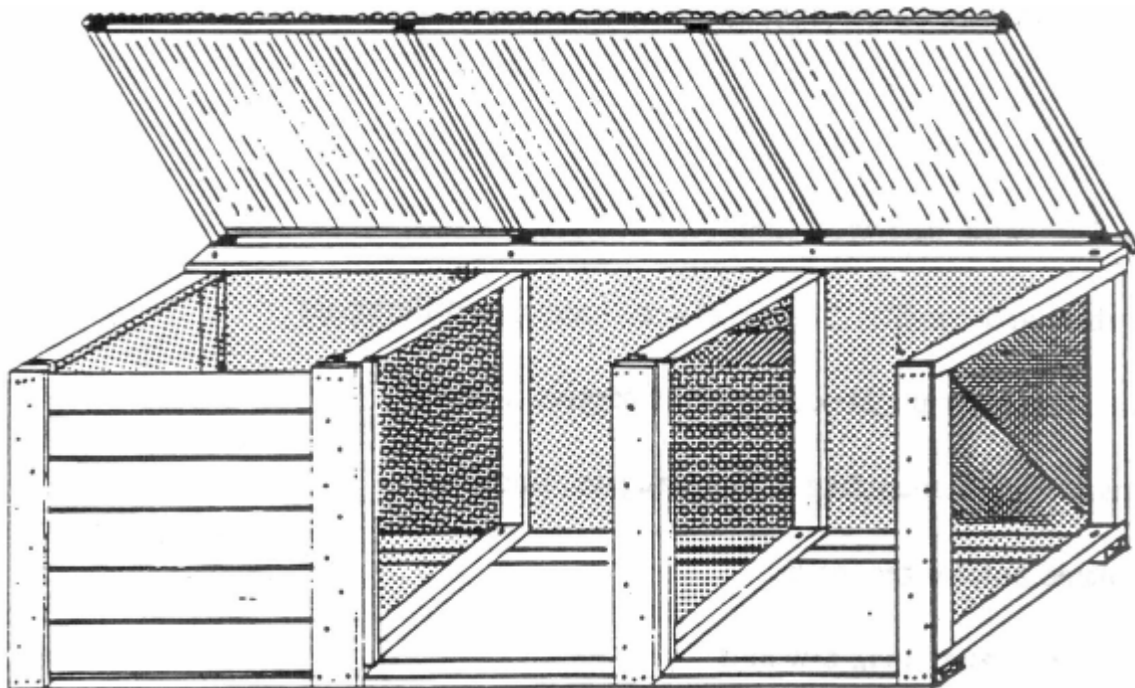
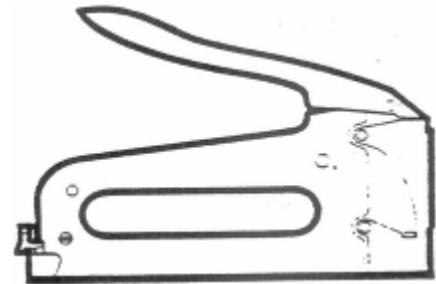
tipsnips

hand or power drill with 1/8" bit and 1/2" spade bit

3/4" socket wrench or adjustable wrench

carpenter's square

staple gun or power stapler c/w staples



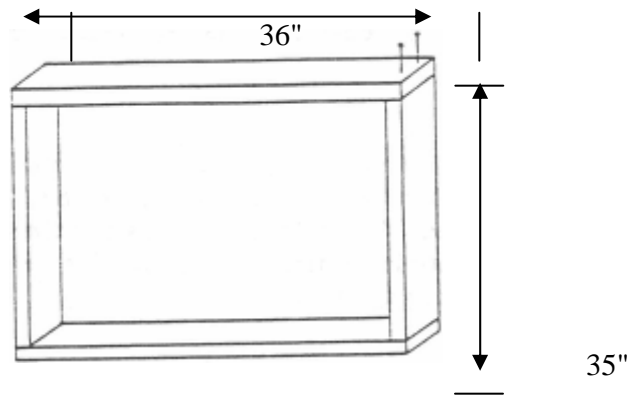


## Construction Sequence

1. Sides and Dividers. From the 12' or 6' 2x4s, cut eight pieces 36" long and eight pieces 32" long. Using two pieces of each on edge, form four butt jointed frames 35" by 36" (see illustration). Connect each joint with nails and glue. Cut four 37" long pieces of hardware cloth. Reinforce each edge by bending it back an inch. Center each section of cloth onto a frame (with the bent edge down against the wood) and staple the two together with a staple every 4". Tension the cloth so that it will not sag when filled with compost.

2. Composter Frame.

Cut the four 10' 2x4s into four 9' pieces. Lay two of them flat side down parallel to each other, 36" apart, outside to outside. Place the four frame pieces on the two boards, 36" dimension down. The two outside frames should be flush with the ends of the board and the two dividers should start at 35" in from each end.



Mark the edges of each frame on both 9' long boards. Lay three of the frames aside.

Starting with an outside frame, align it with its markings on a base board and drill a 1/2" hole through the frame and base board into a piece of scrap wood. Secure the frame to the base board with a carriage bolt, washer and nut, but do not tighten. Feed the bolt through from the remaining three frames.

Lay another 9' top board on top of the frames aligned with their rear outside edge and mark it in the same manner as the bottom boards. Keeping the frames aligned with their markings, drill a 1/2" hole through the top board and each frame in turn. Again, feed a carriage bolt down through each hole and secure the pieces together with a washer and nut.

Check the composter frame for squareness with a carpenter's square or by measuring the distance between outside corners. Adjust if required and tighten down all bolts with a socket or adjustable wrench.

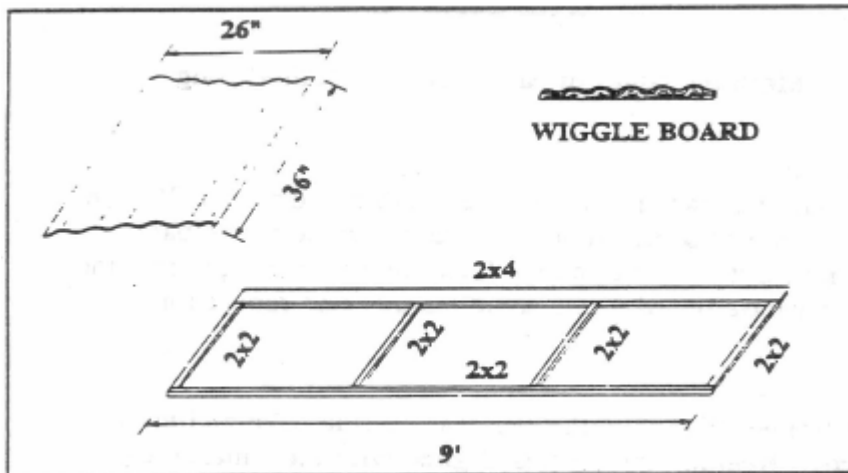
connect the cloth to the frame with a staple every 4". Keep the tension on the cloth to prevent sagging.

3. Runners and Front Slats. Cut four pieces 36" long from the 12' 2x6. Nail two of them flush to the top and outside front edges of the frame. Nail the other two 2x6 pieces to the front of the inside dividers, keeping them centered and flush with the top.

From two 10' 2x2s, cut six pieces 35" long for back runners. Nail these to the frames parallel to the front runners with a 1" gap for slats.

For slats, cut all nine 6' 1x6 boards into pieces 30-1/2" long.

4. Fiberglass Lid. For the lid frame, cut the remaining 10' 2x2 into a 9' piece and the two 6' 2x2s into four pieces 32" long. Form these pieces and remaining 9' 2x4 into a rectangular frame 9' by 37" as per the illustration. Check for squareness and then connect the frame together using corner braces for the outside corners and T braces for the interior dividers. Pilot drill the screw holes first to avoid splitting the wood.



Lay the lid frame, brace side down, on the compartment frame with the 2x4 piece at the rear. Attach the two together with the butt hinges. Pilot drill the screw holes first to avoid splitting wood.

Cut the wiggly board molding to fit the front and back of the lid frame. Position the pieces an inch in

from the sides of the frame and nail them to the top of the lid frame with the 2-1/2" casement nails. Pilot drill the nail holes first to avoid splitting the wood.

Cutting the 10' and 8' sheets of fiberglass into five pieces 37" long. Overlay each piece by at least one channel and position them on the top of the lid. Trim any overhangs at the ends to fit. Pre-drill the fiberglass and wiggly board molding with one nail hole every third hump and connect with gasketed nails.

## **ROTATING BARREL COMPOSTER**

A rotating barrel composter can ease the labor requirements for turning and aerating the composting materials. Most of them are limited in capacity due to the size of readily

GARDEN SHED



## Garden Chalet 4X2 Assembly Manual

Thank you for purchasing a 4x2 Garden Chalet. Please take the time to identify all the parts prior to assembly.

Please use Safety Eyewear and Gloves while Assembling. Be sure to read and follow all operating instructions for any tools used during assembly. Remember- NO SAW CUTTING IS REQUIRED!

### Safety Points and Other Considerations

Our products are built for use based on proper installation and normal residential use, on level ground.

Please follow the instruction manual when building your Grand Garden Chalet and retain the manual for future maintenance purposes.

Some of the safety and usage measures you may wish to consider include:

-if the product is elevated, any structural and building code requirements are solely the customer's responsibility, and should be abided by.

-in high or gusty wind conditions it is advisable to keep the structure securely grounded.

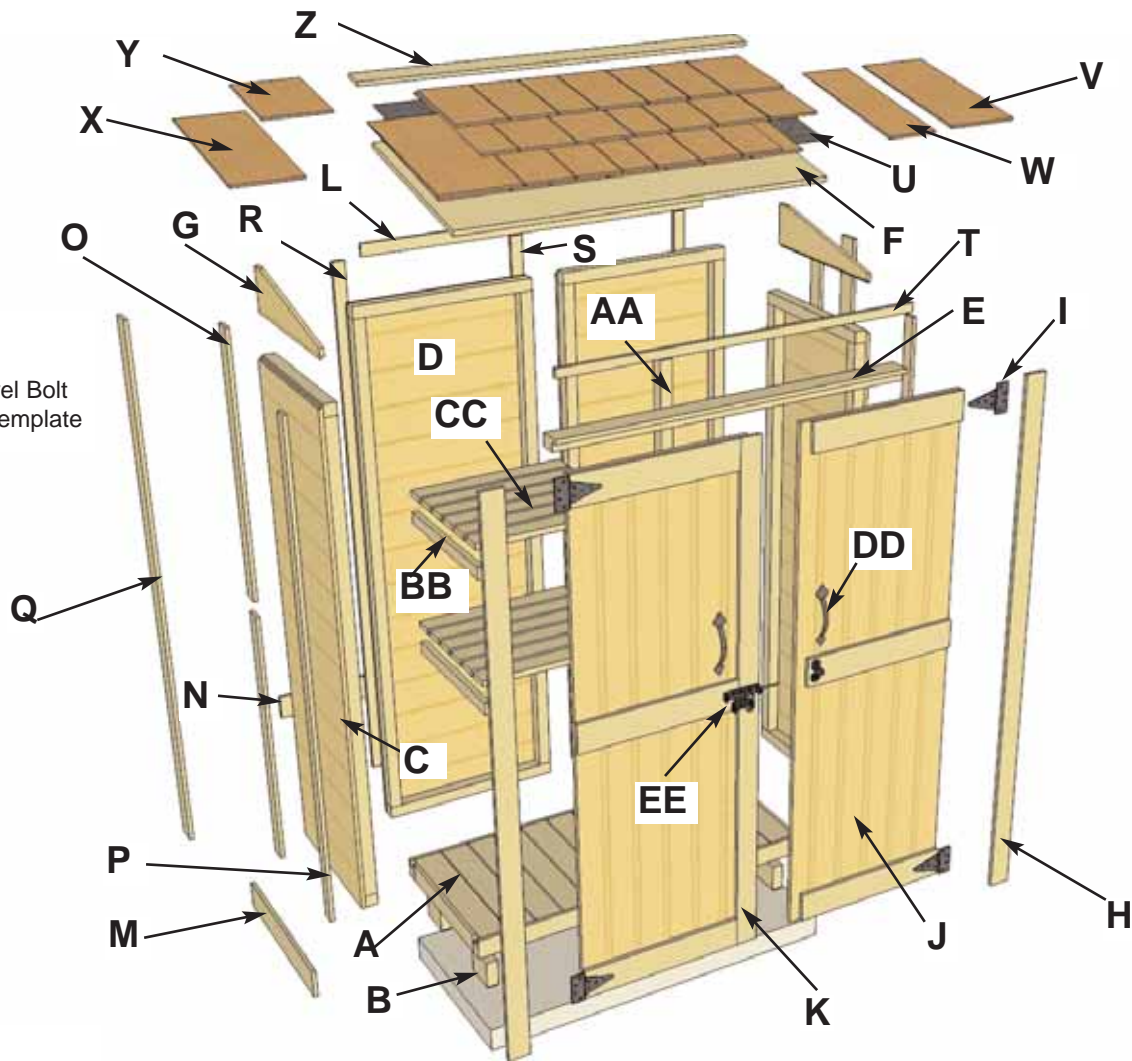
-have a regular maintenance plan to ensure screws, doors, roof and parts are tight.



**4x2 Garden Chalet Dimensions:**  
A: Outside Height (Rear) = 73 3/4"  
B: Outside Height (Front) = 67 1/2"  
C: Outside Width = 49"  
D: Outside Depth = 21 1/2"  
E: Door Width = 40"  
F: Door Height = 61 1/2"  
G: Inside Height (Rear) = 66 1/2"  
H: Inside Height (Front) = 61"  
I: Inside Width = 41"  
J: Inside Depth = 15 3/4"

**In the event of a missing or broken piece, simply call the Outdoor Living Today Customer Support Line @ 1-888-658-1658 within 30 days of the delivery of your purchase. It is our commitment to you to courier replacement parts, free of charge, within 10 business days of this notification. Replacement parts will not be provided free of charge after the 30 day grace period.**

# Exploded View and Parts List for 4'x2' Garden Chalet



Not Shown:  
 Interior Door Stop  
 Interior Silver Barrel Bolt  
 Shingle Spacing Template

## Parts List

### Floor Section

- A 1 - Floor Section - 20 1/2" x 45" x 2 1/2"
- B 4 - Floor Legs - 1 1/2" x 3 1/2" x 4"

### Wall Section

- C 2 - Side Walls - 18 1/2" x 62 1/2"
- D 2 - Rear Walls - 22" x 67"
- E 1 - Door Header - 1 1/2" x 2 1/2" x 41" - Dado Cut
- G 2 - Angle Cut Gable Siding Pieces (left / right) - 1/2" x 18 1/2"
- J 2 - Door Panels - 20 1/4 x 61 3/8"
- K 1 - Door Flange - 1/2" x 2 1/2" x 61 3/8"

### Roof Section

- F 1 - Roof Plywood - 5/8" x 21" x 44"
- U 1 Sheet of Roofing Paper
- V, W, X Approximately 30 - 18" Long Cedar Shingles
- Y Approximately 10 - 10" Long Cedar Shingles
- Z 1 - Roof Ridge Cap - 1/2" x 2 1/2" x 47"

### Trim Section

- H 2 - Front Corner Door Trims - 1/2" x 2 1/2" x 65 1/2"
- L 1 - Upper Rear Horizontal Trim - 1/4" x 1" x 43 3/4"
- M 2 - Side Skirting - 1/2" x 3 1/2" x 21"
- N 1 - Rear Skirting - 1/2" x 3 1/2" x 45"
- O 4 - Filler Trim - 1/2" x 2" x 33"
- P 2 - Side / Front Corner Trim - 1/2" x 1 1/2" x 62"
- Q 2 - Side / Rear Corner Trim - 1/2" x 2 1/4" x 66 3/4"
- R 2 - Rear Corner Trim - 1/2" x 1 1/2" x 67"
- S 1 - Center Rear Trim - 1/2" x 1 1/2" x 67"
- T 1 - Front Door Header Trim - 1/2" x 1" x 41"

### Shelf Section

- AA 1 - Vertical Shelf Support - 1 1/2" x 1 1/2" x 36"
- BB 4 - Shelf Supports - 3/4" x 1 1/2" x 17 3/4"
- CC 2 - Shelves - 17 1/2" x 18 7/8"

### Hardware List

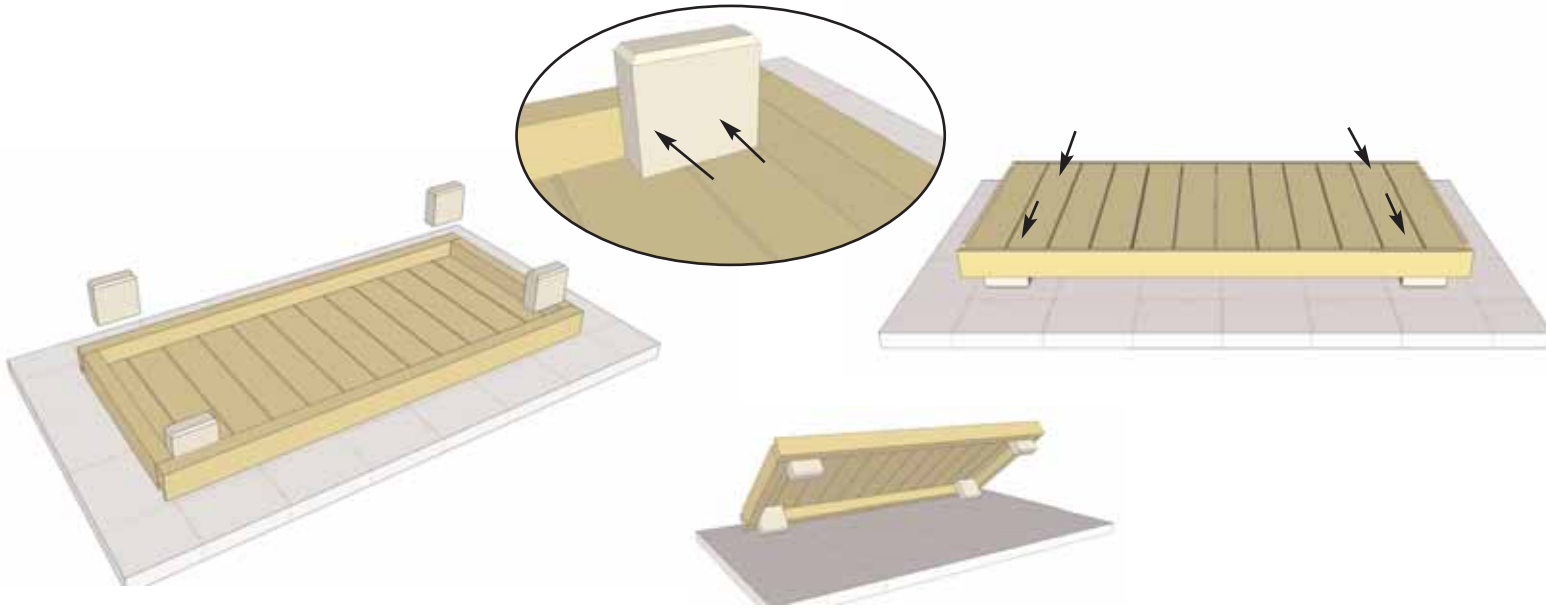
- 1 - Package of Hardware Including:
- 2 1/2" screws, 1 1/4" screws, 1" screws
- 1 1/4" Finishing Nails
- 7/8" Shingle Nails
- 2" Black Hinge Screws for Door Hinge and Door Hinge Trim
- 3/4" Black Hinge/Handle & Barrel Bolt Screws
- 3/4" Silver Screws for Silver Barrel Bolt
- \* Square Drive Screw Bit also included in Hardware Bag.
- I 4 - T-Hinges For Doors
- DD 2 - Pull Handles
- EE 1 - Barrel Bolt

### Miscellaneous (Not Shown on Illustration above)

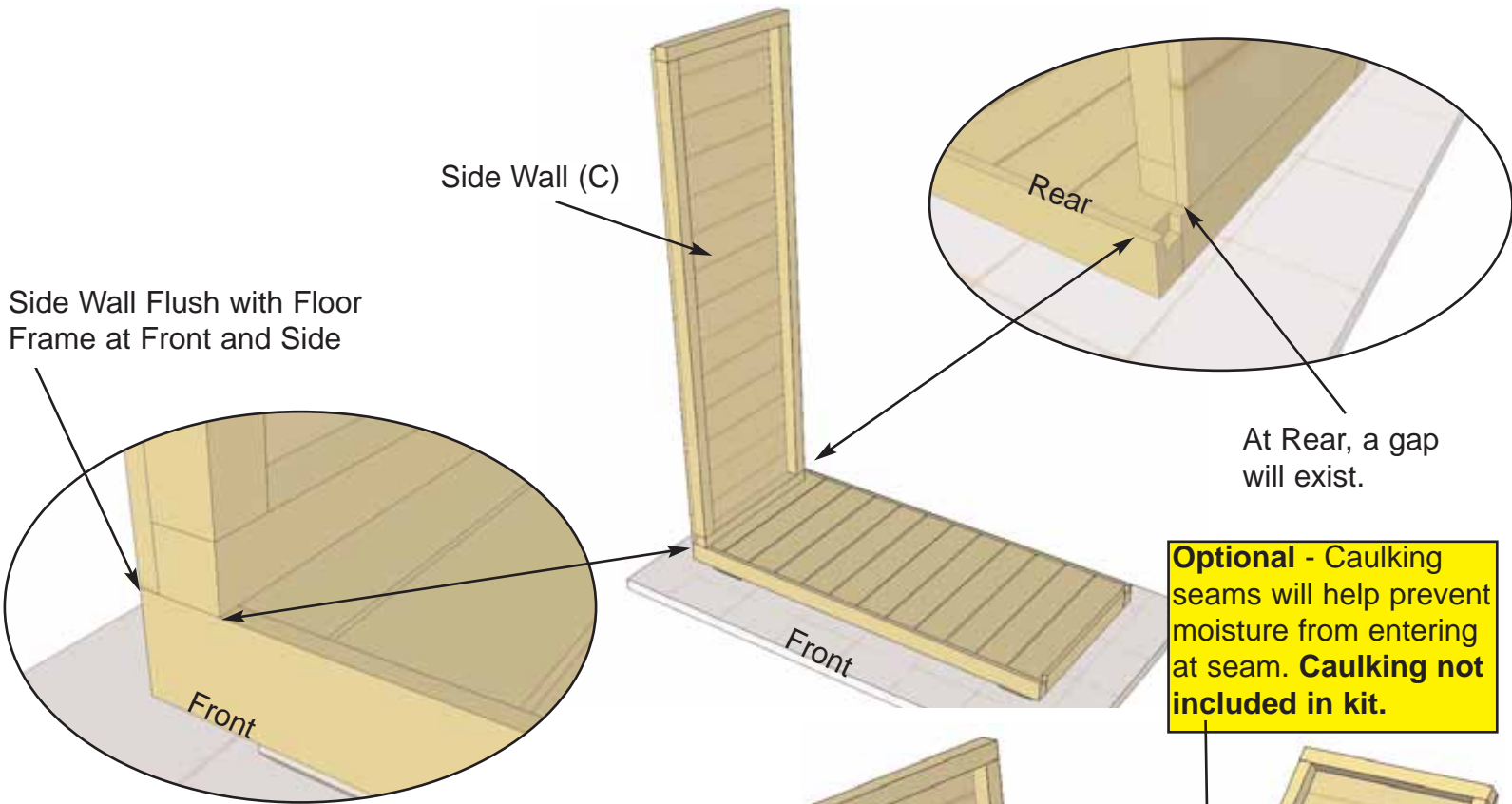
- 1 Interior Door Stop - 3/4" x 1 1/2" x 8"
- 1 Interior Silver Barrel Bolt
- 1 Shingle Spacing Template - 1/8" x 7" x 40"

### You Will Need:

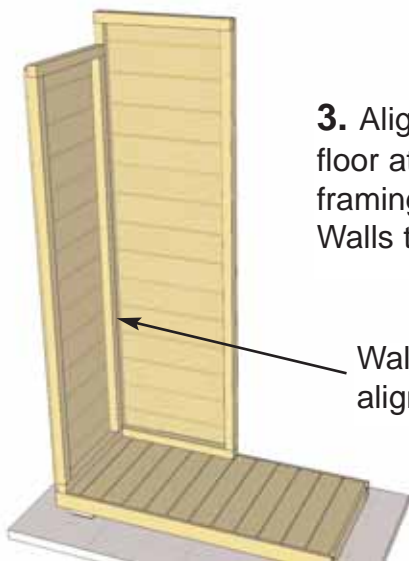
Screw Gun, Drill Bits: 1/8" , 3/8"  
 Tape Measure, Level, Hammer Work Gloves, Safety Glasses,  
 Utility Knife, Step Ladder. **Note:** We recommend you drill a 1/8"  
 pilot hole for each screw, to avoid splitting wood. The hole depth  
 should be equal to 3/4 the length of screw.



**1. Flip Floor (A) over on a level surface. Locate Legs (B) and position in each corner tight to floor and framing and attach with 2- 2 1/2" screws. Complete all Leg attachments. Flip Floor over and complete Leg attachments by screwing 1 - 2 1/2" screws through Floor Boards into each Leg. Level Floor before proceeding to Step 2. You can find the Square Drive Bit for the screws in with the Hardware Kit Bag.**

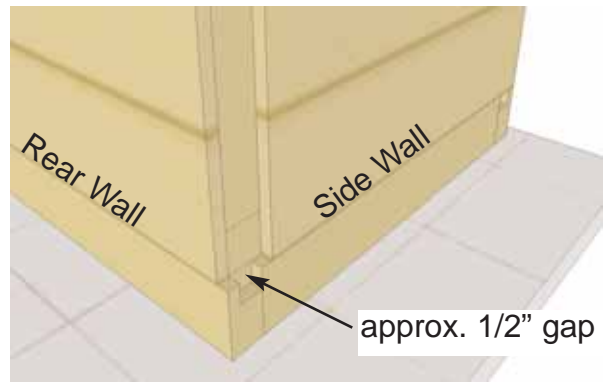


**2. Locate Side Walls (C) and Rear Walls (D). Make sure walls are in correct orientation (Siding cut flush with Wall Framing at bottom). Position Side Wall on Floor so it sits flush with front and side. Have helper hold Side Wall while Rear Wall is positioned on Floor.**  
**Optional - Caulking wall seams will help prevent moisture from entering at seam. Caulking not Included in Kit.**



**3.** Align Rear Wall flush to floor at the back and wall framing of Side and Rear Walls together.

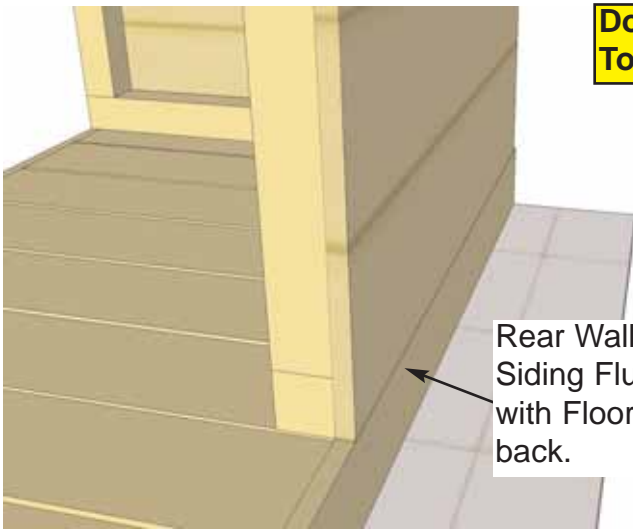
Wall Framing aligned together.



Rear Wall

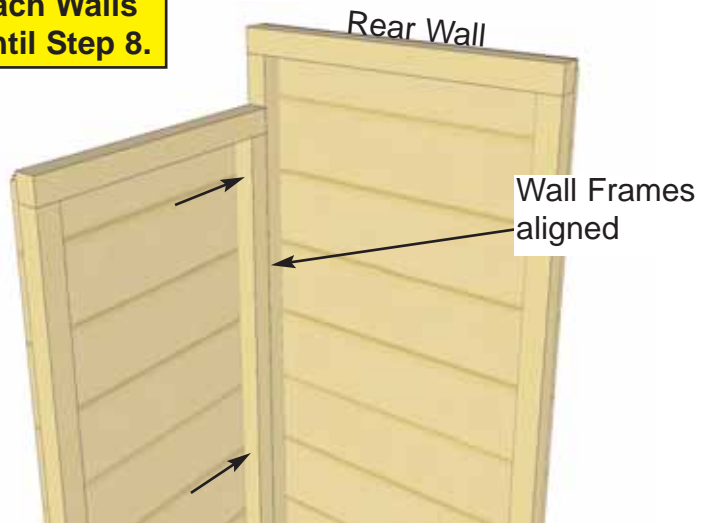
Side Wall

approx. 1/2" gap



Rear Wall Siding Flush with Floor at back.

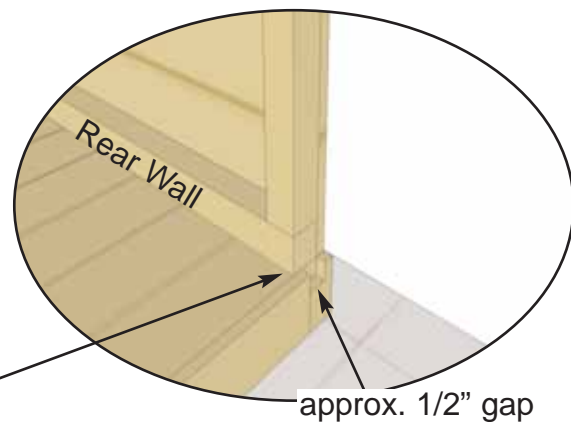
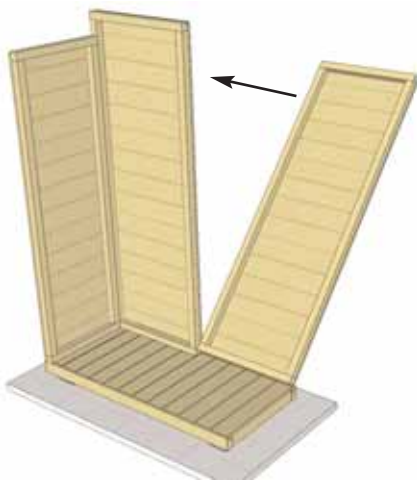
**Do Not Attach Walls To Floor until Step 8.**



Rear Wall

Wall Frames aligned

**4.** With Side and Rear Wall correctly positioned, attach together at top, middle and bottom of vertical wall frames with 3 - 2 1/2" screws.

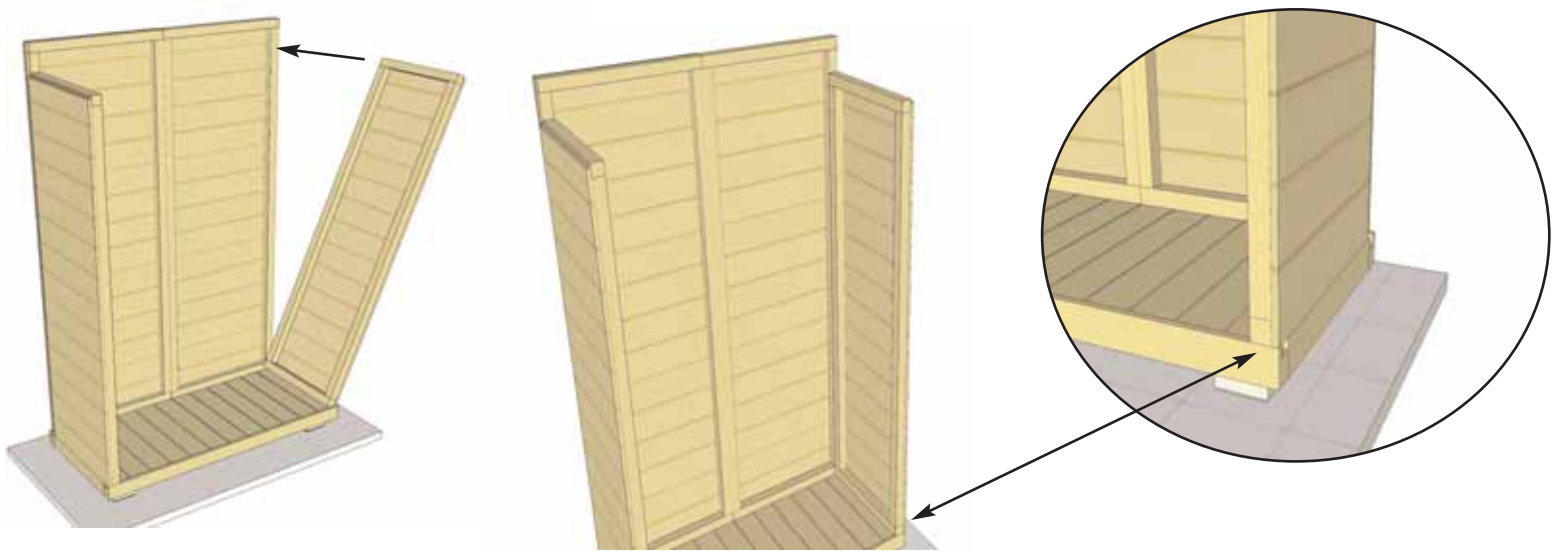


Rear Wall

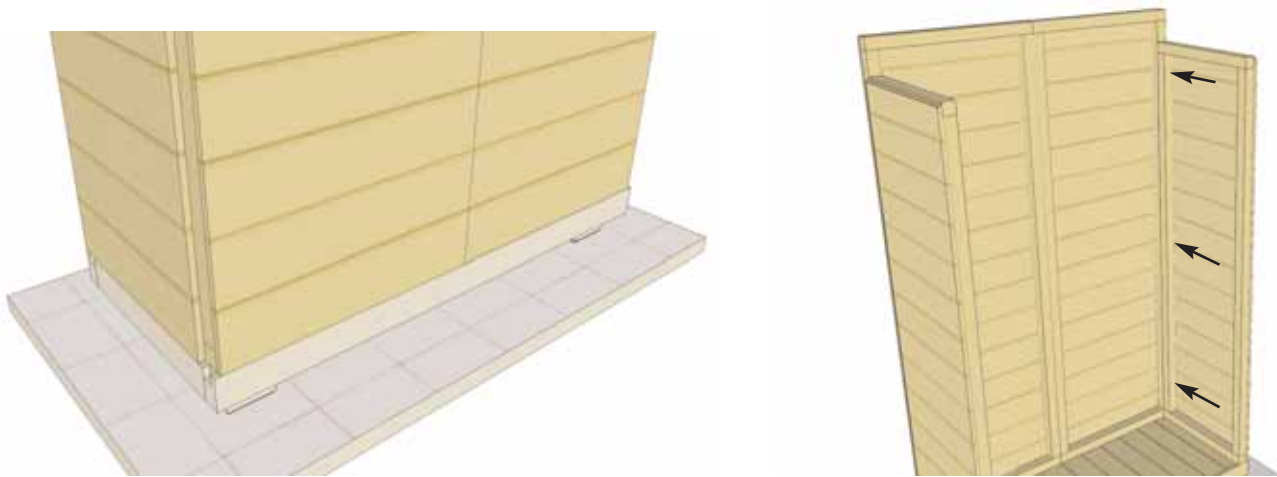
approx. 1/2" gap

**5.** Position 2nd Rear Wall Panel on Floor as per **Step 3 & 4**. Attach wall frames together at top, middle and bottom with 3 - 2 1/2" screws.

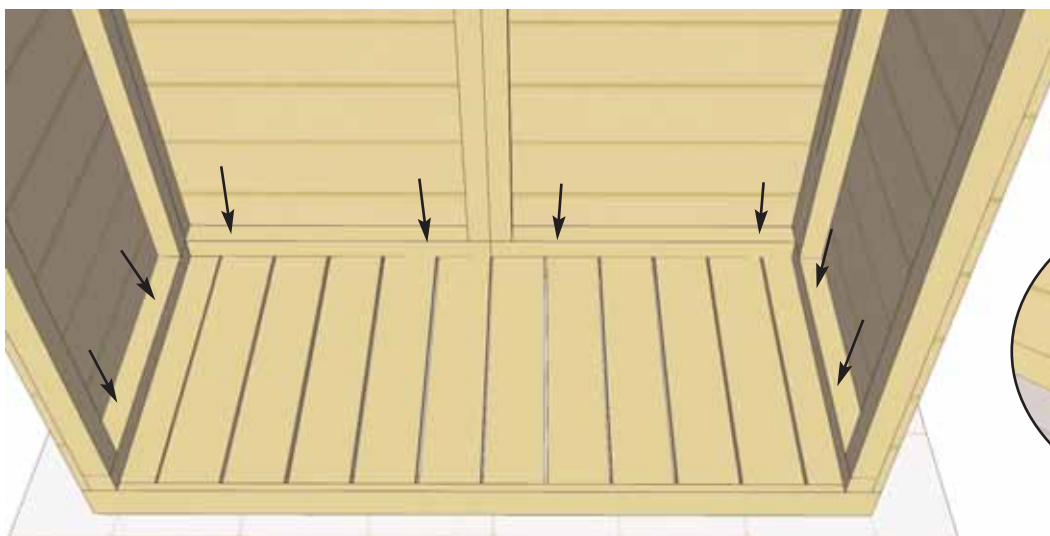




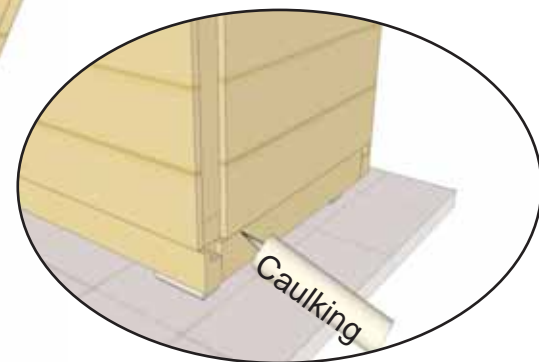
**6.** Position right Side Wall Panel on Floor as per **Step 2-4.**



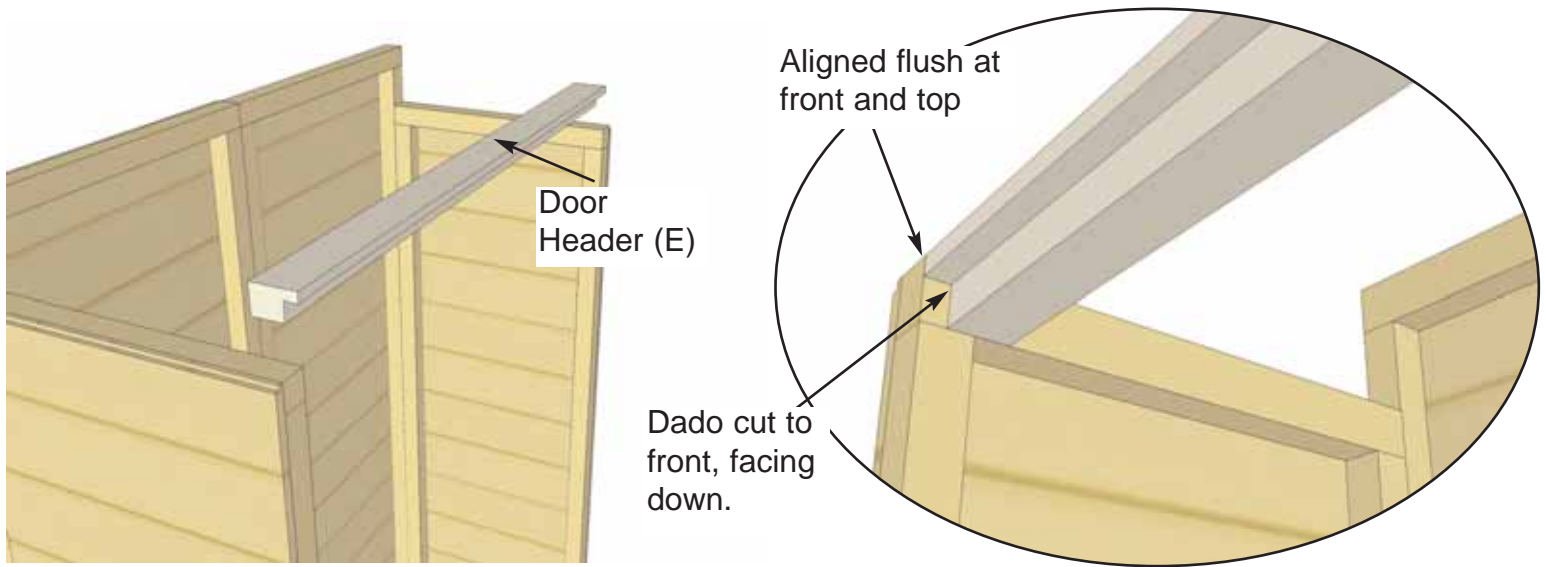
**7.** With Side Wall Panel correctly aligned, attach Rear and Side Wall together at top, middle and bottom of vertical wall frames with 3 - 2 1/2" screws.



**Optional -** Caulking seams will help prevent moisture from entering at seam. **Caulking not included in kit.**

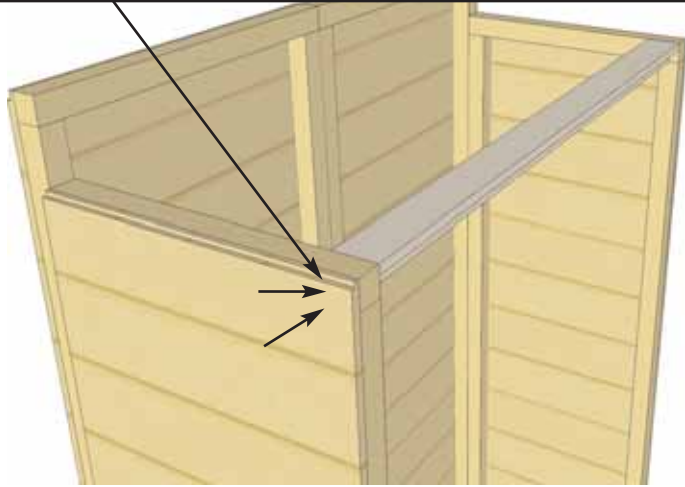


**8.** When all walls are attached together, check alignment with the floor. When positioned correctly, fasten bottom wall framing to floor using 2 - 2 1/2" screws per wall panel.

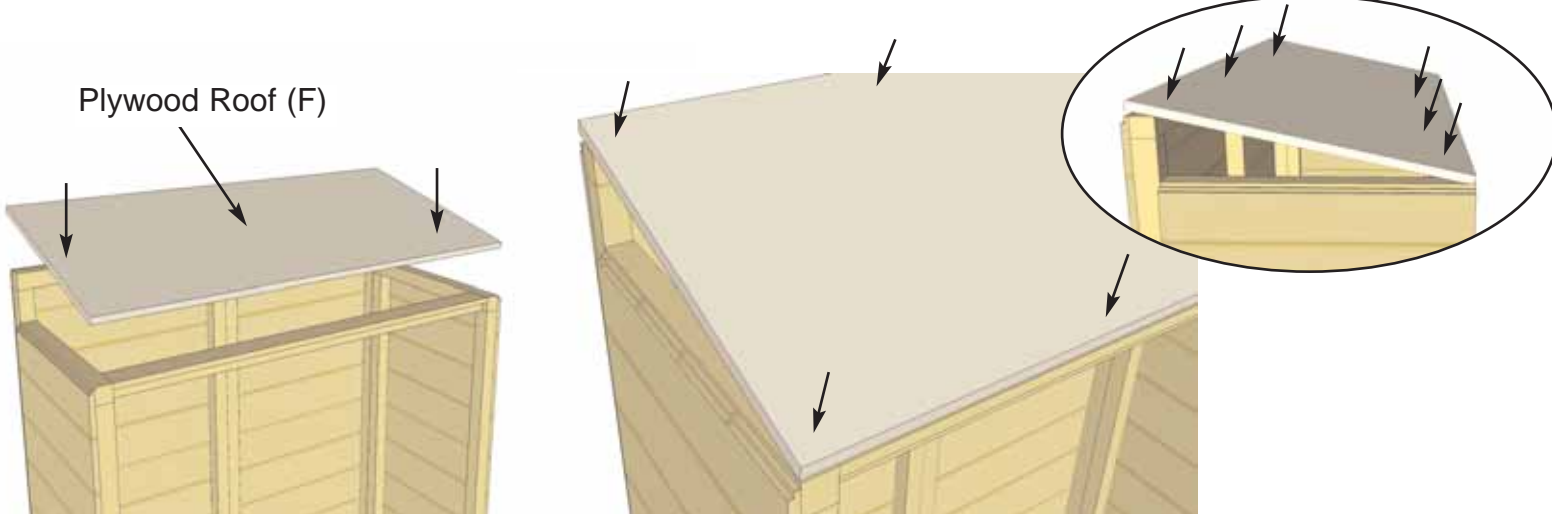


**9.** Locate **Door Header (E)** and place between Side Wall framing with dado cut facing down and to the front.

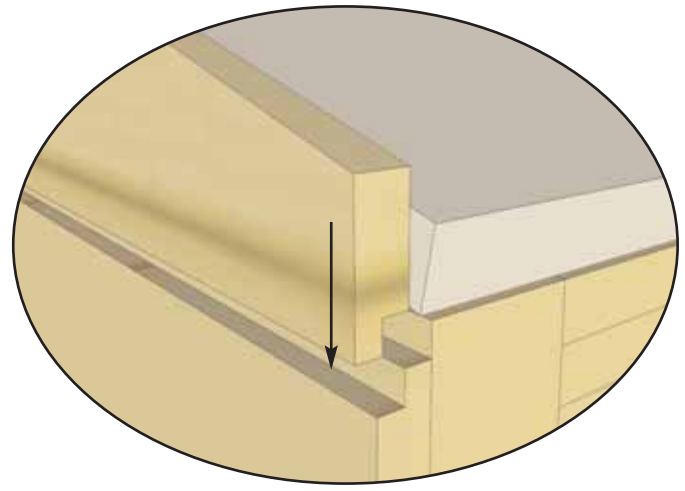
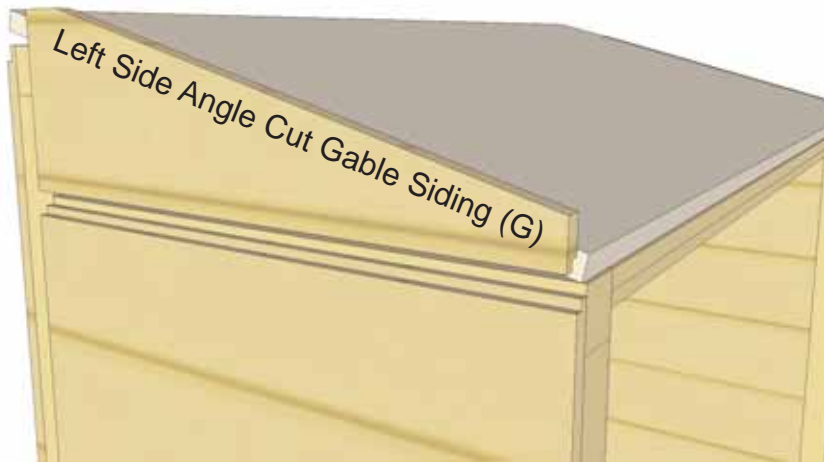
You will want **Front Corner Trim (P)** to cover screws in **Step 24**. Use Trim to confirm screw location.



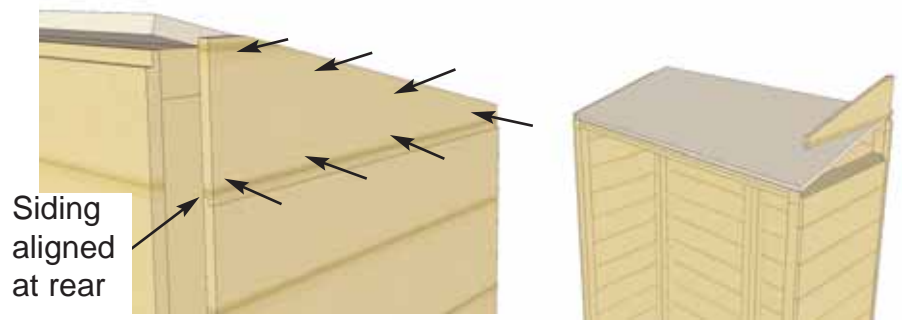
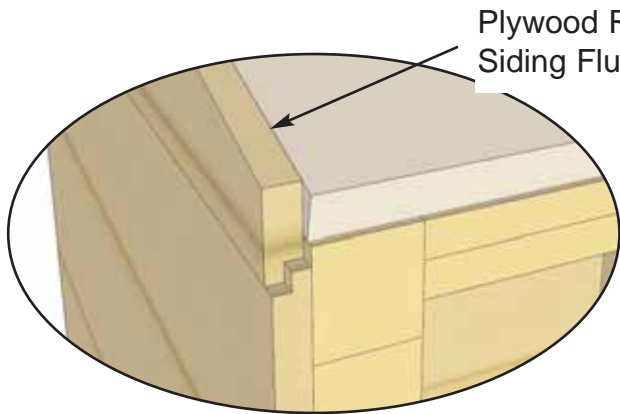
**10.** Prior to attaching Door Header, drill 2 pilot holes with 1/8" drill bit through Side Walls and into the end of Header. Have your helper hold Header and Wall steady. Secure with 2 - 2 1/2" screws per side.



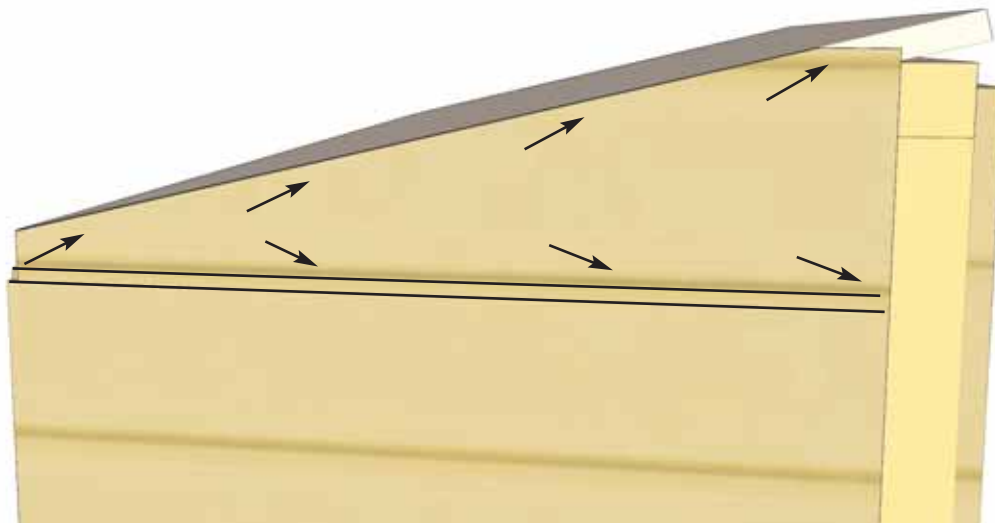
**11.** Place **Plywood Roof (F)** on Wall Framing and Door Header. Align evenly from side to side. At the front, recess Roof slightly. See Step 12 for close up of front Roof alignment. When correctly positioned, screw to framing with 6 - 2" screws. **Note:** Be sure screws do not come through Door Header.



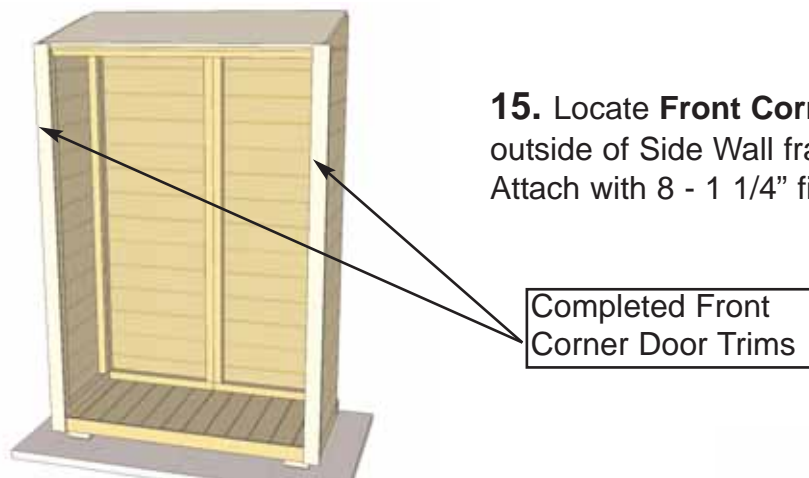
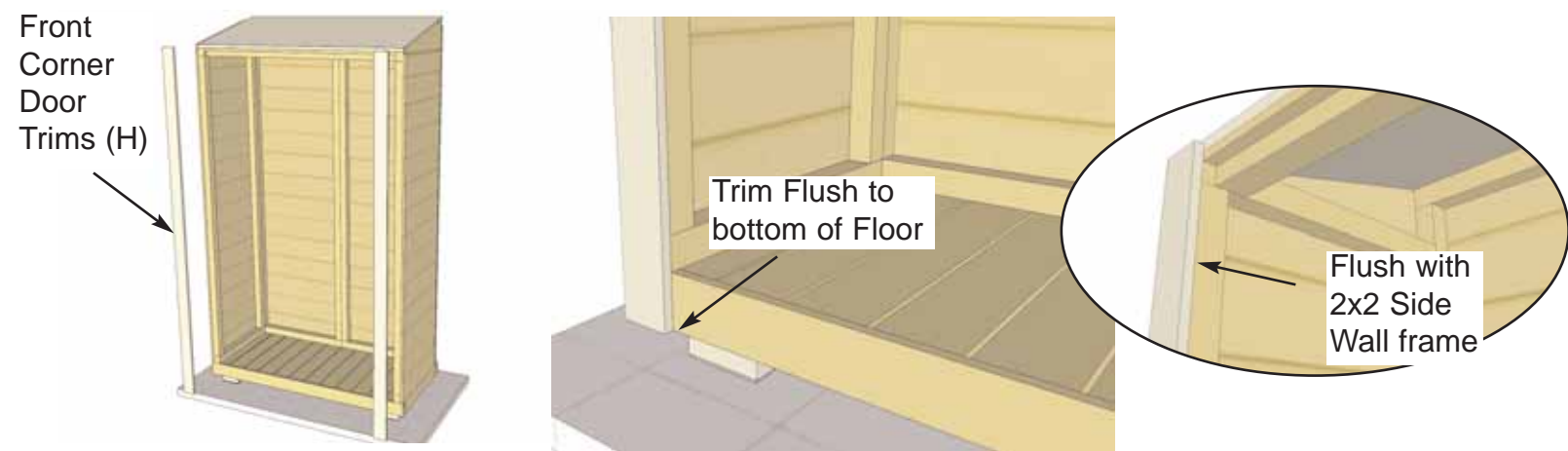
**12.** Locate both **Angle Cut Gable Siding Pieces (G)**. There are left and right side pieces. Starting with the left side, place above Side Wall so lap sidings fit together.



**13.** Align Gable Siding flush at rear with Wall Siding and flush with top of Plywood Roof. Secure with 7 - 1 1/4" finishing nails. Make sure to nail into edge of Plywood Roof at top and into wall framing at bottom. Hammer at slight angle to contact wall framing. Align right side Angle Cut Gable Siding Piece.

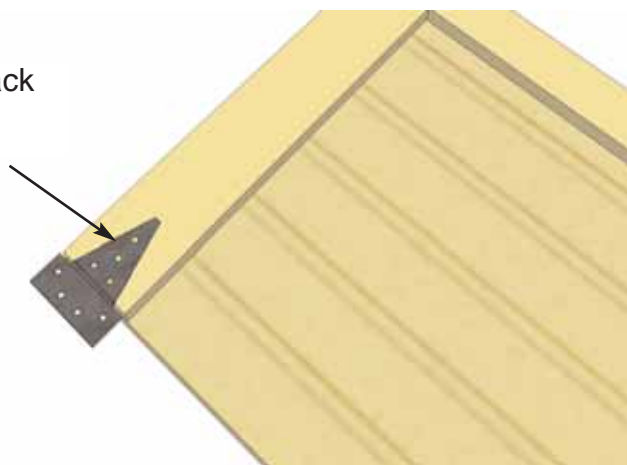


**14.** Complete right side Angle Cut Gable Siding Piece as per **Step 12-13**.



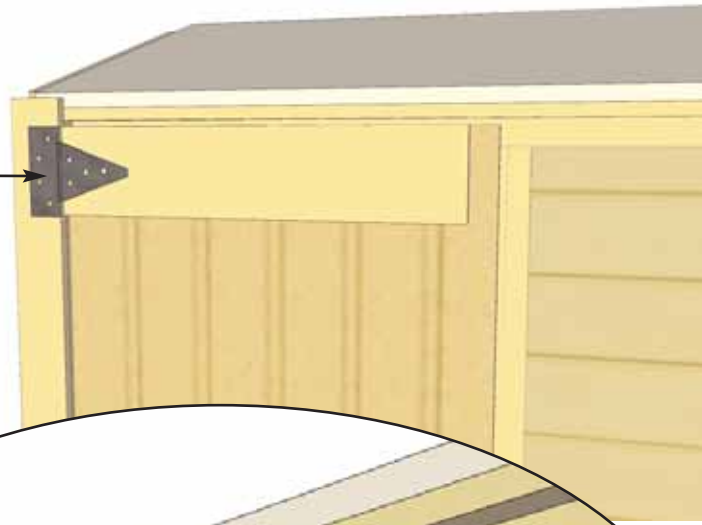
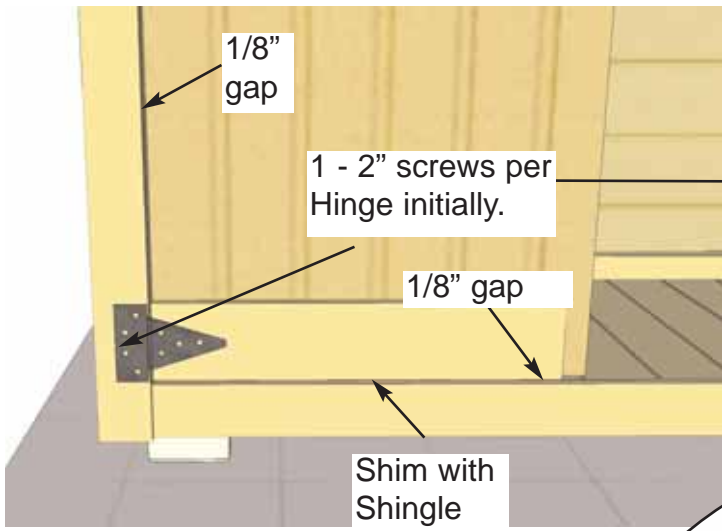
**15.** Locate **Front Corner Door Trims (H)**. Position flush with outside of Side Wall frame 2x2 and flush with bottom of Floor. Attach with 8 - 1 1/4" finishing nails. Complete both sides.

3/4" Black Screws



**16.** Locate **Black T- Hinges (I)**. Attach Hinges to Door Trim of **Door (J)** with 3/4" Black Screws provided in the hardware kit. Drill pilot holes in Door Trim to prevent wood from splitting. Complete both Hinge / Door attachments. Starting with left side Door, lift until Hinges contact Door Trims.

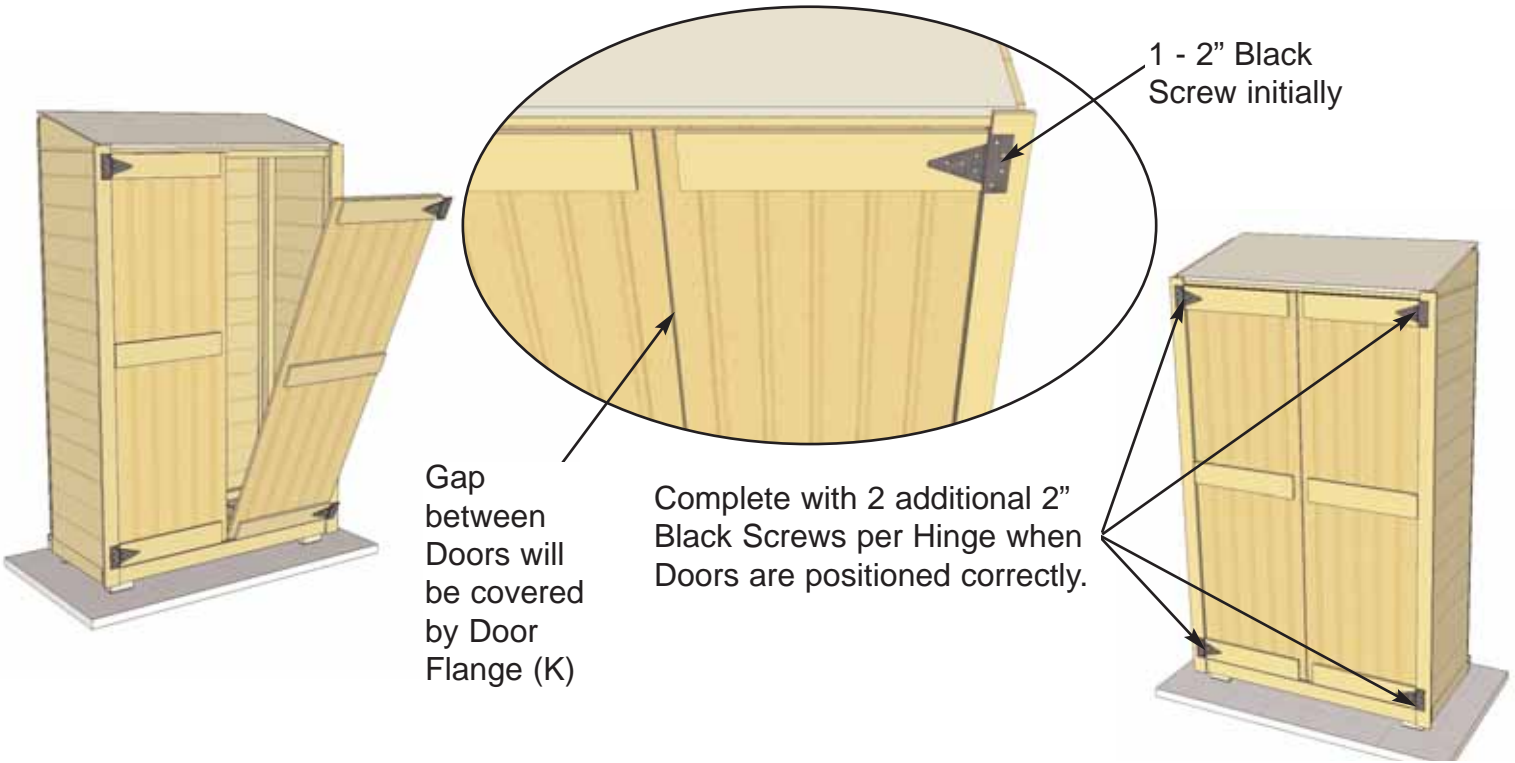
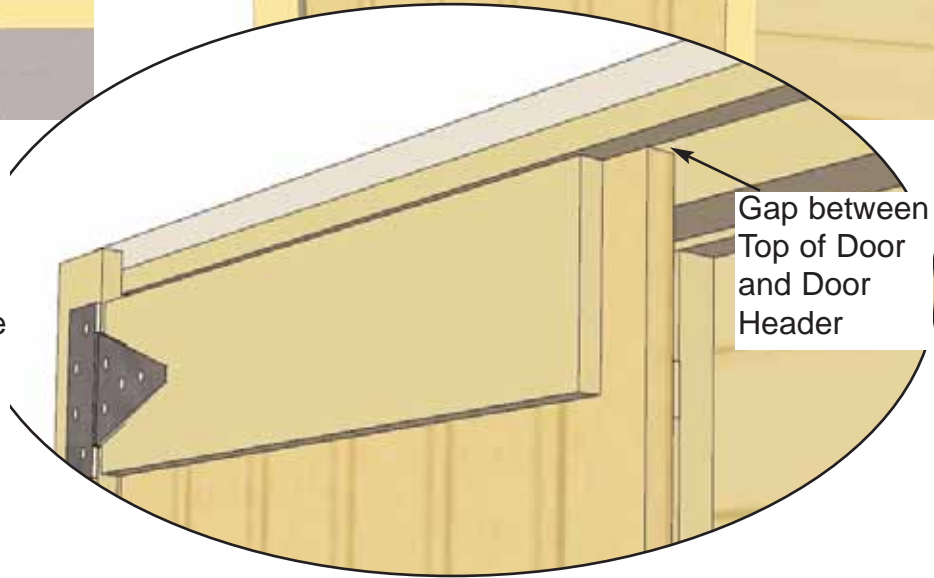




**17.** Leave a gap on left side and bottom of Door approximately 1/8". Use a shingle to shim the door at bottom to help position door evenly.

When door is aligned correctly, screw Hinge into Vertical Door Frame Trim with 2" Black Screws.

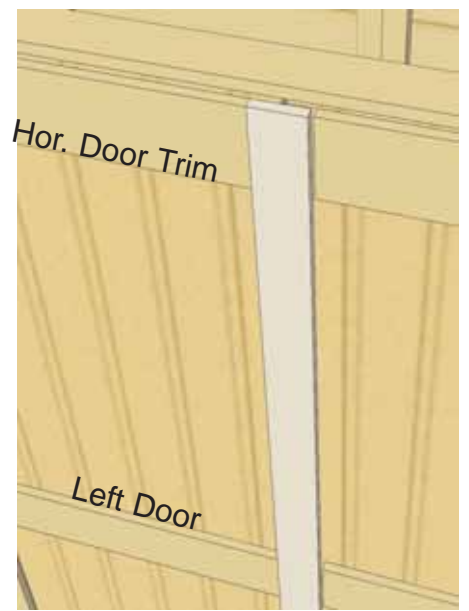
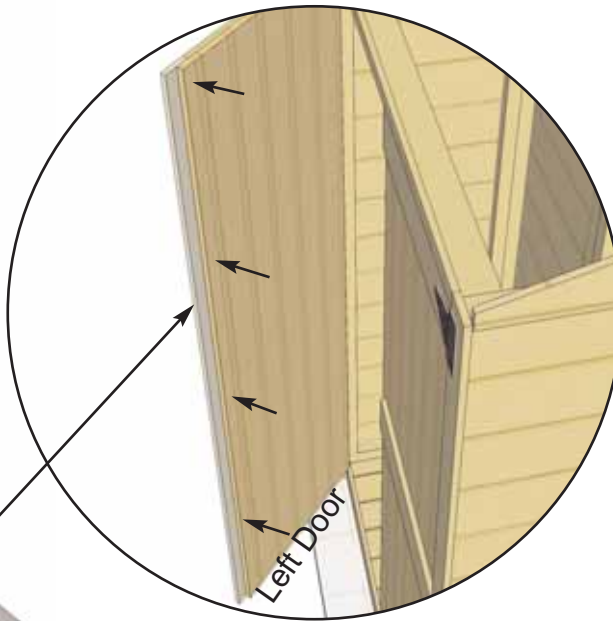
Use only 1 screw initially per hinge until both door alignments are confirmed. Drill pilot holes to prevent wood from splitting.



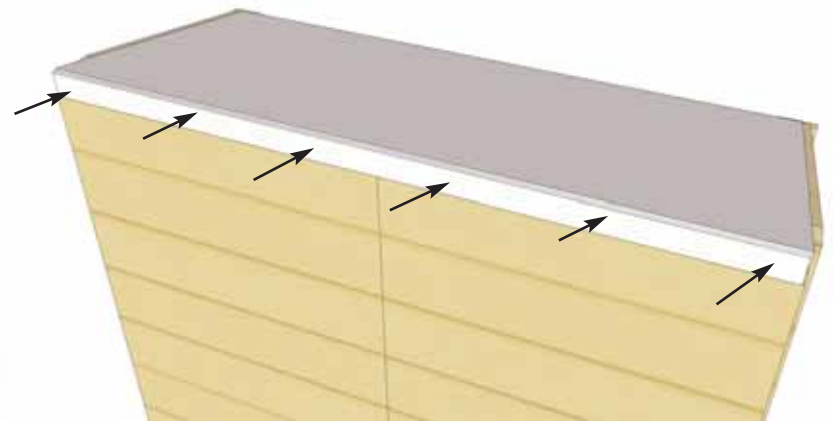
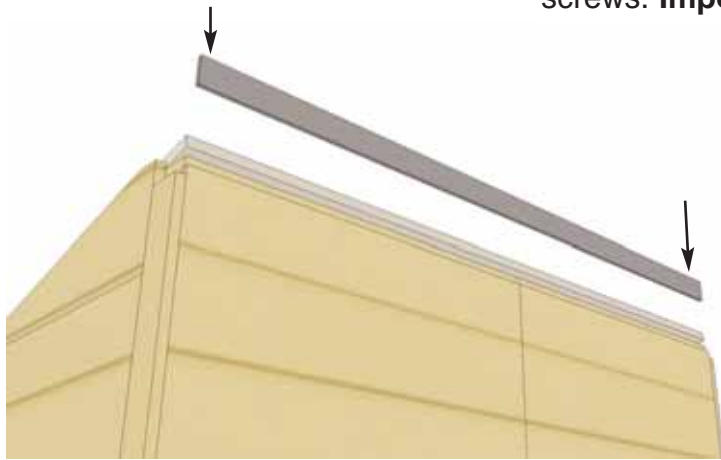
**19.** Position Right Side Door as per **Steps 16-17**. Once again, use only 1 screw per hinge initially to secure Door to Vertical Door Frame Trim. Open and close both Doors to confirm proper Door closing. Re-adjust Door Screws if necessary. When satisfied, complete Hinge attachments with 2 additional 2" Black Screws per Hinge.



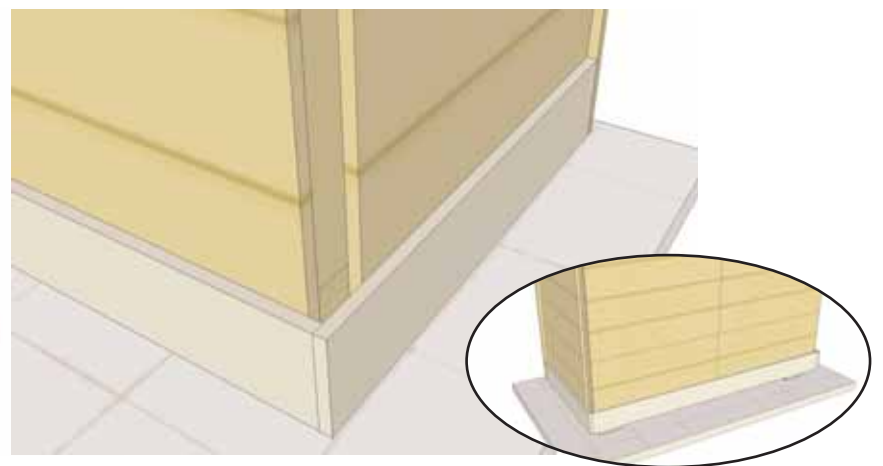
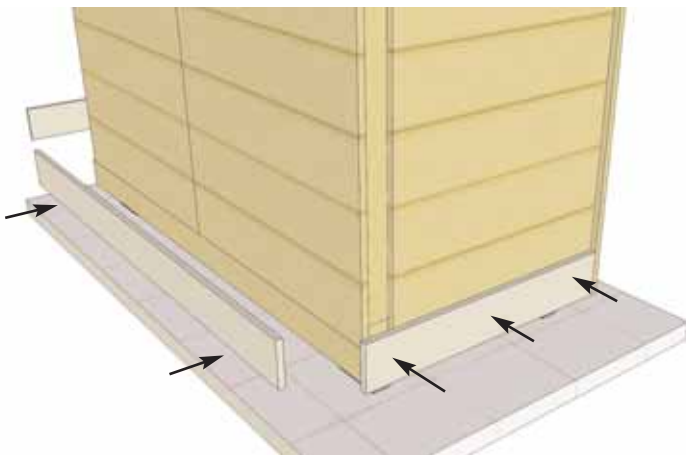
Door Flange (K) to be positioned on Left Door.



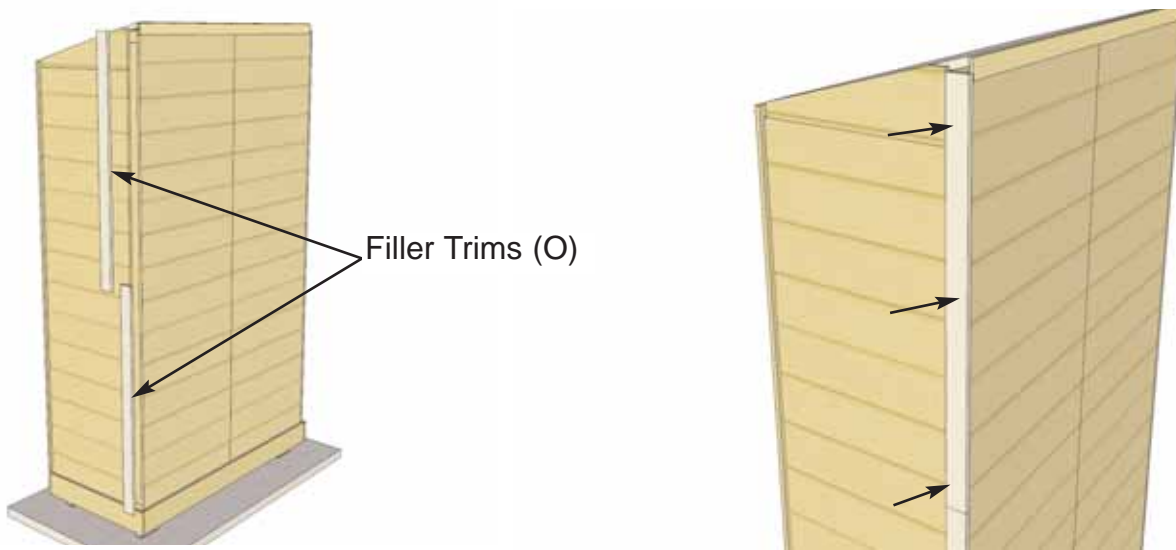
**20.** Open Left Door and position **Door Flange (K)** flush against Horizontal Door Trim making sure also to align evenly at top and bottom of Door Trim. From the inside screw Flange to door with 4 - 1" screws. **Important** - Drill Pilot Holes first to prevent splitting of wood.



**21.** Position **Upper Rear Horizontal Trim (L)** on top lap of Rear Wall Panels evenly from side to side. Nail Trim into Wall Framing and Roof edge with 6 - 1 1/4" finishing nails

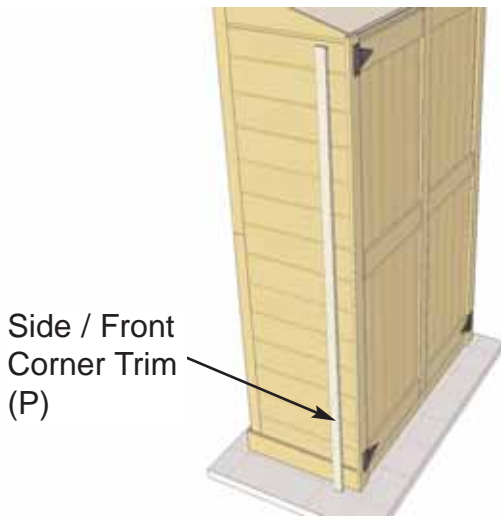


**22.** Locate **Side and Rear Skirting (M & N)** pieces. Starting with the side, position tight to Corner Door Trim and flush with bottom of Floor. Secure with 3 - 1 1/4" Nails per piece. Complete other side. Position Rear Skirting Piece between Side Skirting and secure with 6 - 1 1/4" nails.

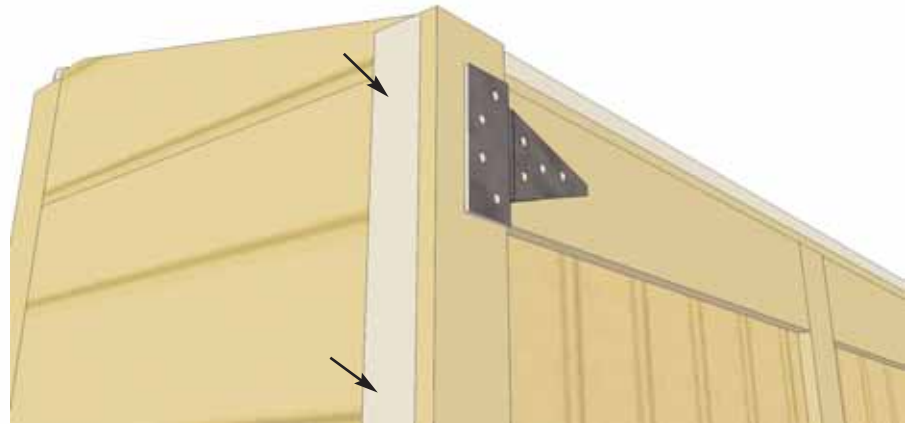


Filler Trims (O)

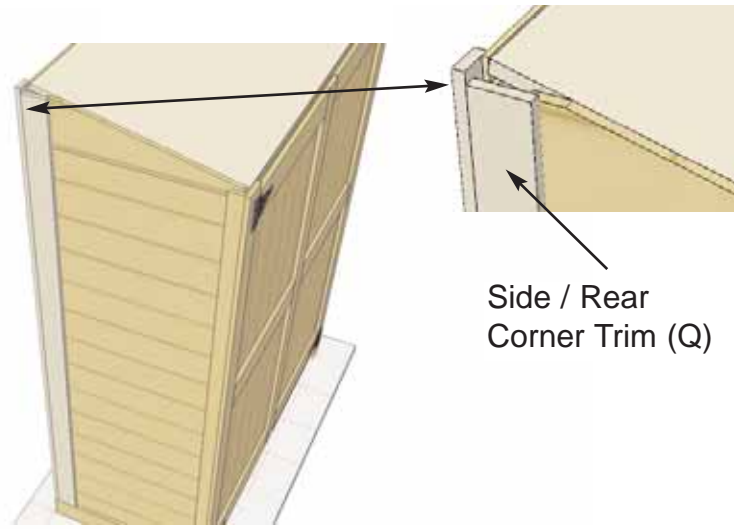
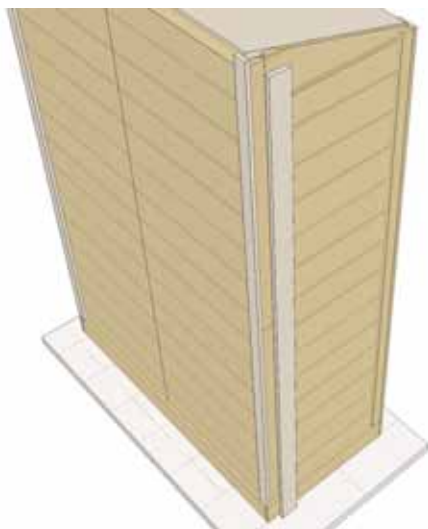
**23. Filler Trims (O)** or nailing strips are positioned in rear side corners. There are 2 Fillers per rear corner. Starting with Lower Trim, position flush to bottom of Side Skirting and nail with 3 - 1 1/4" nails. Place 2nd Filler Trim directly above and secure with 3 - 1 1/4" nails. Complete both sides.



Side / Front  
Corner Trim  
(P)

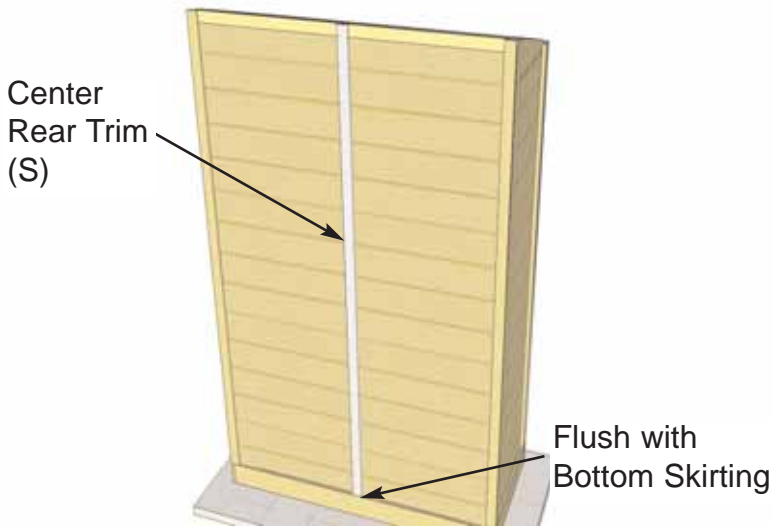


**24. Place Side / Front Corner Trim (P)** tight to Corner Door Trim and flush to top of Skirting at bottom. Nail secure with 6 - 1 1/4" nails. Complete both sides.

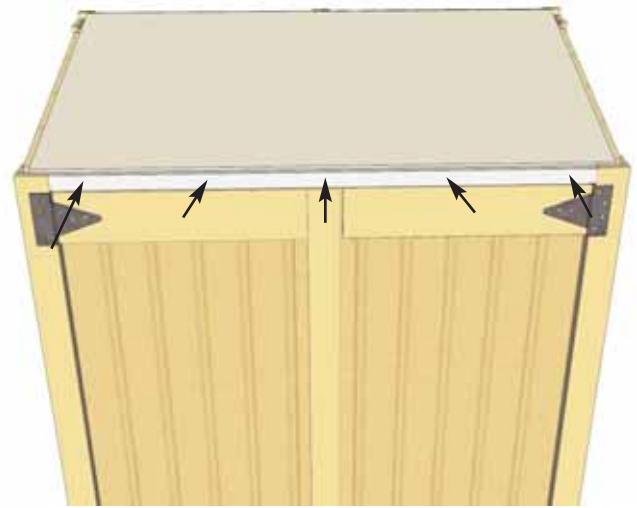
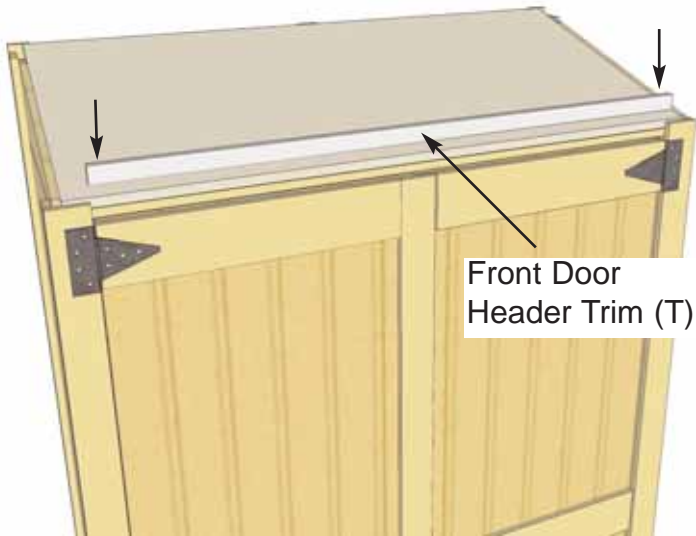


Side / Rear  
Corner Trim (Q)

**25. Locate Side / Rear Corner Trims (Q) and Rear Corner Trims (R).** Position 1 each in rear corner as illustrated above. At bottom, Trims should sit flush with Side and Rear Skirting. When correctly aligned, secure each piece with 8 - 1 1/4" nails.



**26.** Place **Center Rear Trim (S)** over Rear Wall Seam. Trim should sit flush at bottom with Skirting. When correctly aligned, secure with 8 - 1 1/4" nails.

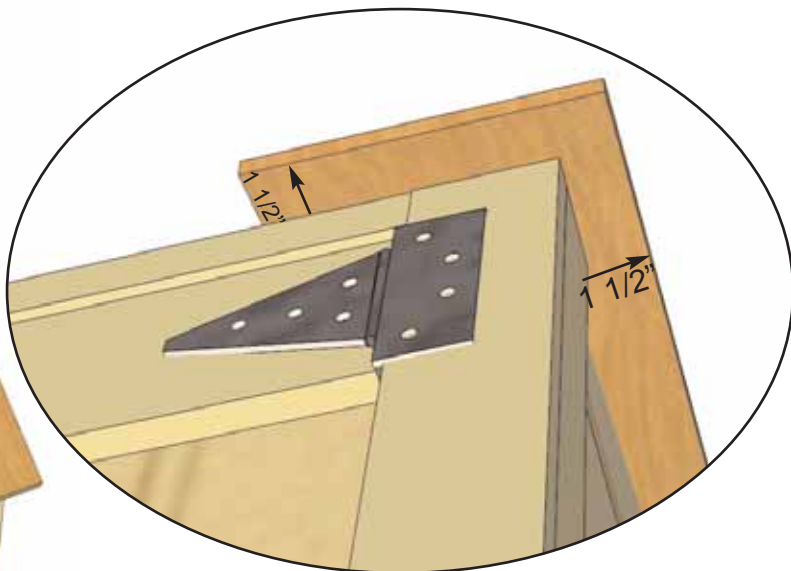
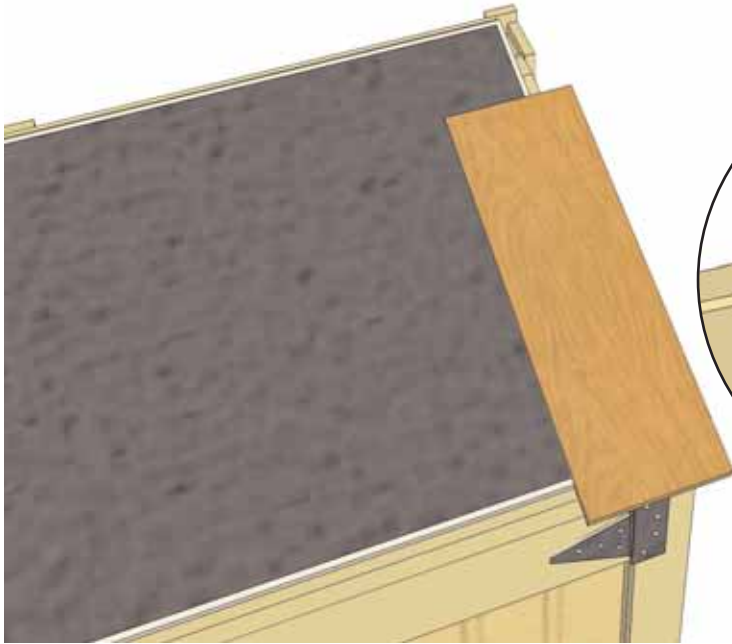


**27.** Locate **Front Door Header Trim (T)** and place between Corner Door Trim flush against Door Header and Plywood Roof. Make sure Door Header Trim is positioned so it does not impede the opening and closing of Doors. When correctly positioned, secure with 5 - 1 1/4 nails.



**28.** Unfold Sheet of **Roofing Paper (U)**. Place on Plywood Roof evenly and nail down with 4 - 7/8" nails. Position nails to penetrate through Plywood Roof into wall framing.

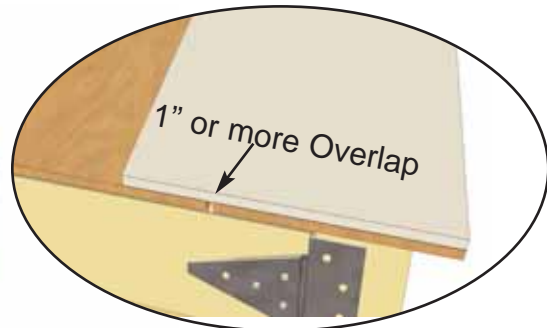




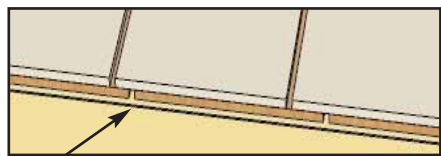
**29.** Locate all **18" Long Shingles (V, W & X)**. Sort through Shingles and pick out approximately 10 Undercourse Shingles (lower grade). Align first Undercourse Shingle on front corner to overhang the Front Door Header Trim and Front / Side Corner Trim by 1 1/2".



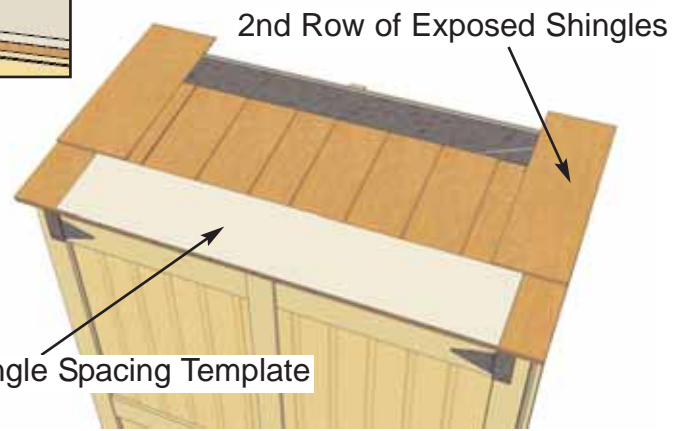
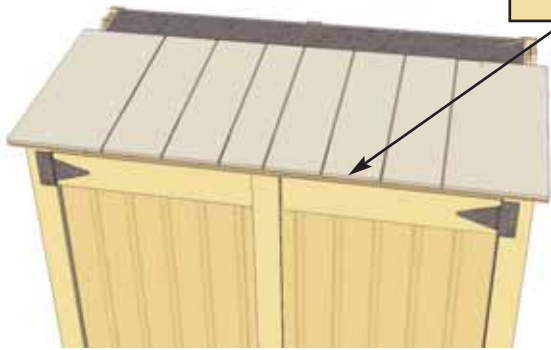
**30.** When first Undercourse Shingle is correctly aligned, nail down to Plywood Roof with 2 - 7/8" shingle nails 2 1/2" from front edge. Position and secure other corner Undercourse Shingle. Space remaining Undercourse Shingles out leaving an 1/8" to 3/8" gap between each Shingle.



**31.** With Undercourse Shingles spaced correctly from side to side and overhanging the Front Door Header Trim by 1 1/2", secure each Shingle with 2 - 7/8" nails. Place 1st exposed row of outside Shingles directly on top of Undercourse Shingles. Choose shingles that overlap the gap between Undercourse by 1" or more. Secure each Shingle with 2 - 7/8" Shingle Nails 8" from bottom.



Choose Shingles that Overlap

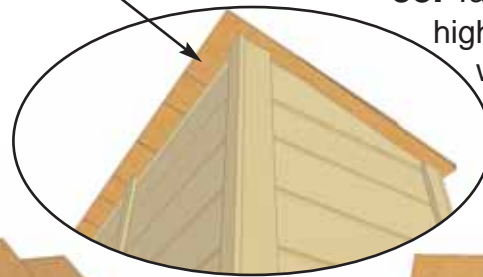


2nd Row of Exposed Shingles

Shingle Spacing Template

**32.** Choose remaining 1st exposed Shingles and place on top of Undercourse Shingles. Position and secure as per **Step 31**.

Overhanging at Rear



**33.** Tack **Shingle Spacing Template** (7" high) with 2 - 7/8" shingle nails flush with front of shingles. Position and attach 2nd exposed row of outside Shingles as per **Step 31**. Butt Shingles to Spacer.



Shingle Spacing Template

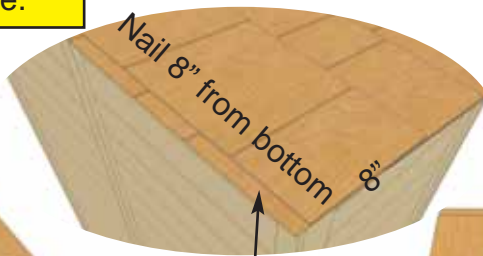
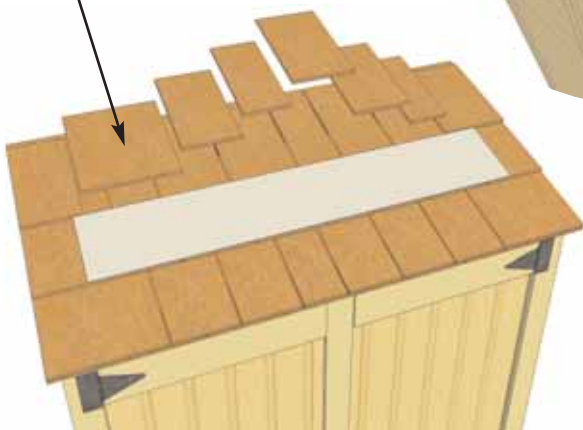


Nail 8" from bottom of shingles

**Note;** on last row of shingles, it may be necessary to score a shingle lengthwise to fit with Utility Knife.

**34.** Position and secure remaining 2nd row of exposed shingles as per **Steps 31-32**.

10" Long Shingles (Y)



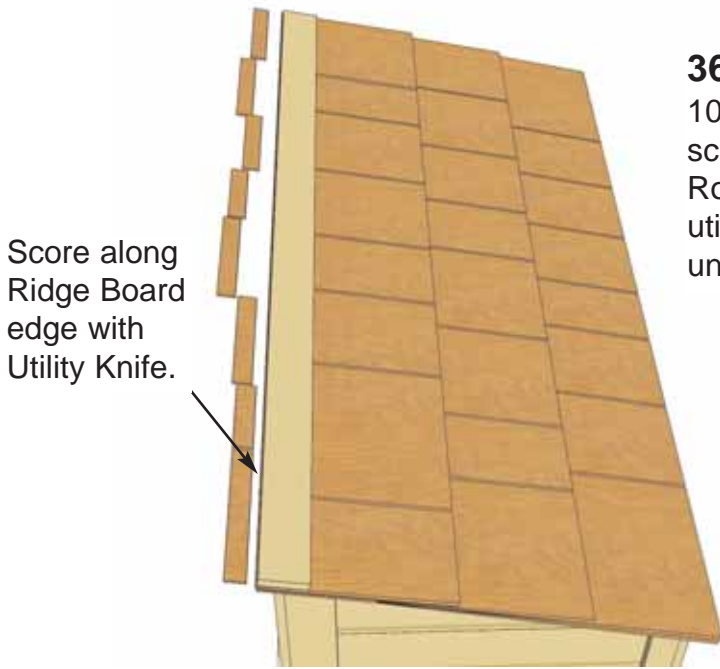
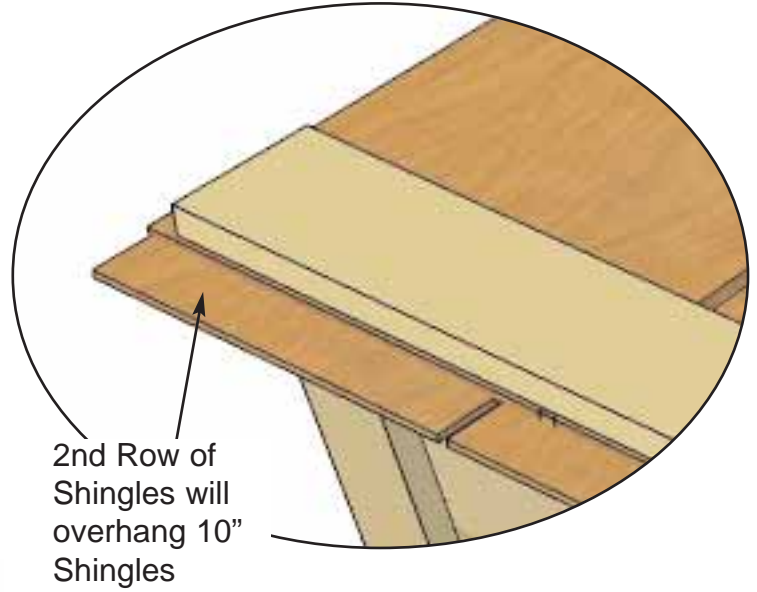
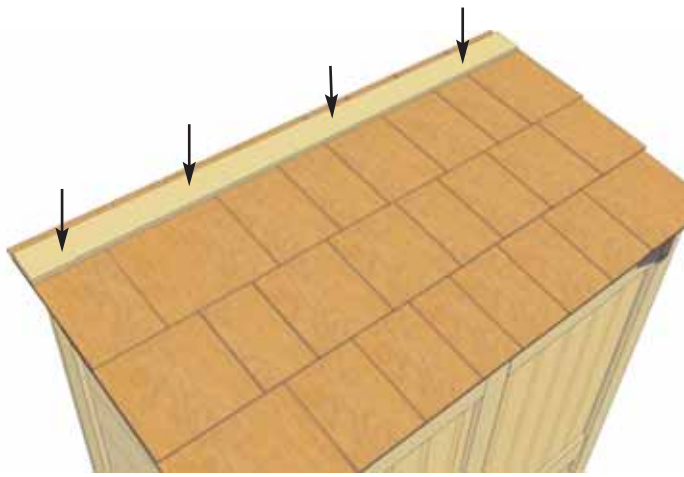
Nail 8" from bottom

2nd Row of Shingles will overhang 10" Shingles

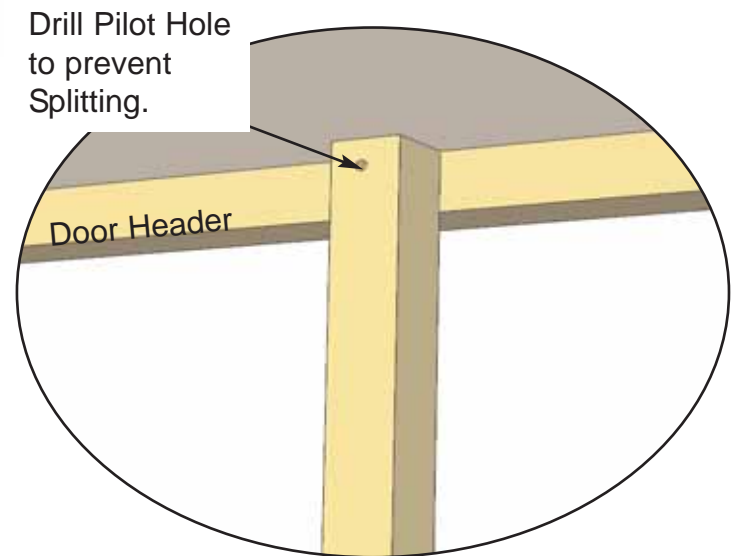
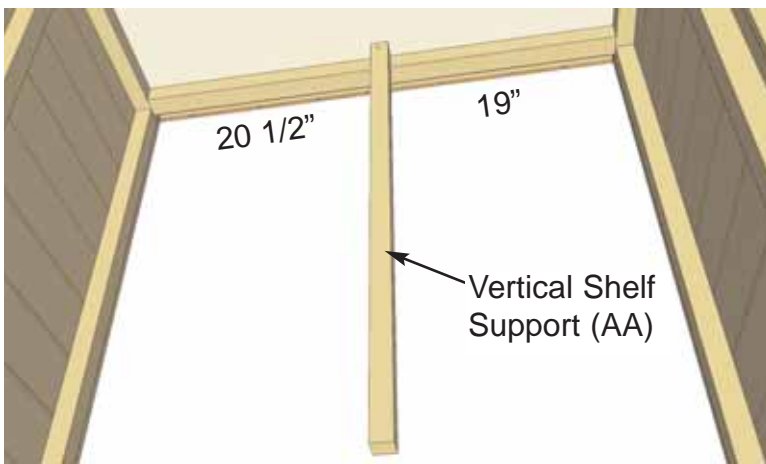


Nail 8" from bottom

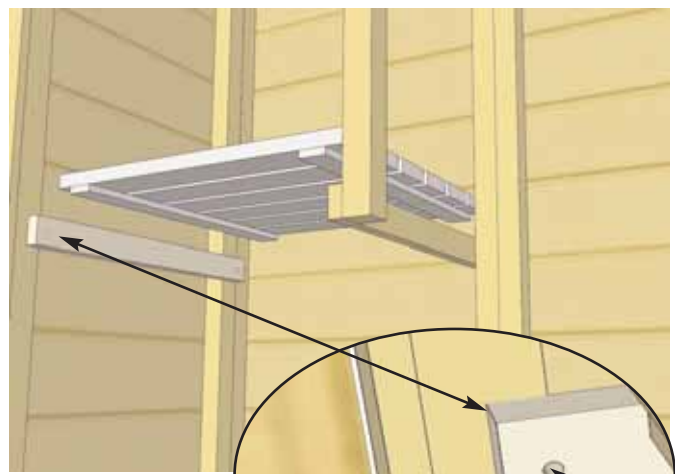
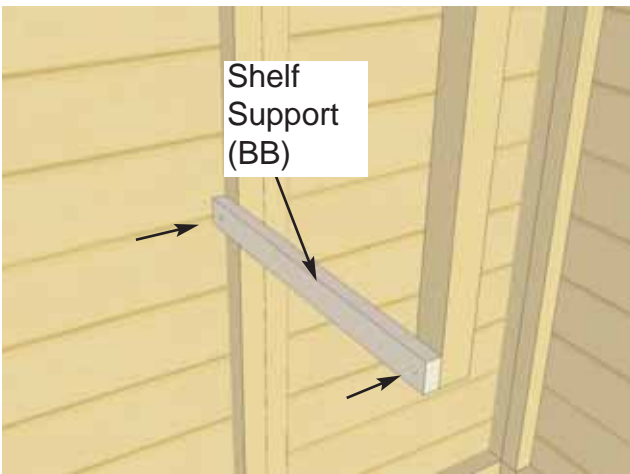
**35.** Re-position Shingle Spacing Template as per **Step 33**. Locate **10" Long Cedar Shingles (Y)** and position and attach as per **Steps 31-34**.



**36.** Position **Roof Ridge Cap (Y)** flush with end of the 10" Shingles. Secure with 4 - 2 1/2" screws. Be sure to screw into Rear Wall framing. Overhanging tips of 2nd Row Shingles will need to be cut or "scored" off. Use a utility knife and score along the edge of the Ridge Cap until Shingles tips break off.

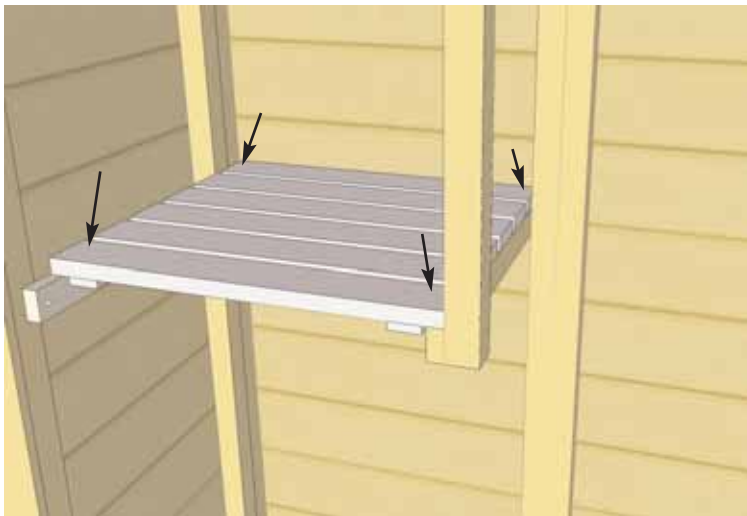


**37.** Shelving may be mounted on Left or Right Side of Chalet. This Assembly Manual illustrates the Shelving being mounted on the Left Side. First, locate the **Vertical Shelf Support (AA)**. Measure 19" from Left Side Wall Framing from the inside. Mark position on Door Header. Drill Pilot Hole near end of Shelf Support to prevent splitting and attach to Door Header with 1 - 2 1/2" screw.

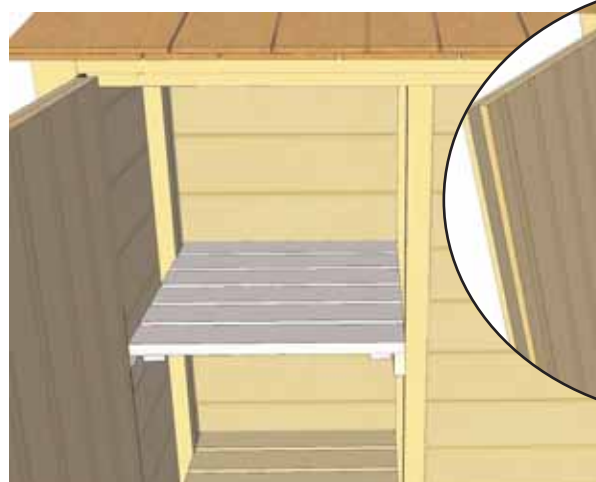


**38.** Locate 1 **Shelf Support (BB)** and position on Vertical Shelf Support and Rear Wall framing. Drill pilot hole in Shelf Support to prevent splitting and attach with 1 - 1 1/4" screw on each end.  
**Note** - Make sure Shelf Support is level prior to attaching. Attach 2nd Shelf Support to Side Wall framing as described above. Place **Shelf (CC)** on top of Shelf Supports.

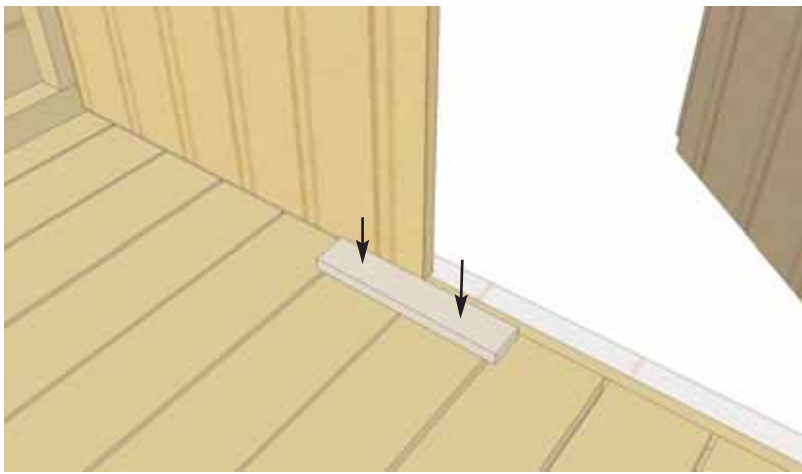
Positioned 3/4" on Side Wall framing. Drill pilot hole on angle before screwing.



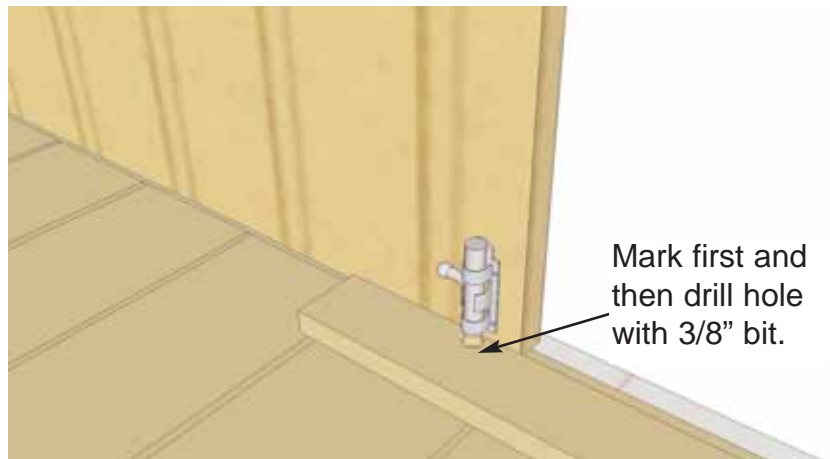
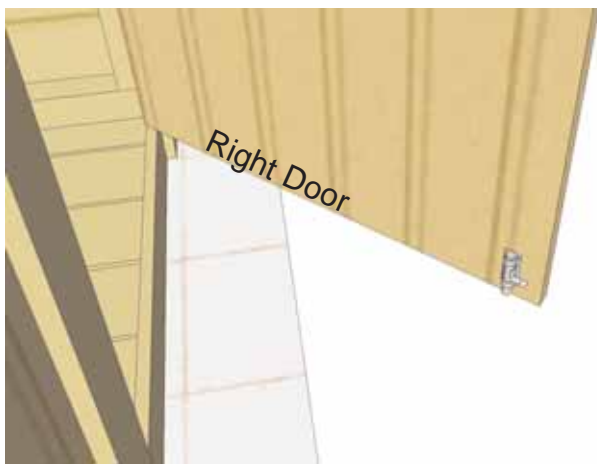
**39.** Secure Shelf to Shelf Supports with 4 - 1 1/4" screws. Drill pilot holes to prevent wood from splitting.



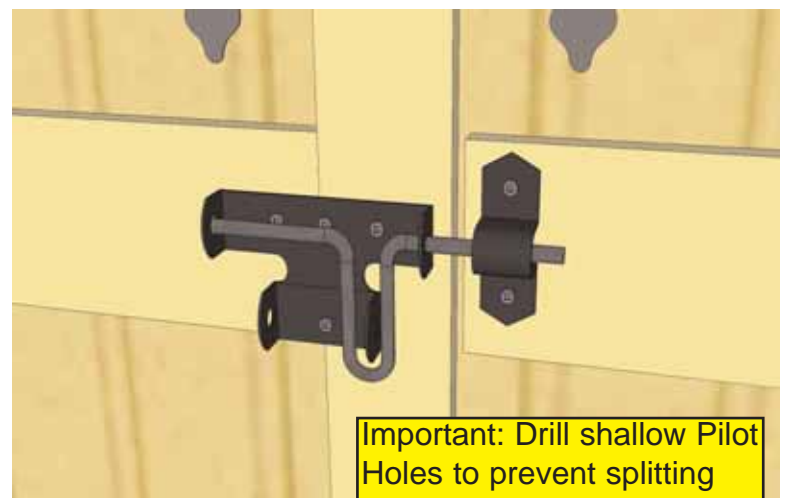
**40.** Complete positioning and attachment of 2nd Shelf as per **Step 38-39.**



**41.** Attach **Interior Door Stop** to Floor with 2 - 1 1/4" screws. To align correctly, close Doors in best close Door position. Mark and attach. Drill pilot holes to prevent splitting.



**42.** Install the smaller **Interior Silver Barrel Bolt** on right Door. Use 3/4" Silver screws supplied in Hardware Package. Tap barrel on Interior Door Stop to mark location. Open Door and Drill with a 3/8" bit.



**43.** Attach **Door Handles (DD)**. Handles are positioned on top section of each door and mounted with 3/4" Black Screws. Attach **Black Barrel Bolt (EE)** as illustrated above with 3/4" Black Screws. Note how female part of Barrel Bolt is positioned higher than male. Do a dry run first to position Barrel Bolt correctly. **Important** - Drill pilot holes with 1/8" drill bit prior to securing with screws to prevent wood splitting.



**Congratulations on building  
your 4x2 Garden Chalet!**

We hope your experience constructing our 4x2 **Garden Chalet** has been both positive and rewarding.

We value your feedback and would like to hear back from you on how well we are doing in the following areas:

- 1. Customer Service**
- 2. On Time Shipping**
- 3. Freight Delivery**
- 4. Quality of Materials**
- 5. Assembly Manual**
- 6. Overall Satisfaction.**

Please call, write or email us at:

**Outdoor Living Today Partnership  
P.O. Box 96  
Sumas, Washington  
98295**

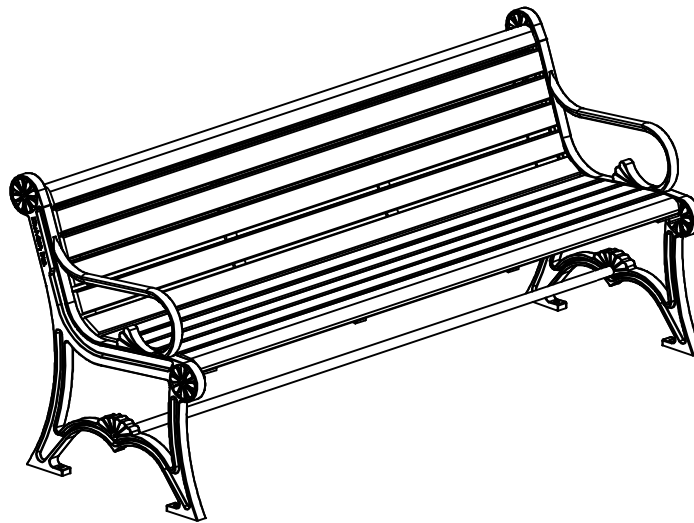
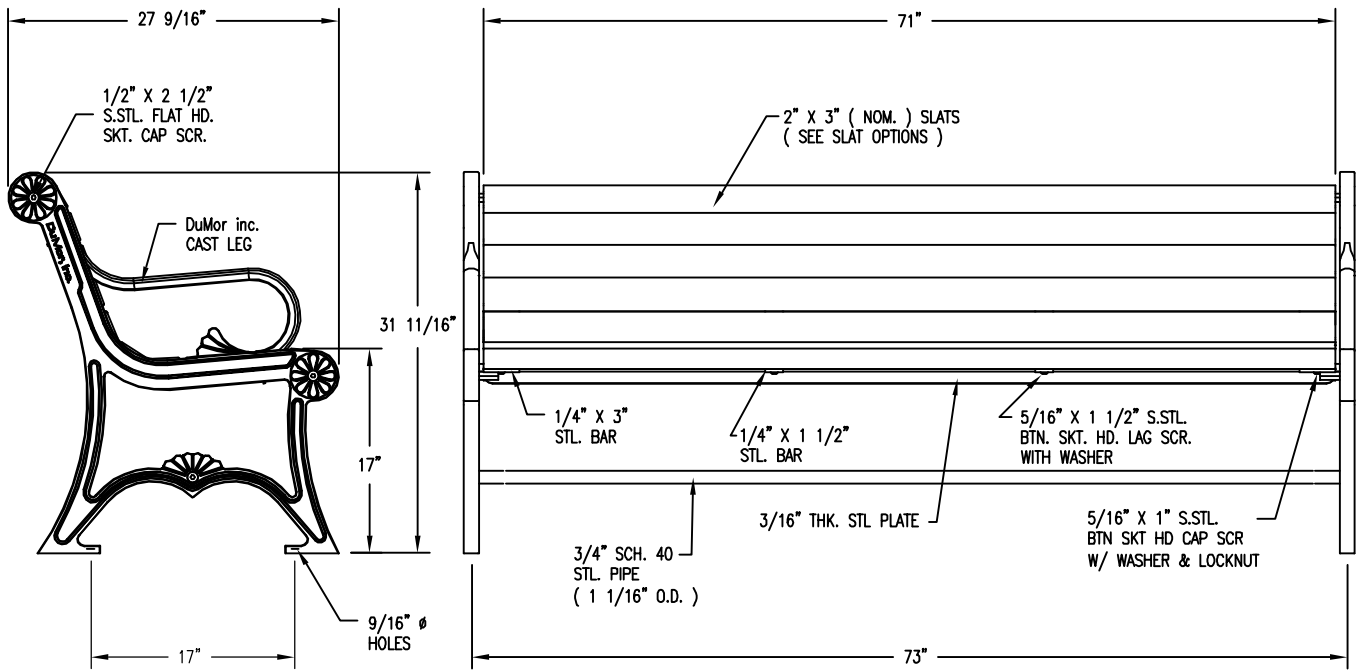


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## SITE FURNISHINGS







CUSTOM LETTERING ( 37 SPACES ) \_\_\_\_\_

**NOTES**

- 1.) ALL STL. MEMBERS COATED W/ ZINC RICH EPOXY THEN FINISHED W/ POLYESTER POWDER COATING.
- 2.) 1/2" X 3 3/4" EXPANSION ANCHOR BOLTS PROVIDED.
- 3.) CUSTOM LETTERING AVAILABLE FOR RECESSED SIDE PANELS ( TOTAL OF 37 SPACES ).

**SLAT OPTIONS**

- "CEDAR" RECYCLED PLASTIC
- "GREY" RECYCLED PLASTIC
- "REDWOOD" RECYCLED PLASTIC
- "WALNUT" RECYCLED PLASTIC
- OTHER \_\_\_\_\_



**DuMor, inc.**  
P.O. Box 142 Mifflintown, PA 17059-0142

SCALE : NONE  
DATE DRAWN : 12/11/01  
DRAWN BY : AH  
DATE REV. : 10/25/11  
REV. BY : RDH

TITLE : BENCH

REV. E

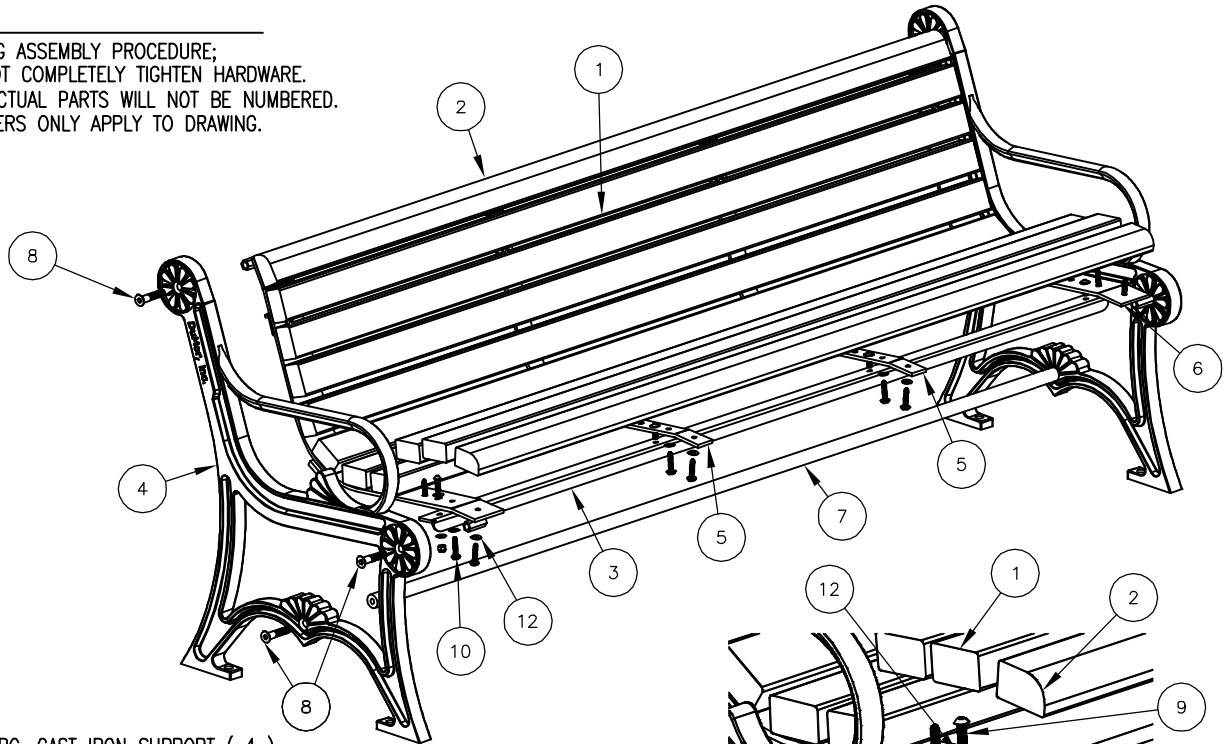
DRAWING NUMBER

57-60PL

SHEET 1 OF 2

**NOTE:**

- 1.) DURING ASSEMBLY PROCEDURE;  
DO NOT COMPLETELY TIGHTEN HARDWARE.
- 2.) THE ACTUAL PARTS WILL NOT BE NUMBERED.  
NUMBERS ONLY APPLY TO DRAWING.



**STEP 1:**

- USE 2 - PC. CAST IRON SUPPORT ( 4 )  
 1 - PC. 71 3/4" PIPE BRACE ( 7 )  
 2 - PCS. 1/2" X 2 1/2" FLT. SKT. HD. CAP SCR. ( 8 )
- ATTACH CAST IRON BENCH SUPPORT ( 4 ) TO 71 3/4" PIPE BRACE ( 7 ) USING HARDWARE ( 8 ). TIGHTEN TO SNUG FIT.

**STEP 2:**

- USE 2 - PCS. END CONTOUR STRAP ( 6 )  
 4 - PCS. 1/2" X 2 1/2" FLT SKT. HD. CAP SCR. ( 8 )
- ATTACH END CONTOUR STRAPS ( 6 ) TO STEP 1 ASSEMBLY USING HARDWARE ( 8 ). TIGHTEN TO SNUG FIT.

**STEP 3:**

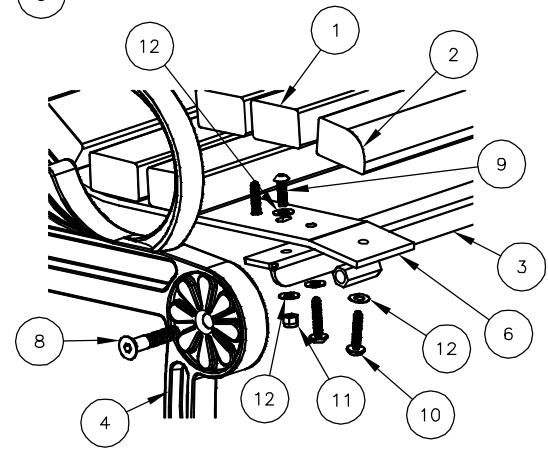
- USE 2 - PCS. 71" SEAT BRACE ( 3 )  
 4 - PCS. 5/16" X 1" SS. BTN SKT HD CAP SCR ( 9 )  
 4 - PCS. 5/16" SS. NYLON LOCKNUT ( 11 )  
 8 - PCS. 5/16" SS. FLAT WASHER ( 12 )
- ATTACH 71" SEAT BRACE ( 3 ) TO STEP 2 ASSEMBLY USING HARDWARE ( 9, 11 & 12 ). TIGHTEN TO SNUG FIT.

**STEP 4:**

- USE 2 - PCS. CENTER CONTOUR STRAP ( 5 )  
 4 - PCS. 5/16" X 1" SS. BTN SKT HD CAP SCR ( 9 )  
 4 - PCS. 5/16" SS. NYLON LOCKNUT ( 11 )  
 8 - PCS. 5/16" SS. FLAT WASHER ( 12 )
- ATTACH CENTER CONTOUR STRAP ( 5 ) TO STEP 3 ASSEMBLY USING HARDWARE ( 9, 11 & 12 ). TIGHTEN TO SNUG FIT.

**STEP 5:**

- USE 9 - PCS. 2" X 3" X 71" PLASTIC INT'R SLAT ( 1 )  
 2 - PCS. 2" X 3" X 71" PLASTIC EDGE SLAT ( 2 )  
 44 - PCS. 5/16" X 1 1/2" SS. BTN. SKT. HD. LAG ( 10 )  
 44 - PCS. 5/16" SS. FLAT WASHER ( 12 )
- ATTACH 2" X 3" X 71" PLASTIC SLATS ( 1 & 2 ) TO STEP 4 ASSEMBLY USING HARDWARE ( 10 & 12 ). TIGHTEN TO SNUG FIT.  
 REPEAT UNTIL ALL SLATS ARE ATTACHED.



**DETAIL A**

**STEP 6:**

UPON COMPLETION OF BENCH ASSEMBLY SQUARE ALL COMPONENTS THEN TIGHTEN ALL HARDWARE.

**STEP 7:**

MOUNT AND ANCHOR AS SPECIFIED.

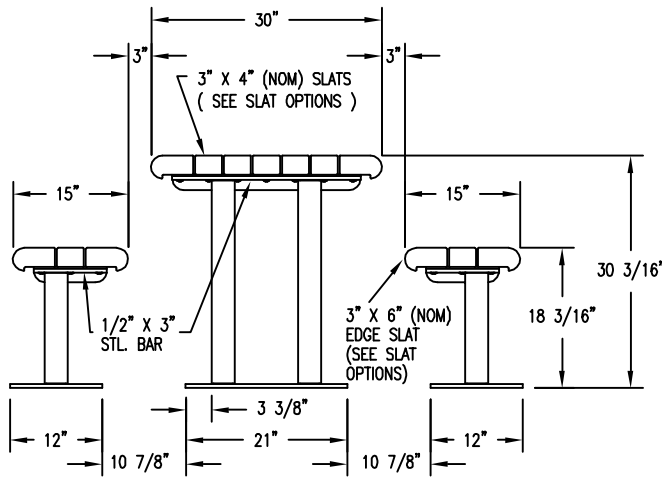
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1	9	0-143-60PL-01	2" X 3" X 71" PLASTIC INT'R SLAT
2	2	0-143-60PL-02	2" X 3" X 71" PLASTIC EDGE SLATS
3	2	0-16-60-06	71" SEAT TUBE BRACE
4	2	0-57-00-02	CAST IRON BENCH SUPPORT
5	2	0-57-00-03	CENTER CONTOUR STRAP
6	2	0-57-00-05	END CONTOUR STRAP
7	1	0-57-60-04	71 3/4" PIPE BRACE
8	6	1-12-065	1/2" X 2 1/2" FLT SKT HD CAP SCR
9	8	1-12-116	5/16" X 1" SS BTN SKT HD CAP SCR
10	44	1-13-023	5/16" X 1 1/2" SS BTN SKT HD LAG
11	8	1-20-016	5/16" SS NYLON LOCKNUT
12	60	1-22-017	5/16" SS FLAT WASHER

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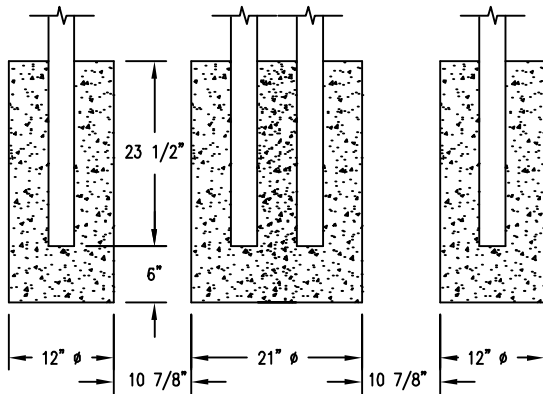
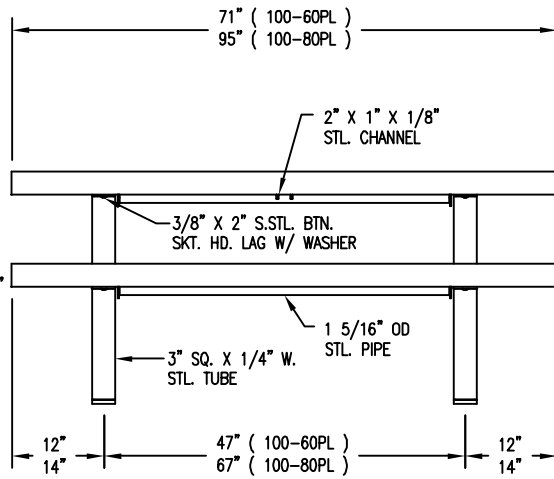
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 DRAWN BY : AWH  
 DATE REV. : 10/25/11  
 REV. BY : RDH

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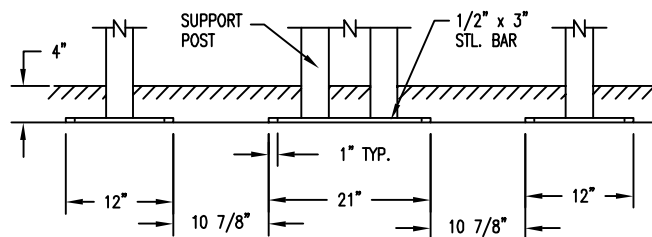
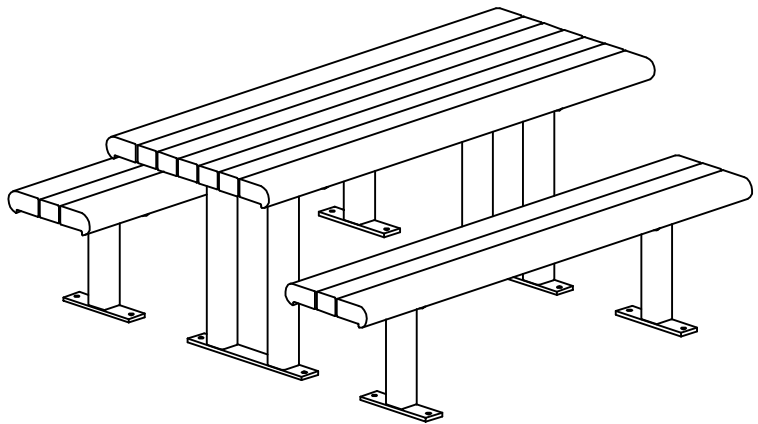
REV. E	DRAWING NUMBER 57-60PL	SHEET 2 OF 2
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S-2 SURFACE MOUNT



S-1 EMBEDMENT



S-4 SUB FLOOR

LENGTH OPTIONS

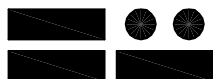
- 6' TABLE
- 8' TABLE

SLAT OPTIONS

- "CEDAR" RECYCLED PLASTIC
- "GREY" RECYCLED PLASTIC
- "REDWOOD" RECYCLED PLASTIC
- "WALNUT" RECYCLED PLASTIC
- OTHER \_\_\_\_\_

NOTES:

- 1.) ALL STL. MEMBERS COATED W/ ZINC RICH EPOXY THEN FINISHED W/ POLYESTER POWDER COATING.
- 2.) 1/2" X 3 3/4" EXPANSION ANCHOR BOLTS PROVIDED. FOR OPTIONS S-2 & S-4.



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SCALE : NONE

DATE DRAWN : 10/10/95

DRAWN BY : AH

DATE REV. : 10/27/11

REV. BY : RDH

TITLE :

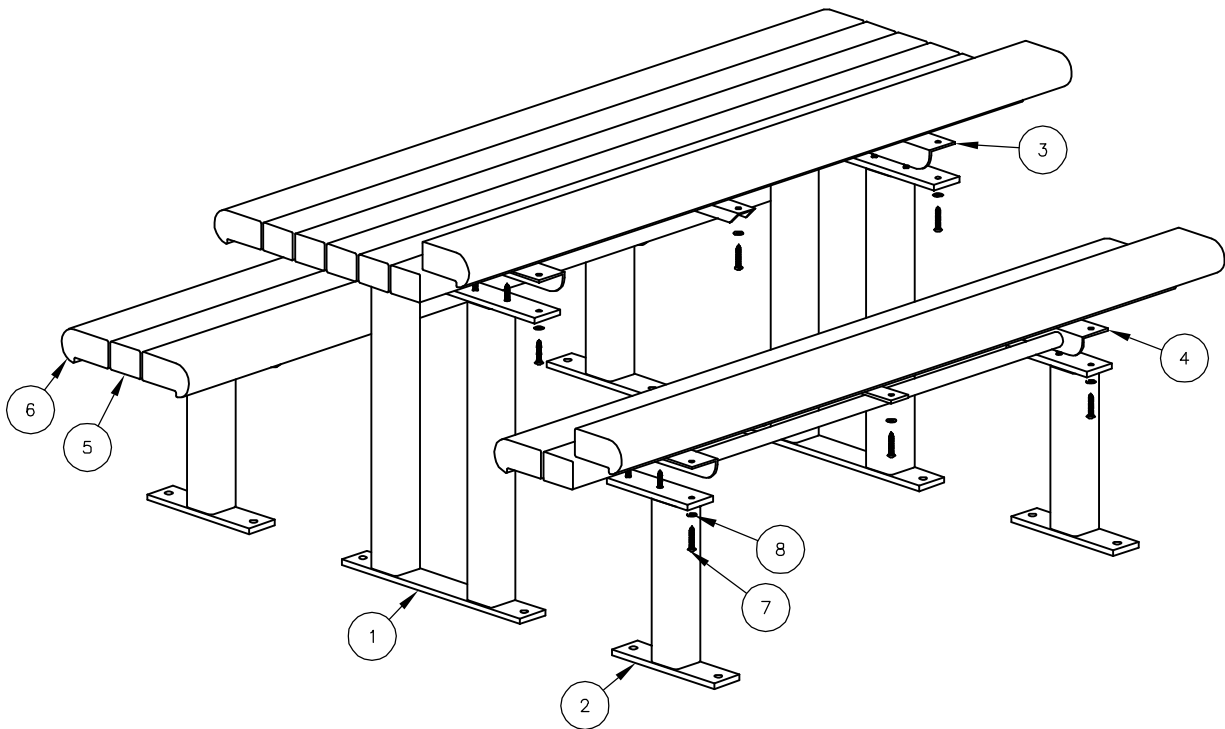
PICNIC TABLE

REV.  
E

DRAWING  
NUMBER

100 SERIES PL

SHEET  
1 OF 2



**NOTES:**

- 1.) DURING ASSEMBLY PROCEDURE;  
DO NOT COMPLETELY TIGHTEN HARDWARE.
- 2.) THE ACTUAL PARTS WILL NOT BE NUMBERED;  
NUMBERS ONLY APPLY TO DRAWING.
- 3.) SEE SPEC. SHEET 1 FOR MOUNTING DETAILS.

**STEP 1:**

USE 1 - PC. 6' TABLE TOP BRACE ( 3 )  
 5 - PCS. 3" X 4" X 71" PLASTIC INT'R SLAT ( 5 )  
 2 - PCS. 71" PLASTIC PROFILED EDGE SLAT ( 6 )  
 7 - PCS. 3/8" X 2" SS. BTN. SKT. HD. LAG SCR. ( 7 )  
 7 - PCS. 3/8" SS. FLAT WASHER ( 8 )  
 ATTACH 3" X 4" X 71" PLASTIC INT'R SLAT ( 5 ) AND 71"  
 PLASTIC PROFILED EDGE SLAT ( 6 ) TO 6' TABLE TOP BRACE ( 3 )  
 USING HARDWARE ( 7 & 8 ), IN CENTER CHANNEL ONLY. TIGHTEN  
 TO SNUG FIT. REPEAT UNTIL ALL SLATS ARE ATTACHED.

**STEP 2:**

USE 2 - PCS. TABLE TOP SUPPORT FOR SURFACE MOUNT ( 1 )  
 14 - PCS. 3/8" X 2" SS. BTN. SKT. HD. LAG SCR. ( 7 )  
 14 - PCS. 3/8" SS. FLAT WASHER ( 8 )  
 ATTACH SUPPORT FOR SURFACE MOUNT  
 ( 1 ) TO STEP 1 ASSEMBLY USING HARDWARE  
 ( 7 & 8 ). TIGHTEN TO SNUG FIT.

**STEP 3:**

USE 2 - PC. 6' SEAT BRACE ( 4 )  
 2 - PCS. 3" X 4" X 71" PLASTIC INT'R SLAT ( 5 )  
 4 - PCS. 71" PLASTIC PROFILED EDGE SLAT ( 6 )  
 6 - PCS. 3/8" X 2" SS. BTN. SKT. HD. LAG SCR. ( 7 )  
 6 - PCS. 3/8" SS. FLAT WASHER ( 8 )  
 ATTACH 3" X 4" X 71" PLASTIC INT'R SLAT ( 5 ) AND 71"  
 PLASTIC PROFILED EDGE SLAT ( 6 ) TO 6' SEAT BRACE ( 4 )  
 USING HARDWARE ( 7 & 8 ), IN CENTER PLATE ONLY.  
 TIGHTEN TO SNUG FIT.

**STEP 4:**

USE 4 - PCS. SEAT SUPPORT FOR SURFACE MOUNT ( 2 )  
 12 - PCS. 3/8" X 2" SS. BTN. SKT. HD. LAG SCR. ( 7 )  
 12 - PCS. 3/8" SS. FLAT WASHER ( 8 )  
 ATTACH SEAT SUPPORT FOR SURFACE MOUNT ( 2 ) TO STEP 3  
 ASSEMBLY USING HARDWARE ( 7 & 8 ). TIGHTEN TO SNUG FIT.

**STEP 5:**

UPON COMPLETION OF TABLE ASSEMBLY SQUARE  
 ALL COMPONENTS THEN TIGHTEN ALL HARDWARE.

**STEP 6:**

ANCHOR ACCORDING TO SUPPORT OPTION USED.

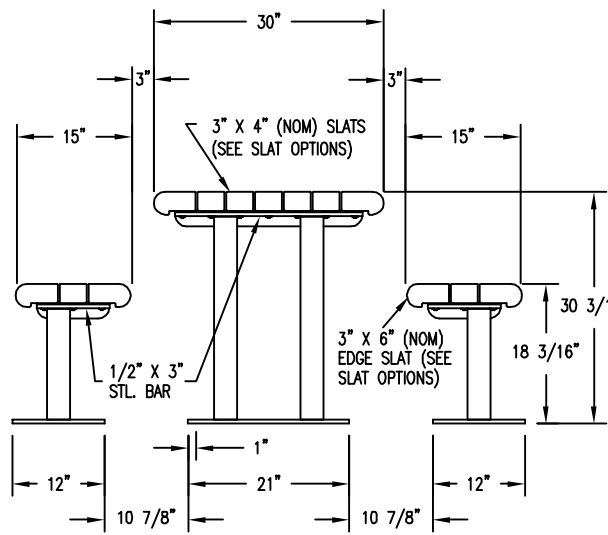
ITEM	QTY	PART NO	DESCRIPTION
1	2	0-100-00-01/S-2	TABLE TOP SUPPORT FOR SURFACE
2	4	0-100-00-02/S-2	SEAT SUPPORT FOR SURFACE MT
3	1	0-100-60-05	6' TABLE TOP BRACE
4	2	0-100-60-06	6' SEAT BRACE
5	7	0-88-60PL-02	3" X 4" X 71" PLASTIC INT'R SLAT
6	6	0-88-60PL-03	71" PLASTIC EDGE SLAT
7	39	1-13-016	3/8" X 2" SS BTN SKT HD LAG SCR
8	39	1-22-024	3/8" SS FLAT WASHER

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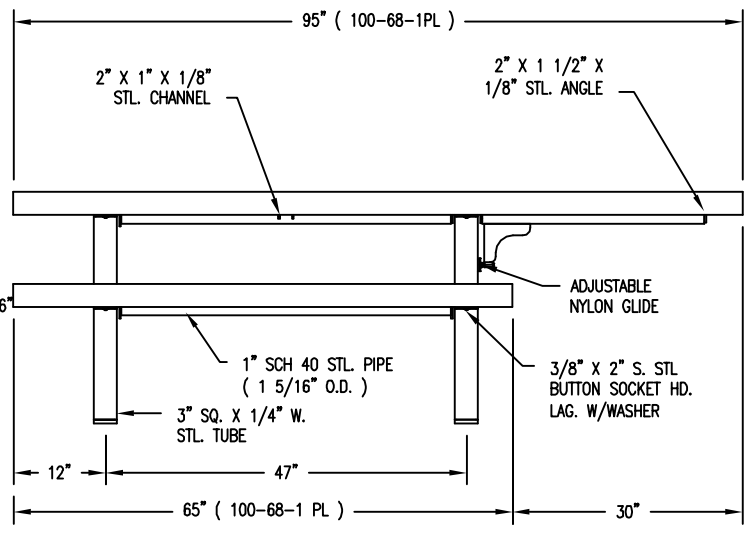
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 DRAWN BY : AH  
 DATE REV. : 10/27/11  
 REV. BY : RDH

TITLE : PICNIC TABLE ASSEMBLY

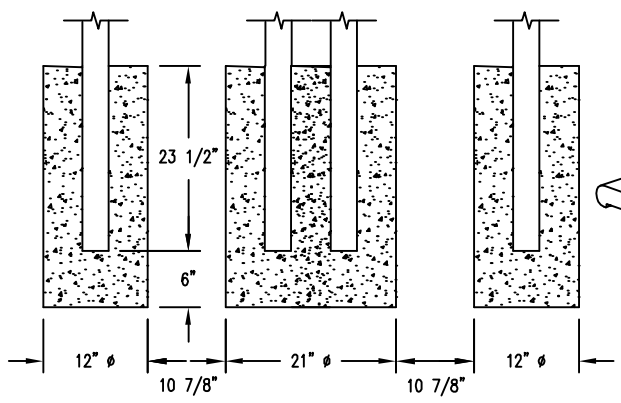
REV. E	DRAWING NUMBER 100 SERIES PL	SHEET 2 OF 2
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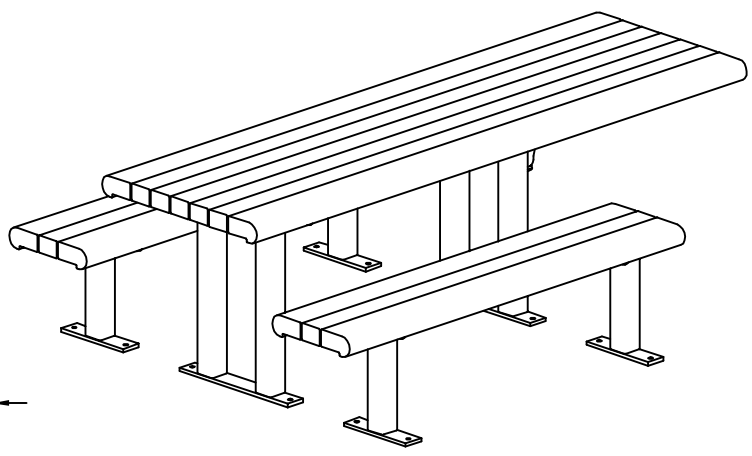
S-2 SURFACE MOUNT



S-1 EMBEDMENT



S-4 SUB FLOOR

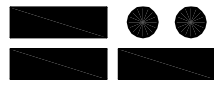


SLAT OPTIONS

- "CEDAR" RECYCLED PLASTIC
- "GREY" RECYCLED PLASTIC
- "REDWOOD" RECYCLED PLASTIC
- "WALNUT" RECYCLED PLASTIC
- OTHER \_\_\_\_\_

NOTES:

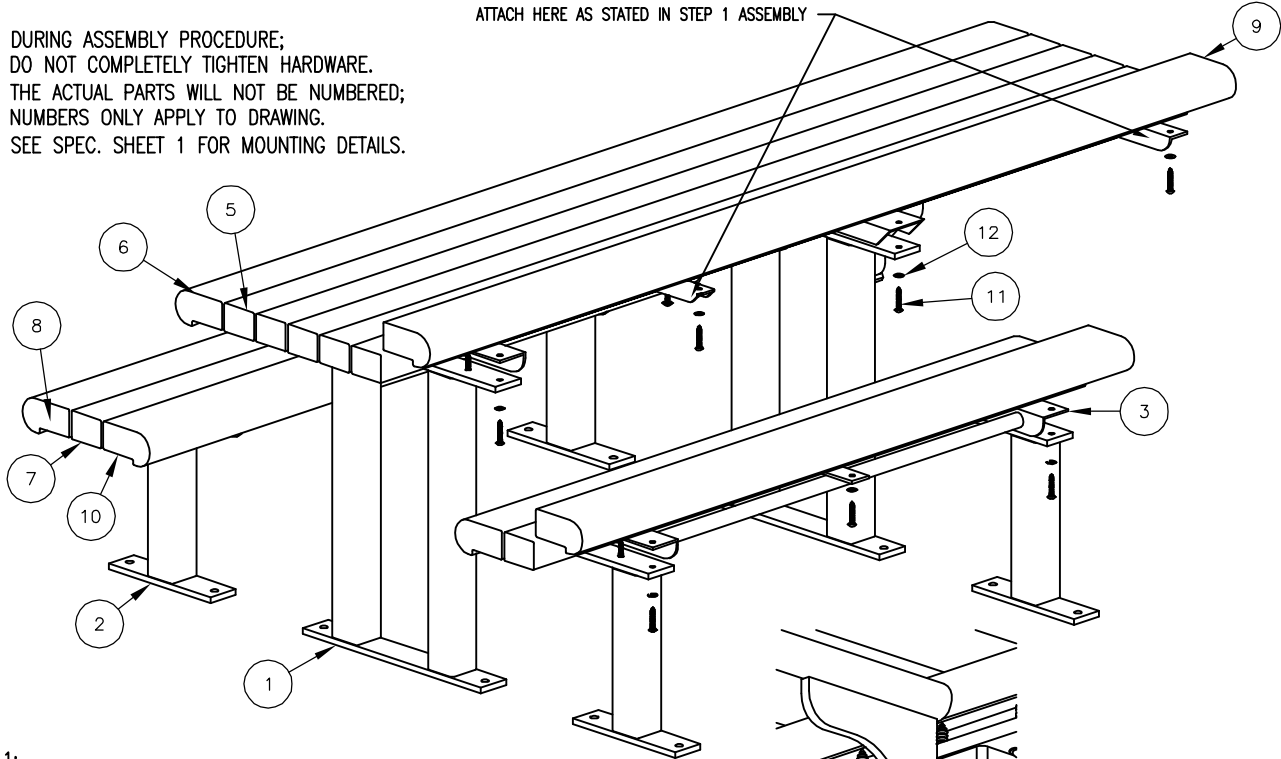
- 1.) ALL STL. MEMBERS COATED W/ ZINC RICH EPOXY THEN FINISHED W/ POLYESTER POWDER COATING.
- 2.) 1/2 X 3 3/4" EXPANSION ANCHOR BOLTS PROVIDED FOR OPTIONS S-2 & S-4.

 <b>DuMor, inc.</b> P.O. Box 142 Mifflintown, PA 17059-0142	SCALE : <b>NONE</b>	TITLE : <b>PICNIC TABLE</b>	
	DATE DRAWN : 4/1/96	REV.	DRAWING NUMBER
	DRAWN BY : AH	E	100-68-1 PL
	DATE REV. : 10/27/11	REV. BY : RDH	SHEET 1 OF 2

**NOTE:**

- 1.) DURING ASSEMBLY PROCEDURE;  
DO NOT COMPLETELY TIGHTEN HARDWARE.
- 2.) THE ACTUAL PARTS WILL NOT BE NUMBERED;  
NUMBERS ONLY APPLY TO DRAWING.
- 3.) SEE SPEC. SHEET 1 FOR MOUNTING DETAILS.

ATTACH HERE AS STATED IN STEP 1 ASSEMBLY



**STEP 1:**

- USE 1 - PCS. TABLE TOP BRACE. HAND. ONE END ( 4 )
- 5 - PCS. 3" X 4" X 95" TOP PLASTIC INT'R TABLE SLAT ( 5 )
- 1 - PC. 95" PL RIGHT PROFILED EDGE TABLE SLAT ( 6 )
- 1 - PC. 95" PL LEFT PROFILED EDGE TABLE SLAT ( 9 )
- 14 - PCS. 3/8" X 2" SS. BTN. SKT. HD. LAG SCR. ( 11 )
- 14 - PCS. 3/8" SS FLAT WASHER ( 12 )
- 2 - PCS. 3/8" X 1 1/2" SWIVEL GLIDE ( 13 )

ALIGN HOLES IN SLAT WITH TABLE TOP BRACE THEN ATTACH 3" X 4" X 95" TOP PLASTIC INT'R TABLE SLAT ( 5 ) AND 95" PLASTIC PROFILED EDGE TABLE SLAT ( 6 & 9 ) TO CENTER AND END OF TABLE TOP BRACE. HAND. ONE END ( 4 ) USING HARDWARE ( 11 & 12 ). TIGHTEN TO SNUG FIT. REPEAT UNTIL ALL SLATS ARE ATTACHED. FASTEN SWIVEL GLIDE ( 13 ) INTO FLAT SIDE OF GUSSET TO A MINIMAL AMOUNT OF THREADS EXPOSED ON GLIDE FACE END.

**STEP 2:**

- USE 2 - PCS. TABLE TOP SUPPORT FOR SURFACE MOUNT ( 1 )
- 14 - PCS. 3/8" X 2" SS BTN SKT HD LAG SCR. ( 11 )
- 14 - PCS. 3/8" SS FLAT WASHER ( 12 )

ATTACH TABLE TOP SUPPORT FOR SURFACE MOUNT ( 1 ) TO STEP 1 ASSEMBLY USING HARDWARE ( 11 & 12 ). TIGHTEN TO SNUG FIT. REPEAT UNTIL ALL SLAT ARE ATTACHED.

**STEP 3:**

- USE 2 - PCS. 6' SEAT BRACE ( 3 )
- 2 - PCS. 3" X 4" X 65" PLASTIC INT'R SEAT SLAT ( 7 )
- 2 - PCS. 65" PL RIGHT PROFILED EDGE SEAT SLAT ( 8 )
- 4 - PCS. 65" PL LEFT PROFILED EDGE SEAT SLAT ( 10 )
- 6 - PCS. 3/8" X 2" SS. BTN. SKT. HD. LAG SCR. ( 11 )
- 6 - PCS. 3/8" SS. FLAT WASHER ( 12 )

ALIGN HOLES IN SLAT WITH SEAT BRACE THEN ATTACH 3" X 4" X 65" PLASTIC INT'R SEAT SLAT ( 7 ) AND 65" PLASTIC PROFILED EDGE SEAT SLAT ( 8 & 10 ) TO THE CENTER OF THE 6' TABLE SEAT BRACE ( 3 ) USING HARDWARE ( 11 & 12 ). TIGHTEN TO SNUG FIT. REPEAT UNTIL ALL SLATS ARE ATTACHED.

**STEP 4:**

- USE 4 - PCS. SEAT SUPPORT FOR SURFACE MOUNT ( 2 )
  - 12 - PCS. 3/8" X 2" SS. BTN. SKT. HD. LAG SCR. ( 11 )
  - 12 - PCS. 3/8" SS. FLAT WASHER ( 12 )
- ATTACH SEAT SUPPORT FOR SURFACE MOUNT ( 2 ) TO STEP 3 ASSEMBLY USING HARDWARE ( 11 & 12 ). TIGHTEN TO SNUG FIT. REPEAT UNTIL ALL SLATS ARE ATTACHED.

**STEP 5:**

UPON COMPLETION OF TABLE ASSEMBLY SQUARE ALL COMPONENTS THEN UNSCREW SWIVEL GLIDE SO IT FITS TIGHT AGAINST SUPPORT POST TUBE AND TIGHTEN ALL HARDWARE.

**STEP 6:**

ANCHOR ACCORDING TO SUPPORT OPTION USED.

ITEM	QTY	PART NO	DESCRIPTION
1	2	0-100-00-01/S-2	TABLE TOP SUPPORT FOR SURFACE
2	4	0-100-00-02/S-2	SEAT SUPPORT FOR SURFACE MT
3	2	0-100-60-06	6' SEAT BRACE
4	1	0-100-68-1-05	TABLE TOP BRACE, HANDICAPPED
5	5	0-100-681PL-1	3" X 4" X 95" PLASTIC INT'R TABLE SLAT
6	1	0-100-681PL-2	95" PL RIGHT PROFILED EDGE TABLE SLAT
7	2	0-100-681PL-3	3" X 4" X 65" PLASTIC INT'R SEAT SLAT
8	2	0-100-681PL-4	65" PL RIGHT PROFILED EDGE SEAT SLAT
9	1	0-100-681PL-8	95" PL LEFT PROFILED EDGE TABLE SLAT
10	2	0-100-681PL-9	65" PL LEFT PROFILED EDGE SEAT SLAT
11	46	1-13-016	3/8" X 2" SS BTN SKT HD LAG SCR
12	46	1-22-024	3/8" SS FLAT WASHER
13	2	5-48-076	3/8" X 1 1/2" SWIVEL GLIDE

**DuMor, inc.**  
P.O. Box 142 Mifflintown, PA 17059-0142

SCALE : NONE  
DATE DRAWN : 4/1/96  
DRAWN BY : AH  
DATE REV. : 10/27/11  
REV. BY : RDH

TITLE : PICNIC TABLE ASSEMBLY

REV. E DRAWING NUMBER 100-68-1 PL

SHEET 2 OF 2

# GEOTECH REPORT





# ***GEOTECHNICAL REPORT***

## **MAGNOLIA PARK REDEVELOPMENT ARLINGTON, MASSACHUSETTS**

February 8, 2016

**GSI Project No. 216109**

***Prepared for:***

Mr. Joseph Connelly  
Director Recreation/Ed Burns Arena  
Town of Arlington  
422 Summer Street  
Arlington, MA 02474

***Prepared by:***

Geotechnical Services, Inc.  
55 North Stark Highway  
Weare, NH 03281

**Geotechnical Services Inc.**

Geotechnical Engineering ▴ Environmental Studies ▴ Materials Testing ▴ Construction Monitoring





February 8, 2016

Mr. Joseph Connelly  
Director Recreation/Ed Burns Arena  
Town of Arlington  
422 Summer Street  
Arlington, MA 02474

**RE: Geotechnical Investigation Report  
Magnolia Park Redevelopment  
Arlington, MA  
GSI Project No. 216109**

Dear Mr. Connelly:

Geotechnical Services, Inc. (GSI) is pleased to submit this geotechnical report on the above referenced project. The report includes the subsurface data obtained through an exploration program, a geotechnical engineering evaluation of the subsurface data and the observed surface geology in relation to the anticipated earthwork and foundation designs for the proposed development. The work was undertaken in accordance with the scope of work stated in our proposal dated January 26, 2016 and your subsequent authorization. The content of this report is subject to the attached **Limitations** (Appendix A).

## PROJECT UNDERSTANDING

The project site is located at the Magnolia Park located off of Herbert Road in Arlington, MA (See Figure 1, Project Locus). We understand that the redevelopment of the park will include the following:

- Replacement of the existing basketball court located within the center of the project site with a new basketball half court to be constructed in the grass field located just south of the existing court.
- Relocation of the existing playground located off of Herbert Road to the area currently occupied by the basketball court,
- Redevelopment and expansion of the public garden located along the northern portion of the site, and
- Drainage improvements at the “low-point” for the park where standing water is an issue.

## SUBSURFACE INVESTIGATION

Six (6) test pits, designated as TP-1 to TP-6, were excavated at the site on January 29, 2016 by the Town of Arlington, MA. The test pits were excavated using a mini track excavator under full supervision of a GSI engineer. The test pits were excavated to depths ranging from 2-ft (TP-6) to 6.5-ft (TP-2) below the existing grade. Each test pit excavation was observed by the GSI engineer and the soils encountered were classified in accordance with the Burmister Classification system. The approximate locations of the test pits are shown on Figures 2, Exploration Location Plan. The finalized logs for the test pits are included in Appendix B. Photographs of the completed test pits were taken and are provided as Appendix C.

## SUBSURFACE CONDITIONS

The subsurface conditions encountered in the investigation indicate that the site is underlain by the following soil units/deposits, described in order of increasing depth:

**Topsoil:** All of the test pits encountered the Topsoil layer at the ground surface. The Topsoil layer generally consists of organic silty soils with grass at the ground surface. The thickness of this soil unit ranges from about a few inches at TP-6 to about 4 to 6-in. in TP-1 and TP-2 and increases in depth in the test pits conducted in the public garden area to 9-in. in TP-3 to over 2.4-ft in TP-4.

**Engineered Fill:** The Engineered Fill was encountered in TP-6. The Engineered Fill generally consists of a yellow brown, fine to coarse SAND with little gravel and trace silt.

**Sand Fill:** The Sand Fill was encountered in TP-1, TP-3, TP-5, and TP-6. The Sand Fill is generally described as a light brown fine SAND. The thickness of the Sand Fill varies from about 6-in. in TP-1 and TP-6 to 1-ft to 1.5-ft in TP-3 and TP-5 (both in the public garden area).

**Coal Ash Fill:** A 5-in. thick layer of Coal Ash Fill was encountered in TP-4 at a depth of 2.4-ft below existing grade.

**Urban Fill:** Urban Fill was encountered in TP-1, TP-2, and TP-6. The Urban Fill is generally described as a brown to gray SILT and fine SAND with varying amounts of gravel and debris. Debris encountered in the Urban Fill included, pieces of metal, plastic, concrete, bricks, wood, and fabric. Occasional cobbles and boulders (TP-2) were also observed in the Urban Fill soils.

**Organic Soils:** Organic soils consisting of PEAT and organic SILT were encountered in TP-3, TP-4 and TP-5. The Organic Soils were encountered roughly from 2-ft below grade to the termination depth of the test pits at 4-ft.

**Groundwater:** Groundwater was observed in TP-1 and TP-5 at depths ranging from 2.4 to 4-ft below the existing grade, respectively. Groundwater was not encountered in the other test pits possibly due to less permeable soil conditions, particularly in TP-2, which resulted in no observed water infiltration during the time period that the test pits were open. Groundwater levels should be expected to vary with season, precipitation, snowmelt, and other factors. As a result, groundwater levels encountered during construction may differ from those encountered in the explorations.

## **GEOTECHNICAL DESIGN RECOMMENDATIONS**

### **General**

As a general guideline, foundation design and construction must conform to the applicable provisions of the Massachusetts Building Code, 8<sup>th</sup> Edition (Building Code).

### **New Basketball Court**

We anticipate that the location of the new basketball court can be supported on the existing Sand Fill and Urban Fill soils. The topsoil material and any unsuitable soils that may be encountered during earthwork activities are considered unsuitable for support of the basketball court and should be removed and replaced with compacted Structural Fill. GSI also recommends placing a layer of biaxial geogrid reinforcement, such as Tensar BX4200, or equal, to reinforce the Subbase material beneath the planned court. The geogrid reinforcement should be placed directly over the prepared Sand Fill/Urban Fill subgrade prior to placement and compaction of the Subbase material. We recommend either compacted Structural Fill or Dense-graded Crushed Stone conforming to the MASSDOT Materials Specification M2.01.7.

The material encountered in TP-6 suggests that Engineered Fill was used as a subbase material beneath the existing basketball court. It is feasible to reuse this material beneath the new basketball court.

### **Public Garden Redevelopment**

The test pits encountered 9 to 2.4-ft of Topsoil material with the existing garden area. It is anticipated that this material can be reused in the planned garden expansion/redevelopment. We recommend that representative samples of the existing topsoil material be collected and tested for soil texture and nutrient at the UMass Soil and Plant Tissue Testing Lab to determine if the material needs to be amended. The soil sampling and evaluation/recommendations for the appropriate soil amendments should be conducted by a Landscape Architect.

It is understood that the existing playground sand is being considered as a drainage medium beneath the planned public garden. GSI considers the sand material to be suitable for use as a drainage material.

### **Drainage Improvement (Low-Point Area)**

TP-2 indicated that Urban Fill will be encountered during construction of the planned catch basin which will connect to the existing drainage system at the site. The Urban Fill will be suitable for support of the the planned manhole



and drainline. We recommend that a 6-in. (min.) layer of Crushed Stone wrapped in a filter fabric (Mirafi 160N, or equal) be placed beneath the manhole structure as a Subbase material.

The Urban Fill encountered exhibited slow groundwater seepage into the test pit which will make the installation of the manhole and drainage line easier without the need of significant dewatering. However, the conditions encountered in the test pit may not be similar to what may be encountered during construction and construction dewatering may be needed.

### **Foundation Support for Playground Equipment and Basketball Nets**

We anticipate that the new foundations will consist of concrete filled sonotube footings embedded at least 4-ft below the planned grade (for frost protection). The existing Sand Fill, Urban Fill, and Imported Engineered Fill for the Subbase will be suitable for support of the new playground equipment and basket net.

## **CONSTRUCTION CONSIDERATIONS**

### **General**

In general, all excavation work, dewatering, and other construction activities should conform to the requirements of OSHA and all other applicable regulations. The site soils would typically be classified as Type C based on OSHA 29 CFR 1926.

### **Excavation**

We anticipate that the excavations in soil for the park redevelopment and site grading can be accomplished with conventional earth-moving equipment.

Temporary cut soil slopes should, typically, be stable if constructed no steeper than about 1.5H:1V. Some sloughing and raveling should be anticipated in temporary earth slopes.

### **Construction Dewatering**

Based on the available subsurface data it is anticipated that during the general site work, no significant dewatering measures will be necessary to conduct the construction "in-the-dry." Groundwater and surface water must be controlled as necessary to enable all final excavation and foundation construction to be conducted in-the-dry.

The Contractor should take measures to prevent storm water to enter into excavated areas, and be prepared to remove ponded surface water by means of localized sumps and pumps. The Contractor should select whichever dewatering procedures may be effective to maintain dry, stable excavation bottoms. Dewatering, including its discharge, should be performed in accordance with all local, state, and federal regulations.

### **Preparation and Protection of Bearing Surfaces**

Final excavation should be conducted in a manner that minimizes disturbance to the subgrade soils when excavating to bearing surfaces. All final excavation and construction should be conducted in-the-dry. We recommend that the exposed subgrade soils be observed in the field by a geotechnical engineer to confirm the projected bearing conditions. It may be necessary to over-excavate and replace weak, disturbed or otherwise unacceptable bearing materials.

Following excavation to bearing grades, exposed subgrade soil surfaces should be re-compacted (proofrolled) prior to placing compacted Structural Fill with a minimum of two passes with a heavy vibratory roller or other heavy vibratory compaction equipment.

If subgrade protection difficulties are encountered due to surface or groundwater, various methods can be utilized:

- Leave subgrades high until immediately before forming and concreting to minimize the time the subgrade is exposed.
- Place a lean concrete mud mat on the exposed soil surface at footing locations after the subgrade has been prepared.
- Over excavate footings by 6 to 8 in. using a smooth edged bucket, place non-woven filter fabric on the exposed stable soil subgrade, and backfill to the design bearing elevation using crushed stone. The exposed top of the crushed stone should also be covered with non-woven filter fabric to prevent migration of fines from the backfill placed above.



Each such encounter is probably best resolved individually in the field upon observation of the subgrade conditions.

**Compaction**

Minimum compaction requirements refer to percentages of the maximum dry density determined in accordance with ASTM D1557. Recommended compaction requirements are as follows:

<u>Location</u>	<u>Minimum Compaction Requirements</u>
Beneath basketball court	95 %
Parking, roadways and sidewalks	92 % up to 3 ft below finished grade 95 % in the upper 3 ft
Landsaped areas	90 % nominal compaction

**Filling and Backfilling**

Filling and backfilling will be required within the proposed basketball court. We recommend that Compacted Structural Fill or Dense-graded Crushed Stone be used as fill and backfill beneath court to the limits.

Placement of compacted soil fills should not be conducted when air temperatures are low enough (approximately 30 degrees F, or below) to cause freezing of the moisture in the fill during or before placement. Fill materials should not be placed on snow, ice or uncompacted frozen soil. Compacted fill should not be placed on frozen soil. No fill should be allowed to freeze prior to compaction. At the end of each day's operations, the last lift of fill, after compaction, should be rolled by a smooth-wheeled roller to eliminate ridges of uncompacted soil.

**Structural Fill**

Structural Fill should consist of bank-run sand and gravel, free of organic material, snow, ice, or other unsuitable materials and should be well-graded within the following limits:

<u>Sieve Size</u>	<u>Percent Finer by Weight</u>
3 in.	100
No. 4	30 – 80
No. 40	10 – 50
No. 200	0 – 10

Other materials could be acceptable for compacted Structural Fill, and should be evaluated by the Geotechnical Engineer on a case-by-case basis if proposed by the Contractor.

Structural Fill should be placed in lift thicknesses not exceeding 12 in. loose measure. In confined areas, hand-guided equipment such as a vibratory plate compactor should be used and the loose lift thickness should not exceed 6 in.

A minimum of four systematic passes of the compaction equipment should be used to compact each lift.



**Crushed Stone**

Crushed Stone should consist of durable crushed rock or crushed gravel stone obtained by breaking and crushing rock, or boulders, and it is free from a detrimental quantity of thin, flat, elongated or other objectionable pieces.

The ½-inch crushed stone should have the following gradation:

<u>Sieve Size</u>	<u>Percent Finer by Weight</u>
5/8 inch	100
½ inch	85-100
3/8 inch	15-45
No. 4	0-15
No. 8	0-5

**PLAN REVIEW**


It is recommended that GSI be provided the opportunity to review the final plans in order to confirm that the recommendations made in this report were interpreted and implemented as intended.

**CLOSURE**

GSI appreciates the opportunity for participating in this early phase of the project, and looks forward to our continuing association during its subsequent phases towards its successful completion. In the mean time, please do not hesitate to contact us, if you have any questions on the content of this report.

Very truly yours,

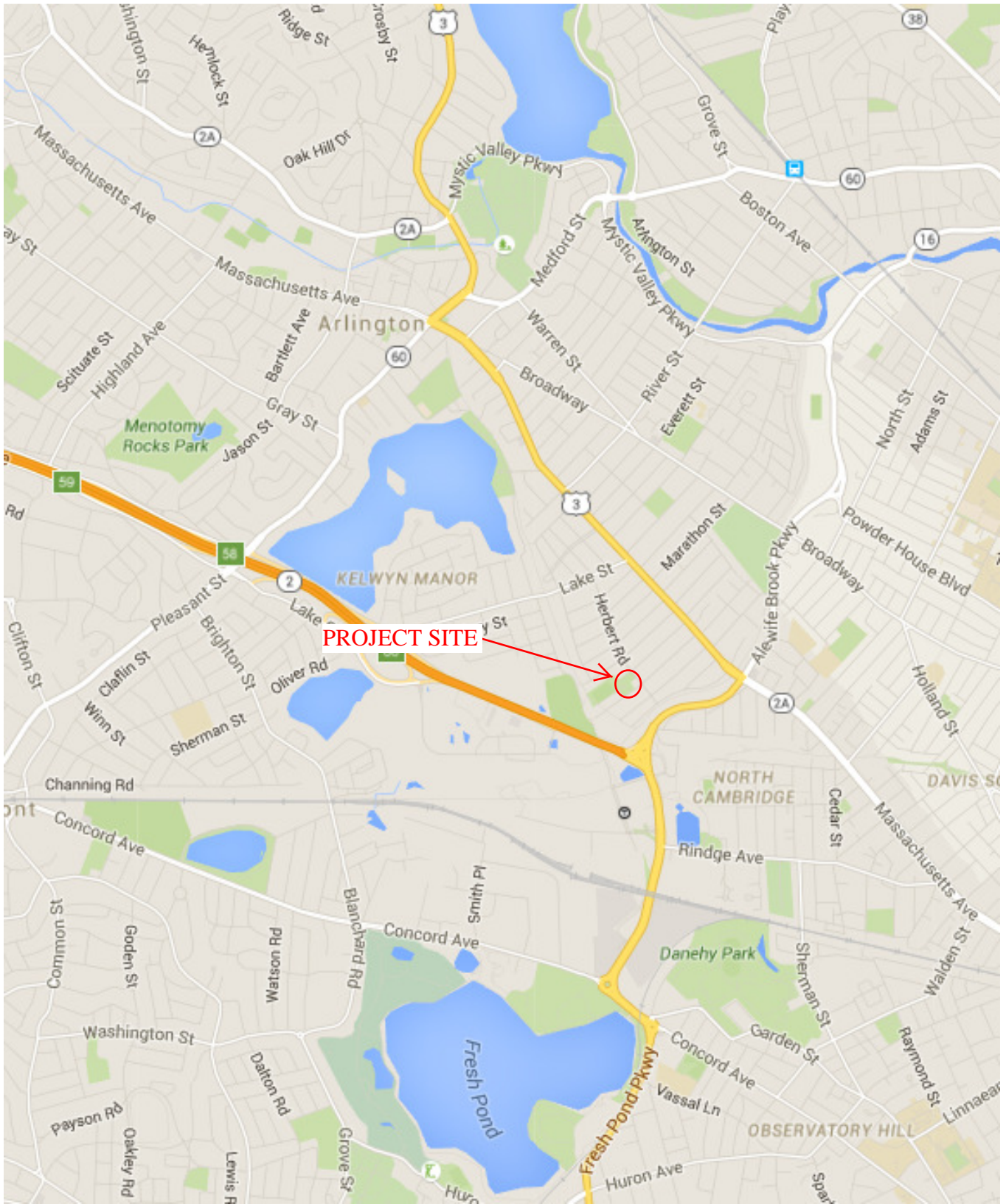
**GEOTECHNICAL SERVICES, INC.**

  
Glen V. Zoladz, P.E.  
*Project Engineer*

Harry K. Wetherbee, P.E.  
*Principal Engineer*

- Figure 1      Project Locus
- Figure 2      Exploration Location Plan
  
- Appendix A    Limitations
- Appendix B    Test Pit Logs
- Appendix C    Photographs





**PROJECT SITE**



**FIGURE 1—PROJECT LOCUS**  
**MAGNOLIA PARK**  
**ARLINGTON, MA**  
**GSI PROJECT NO. 216109**



SCALE: NOT TO SCALE

**LEGEND:**

TP-  
 TEST PIT I.D. AND APPROX. LOCATION



**FIGURE 2—EXPLORATION LOCATION PLAN**

**MAGNOLIA PARK  
ARLINGTON, MA  
GSI PROJECT NO. 216109**



**APPENDIX A**  
**LIMITATIONS**



## LIMITATIONS

### Explorations

1. The analyses, recommendations and designs submitted in this report are based in part upon the data obtained from preliminary subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.
2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretation of widely spaced explorations and samples; actual soil transitions are probably more gradual. For specific information, refer to the individual test pit and/or boring logs.
3. Water level readings have been made in the test pits and/or test borings under conditions stated on the logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors differing from the time the measurements were made.

### Review

4. It is recommended that this firm be given the opportunity to review final design drawings and specifications to evaluate the appropriate implementation of the recommendations provided herein.
5. In the event that any changes in the nature, design, or location of the proposed areas are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of the report modified or verified in writing by Geotechnical Services, Inc.

### Construction

6. It is recommended that this firm be retained to provide geotechnical engineering services during the earthwork phases of the work. This is to observe compliance with the design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

### Use of Report

7. This report has been prepared for the exclusive use of the Town of Arlington, MA in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.
8. This report has been prepared for this project by Geotechnical Services, Inc. This report was completed for preliminary design purposes and may be limited in its scope to complete an accurate bid. Contractors wishing a copy of the report may secure it with the understanding that its scope is limited to evaluation considerations only.



**APPENDIX B**  
**TEST PIT LOGS**





# TEST PIT LOG

Test Pit No.

TP-1

Page 1 of 1

Geotechnical Services, Inc. ♦ 18 Cote Avenue, Goffstown, NH 03045 Tel. 603.624.2722 Fax. 603.624.3733 ♦ 12 Rogers Road, Haverhill, MA 02222 Tel. 978.374.7744 Fax. 978.374.7799

<b>Project</b>	Magnolia Park	<b>Project No.</b>	212109
<b>Location</b>	Arlington, MA	<b>Project Manager</b>	G. Zoladz
<b>Client</b>	City of Arlington	<b>Field Rep.</b>	G. Zoladz
<b>Contractor</b>	Arlington DPW	<b>Date</b>	12/29/16
<b>Equipment</b>	Track Excavator	<b>Weather</b>	Overcast 30°s

Depth (ft)	Sample ID	Stratum Change Depth (ft)	Description of Soils	Obstructions/Remarks
1		0.5	-TOPSOIL-	
		1	Br. fine SAND, tr. silt -SAND FILL-	
2			Dark, br., silty f/c SAND, little gravel, tr. brick pieces, occasional cobbles -URBAN FILL-	
3		2.75	Terminated test pit at 2.75-ft due to groundwater.	
4				
5				
6				
7				
8				
9				

<b>Standing Water in Completed Pit:</b>		<b>Boulders:</b>		<b>Test Pit Dimensions:</b>		<b>Survey Data:</b>	
at depth	2.8 ft	<b>Diameter (in.)</b>	<b>Number</b>	<b>Depth</b>	2.75 ft	<b>Ground El.</b>	N/A ft
Elapsed time after completion of pit:	5 <input type="checkbox"/> hours <input checked="" type="checkbox"/> min.	12 to 24	-	<b>Length</b>	4 ft	<b>El. Datum</b>	N/A
		> 24	-	<b>Width</b>	2 ft		



# TEST PIT LOG

Test Pit No.

TP-2

Page 1 of 1

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<b>Project</b>	Magnolia Park	<b>Project No.</b>	212109
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<b>Client</b>	City of Arlington	<b>Field Rep.</b>	G. Zoladz
<b>Contractor</b>	Arlington DPW	<b>Date</b>	12/29/16
<b>Equipment</b>	Track Excavator	<b>Weather</b>	Overcast 30°s

Depth (ft)	Sample ID	Stratum Change Depth (ft)	Description of Soils	Obstructions/Remarks
1		0.3	-TOPSOIL- Dark gray, SILT and f/m SAND, little gravel, cobbles concrete slab pieces, brick pieces, metal, plastic, wood textile fabric, one 24-in diameter boulder	
2			-URBAN FILL-	
3				
4				
5				
6				
7			Bottom of Exploration at 6.5-ft. No groundwater encountered.	
8				
9				

<b>Standing Water in Completed Pit:</b>		<b>Boulders:</b>		<b>Test Pit Dimensions:</b>		<b>Survey Data:</b>	
at depth	- ft	<b>Diameter (in.)</b>	<b>Number</b>	<b>Depth</b>	6.5 ft	<b>Ground El.</b>	N/A ft
<b>Elapsed time after completion of pit:</b>		12 to 24	-	<b>Length</b>	6 ft	<b>El. Datum</b>	N/A
5	<input type="checkbox"/> hours <input checked="" type="checkbox"/> min.	> 24	1	<b>Width</b>	4 ft		



# TEST PIT LOG

Test Pit No.

TP-3

Page 1 of 1

Geotechnical Services, Inc. ♦ 18 Cote Avenue, Goffstown, NH 03045 Tel. 603.624.2722 Fax. 603.624.3733 ♦ 12 Rogers Road, Haverhill, MA 02222 Tel. 978.374.7744 Fax. 978.374.7799

<b>Project</b>	Magnolia Park	<b>Project No.</b>	216109
<b>Location</b>	Arlington, MA	<b>Project Manager</b>	G. Zoladz
<b>Client</b>	City of Arlington	<b>Field Rep.</b>	G. Zoladz
<b>Contractor</b>	Arlington DPW	<b>Date</b>	12/29/16
<b>Equipment</b>	Track Excavator	<b>Weather</b>	Overcast 30°s

Depth (ft)	Sample ID	Stratum Change Depth (ft)	Description of Soils	Obstructions/Remarks
1		0.8	-TOPSOIL-	
2			Light brown, fine SAND	
3		2.5	-SAND FILL-	
4			Brown Peat and organic SILT	
5			-ORGANIC SOILS-	
6			Bottom of exploration at 4-ft.	
7			No groundwater encountered.	
8				
9				

<b>Standing Water in Completed Pit:</b>		<b>Boulders:</b>		<b>Test Pit Dimensions:</b>		<b>Survey Data:</b>	
at depth	- ft	<b>Diameter (in.)</b>	<b>Number</b>	<b>Depth</b>	4 ft	<b>Ground El.</b>	N/A ft
Elapsed time after completion of pit:		12 to 24	-	<b>Length</b>	4 ft	<b>El. Datum</b>	N/A
5	<input type="checkbox"/> hours <input checked="" type="checkbox"/> min.	> 24	-	<b>Width</b>	2 ft		



# TEST PIT LOG

Test Pit No.

TP-4

Page 1 of 1

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<b>Project</b>	Magnolia Park	<b>Project No.</b>	216109
<b>Location</b>	Arlington, MA	<b>Project Manager</b>	G. Zoladz
<b>Client</b>	City of Arlington	<b>Field Rep.</b>	G. Zoladz
<b>Contractor</b>	Arlington DPW	<b>Date</b>	12/29/16
<b>Equipment</b>	Track Excavator	<b>Weather</b>	Overcast 30°s

Depth (ft)	Sample ID	Stratum Change Depth (ft)	Description of Soils	Obstructions/Remarks
1			-TOPSOIL-	
2				
		2.4	Gray, COAL ASH and f/m SAND, tr. glass, silt	
		2.8	-COAL ASH FILL-	
3			Brown Peat and organic SILT	
			-ORGANIC SOILS-	
4			Bottom of exploration at 4-ft.	
			No groundwater encountered.	
5				
6				
7				
8				
9				

<b>Standing Water in Completed Pit:</b>		<b>Boulders:</b>		<b>Test Pit Dimensions:</b>		<b>Survey Data:</b>	
at depth	- ft	<u>Diameter (in.)</u>	<u>Number</u>	Depth	4 ft	Ground El.	N/A ft
Elapsed time after completion of pit:		12 to 24	-	Length	4 ft	El. Datum	N/A
5	<input type="checkbox"/> hours <input checked="" type="checkbox"/> min.	> 24	-	Width	3 ft		



# TEST PIT LOG

Test Pit No.

TP-5

Page 1 of 1

Geotechnical Services, Inc. ♦ 18 Cote Avenue, Goffstown, NH 03045 Tel. 603.624.2722 Fax. 603.624.3733 ♦ 12 Rogers Road, Haverhill, MA 02222 Tel. 978.374.7744 Fax. 978.374.7799

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<b>Location</b>	Arlington, MA	<b>Project Manager</b>	G. Zoladz
<b>Client</b>	City of Arlington	<b>Field Rep.</b>	G. Zoladz
<b>Contractor</b>	Arlington DPW	<b>Date</b>	12/29/16
<b>Equipment</b>	Track Excavator	<b>Weather</b>	Overcast 30°s

Depth (ft)	Sample ID	Stratum Change Depth (ft)	Description of Soils	Obstructions/Remarks
1		1	-TOPSOIL-	
2		2	Light br., fine SAND -SAND FILL-	
3			Brown Peat and organic SILT -ORGANIC SOILS-	
4			Bottom of exploration at 4-ft.	
5				
6				
7				
8				
9				

<b>Standing Water in Completed Pit:</b>		<b>Boulders:</b>		<b>Test Pit Dimensions:</b>		<b>Survey Data:</b>	
at depth	4.0 ft	<b>Diameter (in.)</b>	<b>Number</b>	<b>Depth</b>	4 ft	<b>Ground El.</b>	N/A ft
Elapsed time after completion of pit:	5 <input type="checkbox"/> hours <input checked="" type="checkbox"/> min.	12 to 24	-	<b>Length</b>	4 ft	<b>El. Datum</b>	N/A
		> 24	-	<b>Width</b>	3 ft		





# TEST PIT LOG

Test Pit No.

TP-6

Page 1 of 1

Geotechnical Services, Inc. ♦ 18 Cote Avenue, Goffstown, NH 03045 Tel. 603.624.2722 Fax. 603.624.3733 ♦ 12 Rogers Road, Haverhill, MA 02222 Tel. 978.374.7744 Fax. 978.374.7799

<b>Project</b>	Magnolia Park	<b>Project No.</b>	216109
<b>Location</b>	Arlington, MA	<b>Project Manager</b>	G. Zoladz
<b>Client</b>	City of Arlington	<b>Field Rep.</b>	G. Zoladz
<b>Contractor</b>	Arlington DPW	<b>Date</b>	12/29/16
<b>Equipment</b>	Track Excavator	<b>Weather</b>	Overcast 30°s

Depth (ft)	Sample ID	Stratum Change Depth (ft)	Description of Soils	Obstructions/Remarks
1			Yellow/br., f/c SAND, little gravel, tr. silt (thin layer of topsoil at the ground surface) <b>-ENGINEERED FILL-</b>	
			Light brown, f/m SAND <b>-SAND FILL-</b>	
2			Br., f/m SAND, some silt, tr. gravel <b>-URBAN FILL-</b>	
3			Bottom of exploration at 2-ft.	
4				
5				
6				
7				
8				
9				

<b>Standing Water in Completed Pit:</b>		<b>Boulders:</b>		<b>Test Pit Dimensions:</b>		<b>Survey Data:</b>	
at depth	- ft	<b>Diameter (in.)</b>	<b>Number</b>	<b>Depth</b>	2 ft	<b>Ground El.</b>	N/A ft
Elapsed time after completion of pit:		12 to 24	-	<b>Length</b>	3 ft	<b>El. Datum</b>	N/A
5	<input type="checkbox"/> hours <input checked="" type="checkbox"/> min.	> 24	-	<b>Width</b>	2 ft		

**APPENDIX C**  
**PHOTOGRAPHS**





Photo 1 Test Pit TP-1



Photo 2 Test Pit TP-2





Photo 3 Test Pit TP-3



Photo 4 Test Pit TP-4



Photo 5 Test Pit TP-5



Photo 6 Test Pit TP-6